CQ

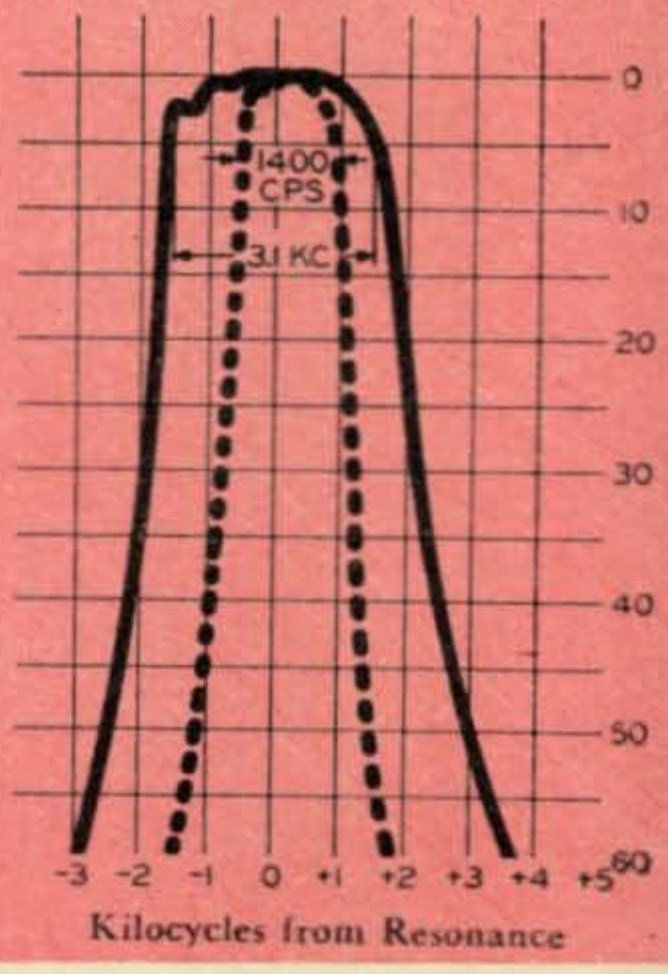
RADIO AMATEURS' JOURNAL

MAY
1954
35c

THIRD SPECIAL MOBILE ISSUE

Sooner or later you'll want

A COLLINS RECEIVER



Collins 75A-3 Receiver with Mechanical Filter

The Collins 75A-3 double conversion superheterodyne receiver, with its crystal-controlled front-end and highly stable low frequency VFO, is like a high frequency crystal-controlled converter working into a very stable low frequency receiver. The high stability and 3.1 kc bandwidth of the 75A-3 make it ideal for AM or single sideband — and an 800 cycle mechanical filter is available as an optional accessory for CW.

All coils are permeability tuned and have a straight-line frequency characteristic allowing linear dial calibration. Only the band in use is visible on the slide rule dial. On the vernier dial each division represents one kc except on the 10 and 11 meter bands, where each dial division represents two kc. This accurate calibration is made possible by the highly stable oscillators in the 75A-3.

The 75A-3 covers the 160, 80, 40, 20, 15, 11, and 10 meter amateur bands. Sensitivity on all bands is 2.5 mv or better for a 10 db signal-to-noise ratio. Image rejection is at least 50 db. AVC is applied to RF as well as IF stages. Separate noise limiters for phone and CW. The S-meter is calibrated from 1 to 9 in steps of approximately 6 db, and for 20, 40 and 60 db over S9. S9 corresponds to a signal input of 100 microvolts. Antenna input impedance is 50 to 150 ohms, balanced or unbalanced. A phone jack and 4 ohm and 500 ohm audio output terminals are provided. Sockets and front-panel controls are included for the 8R-1 100 kc crystal calibrator and 148C-1 NBFM adapter which are available as optional accessories. The following controls are on the 75A-3 front panel: tuning, zero set, bandswitch, RF gain, audio gain, BFO pitch, CW limiter, antenna trimmer, crystal selectivity, crystal phasing, mechanical filter selector, CW-AM-FM switch, noise-limiter calibrate switch, on-off-standby switch. The 75A-3 operates from a 115 volt 50/60 cycle ac power source. Cabinet dimensions are: 21⅛" wide, 12½" high, and 13 1/16" deep. The 19" panel fits a standard relay rack. The 75-A-3 weighs approximately 50 pounds.

Net domestic prices:

75A-3 receiver complete with F455B-31 3 kc mechanical filter:	$530.00
10-inch speaker in matching cabinet:	$20.00
8R-1 crystal calibrator:	$25.00
148C-1 NBFM adaptor:	$22.50
F455B-08 . . . 800 cycle mechanical filter:	$55.00
F455B-60 . . . 6.0 kc mechanical filter:	$55.00

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CQ RADIO AMATEURS' JOURNAL

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the 1954 ELECTRONIC PARTS SHOW
MAY 17-20 • CHICAGO

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From two meters to 160, any versatile Eimac Big Six radial-beam power tube will do the job better—with a wallop. Eimac Big Six tubes, performance proved in all types of commercial, military and amateur operation, contain six inherent features famous in all Eimac multi-grid tubes: 1) High power gain; 2) Low driving power requirements; 3) Simple circuit needs; 4) Extremely low grid-plate capacitances and low inductance leads; 5) Easy TVI suppression; and 6) Incomparable reliability and performance. To be sure of Eimac quality, ask your distributor for Eimac—the mark of excellence in electron-power tubes for 20 years.

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4-250A	2000v	20.0w	600w	350w
4-400A	3000v	25.0w	1000w	600w
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Zero Bias . . .

Good News for the Marine Mobileers

On April 8, the FCC approved the petition of the *Maritime Mobile Amateur Radio Club* (Docket 10501) to amend Section 12.91 (b) of the Commission's Rules, in order to permit operation on the high seas in the 15-meter band. The FCC Order is effective on May 21, 1954.

Thus ends a paradoxical situation which has strikingly pointed out that realism and common sense in ARRL policies have been made to take a back seat—a situation where one Ham and one Ham alone used the power and prestige of the ARRL in a vain attempt to further his own "control" over the radio amateur hobby. In doing so it was revealed that in the name of the ARRL a side deal had been made in 1947 over "cocktails" and in the "corridors" to limit the use of marine mobile privileges. (*From the transcript of the Oral Hearing on Docket 10501, February 8, page 19*). Without the consent of the Board of Directors of the ARRL, and certainly without the backing of the membership (*can you give one good reason to oppose the use of the 15-meter band by marine mobile stations on the high seas?*), the Secretary of the ARRL spent the funds of his organization to fight a legitimate proposal by the very radio amateur members the ARRL was designed to protect.

A portion of the FCC Order on Docket 10501 is printed below.

> "After review and careful consideration of all of the comments submitted in connection with this proposed rule making and of all of the available information pertinent thereto, the Commission has concluded (1) that the League's contention that 'the current international radio situation is such as to make such action highly inadvisable,' is unsupported by official testimony and records and does not constitute justifiable grounds upon which to dismiss the proposed amendment of Section 12.91(b) of the Commission's Rules (2) that the adoption of the proposed amendment should not have any adverse effect upon the present or future status of the Amateur Radio Service, (3) that this proceeding has developed no reason to warrant a limitation of marine mobile operation, either in the 28 to 29.7 Mc frequency band or in the 21 to 21.45 Mc frequency band to United States coastwise operation, and (4) that the League's proposal to amend the rules to authorize the use of all amateur radio frequencies for marine mobile radio operation aboard United States vessels on coastwise voyages, extends beyond the scope of the proposed rule amendment in this matter, and is herewith denied."

—And Now McCarthy!

We noted in the March 15 issue of *Broadcasting Telecasting* magazine (page 32) a disturbing reference to the "dangerousness" of our hobby from a security point of view. The material referred to concerned Senator Joseph McCarthy (R, Wisc.) who was quoted, in part, as asserting his agreement with "some intelligence agencies" that "the Hams are a tremendous potential for passing out improper information for espionage and so forth." At a press conference (which took place during the week preceding the aforementioned issue of *Broadcasting Telecasting*), Senator McCarthy stated that he intended to press for adoption of his bill *S 2125* to require TV and Radio stations, including amateurs, to record all programs and transmissions.

All of this sudden attention on the part of Senator McCarthy to radio stations resulted from the recent heated hassle over whether or not the Senator would be granted free and equal time to answer the charges of Adlai Stevenson—and subsequently CBS' Ed Murrow. We might be inclined to feel these statements were impulsive "intentions" if it were not for the fact that the bill *S 2125* was introduced by McCarthy way back in June 11, 1953. To date, we are happy to say nothing whatsoever has been done about the bill by the Committee on Interstate and Foreign Commerce to which it was assigned at that time. But it is obvious from these quotes of McCarthy's statements in March 1954, that the situation is still on the Senator's mind.

The bill *S 2125* reads as follows: "Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that section 303 (j) of the Communications Act of 1934 is amended to read as follows: . . . (1) have authority to make general rules and regulations requiring stations to keep such records of programs, transmissions of energy, communications, or signals as it may be deemed desirable; (2) shall make rules and regulations requiring broadcasting stations to make and keep recordings of verbatim records of all communications transmitted."

We were pleased to have the senior Senator from Wisconsin, Alexander Wiley, make his views so explicit in regard to amateur radio and the security problem in our March 1954 issue. Now it seems we are perplexed all over again by the junior Senator from Wisconsin's views on our hobby.

As for our thoughts on this new development, we can go along with the FCC whose comments "were more of a questioning nature underlining the many problems which would come from such a demand on stations."*

Direction, Directing and Directors

From time to time** on these editorial pages there appear comments that should reaffirm the strong belief that *CQ* has in the value of the ARRL. We have in the past stated in no uncertain terms that the ARRL should be the champion of the amateur radio cause. Our ideas on this have not changed.

(Continued on page 84)

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* B.T., December 12, 1953.

** To set the record straight, no comment on ARRL political affairs appeared in CQ from November 1952 until December 1953, inclusive.

Feenix, Ariz.

Deer Hon. Ed:

Rubbing the hub-cap, polishing the choke, filling Hon. Automobile up with gas and oil, tromping down on the acksellerator, and were off in a clowd of carbon munoxide. Down the hiways, along the buyways, mike in wun hand, steering wheel in other. It's Spring in Arizona, and have been bitten by the mobile bug.

Hon. Ed., I hoping you will excoosing Scratchi's lyrical outbursting, but I are coming up with sumthing that are so grate that peeple will be calling me another Eddyson. No more will amchoor mobile operators having to worry about antennas. No more wundering wether to using top-side loded, bottom-side loded or center loded antennas. No more having to sell XYL on putting big hole in new car, just to mounting mobile antenna. In fack, amchoors can throwing away present mobile antennas.

Will my new antenna working? Can you reely getting out with Scratchi's mobile antenna? Hon. Ed., it are fablus. One seek-you and everybuddies and their Hon. Brother are coming back to you. You putting out signal from mobile rig that making mane stayshun signal sounding like squeel from regenerative reseever with week batteries. Scratchi's mobile antenna so collosus that when using it you can causing TVI from coast to coast.

Hon. Ed., please stop jumping up and down in chair. Gracious to goodness, I will telling you all abouts it. Have you ever been driving at nites and noticed that nice white line down middle of rode? That nice white line that seeming to staring back at you it so brite? Well, if you taking ohm-meter sum dark nites and measuring resistance of line, you will discovering that white line are a conductor. Yes, indeedy.

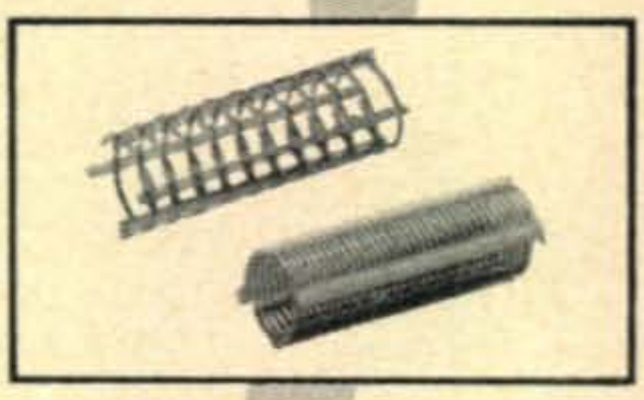
Now, I not knowing how they making paint for line, but when they inventing paint to showing up reel brite, they evidentally putting metal partickles in paint. And, they having enough partickles in paint that it are 1/c conductor. Wowiee!! Are not stewpendus, Hon. Ed?

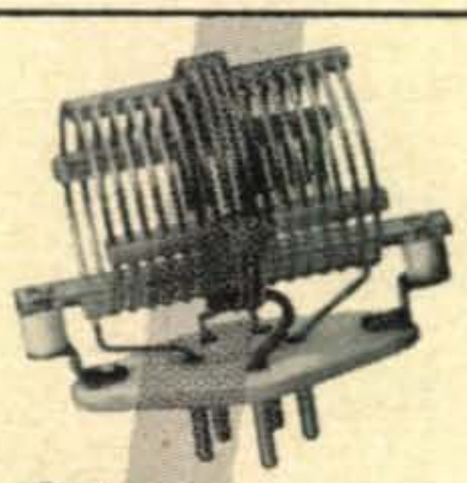
Here are reddy made antenna, just lyeing there in middle of rode, waiting for sumbuddies to use it. Hon. Ed., these lines are stretching all over Yewnited States, from coast to coast, inklooding Callyforna. Can you imagine what are happening when pouring RF power into antenna likesame these white lines? Hackensaki!!

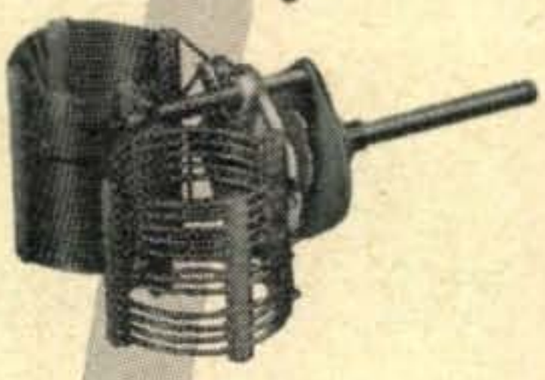
At first Scratchi are thinking to keeping idea to himself, but hole thing are so tramendus that Scratchi's huemanitary instinks rising to top. So,

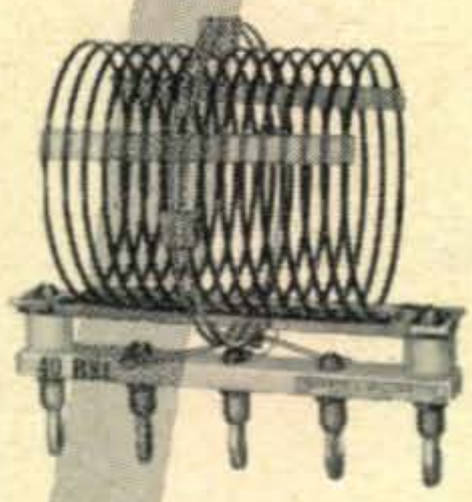
(Continued on page 10)

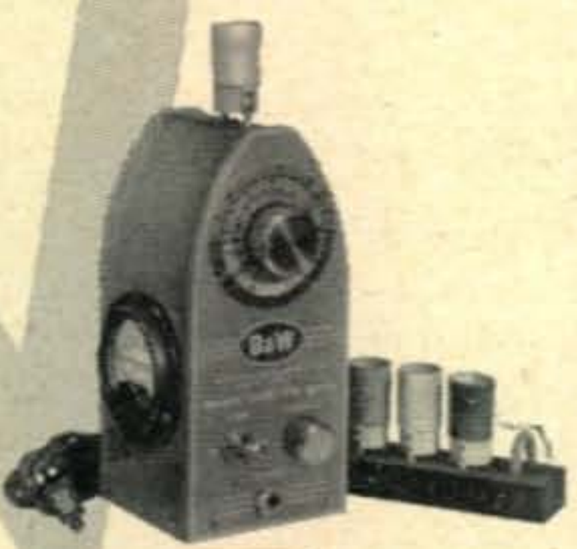
SPACE SAVERS
for fixed or mobile rigs











B&W MINIDUCTORS—tiny, low-cost coils—cut 'em to fit. Highly efficient miniature coils for compact high-frequency circuits. Available in diameters of ½", ⅝", ¾", and 1" and in pitches of 4, 8, 16, or 32 turns-per-inch. Standard lengths of 2" or 3" may readily be cut to size.

B&W "BABY" & "JUNIOR" INDUCTORS — real light weights in 25 & 75 watt sizes. Perfect air spacing, high efficiency, and conservative ratings make these little inductors just right for low-power work. Available with or without taps or links for 160 thru 6 meter bands. 5-prong plug-in bases for easy band changing.

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OTHER B&W AIR INDUCTORS — for powers up to 1000 watts. There's a B&W inductor in the exact size and type for just about every oscillator, buffer, final, or antenna circuit yet devised. All are designed for maximum physical and electrical symmetry.

B&W DIP METER — Get the most out of your rig. This accurately-calibrated measuring instrument can save you time and money on those tedious operations of initial transmitter tuning, neutralizing, antenna loading, and dozens of other jobs that mean so much to the efficiency of your rig. It can be used as a highly sensitive grid dip oscillator, signal generator, absorption wave meter, or signal monitor from 1.75 to 260 M.C.

Write for Free Catalog Showing the Complete Line of B&W Inductors, Variable Capacitors, and Test Instruments for Amateur, Experimental, and Commercial Uses.

B&W

BARKER & WILLIAMSON, Inc.

237 FAIRFIELD AVE., UPPER DARBY, PA.

(from page 8)

deciding to riting you post-hasty about idea. I are not having chance to testing idea, but are no reason why it not working, are you thinking?

What I are planning on doing is making a wide strip of copper which fitting under automobile, and extending from wun side to other side of car. This copper are scraping over rode and touching white line no matters where you driving on rode. I then connecking this hunk of copper to antenna leed on mobile rig. RF powers can thusly flowing from outputs stage along wire to copper strip, then into line of paint on rode. Presto—antenna all set.

This are not to saying that there are not sum problums. For instants, can't having antenna when travelling on gravel rode, but this are okey on acct. noise of copper strip against gravel are telling you in 1/c hurry that you are having lost an antenna. Also, natchyourally, it possible you having trubble when passing another car on rode. It tecknickly possible to stay over white line when passing, but other car not having to much room. In fackly, having trubble trying to stay on white line even when not passing another car, on acct. cars coming other direckshun needing sum room also.

Are not reely worried about these trubbles, as old geenyus Scratchi can solving them, no doubtly. Are only wun thing I not figguring out. In sum states these white lines on rode are not all wun white line, but more like dashes on pavement. Not being solid line not being much of a conductor. Not being much of a conductor not being much of an antenna.

Hon. Ed., you think maybe you can sponsoring sum legislayshun to making all states putting down solid white lines in middle of rode? If can, letting me knowing and I proceeding to solving other problums. In fack, are alreddy solving wun problum. All I having to do in order to staying on white line all time is putting red lite and siren on car, then can travelling down middle of rode like nobuddies business. Has anyone making WAZ Mobile yet, Hon. Ed? If not, saving me first certificate.

Respectively yours,
Hashafisti Scratchi

Acapulco Calling CQ!!

(The letter below is a copy of the one sent by John R. Griggs, W6KW, Southwestern ARRL Division Director to all SCM's and League Directors in behalf of the forthcoming Acapulco LMRE Convention. As W6KW has indicated, this meeting is far more than just another Hamfest. It will be a convention to unify the ranks of amateur radio operators, especially throughout Pan-America. If the "current international radio situation" is so touchy, as some have claimed, there can be no more apropos reason for supporting this excellent opportunity for better understanding.—Editor.)

3661 Buckingham Road
Los Angeles 16, California
March 25, 1954

Dear OM:

I would like to ask your cooperation on a matter that I feel is of vital importance to the continuance of amateur radio. We are aware of the fact that there is supposed to be an international telecommunications conference every five years. The last one was held in Atlantic City, N. J., in 1947 and because of the long delays involved in getting some of the treaty provisions placed into effect, the conference that was supposed to have been held in 1952 was postponed. It now appears there may be another

(Continued on page 12)

ACAPULCO CALLING CQ

To All Radio Amateurs

MAY 27 THRU 30th

Finest Amateur Radio Convention Ever Held

Being sponsored for better understanding between radio amateurs in the Western Hemisphere, the Mexican Radio Experimenters League, Civil Association proudly presents its XXII Annual AMATEUR RADIO CONVENTION. To be held at Acapulco, the Paradise of the Pacific, May 27 thru 30th, 1954—and unmarred by language difficulties—this great event will be another milestone in the progress of Inter-American relations.

Registration Fees: Members $15.00. Restricted to radio amateurs, technicians, radio engineers, electronic manufacturers and press who become Associate Members.
Members' Guests: $7.50 (wives, relatives and friends of Associate Members only).

Here's what your registration fee covers

- **Registration** at the XXII LMRE Convention
- **Association Membership** with beautifully finished lapel emblem and LMRE Membership Card
- **Free Admission** to displays, official and technical sessions, talent shows
- **Entertainment**—surf riding, deep-sea fishing, hunting, etc. Sight-seeing tours organized by tourist agency and sponsored by the Mexican Government Tourist Bureau. Admission to Official Banquet and Ball (Sunday, May 30)
- **Participation in Prize Drawing**—where thousands of dollars worth of electronics equipment will be donated by manufacturers and distributors.

OPERATE MOBILE or PORTABLE WITH AN "XE" CALL . . . !

The LMRE will process "XE" license applications to operate mobile or portable in Mexico for all qualified registrants for the XXII Annual Convention at Acapulco. Register now and send a photostat of your valid radio operators license!

NOTE:
Guests entitled to all of the above, except Association Membership Card, lapel emblem and license processing—plus any entertainment organized by the Ladies' Reception Committee.

Guy H. Dennis (W6D1) U.S. Convention Manager
655 Firth Ave., West Los Angeles 49, California

Rush me complete details on LMRE Convention ☐

Check enclosed for $_____ for _____ registrations

(Make all checks and money orders payable to:
Guy H. Dennis, Trustee)

Name _____ Call _____

Address _____

City _____ Zone ____ State _____

(from page 10)

international treaty on telecommunications in 1957 and it may be that the amateur service will lose frequencies. FCC Commissioner Sterling at the National A.R.R.L. Convention last year warned that we might lose 20 and 40 meters outright unless we get together and present a solid front against the interests seeking our frequencies. This view is held by many others who should know, and I find it is shared with some concern by many amateurs in foreign countries. For this reason, I think the announcement of an International Amateur Radio Convention to be held at Acapulco, Mexico, May 27-30, should be of great interest to all amateurs. The announced purpose of the convention is the convening of amateurs on an international basis to adopt a uniform procedure having for its goal the preservation of amateur frequencies at the next international telecommunications conference. I wish to stress the importance of this plan.

This group of Hams attended a dinner at the Beverly Wilshire Hotel, Beverly Hills, Calif. to act as the American "planning committee" for the LMRE Acapulco Convention, May 27 through 30. Left to right in the photo are: Jack Sterner, K6ATA; Dr. Jose Polak, XE1VA representing the Mexican Radio Experimenters' League; John R. Griggs, W6KW; Guy Dennis, W6DI the U. S. Convention Manager and Ed Luckey, W6MJ. A familiar piece of Southern California equipment is on the table—a Gonset "Communicator."

The four days, May 27 to 30 inclusive, may prove to be the four most important days in the history of amateur radio so far as the western hemisphere is concerned. Sponsored by the L.M.R.E. (League of Mexican Radio Experimenters, Mexico's equivalent to the A.R.R.L. and a member organization of the I.A.R.U.), it will also be the 22nd annual convention of the Mexican League, and delegations from 27 countries have already made reservations. Even the Mexican Government is helping to share the costs of staging this big convention! In view of the fact that there will be no National A.R.R.L. Convention in the United States this year, and seeing the importance of this international meeting, I urge your support of the event.

Anyone attending is certain to enjoy Mexico's hospitality to the fullest, so one can have fun and at the same time participate in a particularly important affair. In fact, anyone planning on attending and registering early enough will even be granted permission to operate mobile in Mexico and be assigned an "XE" call! This and other courtesies being extended visiting radio amateurs of the U.S. by our Mexican brother "Hams" are detailed in a brochure enclosed herein.

(Continued on page 14)

(from page 12)

I am also writing the Director of your Division, asking his support for this effort in behalf of amateur radio and what looks like just good plain fun in Mexico—a real holiday with a purpose! If you agree with me that word of the convention should be spread around, I would appreciate your transmitting the enclosed copies of a special bulletin to the various OBS's and/or nets in your section. I am sure that, should you need additional copies of the brochure or other material or information, you will be able to obtain it from the L.M.R.E. U.S. Convention Manager, Guy Dennis, W6DI, 655 Firth Avenue, Los Angeles 49, California.

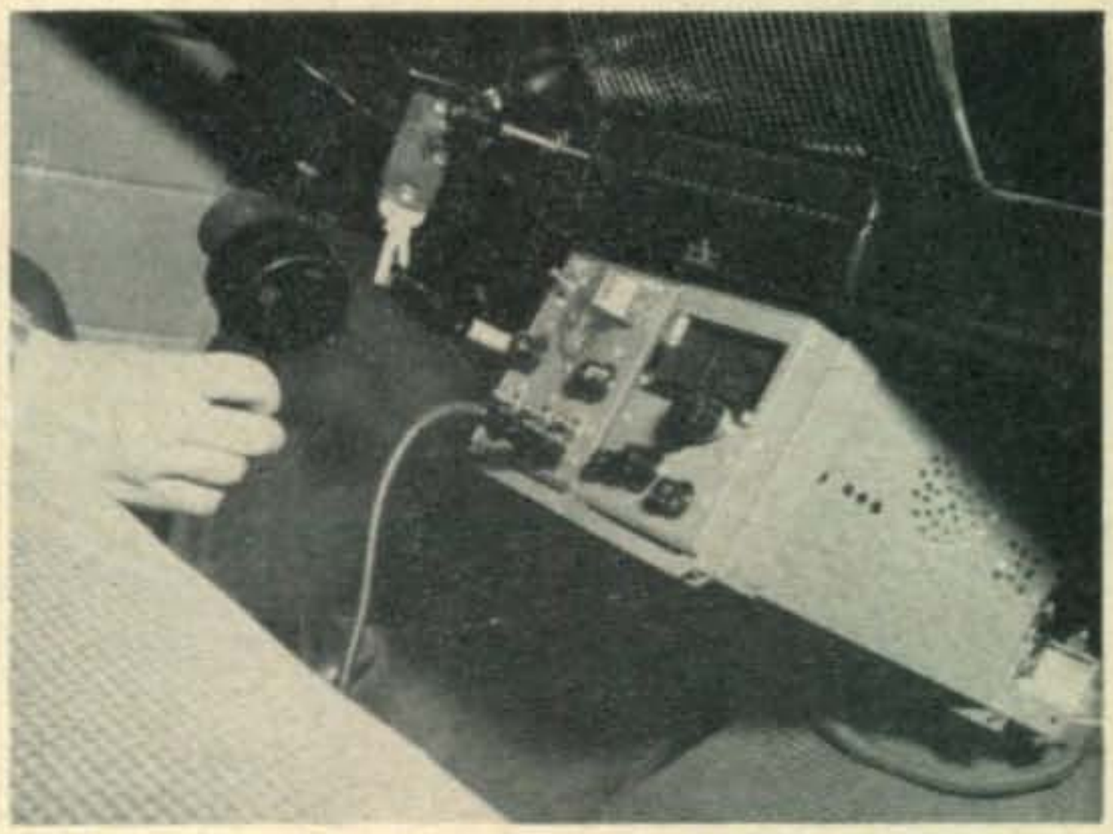
The promotion of good will among the radio amateurs of all countries throughout the western hemisphere will lead to a united front, thereby aiding in the protection of our common interest, Amateur Radio! Your interest and cooperation will support the general welfare of "Hams" everywhere!

s/ John R. Griggs
John R. Griggs, W6KW
Director, Southwestern Division, A.R.R.L.

Novel Mobile

Many CQ readers envy Tommy Smith, W2MCJ, the draftsman of the schematics that appear in each month's issue. His position allows him to see far in advance all the best circuits and the very nature of his work enables a thorough study of each diagram as it is being laid out on the drawing board.

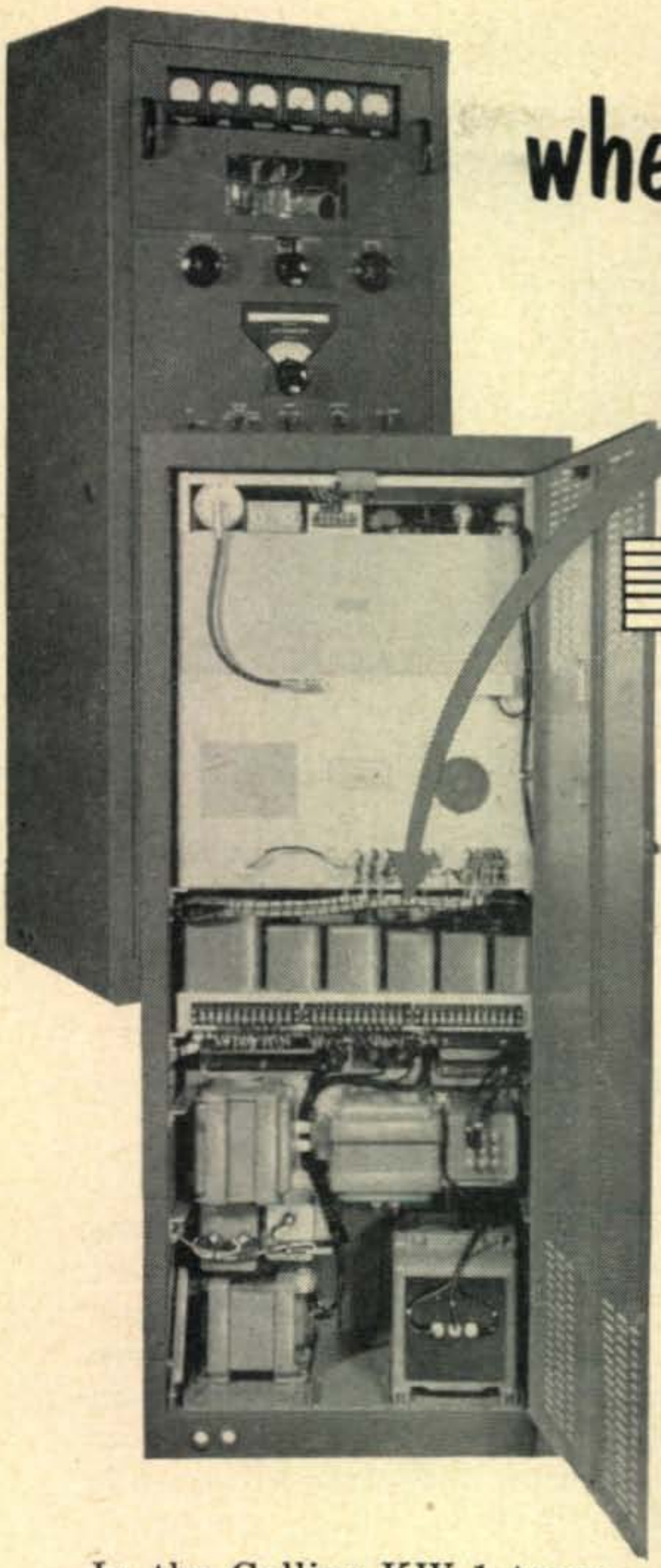
While working on the RADIO AMATEURS' MOBILE HANDBOOK (page 58), Tommy was attracted to the "Standard of Comparison" receiver designed by W2AEF. Then when the "2nd Special Mobile Issue" came along, Tommy thought that the transmitter built by W4SIA (page 43) would make an ideal companion piece.



Mobile installation of W2MCJ, the CQ draftsman which combines the "Standard of Comparison" receiver and W4SIA 30-watt transmitter.

Modifying both the transmitter and receiver structural layout as he went along, and by dropping the bandswitch feature of the W4SIA unit, the entire mobile rig was made up in a space only 10"x5¾"x12". Two separate chassis are used with rack mounting and plug-in connections for power and antenna.

W2MCJ is very active in Civil Defense work in the North Tarrytown, New York area.



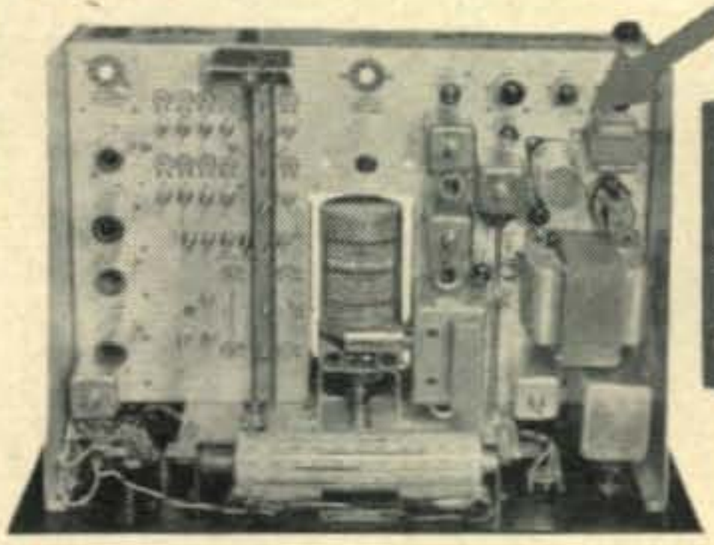
where only the best will do

COLLINS uses

CHICAGO

the World's Toughest Transformers

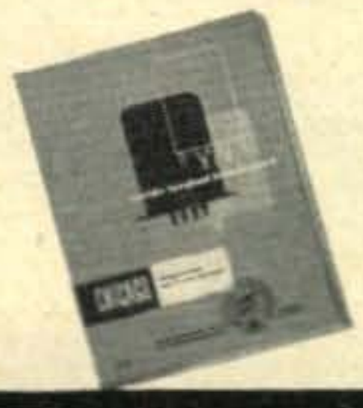
in the new
KW-1 transmitter
and 75A-3 receiver



In the Collins KW-1 transmitter, where quality and performance are the only considerations, Collins chose CHICAGO transformers.

The conservative ratings and precision construction of Chicago's "Sealed-in-Steel" transformers are a complete guarantee of reliability for this superb 1000 watt transmitter. To insure excellent intelligible audio quality, only CHICAGO transformers are used throughout the audio system.

Recognized by hams everywhere as the finest in receiving equipment, the Collins 75A-3 features remarkable stability, calibration accuracy and high sensitivity. This receiver, designed for long periods of trouble-free operation, is powered exclusively by CHICAGO transformers.



Chicago's FREE Catalog CT-153, listing hundreds of stock transformers for ham, industrial and military applications is now available from your CHICAGO distributor, or from Chicago Standard Transformer Corporation.

CHICAGO TRANSFORMER ® STANCOR

CHICAGO STANDARD TRANSFORMER CORP.

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2XP

the new LOW COST PR crystal especially made for converters, experimental applications, etc.

TYPE 2XP

FUNDAMENTAL
1600 to 12000 Kc.
± 5 Kc. $3.95

3RD MODE
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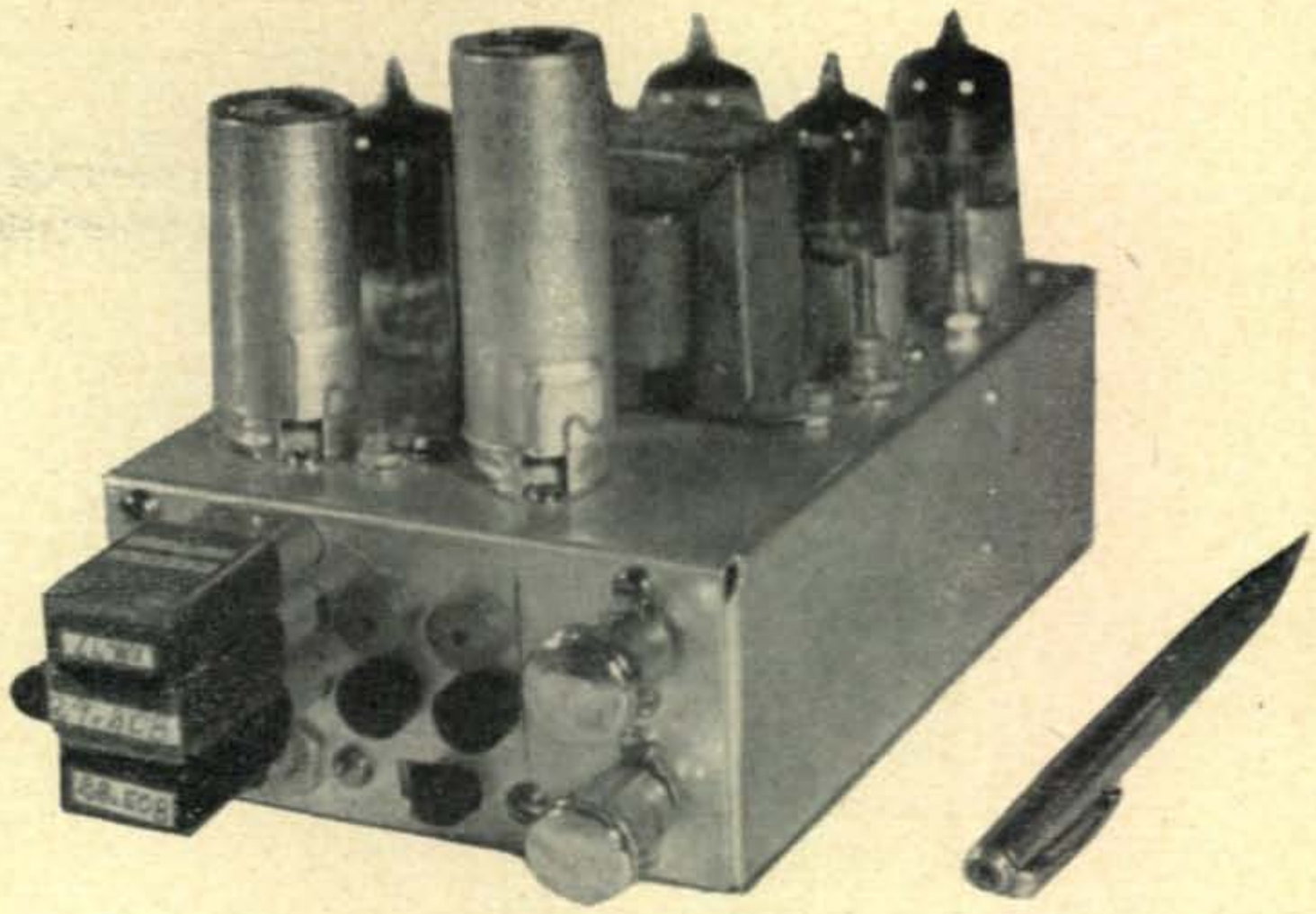
"Combo"



Major F. C. McDANIEL, JR., W4PMM

Quarters 422, MCS, Quantico, Va.

As The Name Implies This Miniature Mobile Station Combines Two of the Most Popular Units to Appear in the RADIO AMATEURS' MOBILE HANDBOOK

If the question "Would you like to go mobile?" were asked, probably ninety per cent of the Hams would reply in the affirmative. If you asked, "Are you operating mobile now?" the percentage of Hams answering yes would be rather small. It would be a pitifully small percentage from the view of the CD planners.

Now if you asked a third question, "Why don't you go mobile?" you would get answers ranging all the way from "Huh?" to several thousand words on why mobile operation isn't practical. But probably the answer heard most frequently would be "It costs too much." This is an excellent answer—the price tag on even a modest installation using commercially built units is equivalent to the cost of several months groceries.

The next most frequent answer would probably be "The XYL doesn't like the idea," or variations of that theme. The gals, bless 'em, seem to rebel at the suggestion that they share the front seat with a conglomeration of knobs, dials and meters. The gadget pictured on these pages is offered as a solution to the problem raised by these two objections. It is a simple and inexpensive (a purely relative term of course) way to go mobile. It consists of a crystal switching plate modulated transmitter *and* a sensitive fixed-tuned converter all on one chassis, measuring 4" x 6" x 2". It is easy on the OM's pocketbook since it will unbalance the budget by well under twenty-five bucks (except for tubes, crystals and a mike), even if all the parts used are brand new. The XYLs will like it because it is inconspicuous. In the author's installation, for example, the only thing in sight when on the air is the mike; when inoperative no part of it need show. Neither the power supply nor the antenna need cause additional concern or expense. The power supply in the broadcast receiver furnishes all the power required and the BC whip antenna can be used for a transmitting antenna.

Obviously, we are not talking about a super-modulated kilowatt in a small package. The rig pictured runs a modest six watts input, but don't sneer—in mobile work six watts can, and does, provide very satisfactory operation.

Circuits

The circuits involved are all simple and straightforward; no tricks necessary. The 6J6 oscillator-doubler doubles in both plate sections to furnish 28-Mc. output using 7-Mc. crystals.[1] The crystal switching circuit is admittedly a luxury that could have been omitted, but it is a lot easier (and safer too, if you QSY in motion) to throw the switch than it is to grope around trying to unplug one crystal and replace it with another. The oscillator is capacitively coupled to the final amplifier, a

1. Smith, "The 28-9," **CQ**, May 1952, p. 47.

6AQ5 that operates straight through as in the "28-9." A conventional pi-network is used in the plate circuit of the final; shunt resistors and tip jacks provide a means for measuring the final amplifier grid and plate currents. The final amplifier has proven to be entirely stable in spite of the crowded quarters.

The speech amplifier and modulator section is simplicity itself and should require no further explanation.[2]

The broadband converter will be recognized as a slightly modified version of the "Converter-ette" described previously by W2AEF on these pages.[3] Incidentally this converter is a pleasure to use; it's sensitivity compares with more expensive commercially built models and its stability is excellent after a brief warm-up. The broadband approach makes for excellent bandspread since the 10-meter band is spread over the entire dial of the broadcast receiver. Another feature is that spot frequencies can be tuned in in a flash by just punching the button.

As previously indicated the broadcast receiver is called upon to furnish power for both converter and transmitter sections. Power for the converter is taken from any convenient point in the receiver. The transmitter portion requires a bit more effort since most car receivers employ a resistance-capacitance filter that is not entirely satisfactory for transmitter purposes. To get around this a relay, built into the unit, is used to switch the B+ lead so that a choke-capacitance filter is substituted when the transmitter is in use. This also silences the receiver when transmitting. Lest the reader puzzle over the characteristics of *Ch1* let it be added that it was selected for its small physical size and low resistance, not for its current handling capacity.

2. Chambers, "A Two-Band Miniature Mobile Transmitter," **QST**, September 1952, p. 11.
3. Scherer, "The W2AEF Converter-ettes," **CQ**, May 1953, p. 37.

Construction and Alignment

In spite of its small size the rig is not difficult to construct and only standard and readily available parts are used. While not essential, a small soldering iron (⅛" tip) is very handy for getting into some of the tighter spots where the usual ⅜" tip has difficulty. The relay *(Ry1)* shown in the bottom view is a surplus item that was on hand; the relay specified in the parts list is smaller and should be easier to use.

No attempt will be made to give a "blow-by-blow" description of the assembly and wiring procedure; instead, only a general sequence of events and an explanation of a few points that could cause some trouble. *Figure 1* gives the principal layout dimensions; they are not quite as critical as the figures given would indicate, however. The photographs further illustrate the parts layout and also show most of the wiring. Though the photographs show shield bases for the *6BJ6 (V5)* and the *6U8 (V6)*, these are not required, having been instalied originally "just in case."

It is suggested that the first step be to wire and test the r-f section, because it is somewhat difficult to work on after all the other parts have been mounted. Switch *S1* is mounted so that the spring is on the inside (facing the socket of *V1*); the lugs on the unused half of the switch are bent so as to allow the switch to fit nearly flush agains the chassis walls. If in drilling the holes for *S1* mounting screws, you drill out the chassis spot welds, don't worry. These same two screws will take over the job of holding the chassis together. The leads between the crystal sockets and the switch lugs should be crossed; that is, the bottom lug connects to the top socket, the top lug connects to the bottom socket and the middle lug and middle socket are wired together. By doing this the knob on *S1* will be next to the crystal in use, and will save some

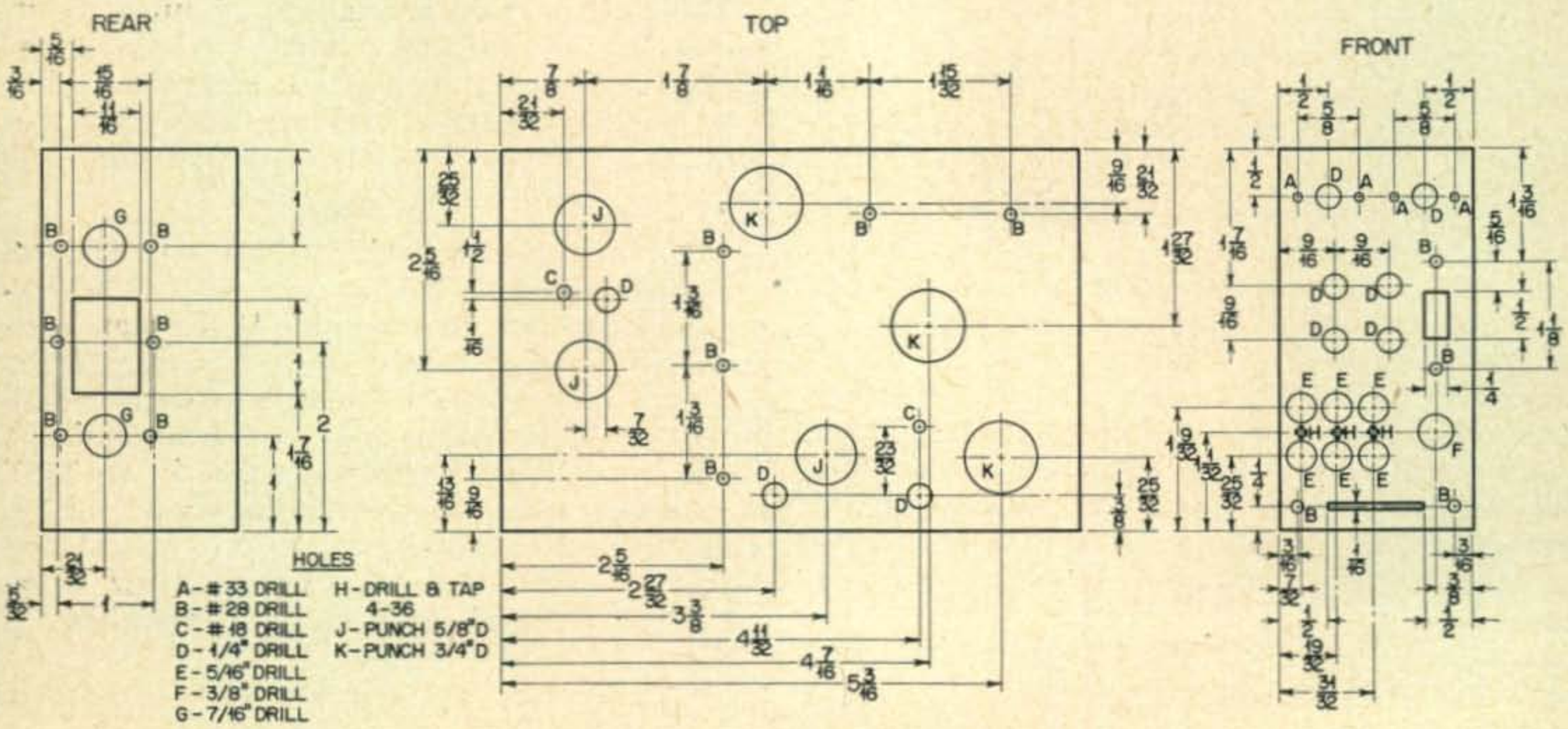
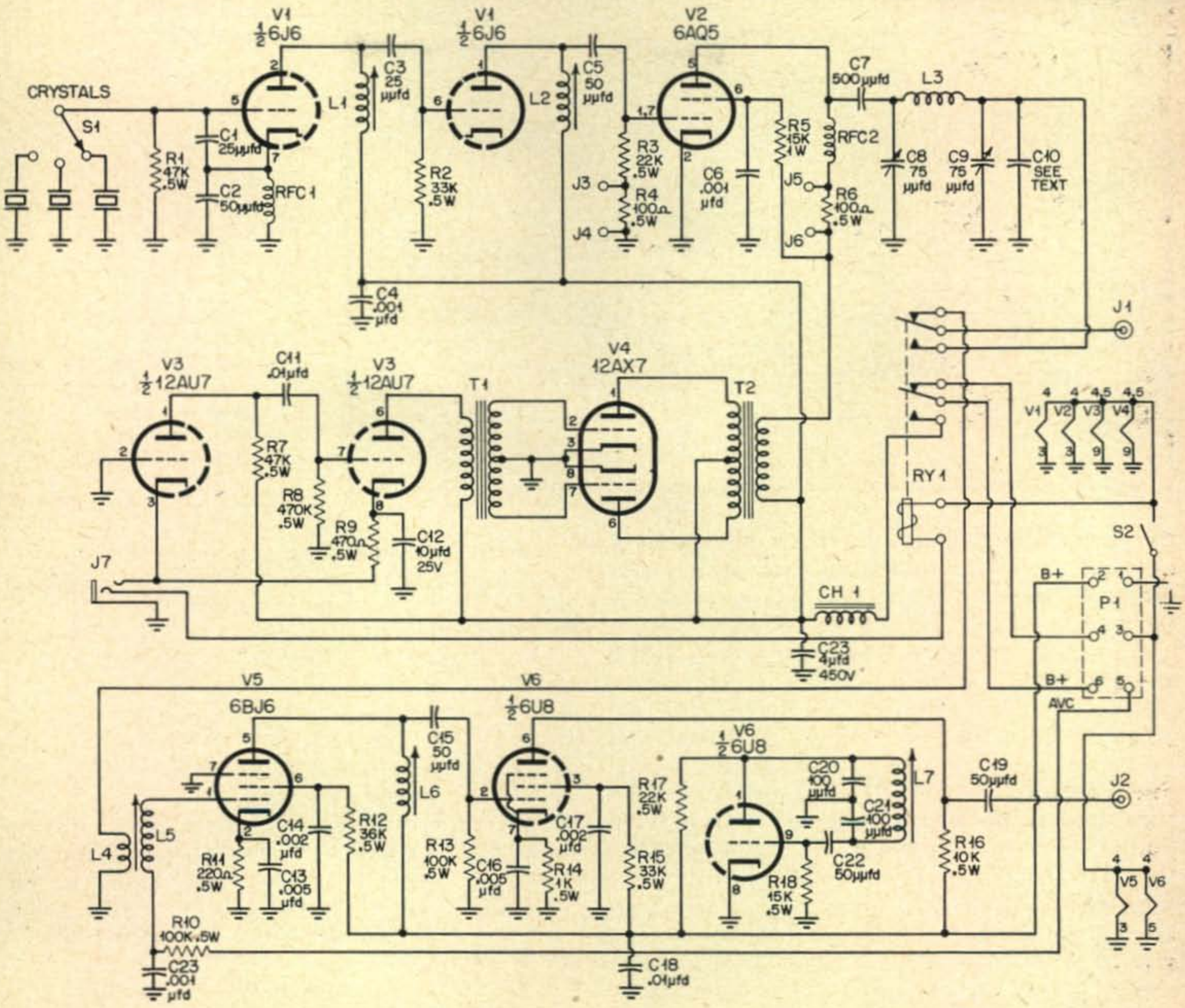


Fig. 1. Principal layout dimensions for this complete transmitter/receiver combination.



Complete wiring schematic and parts list. (Editor's Note: In the final check of this schematic we have noted the use of two C23 designations. The C23 with a value of 0.001 μfd. should be known as C24.)

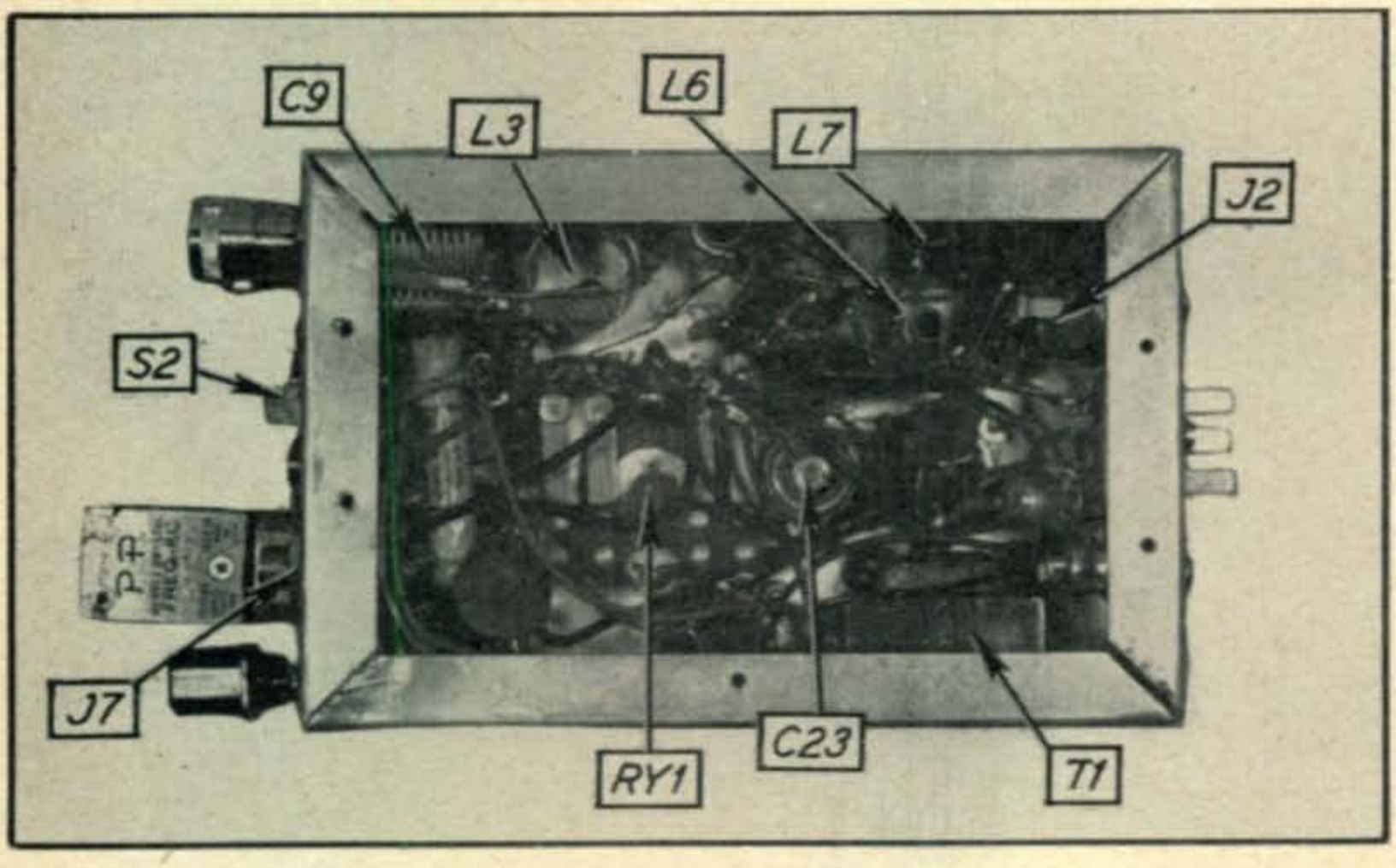
confusion when QSY-ing. *RFC2* is mounted horizontally and parallel to the front chassis wall. One lead is cut to a length of about one inch and is soldered to *pin 5* of the socket of *V3* so that the lead is at right angles to the chassis bottom. The other lead runs horizontally, to *J5*, laying close to *RFC2*. With one lead attached to *J6*, loop *R5* up and over *RFC2* to *pin 6* of the socket of *V3*. One of the last permanent connections to be made will be the lead from *T2* to *R5* right at the resistor body.

After wiring the r-f section it should be tested for proper operation. Make temporary power connections, plug a crystal into the crystal socket and a 0-10 ma. meter into the 6AQ5 grid circuit. Tune *L1* and *L2* for maximum grid current, which should run 3 to 4 ma. If a mid-band frequency is used at this time, *L1* and *L2* may be locked in place and forgotten. The final amplifier is checked using a 5-watt light bulb as a dummy antenna and tuning *C8* and

C1, C3—25 μμfd. ceramic.
C2, C5, C15, C19, C22—50 μμfd. ceramic.
C4, C6, C18, C24—0.001 μμfd. disc ceramic.
C7—500 μμfd. mica.
C8, C9—75 μμfd. variable, air padding (Hammarlund APC 75).
C10—mica, see text.
C11—0.01 μfd. disc ceramic.
C12—10 μfd. 25v. electrolytic.
C13, C16—0.005 μfd. disc ceramic.
C14, C17—0.002 μfd. disc ceramic.
C20, C21—100 μμfd. silver mica, midget.
C23—4.0 μfd. 450v. electrolytic.

R1, R7—47,000 ohms.
R2, R15—33,000 ohms.
R3, R17—22,000 ohms.
R4, R6—100 ohms.
R5—15,000 ohms, 1w.
R8—0.47 megohms.
R9—470 ohms.
R10, R13—100,000 ohms.
R11—220 ohms.
R12—36,000 ohms.
R14—1000 ohms.
R16—10,000 ohms.
R18—15,000 ohms.
All resistors ½ watt unless otherwise noted.

Ch1—1.5 hy., 200 ma., 90 ohm choke, (Merit C-2994)
RFC1—One pie of standard 2.5 mh. 4 pie choke (can be mounted over C2 to save space).
RFC2—Z-28 Ohmite.
S1—Two pole, three position lever switch, (Centralab 1454).
S2—s.p.s.t. slide switch, 1½ A rating, (Smith No. 515).
Ry1—d.p.d.t. 6vdc relay, (P & B type KR 11D).
J1, J2—Automobile type antenna jack.
J3, J4, J5, J6—Phone tip jacks.
J7—3 way microphone jack.
T1—Driver transformer, s.p. to p.p. grids, 2.66:1 prim. to ½ sec. (Triad A-81X).
T2—5 watt mod. trans. variable ratio secondary rating 50 ma., (Triad M-1X).
P1—Chassis mounting plug, 6 contact (Jones P306AB).
Xtal sockets—Jones 2 KM.
Chassis—4" x 6" x 2" Aluminum (Bud AC-430).



Bottom view of the unit showing the compact arrangement possible if the instructions in the text are followed carefully.

C9 for maximum lamp brilliance. The value of *C10* will vary with different installations, and must be determined experimentally after the rig is in the car.

Following the r-f section, the converter is wired in place. A small aluminum or copper-shield is used to separate *L5* from *L6* and *L8*. The lead between *pin 5* of the *V5* socket and *L6* is run through a small hole drilled in the shield for this purpose. The heater lead to *V5* runs under the shield in the chassis corner. Following the completion of the wiring the converter is aligned and tested.

In the original article on the "Converterette" two alternate alignment methods are given. A third and somewhat easier method was employed at this station. The first step in any of the procedures is to set the local oscillator frequency at 28.0 Mc. by listening for the beat in a receiver tuned to that frequency while tuning *L8*. Two notes of caution: (1) select the stronger of the two signals that will be heard—the other is the image; (2) tune *L7* very slowly as it tunes quite sharply.

Coil Winding Data

MAIN SCHEMATIC

10 Meter Operation

L1—72 t. #28 enam. closewound on ¼" dia. ceramic form, CTC LS6.
L2—21 t. #24 enam. closewound on ⅜" dia. ceramic form, CTC LS5.
L3—8 t. #20 tinned, 1" long, ¾" dia., B&W Miniductor 3010.
L4—3 t. #24 enam. closewound over cold end of L5. Wrap L5 with one layer of Scotch tape before winding L4.
L5—21 t. #24 enam. closewound on ⅜" dia. ceramic form, CTC LS5.
L6—15 t. #24 enam. wound on ⅜" dia. ceramic form, CTC LS5.
L7—14 t. #26 enam. closewound on ¼" dia. ceramic form, CTC LS6.

WAVEMETER

L1—15 t. #20 enam., 15/16" long, ¾" dia. Coil form—Amphenol 24-5H.
L2—2 t. #20, wound at "cold" end of L1.

Of course, you can set the local oscillator frequency as desired, depending on which portion of the band you want to cover. The frequency of 28.0 Mc. is suggested because the broadcast dial will then read directly in kilocycles above 28 Mc. For example, 28.7 Mc. would be read as 7 (700 kc.) on the dial, 29.2 Mc. would be at 12 (1200 kc.) and so forth. The portion of the 10-meter band covered will be from 28.55 Mc. to 29.6 Mc. on most receivers.

After *L8* has been set, feed the converter output (using shielded lead) into a receiver equipped with an *S*-meter and tuned to the broadcast band. A signal generator of some sort is set to approximately the center of the 10-meter 'phone band and loosely coupled to the converter input. The receiver is tuned near the middle of the band (BC band, that is) for an indication of converter output as read on the *S*-meter. *L5* and *L6* are then peaked for a maximum *S*-meter reading. Lock *L5, L6* and *L7* in place and you are through with the converter.

Installing the Modulator

The speech amplifier and modulator sections are wired in next. *T1* and *T2* are mounted "back-to-back" on either side of the chassis so that one set of mounting holes suffices for both. *T2* is mounted topside with its leads run through grommet-lined holes.

The modulator and speech amplifier should be checked for proper operation before the remainder of the components are installed. Temporarily hook up the r-f and speech sections and note the variation in brilliance of the light bulb dummy antenna as you speak into the microphone.

Relay, *Ry1* can now be mounted and the connections to *L4* and *C9* made at this time. Before mounting *Ry1* disconnect the flexible lead from the bottom lug on the left-hand side of the relay (looking at the top with the relay spring facing you). The relay mounting stud must be cut off and filed down to the level of

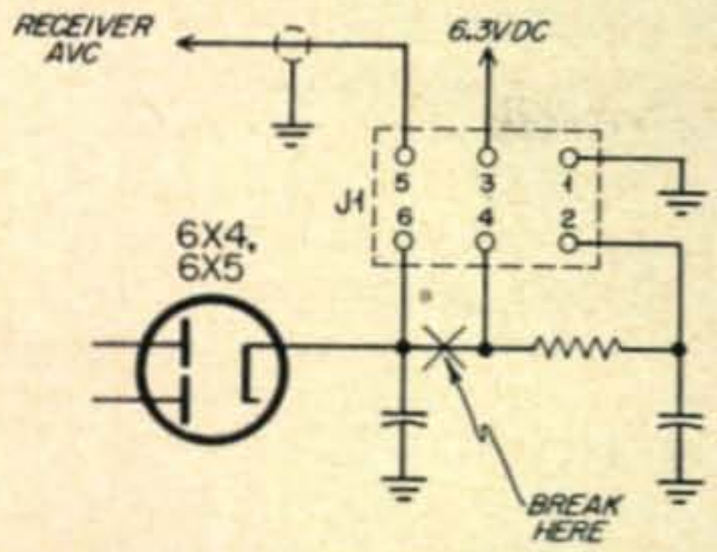


Fig. 2. Power to operate the "Combo" is taken from the automobile BC receiver. The high voltage lead is broken as shown and a filter (choke-capacitance) in the transmitter is substituted.

the nut that secures it. When *Ch1* is installed it is spaced above the chassis by using other *6-32* nuts as spacers. The two leads from *Ch1* are run through grommet-lined holes in the chassis. After *Ch1* is mounted, the power leads to *Ry1, T1, T2* and *R5* can be permanently connected. As a final step, one end of a heavy (#15 is suggested) enameled copper wire is wrapped around the end of the circular portion of *J1* and soldered. Do not use the small tab on the end of *J1,* as vibration will eventually cause it to fail. The other end of this heavy lead is brought close to *Ry1* and is connected to the short flexible lead from the relay. This heavy lead should, of course, be bent so as to space it a reasonable distance away from the other components over which it passes.

As previously mentioned, the unit draws its power from the car receiver; *Fig. 2* shows the slight amount of "surgery" to be performed on that receiver.

Antenna Considerations

The transmitter portion will load into the usual BC whip if desired, but the radiated field will be considerably less than if a 10-meter whip is used. The 10-meter whip is much preferred by the writer in spite of the attention it attracts.

Switching

In order to keep the XYL's happy, some provision must be made for restoring the broadcast receiver to normal, at least some of the time. This is done the easy way, by switching the receiver input between the converter output

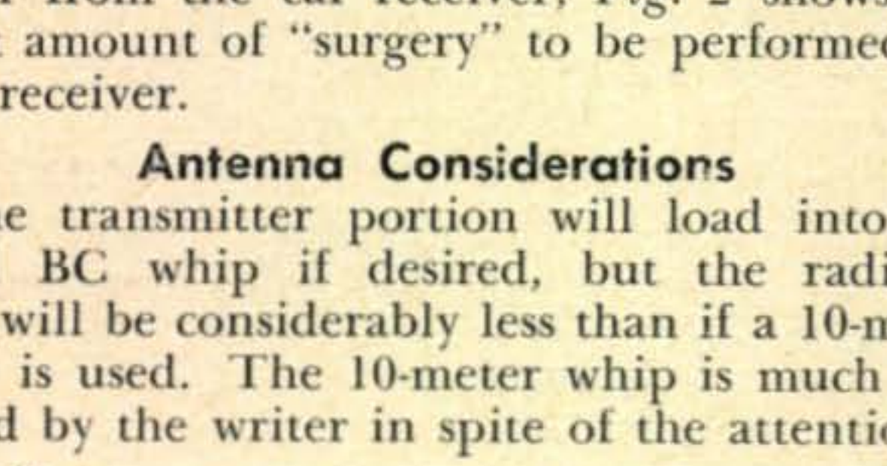


Fig. 3. This switching arrangement keeps peace in the family by permitting the XYL to "use" the BC receiver. S1 is a 4-pole, 2-position lever action switch (Centralab 1458).

and the broadcast whip. This is not only the easy way, but one which will usually provide better reception than if the 10-meter whip is used. The switching is done in a small box that contains only the switch and four antenna jacks (see *Fig. 3*). This method has a disadvantage in that it leaves the converter in operation even when listening to the BC band and obviates the headache that several cables and a few jacks and plugs would produce. This is considered a satisfactory solution to the problem, since the drain is quite small and doesn't hurt the converter. In fact, the transmitter filaments are so seldom turned off that *S2* could easily be omitted.

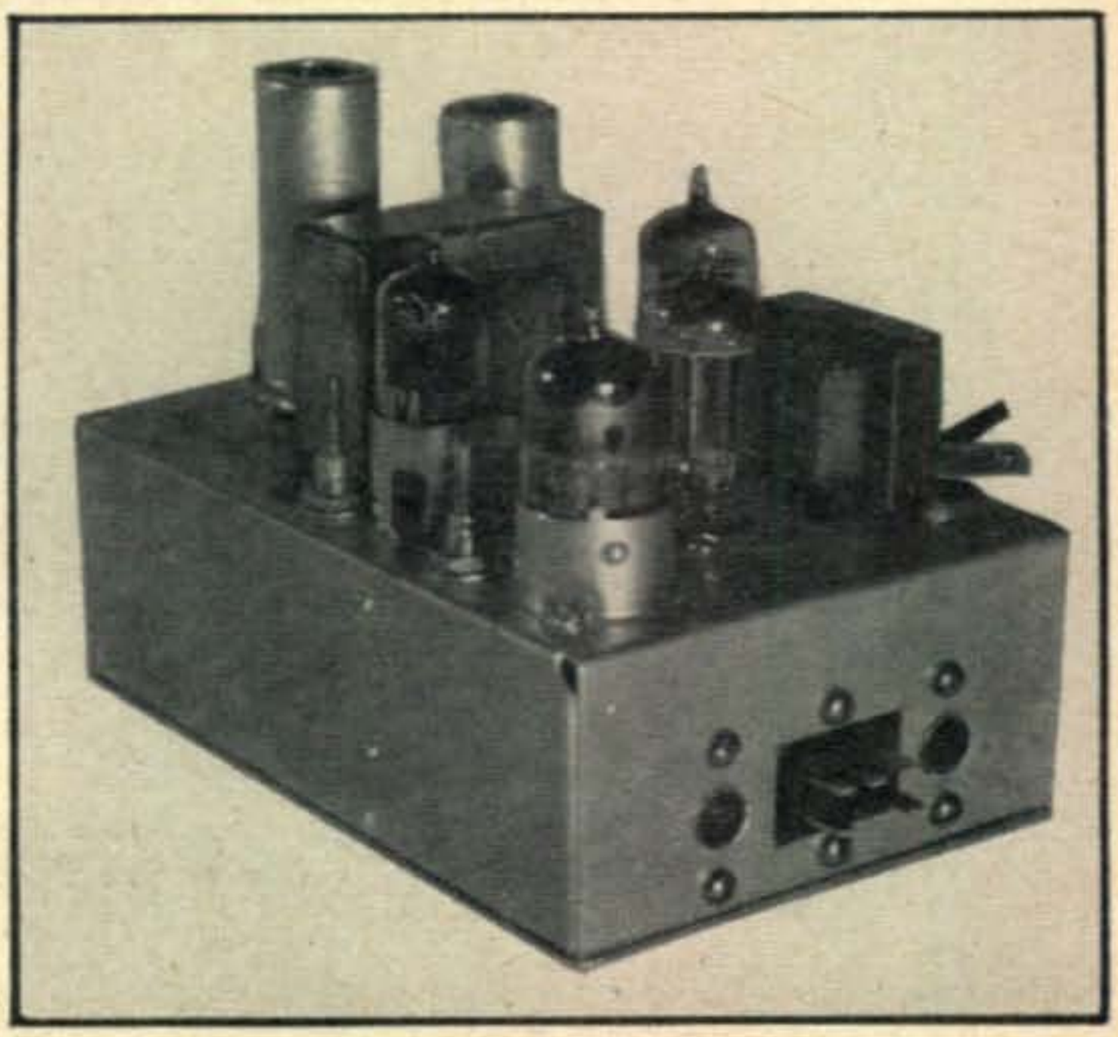
Installation

Installation is not quite the proper word in this case—you merely "hang it on." For example, the author's rig rides on the floor under the front seat. Only some old popcorn bags had to be removed to make room for it. It is not fastened down in any way, an arrangement that allows it to be removed for servicing, or display to the curious, in a matter of seconds. The power cable, a-v-c lead and converter output cable all run under the front floor mat to a point behind the instrument panel; a socket mounted on the receiver (the only real installation required) takes the power and a-v-c leads while the converter output goes to the switchbox.

The lead to the antenna runs under the rear floor mat and seat, through the trunk, to the antenna. The author's car has a "tunnel" over the drive shaft and by laying the leads in close to the base of this tunnel they go completely unnoticed.

Tune-Up

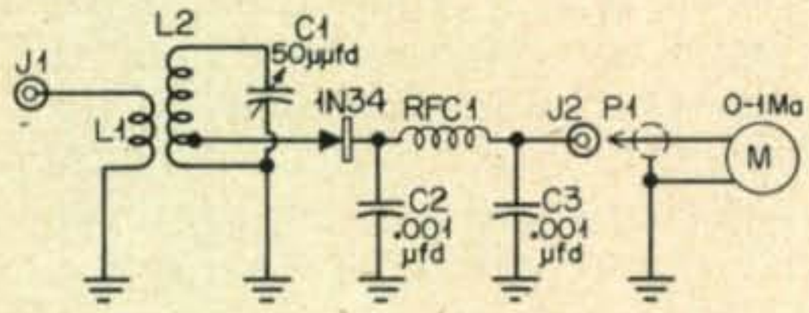
Tune-up procedure for the transmitter is standard. *L1* and *L2* are tuned for maximum grid current, *C8,* is tuned for plate current dip and *C9* is tuned for proper loading, the last two as read on a 0-50 ma. meter in the plate circuit of *V2 (CAUTION: the meter is at B plus).*



Another view of the compact "Combo."

The value of *C10* is determined by setting *C9* at midcapacitance and placing a large variable capacitor in parallel with it. Tune the temporary capacitor for proper loading, determine the value to which it has been set (using a capacity meter, grid-dipper and fixed coil or other means), and then replace it with a small mica capacitor of equal or near equal value. Subsequent tune ups are made using *C8* and *C9* only.

The author has had a meter in the plate circuit of *V2* only once, and that was for the sole purpose of determining the input power. However, the input power is a question of little concern, since we are *well* within the maximum



C1—50 *μμ*fd. midget variable (Millen 20050).
C2, C3—0.001 *μ*fd. disc ceramic.
J1—Auto Type antenna jack.
J2—Phono jack.
P1—Phono plug.
RFC1—One or two pies of 2.5 mh four pie choke.
M—0-1 ma.
Chassis—2" x 2" x 1½" Aluminum interlock box.

This wavemeter circuit has proven to be quite valuable in tuning up and monitoring the "Combo."

legal input. The real concern is that the transmitter is tuned for maximum output, and the easiest way to do that when tuning a pentode is *not* by watching the plate current meter. To simplify the tune-up problem the BC whip is loosely coupled to an absorption wavemeter used as a field strength meter. With the wavemeter tuned to 10 meters the transmitter can be tuned up by adjusting *C8* and then *C9* to get a maximum reading on the wavemeter indicator. Quick, easy and safe.

The meter also affords a means for monitoring the transmitter output, but *don't* try to watch its while driving. The value of *C10* can be determined more readily and accurately if the field strength meter rather than the plate current meter is used to determine proper loading.

Incidentally, the box containing the wavemeter proper is jammed in alongside the switch box, and the meter is mounted on a small bracket that hangs on a convenient heater control cable that runs along the firewall.

Conclusion

The author has had the opportunity to compare flea power operation, using this rig with higher powered operation since the unit just described was a replacement for a combination that consisted of a thirty-five watt commercially built transmitter in the trunk, a "store bought" converter under the dash and a dynamotor under the hood (and lots of wires and cables to hook 'em all together). It was a nice arrangement but the limited amount of time allotted to mobile operation did not seem to justify either the space the rig occupied or the money invested in it. The result is the lash-up that has just been described. The little one compares favorably with the more elaborate installation, it has provided nearly equal local coverage, it saves wear and tear on the battery, and does not occupy any otherwise usable space in the car. No claim is made for DX-ing, the 10-meter band being what it is of late. To those who are looking for a nearly painless way to go mobile, this rig can be highly recommended.

Thanks go to W8AWZ/4 and W4QDU for several "on the air" listening tests (late at night) and to W4MIK who took the accompanying photographs.

Call letter license plates continue to be issued by an increasing number of states. A recent addition to this family was Texas. The photo on the left shows some of the employees at KRLD-TV after getting their plates at the Dallas Courthouse. Oh yes, we wondered about the fellow holding his upside down—it turns out to be W5LCM who didn't have his plates, but wanted to get into the picture.

Something for two

RAY FULTON, K6BP

Fulton's Radio Service, Manteca, Calif.

A Transmitter That Will Satisfy The Demand for an Efficient, Low Drain, 144 Mc. Mobile or Fixed Unit With Better Than Ordinary Speech Quality

This 144-Mc. transmitter was built after I was asked if I could design a really low-drain model with still enough output to be practicable. I said that I could—if I had the time. The whole matter remained in this status until I began hearing things like, "Well, I guess you really can't do it, after all." Thus challenged, I got busy, and the pictures and the wiring diagram *(Fig. 1)* show the finished result.

Power requirements are 125 milliamperes at 300 volts, d.c., or 100 milliamperes at 250 volts plus 6.3 volts at two amperes, a.c. or d.c. These are the total power requirements for both the r.f. and audio sections of the transmitter. At 300 volts, the final amplifier plate current is 40 ma., which equals 12 watts input. Output is six or seven watts, or about double that of the mighty (?) *522 surplus* transmitter with its much greater current requirements. While the *522* will almost burn out a *No.47*, 6-volt pilot bulb, this transmitter will burn out one bulb and almost burn out two connected in parallel.

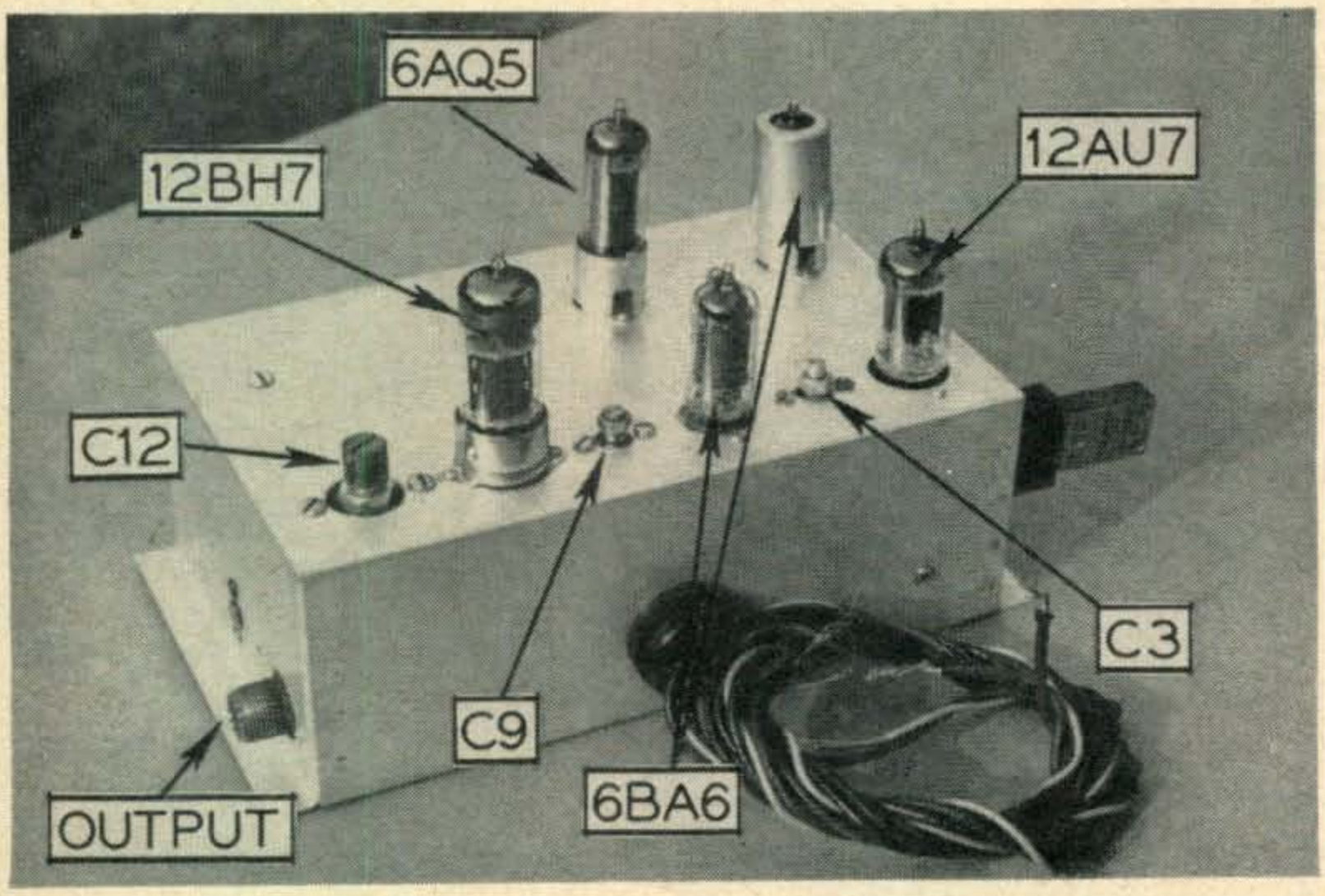
Connected to my large corner reflector beam, *S9* reports over distances of 100 miles and more are quite common with this transmitter. As a mobile transmitter, feeding a 19-inch "spike" antenna, many sixty to seventy mile contacts have been made from good locations.

The Circuit

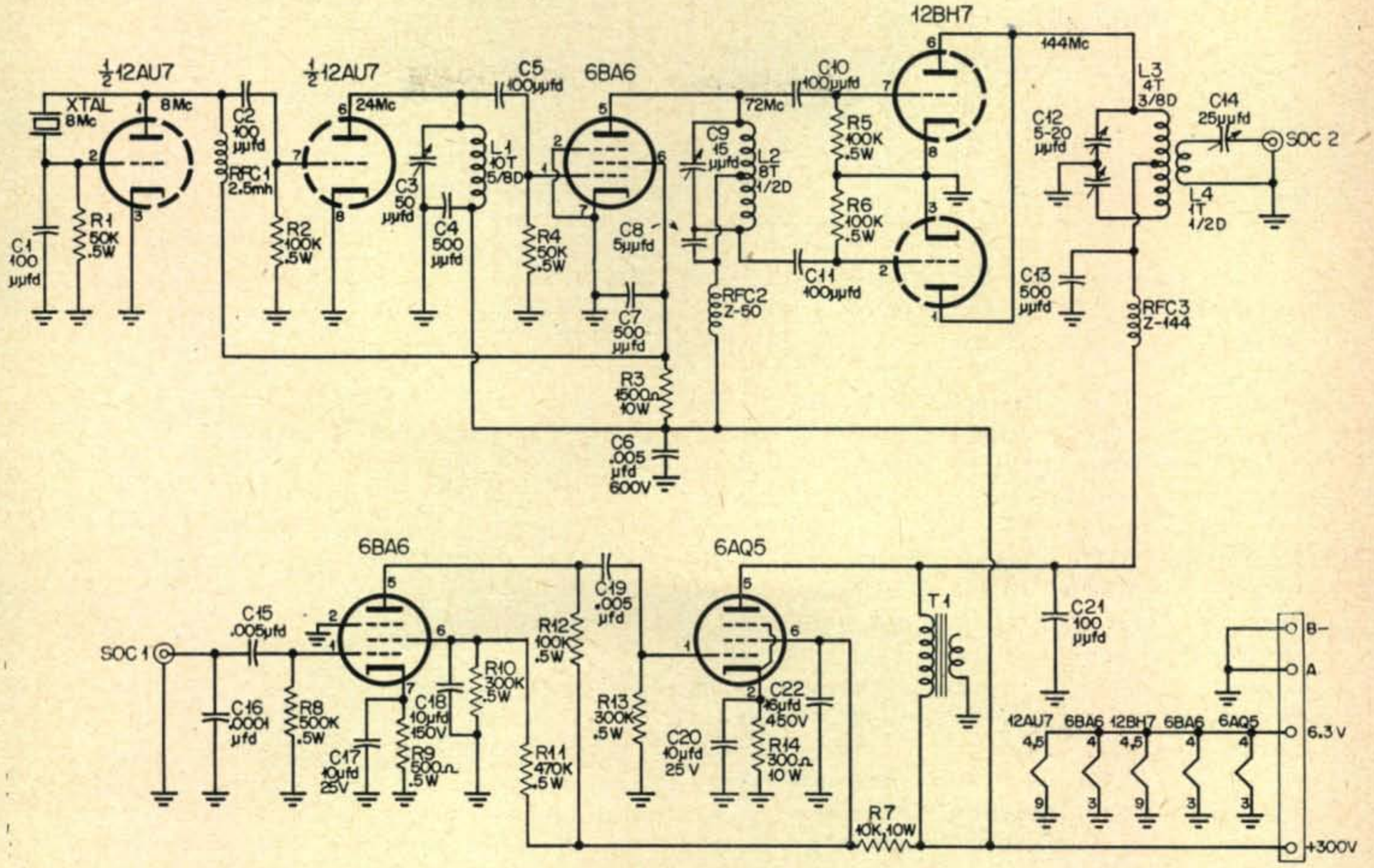
From its initial appearance on the market, I had been attracted to the 12BH7. Its characteristics looked "two meterish," if you know what I mean. So I decided to give it a trial, as a final amplifier, with the results already described. But reverting to the front of the transmitter, the first tube is an old favorite of mine, the 12AU7. One-half of it is used with 8-Mc. crystals as an untuned Pierce oscillator. This circuit was chosen for simplicity and reliability. With good crystals it "starts" every time, and that is important. The oscillator drives the other half of the 12AU7 as a 24-Mc. tripler, which drives a 6BA6 as a second tripler to 72 Mc. This gives us 72-Mc. output using only two tubes and two tuned circuits.

The 6BA6 won out as the second tripler after testing a number of other tubes in this position. It develops sufficient output to drive the 12BH7, without drawing a great deal of plate current. Also, it does not go "flat" with 300 volts on its plate.*

* A 6BK5 also works excellently as a 72-Mc. tripler. It actually delivers almost twice as much output as the 6BA6, but it draws 1.2 amperes of filament current, compared to 0.3 amperes for the 6BA6, as well as considerably more plate current. It might be considered in a home-station installation, where the increased power requirements can be easily handled.



This compact 2-meter transmitter features 12 watts input to a 12BH7 as the final amplifier. No power supply is shown with this unit as it is adaptable to either mobile or fixed station use. This is a rear view.



Finally, the 72-Mc. tripler drives the 12BH7 as a push-push doubler to 144 Mc. Note that no two stages in the r-f section are on the same frequency. Self-oscillation is, therefore, virtually impossible. You get crystal-controlled output, or no output at all.

Examination of the audio-frequency portion of the circuit reveals that a crystal microphone is used instead of the single-button carbon microphone often employed in low-power, 144-Mc. transmitters. The crystal microphone results in much better speech quality and eliminates the necessity of supplying d-c microphone current, as required with a carbon microphone. This also eliminates a source of "hum modulation," in mobile transmitters that frequently develops when microphone current is obtained from the automobile battery.

A 6BA6 serves as the microphone amplifier and drives a 6AQ5 as a modulator. The 6AQ5's output is coupled into the 12BH7 plate circuit by feeding the plate current for both tubes through the primary of a replacement-type speaker output transformer, which acts as a Heising modulation choke.

The only bug that developed in the transmitter was some audio feedback that showed up when it was first placed into operation. Shielding the first audio tube and adding two condensers *(C16* and *C21)* to the input and output circuits eliminated the feedback.

Construction

The transmitter is built on a 5″x8″x3″ aluminum chassis, with lots of room to spare, though I do not advise crowding it on a smaller one.

C1, C2, C5, C10, C11—100 µµfd. tubular ceramic.
C3—50 µµfd. midget variable, screwdriver adjusted **APC.**
C4, C6, C13—500 µµfd. 600v. disc ceramics.
C8—5 µµfd. ceramic **NPO.**
C9—15 µµfd. midget variable, screwdriver adjusted **APC.**
C12—5-20 µµfd. per section butterfly (**Surplus.** Similar to **E. F. Johnson** #25LB15).
C14—25 µµfd. midget variable, screwdriver adjusted **APC** type.
C16, C21—100 µµfd. ceramic or mica.
C17, C20—10 µfd. 25v. paper electrolytics.
C18—10 µfd. 150v. paper electrolytic.
C22—16 µfd. 450v. paper electrolytic.
R1, R4—50,000 ohms, ½w.
R2, R5, R6, R12—100,000 ohms, ½w.
R3—1500 ohms, 10w.
R7—10,000 ohms, 10w.
R8—500,000 ohms, ½w.
R9—500 ohms, ½w.
R10, R13—300 ohms, ½w.
R11—470,000 ohms, ½w.
R14—300 ohms, 10w.
RFC1—2.5-mh r-f choke.
RFC2—60 T on ¼″ rod or **Ohmite** Z-50
RFC—40 T on ¼″ rod or **Ohmite** Z-144.
T1—Speaker output trans. capable of carrying 75-80 ma. in primary. Ground one side of voice-coil winding. Let other side float.
Xtal—8-Mc. (Exact frequency 1/18 of desired output freq.)
Soc1—Microphone connector.
Soc2—Coaxial cable connector.
Power plug—4 prong socket.
Chassis— 5x8x3″ aluminum.

Fig. 1. Wiring Schematic and parts list.

All components, except tubes and connectors, are mounted underneath the chassis.

Layout is straightforward. The r-f tubes and tuned circuits are evenly spaced in a line across the back of the chassis. The crystal socket is mounted vertically on the left end, and the coaxial output connector and the antenna condenser, *C14,* are mounted on the right end. The front half of the chassis is occupied by

Coil Winding Data

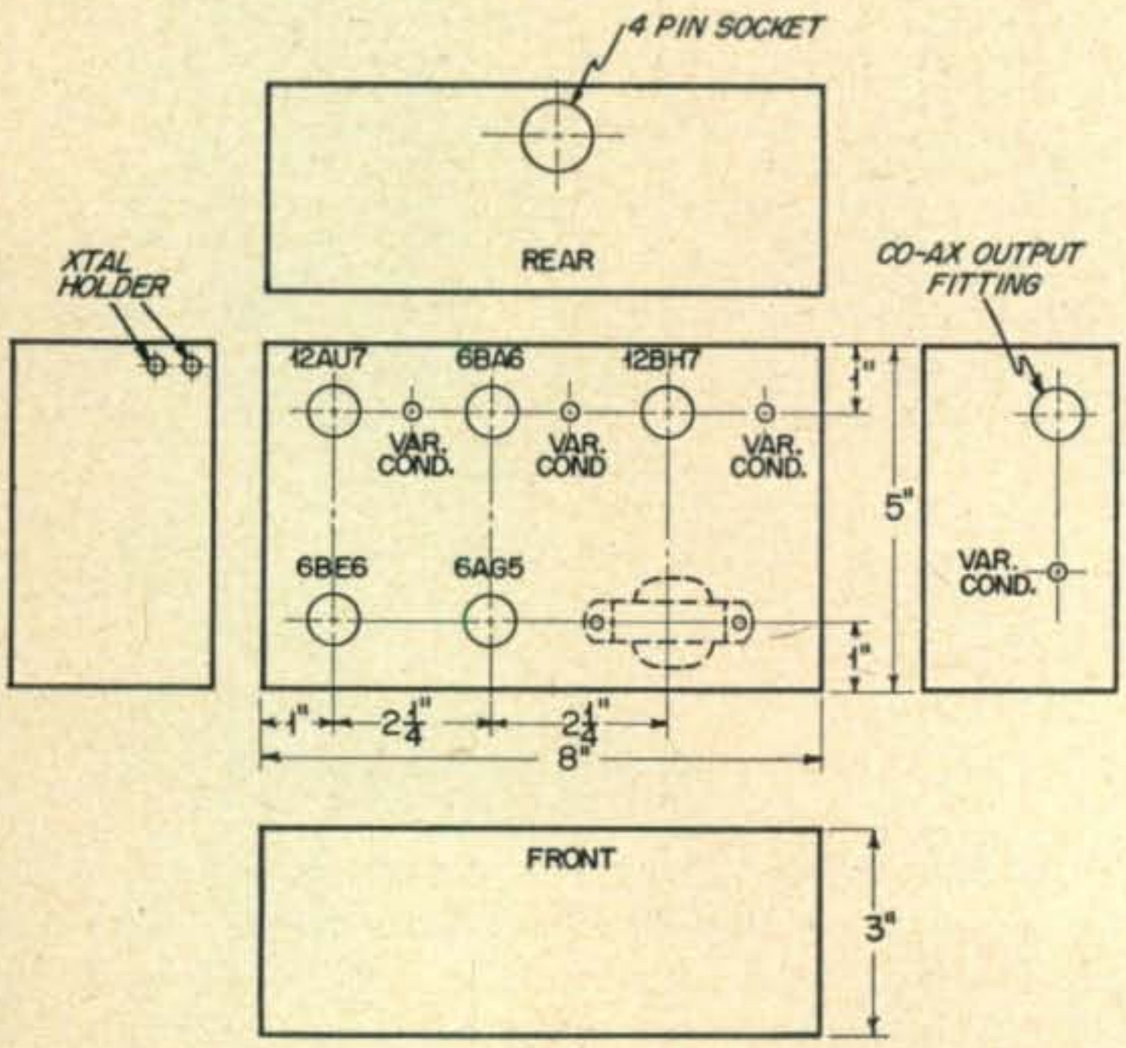
L1—10t., 5/8" dia. (part of B&W Miniductor #3007.)
L2—8t., 1/2" dia. (part of B&W Miniductor #3001, centertapped.)
L3—4t #14 enam., on 3/8" dia. form, 1/2" long. Centertapped.)
L4—1t., 1/2" dia. form.

the audio components. The microphone connector is mounted on the left end in a position to keep the connection between it and the control grid of the 6BA6 *(pin 1)* short. *T1* is mounted under the chassis, to the right of the 6AQ5 socket and in front of the 12BH7 socket. This layout keeps critical components well separated, at the same time, keeping connecting leads short.

Possibly the only component mounting which cannot be determined by inspection of the pictures is *C9,* the 72-Mc. tuning condenser. It is a single-ended condenser tuning a circuit that must supply balanced excitation to the push-pull grids of the 12BH7. Therefore it must be insulated from the chassis and spaced well away from it, to minimize capacity unbalance. Spacing is increased beyond that provided by the normal mounting studs by slipping spacing washers over the mounting screws between the chassis and the studs. This condenser must be adjusted with a non-metallic screwdriver or neutralizing tool.

All tuning condensers are ceramic insulated and, with the exception of *C12* the 12BH7 plate condenser, are screwdriver adjusted APC's. *C12* is a surplus butterfly condenser, similar to the *Johnson 25LB15,* 25-$\mu\mu$fd. per-section butterfly.

Wiring presents no particular problems. This being a v-h-f transmitter, the important thing



Suggested chassis layout plan.

is to keep all leads in the r-f section to a minimum length. This is best accomplished by sticking fairly close to the specified components and to the arrangement used in the original. It has been duplicated by several W6 amateurs, all with excellent results. Use solid wire for the r-f connections. Most of the smaller components are supported by their leads, with a number of insulated "tie points" employed where necessary to eliminate the possibility of parts flopping around.

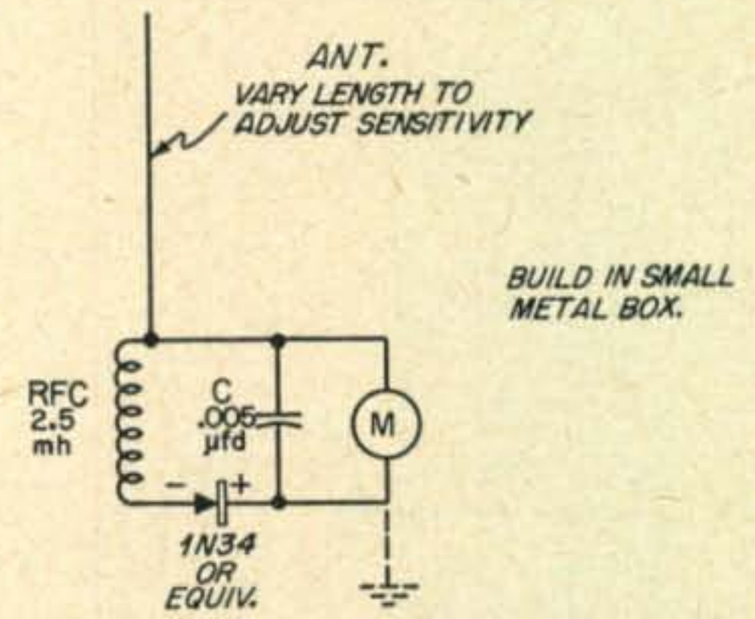


Fig. 2. This untuned r-f indicator is useful in the tuning up of this and other transmitters. The strength of indication will depend on the antenna length and the meter sensitivity.

Be careful in wiring the 6BA6 stage r-f plate circuit, to minimize capacity unbalance. Connect the 6BA6 plate *(pin 5)* to the stator of *C9,* and connect *L2* directly across the rotor and stator terminals of the condenser. Feed the 6BA6 plate voltage into the center of *L2* through *RFC2,* and connect *C8,* a 5-$\mu\mu$fd. ceramic condenser, between the rotor of *C9* and the coil centertrap, to compensate for the output capacity of the 6BA6 across the other half of the coil.

Centertap both *L2* and *L3* just as accurately as possible for best results.

Connect the 12BH7 grids *(pins 2* and *7)* to the terminals of *C9* through the 100-$\mu\mu$fd. ceramic condensers, *C10* and *C11.* Then ground each grid terminal through the 100,000-ohm resistors, *R5* and *R6.* Proceeding to the 12BH7 plate circuit, tie the two plates *(pins 1* and *6)* together, and connect another wire from the center of this wire to the nearest stator terminal of *C12.*

Connect *L3* across the stators of *C12.* Feed the 12BH7 plate voltage to the center of the coil through *RFC3* from *T1* and the plate terminal *(pin 5)* of the 6AQ5, bypassing the tap to the chassis with a 500-$\mu\mu$fd. ceramic condenser *(C13).* Some transmitters give more output with this condenser omitted; therefore, arrange the wiring so that it can be disconnected, to determine whether it should be left in or removed during preliminary tests.

The antenna coupling coil, *L4,* consists of a single turn around *L3.* One end of it is supported by the center terminal of the coaxial

output connector and the other end by the stator of *C14*. The rotor of *C14* is then grounded to a lug under one of the screws fastening the coaxial fitting to the chassis.

In wiring the audio amplifier, only the particular precautions dictated by normal good practice are required. Keep grid and plate circuit components of the two tubes well separated and all leads short. As mentioned earlier, some audio feedback developed at first, but was cured by the addition of *C16* and *C21* across the input and output circuits.*

Tuning The Transmitter

After the transmitter is completed and the wiring checked, it may be tuned. A calibrated grid-dip meter or a wavemeter is invaluable in making certain that the various tuned circuits are actually on the proper frequency.

Another handy tuning aid for use with this and any other transmitter is the untuned field-strength meter diagrammed in *Fig. 2*. It consists of a low-range milliammeter, a crystal diode, an r-f choke, a mica condenser, and a short pick-up antenna. A meter with up to a 5-milliampere movement may be used; however, the more sensitive the meter the better.

Preliminary tuning should be done with reduced plate voltage applied. Start with the oscillator, disconnecting the plate voltage temporarily from the 6BA6 and 12BH7. The oscillator requires no tuning, but it can be checked for proper functioning by a deflection of the milliammeter in the field-strength meter when its pick-up antenna is brought near the plate or grid terminal of the oscillator and by tuning the station receiver to the crystal frequency and hearing the signal being generated.

Next, adjust *C3* for 24-Mc. output from the second section of the 12AU7. If duplicates of the original parts are used, resonance at this frequency should occur with the plates of *C9* just a bit over one-third meshed. Use the field-strength meter to indicate maximum output and the wavemeter or grid-dip meter to insure that the stage is actually tuned to 24 Mc.

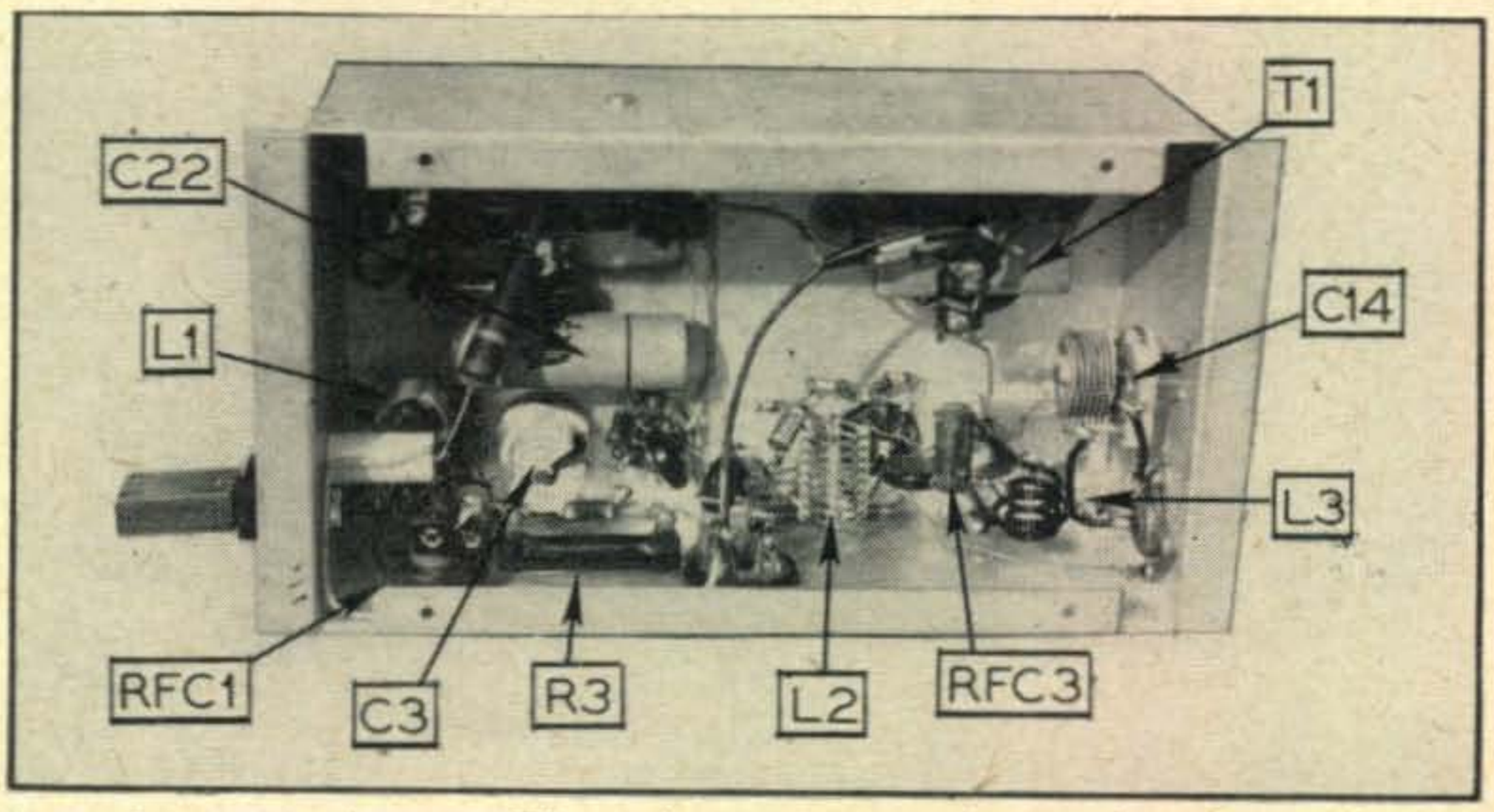
Apply plate voltage to the 6BA6 and resonate its tank circuit to 72 Mc. in the same manner. Resonance should occur near minimum capacity of *C9*.

Now, connect two *No-47*, 6-volt pilot bulbs in parallel to the output connector of the transmitter and apply plate voltage to the 12BH7. Adjust *C12* for maximum output, as indicated by the brightest glow from the bulbs. Then, work back and forth between *C12* and *C14* for a further increase in output. After the transmitter has been tuned up at low plate voltages, the full voltage may be applied and the tuning given a final touch up.

Trying to tune up the transmitter, especially the output stage, by observing plate current dips at resonance is not likely to be too successful, because they are very slight. However, tuning with the aid of a field-strength meter is both simple and effective.

Substituting the transmitting antenna for the light-bulb dummy antenna will probably require re-adjustment of both *C12* and *C14*. Again, the best indication of proper tuning will probably be the field-strength meter reading.

The purpose of *C14* is to tune out the reactance introduced into the coupling link by the antenna. With some antennas, I have found it to be a great help in getting maximum power into them. With others, it is of little help, although it does afford a convenient means of varying antenna coupling.



Under chassis part placement view.

There is one precaution to be observed when using the field-strength meter. Do not move around physically while using it. Doing so can cause a large variation in the meter reading, especially when the power to operate the meter is obtained from the power radiated by the transmitting antenna.

Power Supplies

For fixed station use, a 117-volt, a-c supply, capable of delivering 250 to 300 volts d.c., at 100 to 125 milliamperes and 6.3 volts a.c., at

(Continued on page 90)

* Using flexible shielded wire for wiring the audio circuits is a wise and easy precaution against feedback—**Editor.**

VAARO BUMPER MOUNTS

VAARO MODEL V-105 . . .

Another FIRST in amateur mobile equipment . . . A revolutionary antenna bumper mount. "DON'T CHOP HOLES IN YOUR CAR." This unit is engineered to fit any antenna and car bumper on the market. A special feature is the bumper curvature insert inexpensively replaceable as you exchange your car model.

Material - Cast Aluminum. Socket Dimensions - Standard 3/8 x 24 Thread. Finish - Hammertone Baked Enamel. Weight - 2 pounds.

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GUARANTEED FOR 5 YEARS AGAINST CORROSION AND FLAKING.

Material - Cast Bronze. Finish - Heavy Chrome with Copper & Nickel Underplating. Socket Dimensions - Standard 3/8 x 24 Thread. Weight - 5 1/2 pounds.

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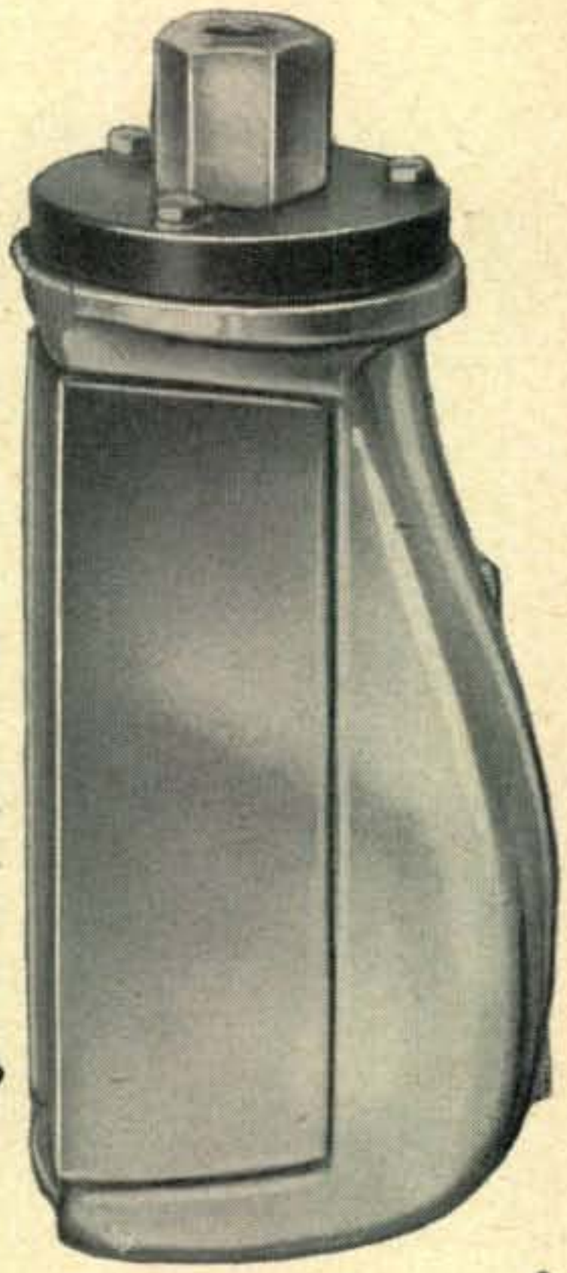

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Made of hard drawn tubing 5/8" in diameter, flash coppered-nickel plated and chrome plated a total of .006. 3/8" SAE threaded studs at each end fit all standard antennas. No round knurling to chew up with pliers—as this unit has a good solid hex fitting for wrench tightening.

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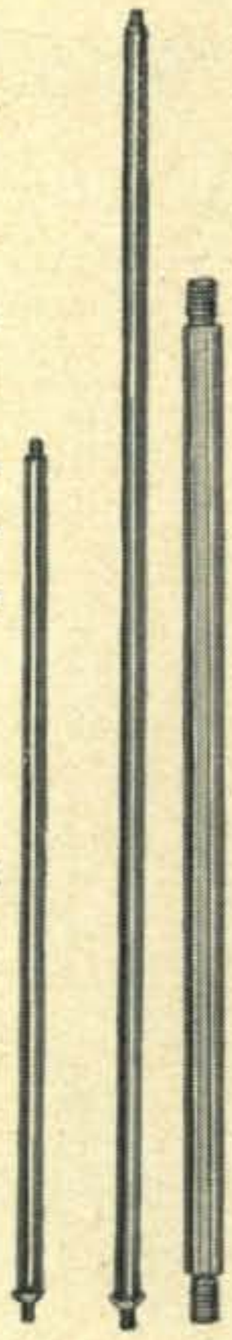
24" V-104—$4.50

36" V-104—$5.25



VAARO FIBREGLAS ANTENNA WHIPS

Fibreglas has been selected as the most nearly perfect material for Vaaro ANTENNA WHIPS as it ideally takes the road shocks and constant whipping to which antenna whips are subjected. VAARO ANTENNA WHIPS possess remarkable resilience. In fact, while they can be bent into an almost complete circle, they spring immediately back into a straight position with no danger of taking a permanent bend. They are light in weight and so impose less strain on mounts.

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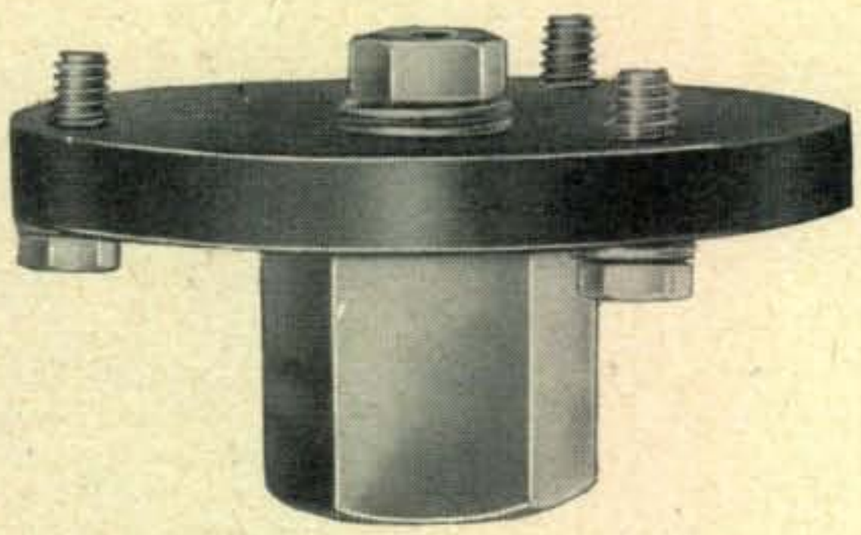
V-101-7' $9.95
V-101-8' $9.95

VAARO Body Mount

This unit is designed for mounting directly on the car body. This mount is used for a flat surface mounting. For contour mounting a swivel unit is available and can be used in conjunction with this mount. The Vaaro Body Mount is chrome plated with stainless steel fittings. The insulator is double "X" Bakelite, the finest grade.

Price: $4.25



All Vaaro Products are available at your dealers or write:

VAARO ELECTRONIC ENGINEERING CO.

BOX 5035 LONG BEACH, CALIFORNIA

More Power *for the* Mobile

WILLIAM C. RYDER, W1JNM

Bar Cliff Ave., Chatham, Mass.

After operating 75-meter mobile for more than a year using only 15 watts input, it was decided to try higher power. It seemed hardly worthwhile to increase to anything less than four times the previous power. Thus a goal of 60 watts input was established.

The PE-101-C surplus dynamotor appeared to be the most efficient, compact and economical unit to use and it was felt that a 12-volt system was very desirable. The dynamotor was purchased and converted per *CQ*.[1, 2].

At this time a 1953 *Ford* came into the picture and the problem of increasing power and re-installing the rig occurred together.* The greatest problem appeared to be arranging a suitable 12-volt system at minimum expense. At the same time it seemed that a 6-volt circuit for the receiver and for transmitter filaments separate from the auto starting battery would be desirable. In case the receiver or transmitter filaments were unintentionally left on, the operation of the automobile would not be effected.

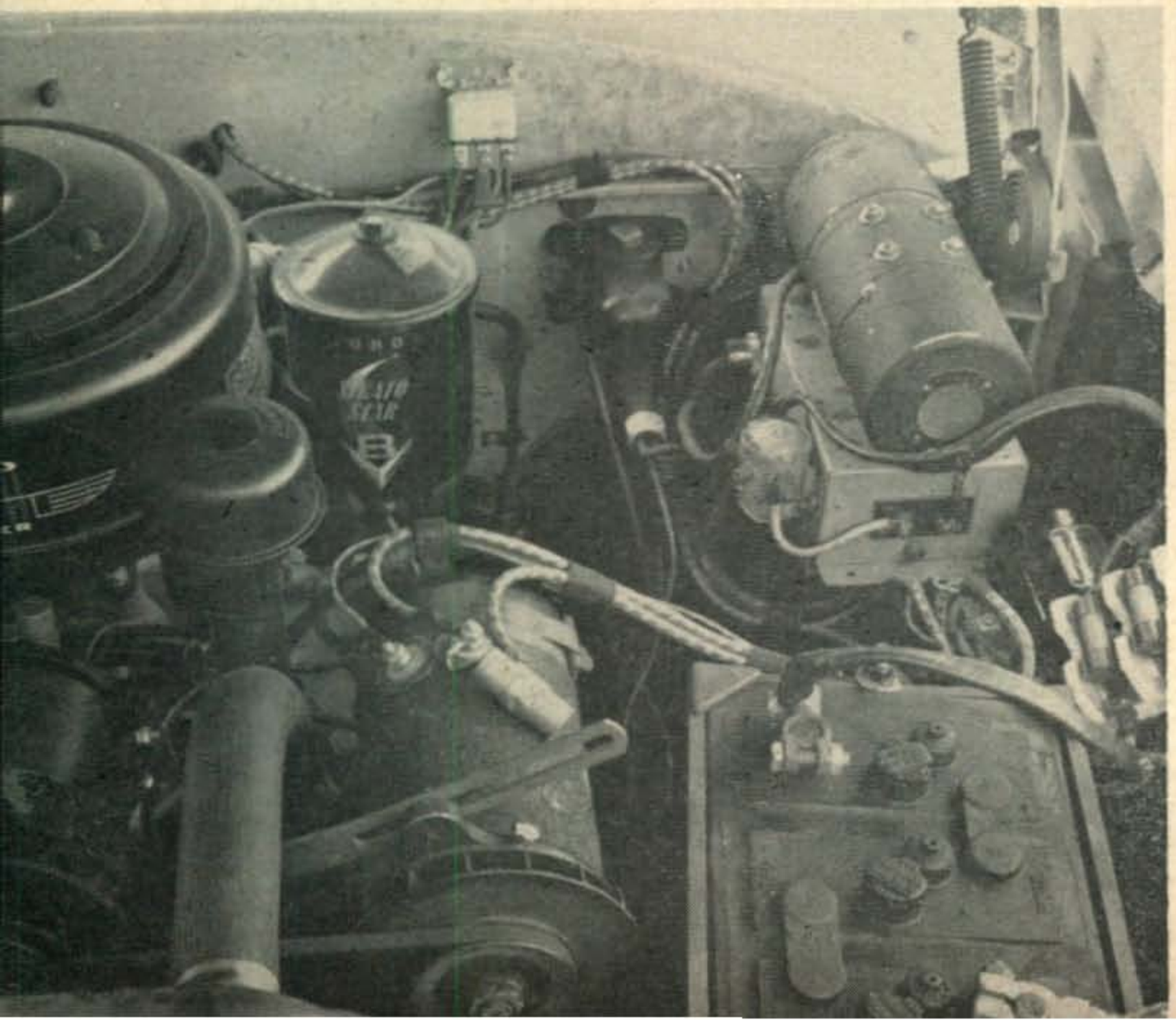
A circuit was drawn up which incorporated all the above features and yet it uses no battery switching, manual or otherwise. It has been in use for more than 1 year and no difficulties have been encountered.

Primarily a second battery (6v./120 amp. hr.) was installed and an additional auto generator mounted on the motor and belted to the regular generator.

The normal circuit in a *Ford* uses a battery with the positive terminal grounded. The second battery was connected with the negative terminal grounded. As can be seen in *Fig. 1* this provides two hot terminals; one 6 volts negative and one 6 volts positive. By using either terminal against ground, a 6-volt system independent of the other 6-volt battery and generator is obtained. At the same time, using both hot terminals we have 12 volts available. It should be noted that with both leads hot, neither side of the dynamotor input should be grounded.

1. "Converting the PE-101-C Dynamotor," Millar and Wollin, CQ, Aug., 1952, p. 25.
2. "More on the PE-101-C," Millar, CQ, Dec., 1952, p. 25.

* The low power 75-meter mobile transmitter used by W1JNM appears in the RADIO AMATEURS' MOBILE HANDBOOK on page 120.



Looking under the hood of the author's 1953 Ford, we see the new generator mounted between the regular battery and water pipe to the V-8 block. The PE-101-C and associated relays are mounted in the upper left corner after the regulator has been moved. The new battery is mounted on the other side of the motor compartment in the same spot as the regular battery. It is supported by a battery frame obtained from the Ford dealer.

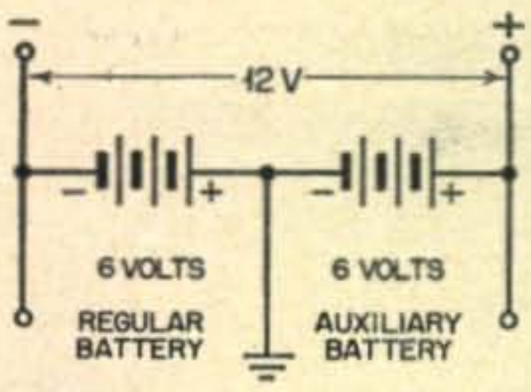


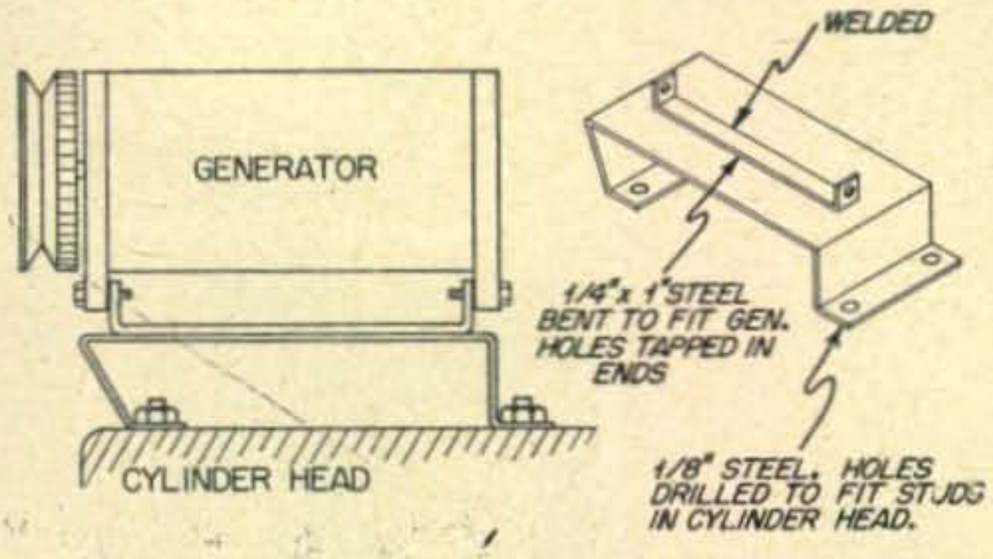
Fig. 1. Battery polarity in the Ford cars.

Having separate generators with a voltage regulator for each battery insures that each battery will be charged according to its needs. The additional generator in this case must be a negative grounded type. The one used is a re-built replacement generator for a 1940-48 Model *Chevrolet* with a suitable regulator. The cost is about $20 at an auto parts distributor.

If it were desired to put a similar installation in a car with normally negative grounded electrical system, the second generator and battery would need the positive grounded.

It is definitely an advantage to use standard automobile parts, because replacement parts are then readily available if ever needed. The auxiliary battery is mounted on the right side of the automobile opposite the regular battery as you look under the hood. A battery box obtained from the local *Ford* dealer was used. A second pulley, *Ford part #8BA10130-K* was attached to the regular *Ford* generator pulley by being welded around the rim. The center of the additional pulley was cut out on a lathe to allow access to the nut on the shaft which holds the regular pulley in place. The fan blades of the additional pulley were also cut off.

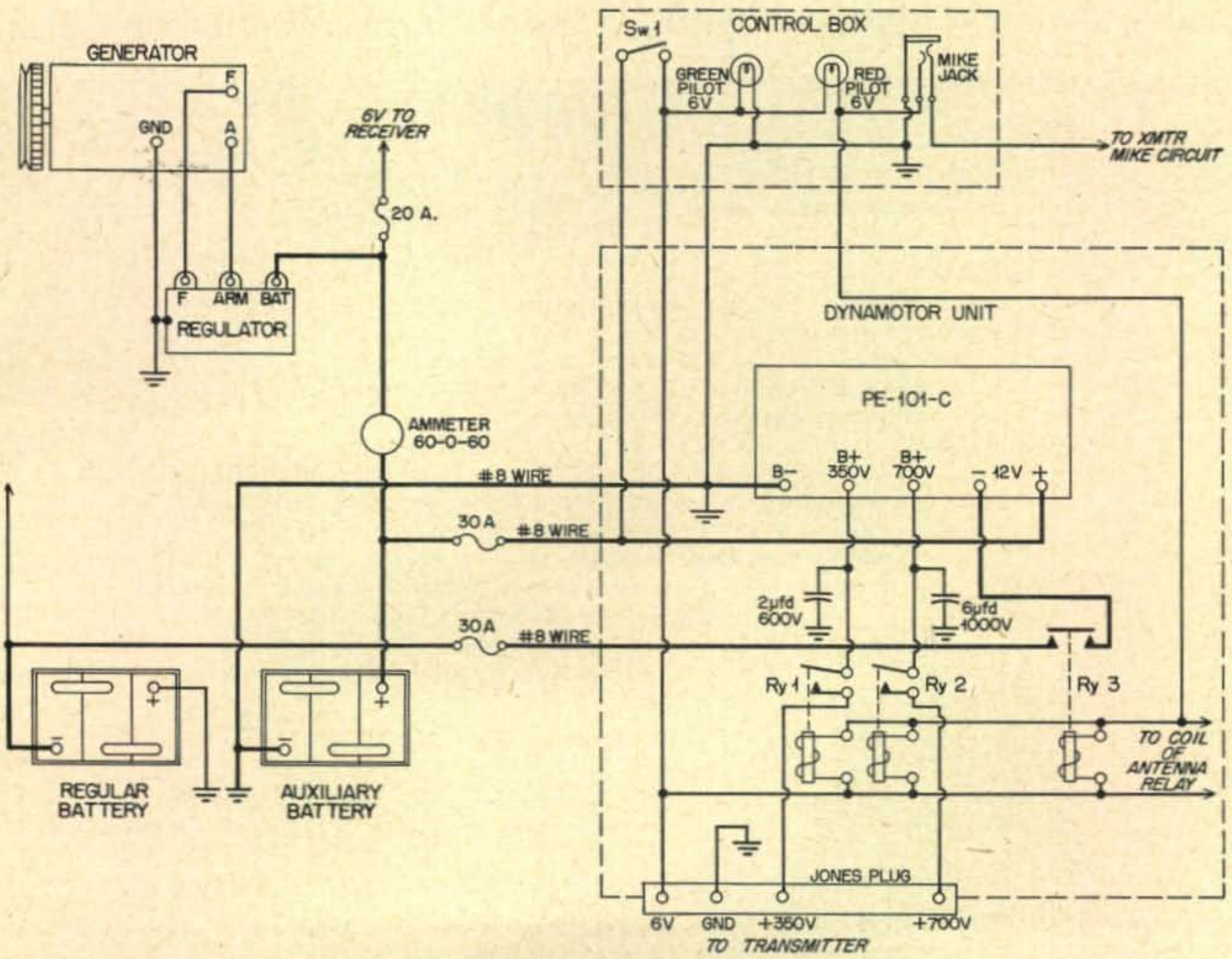
A *Ford* pulley, *part #8BA10130-H* is used on the *Chevrolet* generator. It was necessary to cut



This frame is used to mount the new generator on the V-8 block.

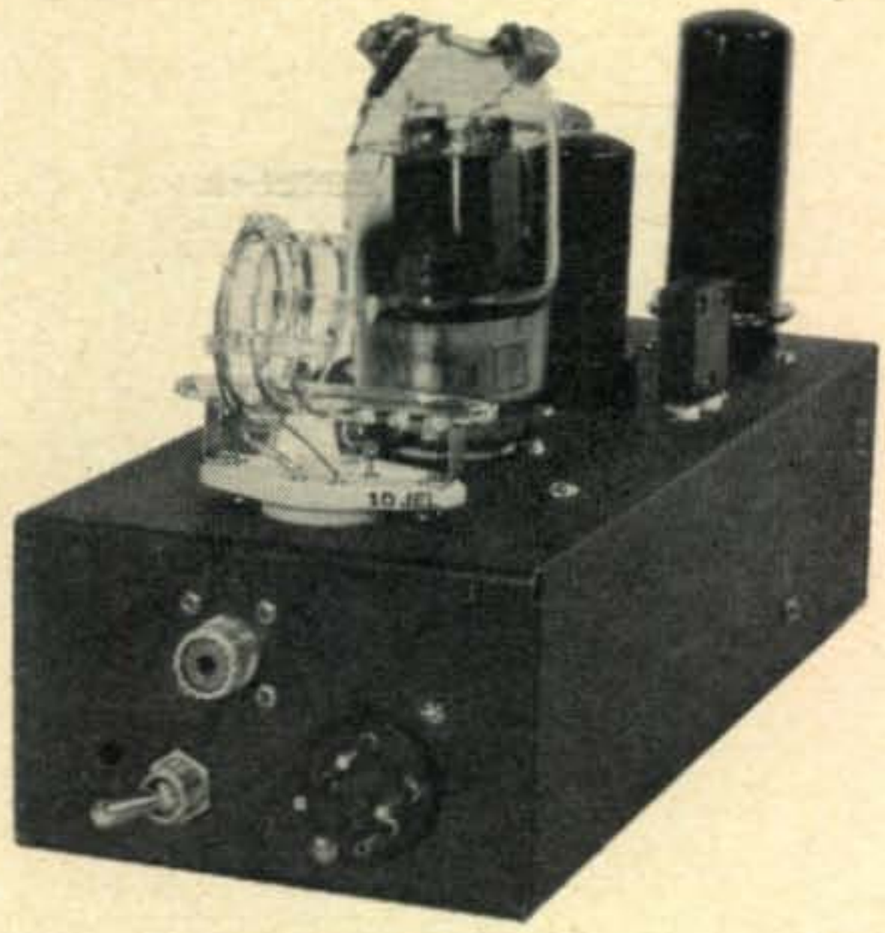
off a fraction of an inch from the rear of this pulley hub to make it short enough to allow the nut to go on the shaft. All three pulleys are the same diameter, therefore both generators run at the same speed. These pulleys are the

(Continued on page 100)



This diagram shows the relay and control system used with 6/12-volt mobile circuit devised by the author. Relays Ry1 and Ry2 are single-pole relays that are normally open. Relay Ry3 is a 12-volt dynamotor relay as used with the PE-101-C. Switch S1 is a heavy duty toggle such as the Arrow or H&H #806Q7-B.

20 Watts *in a* Fixed/Mobile Transmitter



LOUIS L. BRENT, WØUC

1330 North Newstead Avenue, Saint Louis 13, Mo.

Low Power Plus Efficient Design Resulting in an Effective Mobile Transmitter That is Easy on the Automobile Battery

Here is a simple, compact little rig that really fills the bill for a mobile or fixed, low-power phone transmitter. It has proved itself at WØUC during a year and a half of operation.

Two features of the transmitter are: (1) the use of screen-grid "clamp-tube" modulation, to eliminate the modulation transformer, which is an item of considerable expense. (2) the use of a ground-grid input stage in the speech amplifier, to eliminate the microphone transformer and to supply energizing current for the *T-17B* carbon microphone used.* Quality reports have varied from good to excellent.

Circuit and Construction

The complete transmitter, less power supply, is built on a 5″x10″x3″ chassis. *Figure 1* shows the four-tube circuit, and the photographs show the physical layout.

Referring to the title photograph above, the output tank coil, *L2* and *L3* can be seen directly in front of the 815 power amplifier. Hidden behind the 815 is the 6SN7GT speech amplifier tube, the modulator tube, which may be either a 6V6 or 6L6, and the oscillator coil, *L1*, with the 6AG7 oscillator tube and crystal.

On the far end of the chassis are mounted the microphone jack, oscillator tuning condenser, *C3*, the "Tune-Operate" switch, cathode current metering jack and output tuning condenser, *C8*.

On this end of the chassis facing the reader, the power input socket is visible in the lower right corner. A coaxial output connecter is mounted just below the tank coil. The switch, *Sw2*, permits controlling the plate voltage when working on the transmitter. *Figure 2* indicates how the components are mounted where convenient, bearing in mind the necessity for short leads, both for electrical efficiency and vibration resistance.

The 6AG7, modified-Pierce crystal oscillator develops sufficient output to drive the 815 grid at the fundamental, second, third, and fourth harmonics of the crystal frequency. Its output is coupled into the grid of the 815 through a 100-$\mu\mu$fd. capacitor, which may be made variable to adjust the drive to the desired value.

The 815 used in the final amplifier stage is actually two tetrodes in one envelope and may be connected for either six or twelve-volt heater operation. These tubes may still be purchased on the *surplus* market for less than $3.00 each, and have an input capability of sixty to seventy-five watts at 400 to 500 volts. For simplicity, all tube elements are connected in parallel, and the heaters are operated from six volts. To guard against instability, a parasitic suppressor of six turns of #24, space wound on a one-watt, 100-ohm resistor is inserted in the common plate lead *right at the tube*.

In the audio section of the transmitter, a 6SN7GT acts as the microphone coupling device and speech amplifier, to drive the modulator tube which may be either a triode-connected 6L6 or 6V6. Modulator plate voltage and 815 screen voltage are obtained through the dropping resistor, *R10*. Its resistance should be sufficient to limit the 815 screen voltage to 150 volts, with the modulator tube out of the socket. About 20,000 ohms will be right.

---

* This circuit works excellently with a high-resistance, single-button, carbon microphone, such as the surplus T-17B. However, low-resistance microphones, such as F1 and F2 buttons, probably will not develop sufficient output to modulate the 815 fully—**Editor.**

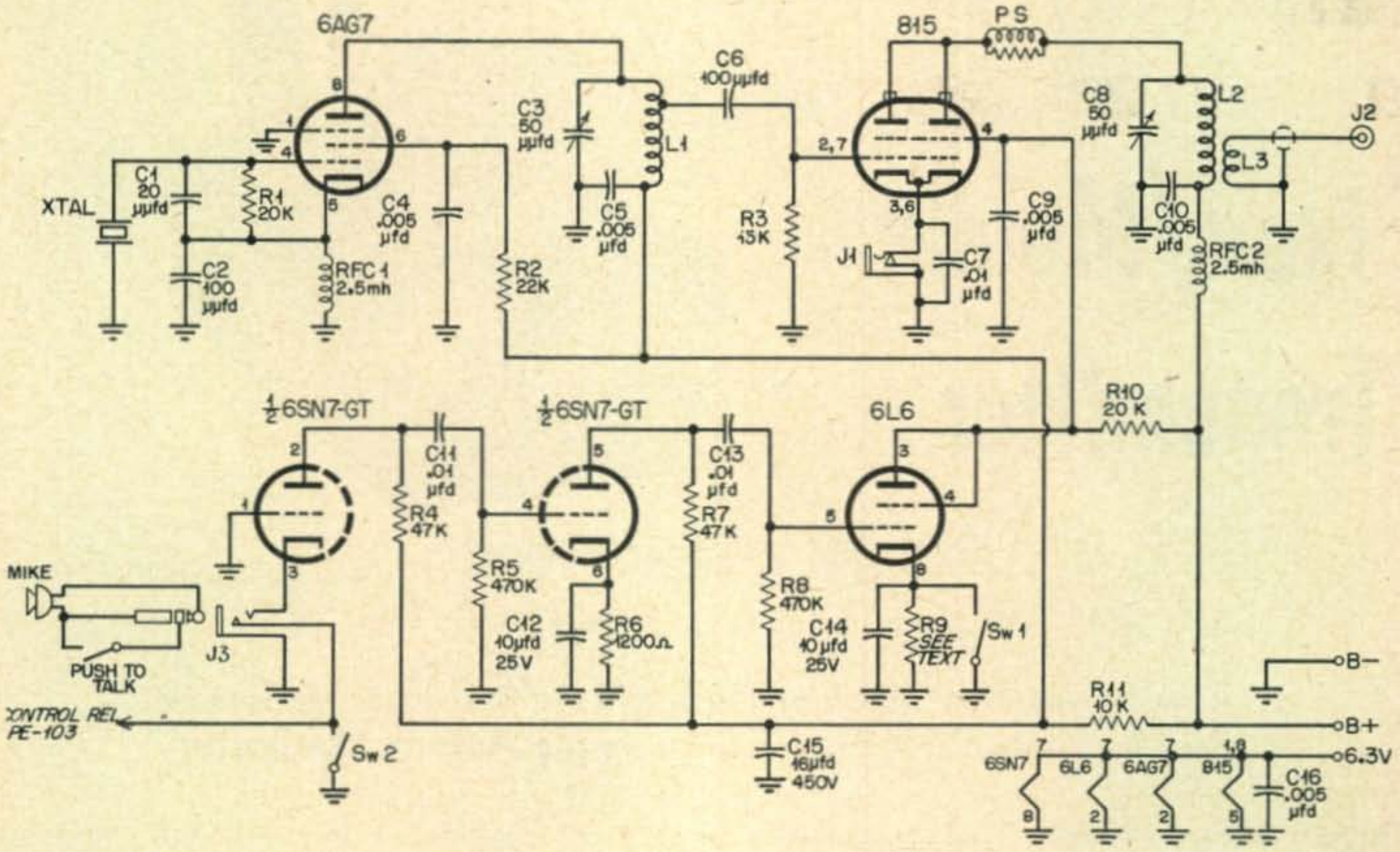


Fig. 1. Wiring schematic and parts list of the 20 watt transmitter. This unit is suitable for use either in a mobile rig or as a fixed station. The author has his arranged so that it can be unplugged from the mobile and taken in the house to complete a QSO.

C1—20 µµfd. tubular ceramic.
C2—100 µµfd. tubular ceramic.
C3—50 µµfd. midget variable.
C4, C5, C9, C10, C16—0.005 µfd. mica, 500v.
C6—100 µµfd. mica.
C7—0.01 µfd. 600v. paper.
C8—50 µµfd. double-spaced, midget variable.
C10—0.005 µfd. mica, 1,000v.
C11, C13—0.01 µfd. disc ceramic, 600v.
C12, C14—10 µfd. electrolytics, 25v.
C15—16 µfd. electrolytic 450v.
J2—Coaxial chassis connector.
J3—Microphone jack.
PS—6 turns, #24 enam. space wound on a 100 ohm, 1w. resistor.
SW1, SW2—s.p.s.t. toggle switches.
Mike—T-17B, single button carbon mike, with "push-to-talk" switch.
L1—Oscillator Coil (See coil table).
L2, L3—815 plate coil. (See coil table).
R1—20,000 ohms, 1w.
R2—22,000 ohms, 1w.
R3—15,000 ohms, 1w.
R4, R7—47,000 ohms, 1w.
R5, R8—470,000 ohms, ½w.
R6—1,200 ohms, 1w.
R9—500 to 2,500 ohms, exact value determined by experiment. (See text).
R10—20,000 ohms, 20w
R11—10,000 ohms, 20w.
RFC1, RFC2—2.5 mh r-f choke.
J1—Closed circuit phone jack.
Tubes—One each, 6AG7, 815, 6SN7GT, 6L6, or 6V6.
Tube sockets—Octals. Two ceramic for r-f tubes; two bakelite for audio tubes.
Coil sockets—Two five-pin, ceramic, tube sockets.
Chassis—5x10x3-inch steel, black crackle finish.

Set the cathode resistor of the modulator tube to 1,000 ohms. Later in this article, instructions will be given for its exact adjustment.

Tune-up Procedure

Since the 28-Mc. band will be the highest frequency on which the transmitter will operate, let us get the transmitter working there first; the other bands will then be easy.

Insert the tubes in their proper sockets and any 7-Mc. crystal that will quadruple in frequency between 28.5 and 29.7 Mc. into the crystal socket. Plug in the 28-Mc. oscillator plate coil, and plug a 150-milliampere meter into the cathode jack. Connect a power supply capable of furnishing 400 to 500 volts at 150 milliamperes and six volts at four amperes to the transmitter. Do not plug in the amplifier plate coil.

Turn on the power supply, and tune *C3* to resonance. This will be indicated by maximum rise in 815 cathode current. Now, measure the 815 screen voltage. With *Sw1* across *R9* open, it should be between fifty and sixty volts. If it is not, adjust *R9* to bring the screen voltage to this value.

Turn the power off. Plug in the amplifier coil and the microphone. Turn the power on and tune *C8* to resonance, as indicated by the dip in amplifier plate current. Next, connect a load to the output coaxial fitting and adjust the spacing between *L2* and *L3* for the highest percentage of modulation and best speech quality.

COIL WINDING DATA

L1—OSCILLATOR PLATE COIL.

3.5 Mc.—36t. #18, DCC close wound.
7 Mc.—18t. #18, DCC close wound.
14 Mc.—6t. #18, DCC close wound.
21 Mc.—4½t. #18, insulated "hook-up" wire, close wound.
28 Mc.—3t. #18, insulated "hook-up" wire, close wound.

L1 wound on tube bases or 1¼-inch diameter coil forms. Coil is not tapped.

L2, L3—AMPLIFIER PLATE COIL.
BUD OEL OR B&W JEL, END-LINKED COILS.

3.5 Mc.—Unmodified, 3.5-Mc. coil.
7 Mc.—Unmodified, 7-Mc. coil.
14 Mc.—21-Mc. coil.
21 Mc.—28-Mc. coil with one turn removed from the larger winding (L2).
28 Mc.—28 Mc. coil with three turns removed from the larger winding (L2).

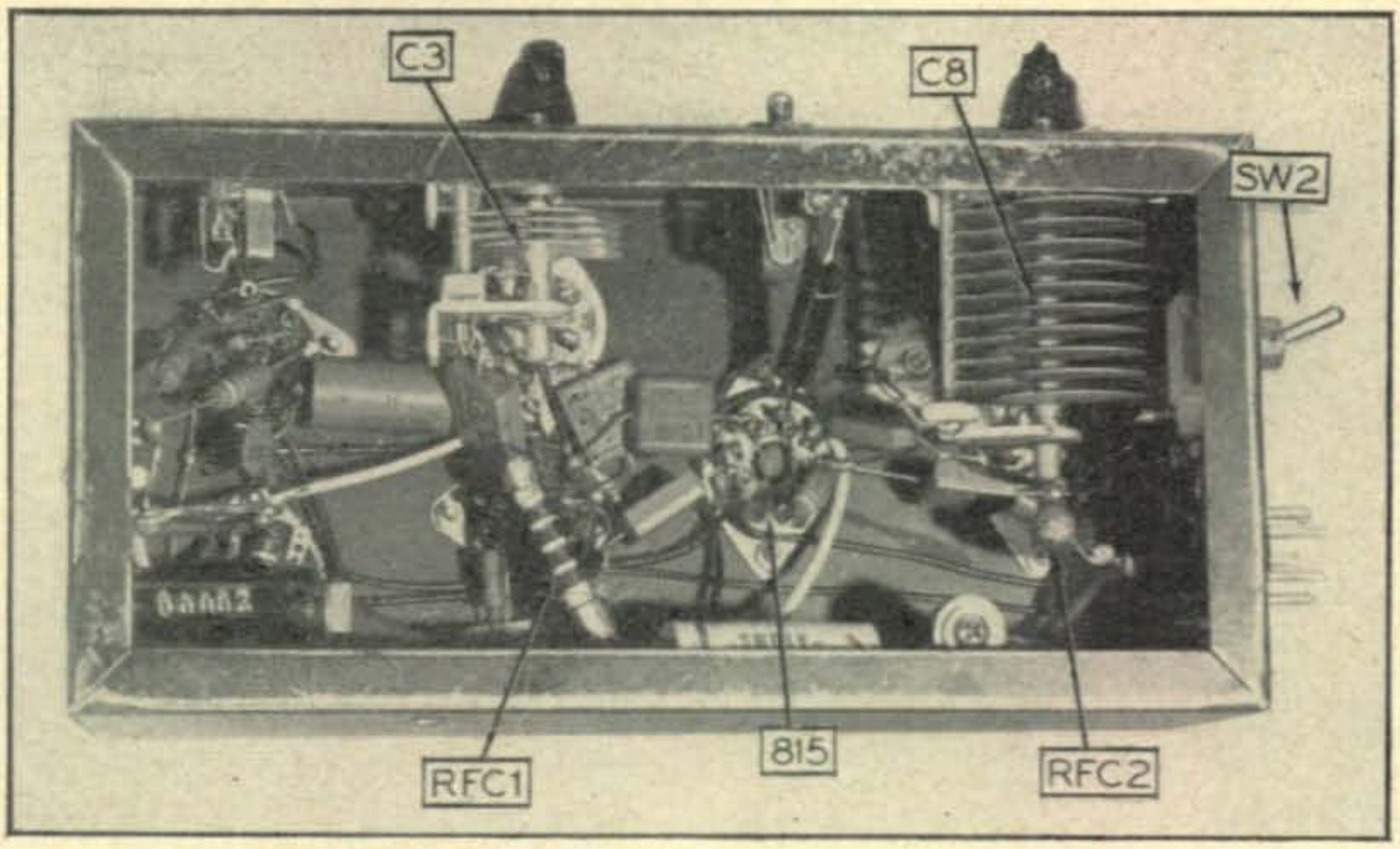


Fig. 2. Bottom view of the WØUC transmitter using an 815 in the final. It is modulated by a 6L6 in a "controlled carrier" arrangement.

This condition is achieved only with very tight antenna coupling. In fact, optimum coupling is slightly greater than that giving maximum output from the transmitter. A 25-watt, 117-volt lamp makes an excellent dummy antenna for preliminary adjustments. At optimum coupling, the total cathode current of the 815 will be approximately 90 ma. There will only be a very slight dip in plate current as the tank condenser, *C8, is* tuned through resonance.

Now, short out *R9* by closing *Sw1*. The cathode current of the 815 will drop to approximately 30 ma., and the output will also decrease. Talking into the microphone, however, will cause both current and output to increase.*

This "controlled-carrier" effect allows the 815 to "rest" during speech pauses, resulting in decreased power consumption, as well as reduced heterodyne interference.

Of course, the amount of coupling required will be different when the radiating antenna is substituted for the dummy antenna, but the requirements are the same. Antenna coupling *must be very tight for best results with this type of modulation.*

No gain control is required to regulate modulation. Normal close talking into the microphones gives best results. Cathode current will hit slightly over 60 ma. on normal voice peaks.

Results

Most of my operating is done on the 28-Mc. band, and I have QSL cards from eleven states and Canada worked with this transmitter while mobile in and around St. Louis, Mo. Often, when I get home before completing a QSO, I unplug the transmitter from the power and antenna cables and bring it in the house to finish the QSO with the aid of a small, a-c power supply and an indoor dipole.

Incidentally, the 815 produces almost as much output when operated as a frequency doubler as in straight-through operation.

A PE-103 dynamotor furnishes power to operate the transmitter.

* The actual voltages and currents obtained in this tune-up procedure will depend somewhat on the amount of grid drive to the 815. On 28 Mc., probably the maximum available drive from the oscillator will be about optimum. On the lower-frequency bands, however, grid drive will probably have to be reduced by means of C6 to around that which is available on 28 Mc.—**Editor.**

Acapulco Calling CQ!!

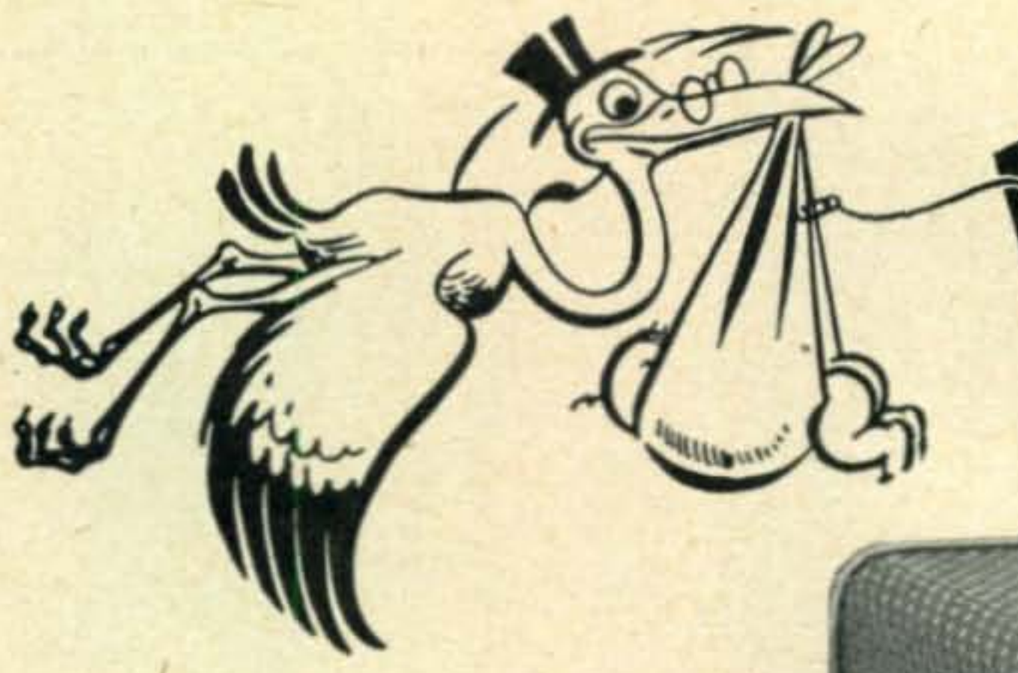
On another page of this issue we have quoted a letter from W6KW to mention a few of the "political" aspects of the forthcoming *LMRE 22nd Annual Radio Convention* in Acapulco, Mexico. In this space a few words on the "social" might be in order.

The usual convention attractions will be presented in the best possible manner. You know them all—manufacturers' exhibits, contests, sightseeing tours, official and technical sessions, plus the awarding of thousands of dollars worth of fine prizes and equipment.

Five of the leading hotels in Acapulco have been booked to accommodate the delegates. Very attractive rates for travel and accommodations have been secured. Don't forget that if you go mobile the LMRE will aid in processing and and arranging for your "XE" license.

Make this a combined Hamfest and vacation trip. The setting is practically beyond description. Acapulco boasts of a fine golf course, a new fronton court where Jai-Alai is played nightly and a new bull ring where the most popular toreros in Mexico appear. Then there's also swimming, water skiing, sailing and deep sea fishing.

There is still ample time to make arrangements to attend. Write or wire Guy Dennis, W6DI, U. S. Convention Manager, 655 First Avenue, West Los Angeles 49, Calif. Guy will immediately send you detailed information and the necessary blanks for your travel requirements.



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Mini-Ten

ROBERT M. SEE, W9OCL
1208 Bayard Park, Evansville, Ind.

A Miniaturized 10 Meter Mobile Transmitter

Have you ever tried to cram a 15-watt mobile transmitter into some of the new cars? It can be done, but it certainly isn't an easy job! The answer, of course, is to make the transmitter as small as possible, and to design it so that it can fit effectively into any available free space in the automobile. The small size of this 15-watt, 28 Mc. transmitter should make it easy to install in almost any car. It may be mounted in the glove compartment, or under the dash—in fact, almost anywhere. In our particular installation, the transmitter was mounted under the dash and to the left of the steering post. Most automobiles have a few extra holes on the dash "lip," so the transmitter shock mounts were spaced to utilize two of these holes. This little trick eliminated the need for drilling two new holes in the car.

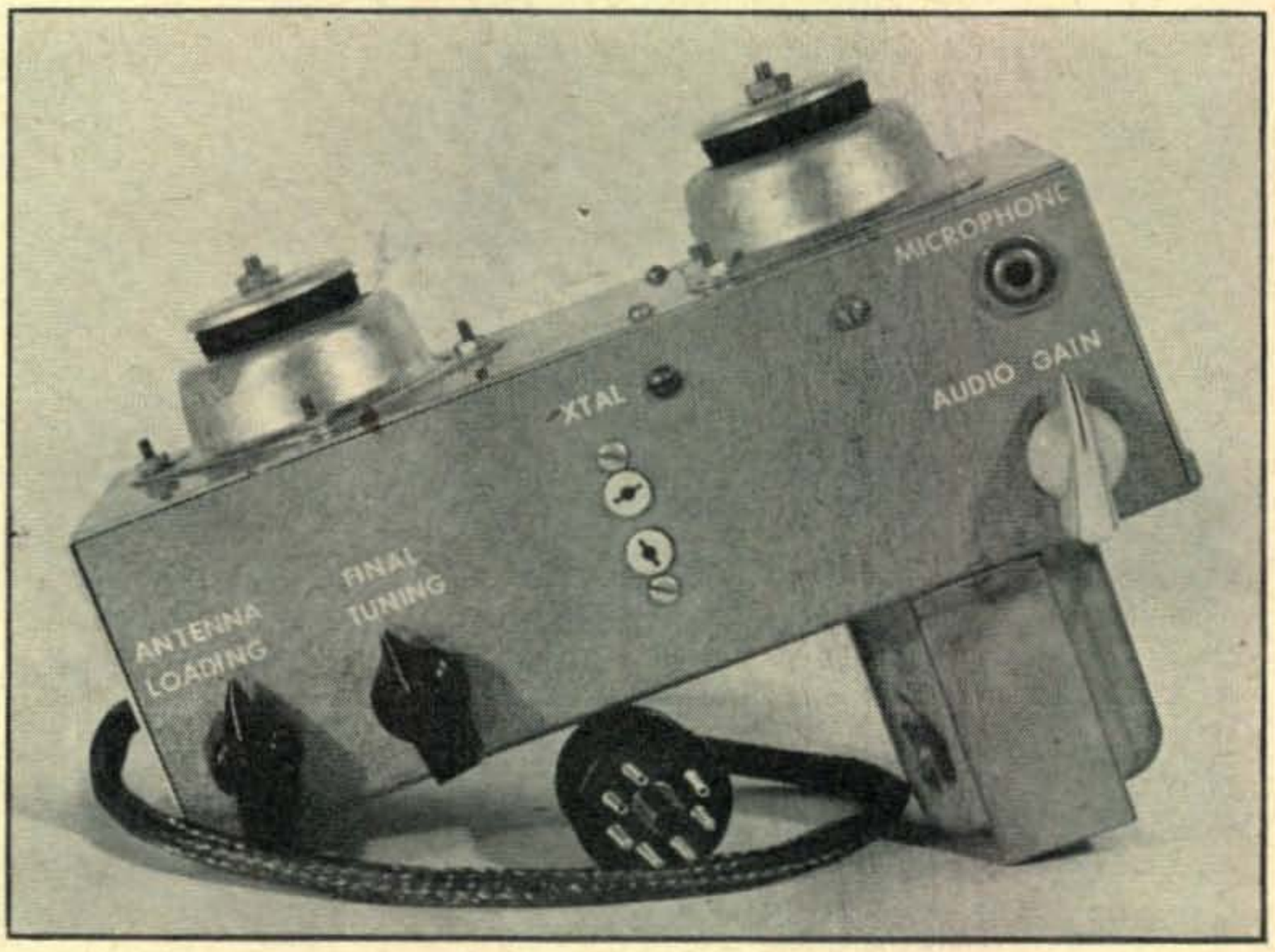
The Circuit

The complete transmitter circuit is shown in *Fig. 1*. A 6J6 twin triode is used in the exciter stage. The first section of the 6J6 serves as an oscillator-doubler, developing 14 Mc. output from a 7 Mc. crystal. The second section doubles from 14 Mc. to 28 Mc., driving the 5763 as a straight amplifier on 10 meters. With about 190 volts on the plates of the 6J6, the total exciter current drain is 18 milliamperes.

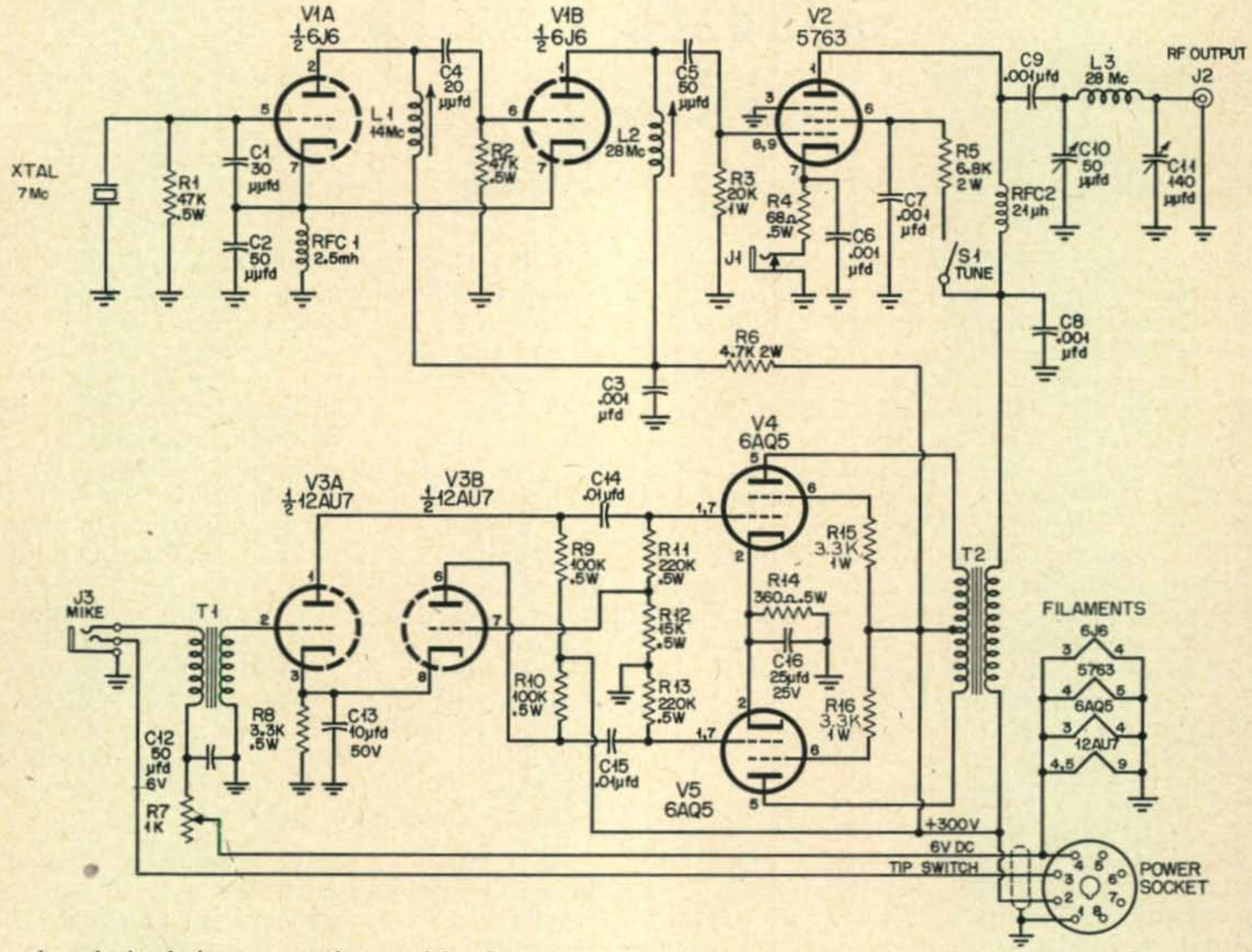
The 5763 final amplifier is coupled to a low impedance coaxial load by means of a pi-network output circuit, *C10, L3* and *C11*. A screen switch *(S1)* is placed in series with the 5763 screen resistor to open the screen supply for tune-up purposes.

A single-button microphone is coupled to the speech amplifier by means of a high-ratio transformer, *T1*. A double triode 12AU7 is employed as a single stage of speech amplification and as a phase-inverter, feeding two 6AQ5's in a push-pull class AB2 modulator. One of the many troubles with pee-wee rigs of this type is the lack of modulator power. A single 6AQ5 just won't turn the trick. It is necessary to have a good, solid 8 to 9 watts of audio power to modulate a 15-watt final amplifier. Output transformer losses in the small type modulation transformers will quickly eat up any surplus audio power! The 6AQ5 modulators may be slightly over-biased to reduce the idling plate current. Since these tubes are capable of some 15 watts of audio power, they coast easily along and deliver the needed 7 or 8 watts with a minimum of distortion, even when operating in an over-biased condition.

As a final step in the elimination of extra work, the transmitter is designed to use the regular four-section car receiving antenna. The pi-output section of the 5763 allows the transmitter to be loaded into any conventional automobile antenna capable of extending to a length of 85 inches or more. Signal strength reports indicate that this method leaves nothing



The transmitter (minus power supply) is contained within a small 8x3x3-inch box. The tubes do not project outside the box, but are mounted inside on small shelves.



to be desired in comparison with the more costly bumper-mounted type whip antennas.

Miniaturization was not carried to the extreme in this transmitter because of the increasing cost of smaller components. It would be possible, however, to put the modulation transformer inside the chassis, by using either commercially available printed circuits, or transistors in the speech amplifier. However, it was felt that the present design was a good compromise between size and cost.

Construction

The whole transmitter is built in and upon a small aluminum interlock box, measuring 8″ x 3″ x 3″ in size. *Figure 2* shows the approximate placement of the major parts within the shell of the box. Two small sub-chassis are cut from scrap aluminum and bolted into place with angle brackets and sheet metal screws. These chassis divide the box into three compartments: one about 1½″ high which contains the audio wiring, and two larger compartments, each slightly over 3″ high, which contain the r-f circuitry. On the lower chassis are mounted the sockets for the 12AU7 speech amplifier tube *(V3)*, and the two sockets for the 6AQ5 modulators *(V4* and *V5)*. On the top chassis is mounted the 6J6 oscillator tube socket *(V1)*, and the socket for the 5763 *(V2)*. Take note that good, ceramic sockets and coil forms should be used. The garden-variety "mud" sockets and forms will give poor results and absorb up to 50% of the available grid drive.

On the top chassis are also mounted coils *L1* and *L2*, wound on the small CTC (Cambridge Thermionic Co.) coil forms, tuned by brass slugs. These coils resonate with the circuit and tube capacities to the desired frequencies. The microphone jack *J1*, and the

C1—33 µµfd., El-Menco or Centralab D6-300.
C2, C5—50 µµfd., El-Menco or Centralab D6-500.
C3, C6, C7, C8, C9—0.001 µfd., Centralab DD-102.
C4—20 µµfd., Centralab D6-200.
C10—50 µµfd., variable, Hammarlund HF-50.
C11—140 µµfd., variable, Hammarlund, HF-140.
C12—50 µfd., electrolytic, Aerovox, SRE Bantam.
C13—10 µfd., electrolytic, Aerovox, SRE Bantam.
C14, C15—0.01 µfd., Centralab DD-103.
C16—25 µfd., electrolytic, Aerovox, SRE Bantam.
J1—Closed circuit jack.
J2—Co-ax connector, Amphenol UG-290/U.
J3—3-circuit mike jack.
L1—38 turns, #28 enam. on CTC LS5 form.
L2—18 turns, #20 enam. on CTC LS5 form.
L3—10 turns of B&W 3010 Miniductor.
R1, R2—47,000 ohms, ½w.
R3—20,000 ohms, 1w.
R4—68 ohms, ½w.
R5—6800 ohms, 2w.
R6—4700 ohms, 2w.
R7—1000-ohm wire wound potentiometer.
R8—3300 ohms, ½w.
R9, R10—100,000 ohms, ½w.
R11, R13—220,000 ohms, ½w.
R12—15,000 ohms, ½w.
R14—360 ohms, ½w.
R15, R16—3300 ohms, 1w.
RFC1—2.5 mh., choke, National R-50.
RFC2—21 uh., choke, Ohmite Z-28.
S1—SPST toggle.
T1—Microphone transformer, Stancor A-4706.
T2—Modulation transformer, Thordarson T-21M52.
Xtal—7.125 to 7.425 Mc.

Fig. 1. Parts list and wiring diagram.

audio gain control, *R7* mount on the box wall in the bottom compartment. The crystal socket, and screen switch *S1*, mount on the box wall in the second compartment, and the final amplifier tuning controls *C10, C11,* and the output jack *J2,* mount on the box walls in the third, or top compartment. The microphone transformer *T1* mounts on the "back" of the box, opposite *J3* and *R7*. The modulation transformer, *T2,* mounts on the "side" of the box, next to *T1*.

When the transmitter is assembled, and mounted in the car, the "side" of the box becomes the bottom, with the modulation transformer hanging by its head under the transmitter, as shown on page 37. The two shock mounts are mounted on the free side of the box, and the whole assembly bolted together to form one closed unit.

How it is Assembled

Before the sub-chassis are drilled for components, they should be placed in position in the box, and the tube sockets, coils, condensers and other major components temporarily placed in the box. It is necessary to position *L1* and *L2* so that the free ends of the coil forms do not hit the 6AQ5 tubes mounted on the bottom sub-chassis. When all components are found to fit satisfactorily, the sub-chassis plates may be removed and drilled for tube sockets and coils. The sub-chassis may then be wired. It is at this point that so many miniature transmitters seem to go to pieces, so to speak. By following a few simple rules, however, all components will fit neatly into place:

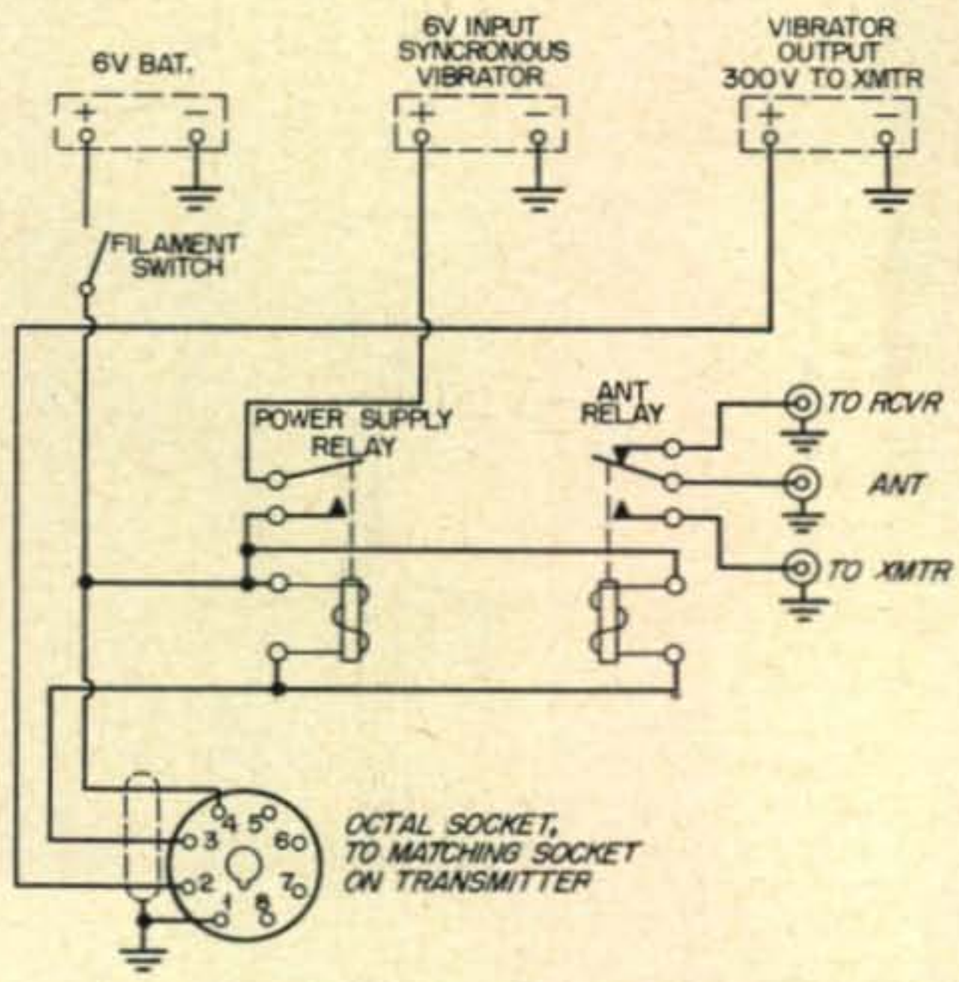
1. Use small diameter plastic hook-up wire for all leads. The smaller the wire, the greater the ease in wiring to the small socket pins.
2. Mount as many components on the tube sockets (by their own leads) as possible. For example. *C1* should be connected between *pin 5* and *pin 7* of socket *V1a. C2* should be connected between *pin 7* and *pin 4* (gnd.). If *C1* and *C2* are the midget silver mica condensers that are on the market (made by *El-Menco*) there will be no trouble mounting them directly on the socket pins. If, however, *C1* and *C2* are bulky, "postage stamp" mica condensers, you will have quite a job cramming them into place. *R1* should connect from *pin 5* to *pin 4* (gnd.) of *V1a.* A ¼-watt resistor may be used here, if desired. *C4* mounts directly between *pin 2* and *pin 6. R2* goes from *pin 6* to *pin 4.* And so on. *C6, C7,* and *R3* mount directly on the 5763 socket.
3. Use tie points. Don't let components flop around. If you do, your mobile rig will fall apart sooner or later!

Wiring

Wire the r-f sub-chassis first so that it may be tested before the audio section is mounted. The two chassis should be wired completely as possible before attempting to mount them in the box. Leads which go from one compartment to another should be left sufficiently long for eventual connection. They should be insulated with short pieces of spaghetti tubing where they pass through the plates.

After the r-f deck is placed in the box, the modulated 300-volt lead should be tied to a small insulated terminal point. This point serves as tie point for *C8* and one end of *RFC2*. The other end of *RFC2* is soldered to a small tie point, which also supports one end of *C9*. A lead from this tie point passes down through the r-f chassis and connects to the plate *(pin 1)* of the 5763. All the above-mentioned components mount above the r-f chassis, as does *C10, C11* and *L3*.

After checking the r-f portion of the transmitter (to be discussed later), the modulator deck should be wired and bolted into place. The modulation transformer is mounted on the bottom of the box, and the primary leads brought into the audio section through a rubber grommet. The secondary wires of *T2* are brought through a grommet into the center section of the transmitter. The modulation transformer leads are connected for a plate-to-plate load impedance of 8000 ohms when the r-f load is connected for 6000 ohms. The microphone transformer is mounted on the back of the chassis, and the leads brought through a rubber grommet into the audio compartment "below deck." The power cable is brought into the center compartment, also through a rubber



Suggested power and switching circuit.

grommet, and is tied securely to a 4-terminal lug strip, mounted on the "bottom" wall. As a final step, the plate coil, *L3,* is mounted between *C10* and *C11* in the top compartment. All wiring should now be checked.

Preliminary Check-Out

Connect the power leads temporarily to the r-f deck. A 300-volt a-c-operated power supply may be used for these checks, and the filaments of the tubes may be run on a.c. Turn *S1* to

the "off" position, so that the 5763 will not draw plate current. Apply filament and plate voltage, and adjust *L1* and *L2* for maximum grid current to the 5763. This current may be read by plugging a 10-ma. meter in *J1*. Be sure to use a 7-Mc. crystal whose 4th harmonic falls within the limits of the 28-Mc. phone band. When the coils are properly tuned, a current of about 3½ ma. should be read on the meter plugged into *J1*. Now, temporarily place a short across *J2*. Close *S1*, and the 5763 stage is now in operation. Tune *C10* (final plate circuit tuning condenser) for a dip in the cathode current of the 5763. Next, remove the short across *J2*, and connect a 10-meter antenna, or a dummy load capable of dissipating 10 to 15 watts at 10 meters. It will be found that the loading of the 5763 can now be controlled by the amount of capacity in *C11* (antenna loading condenser). Decreasing the capacity of *C11* will increase the antenna loading. For correct operation at 300 volts, the total cathode current of the 5763 at resonance will be about 55 to 53 milliamperes. Of this current, 50 ma. will be plate current, 5 ma. will be screen current, and about 3 ma. will be grid current.

Current Drain

When the r-f circuitry is working properly, the modulator may be connected, and the modulator tubes plugged in their respective sockets. The three audio tubes should draw about 45 milliamperes total current with no modulation. Thus the total transmitter current drain without modulation is:

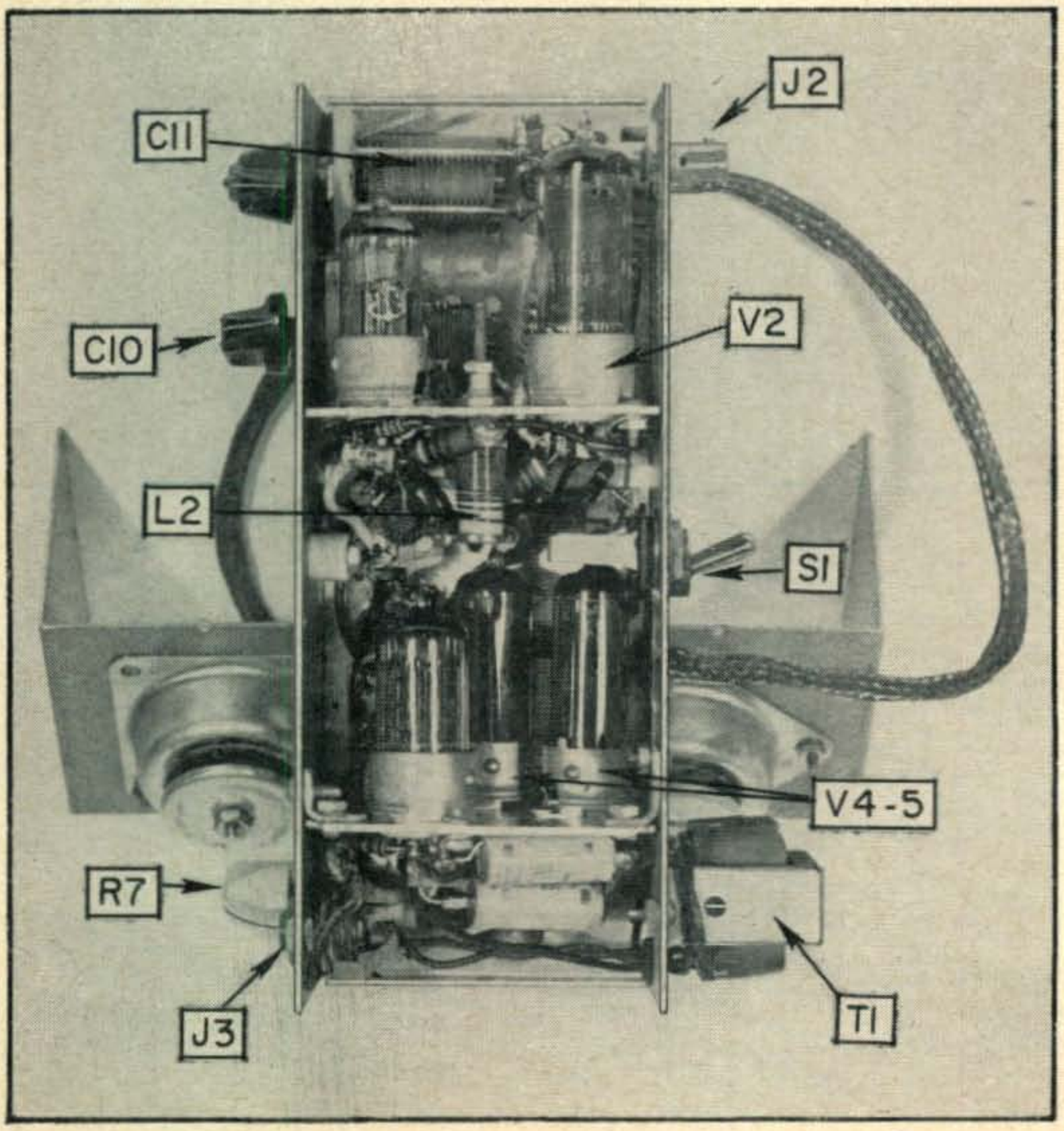
6J6 exciter	18 ma.
5763 (plate & screen)	55 ma.
Audio stages	45 ma.
Total current drain without modulation	118 ma.

Under 100% modulation, the plate current of the 6AQ5 tubes will kick up slightly, making the total current drain about 125-130 milliamperes. The best check for proper operation of the modulator is to operate the transmitter with a temporary antenna, and listen to it in a remote receiver. If the filaments are run on a-c during this test, disconnect the 6-volt lead to *R7*, and run the microphone from a separate 6-volt battery. Any carbon microphone similar to the surplus T-17 unit will give good results.

As a final step, a series of ventilation holes may be drilled in the walls of the r-f and audio sections to allow air circulation around the tubes. This was done as an afterthought, but a strong suggestion is made to do this before the final assembly step to save the chore of picking metal filings out of the sockets and associated wiring!

The antenna relay for the transmitter is mounted on the firewall of the car at the base of the antenna, and is operated by the circuit which controls the vibrator supply input relay. The control for this circuit is the switch in the 7-17 mike. The filament switch is located on a small control box mounted on the steering column of the automobile.

The filament drain from the car battery is 2.4 amperes, and the total primary drain of the transmitter is less than 15 amperes, which means that there is no need to install a heavy duty battery or generator in the car. Thus, another obstacle is overcome for the Ham who doesn't want to make a lifetime project of "going mobile." The many enjoyable contacts this transmitter has provided the writer have proved that this *is* an easy way of getting a mobile rig on the air!



(Figure 2)
This view shows the location of the two shelves inside the chassis box. Ventilation holes permit the heat to escape.

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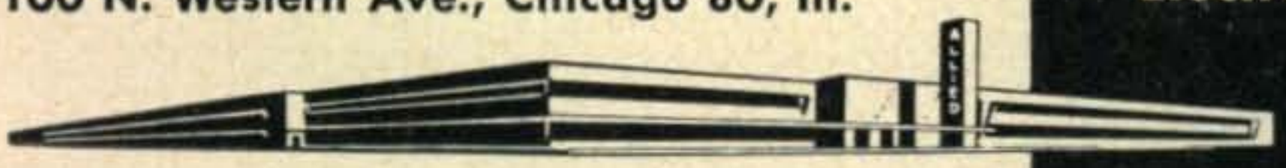


The Leading Amateur Supply House .

Mobile Loading Coil Review

HERBERT S. BRIER, W9EGQ

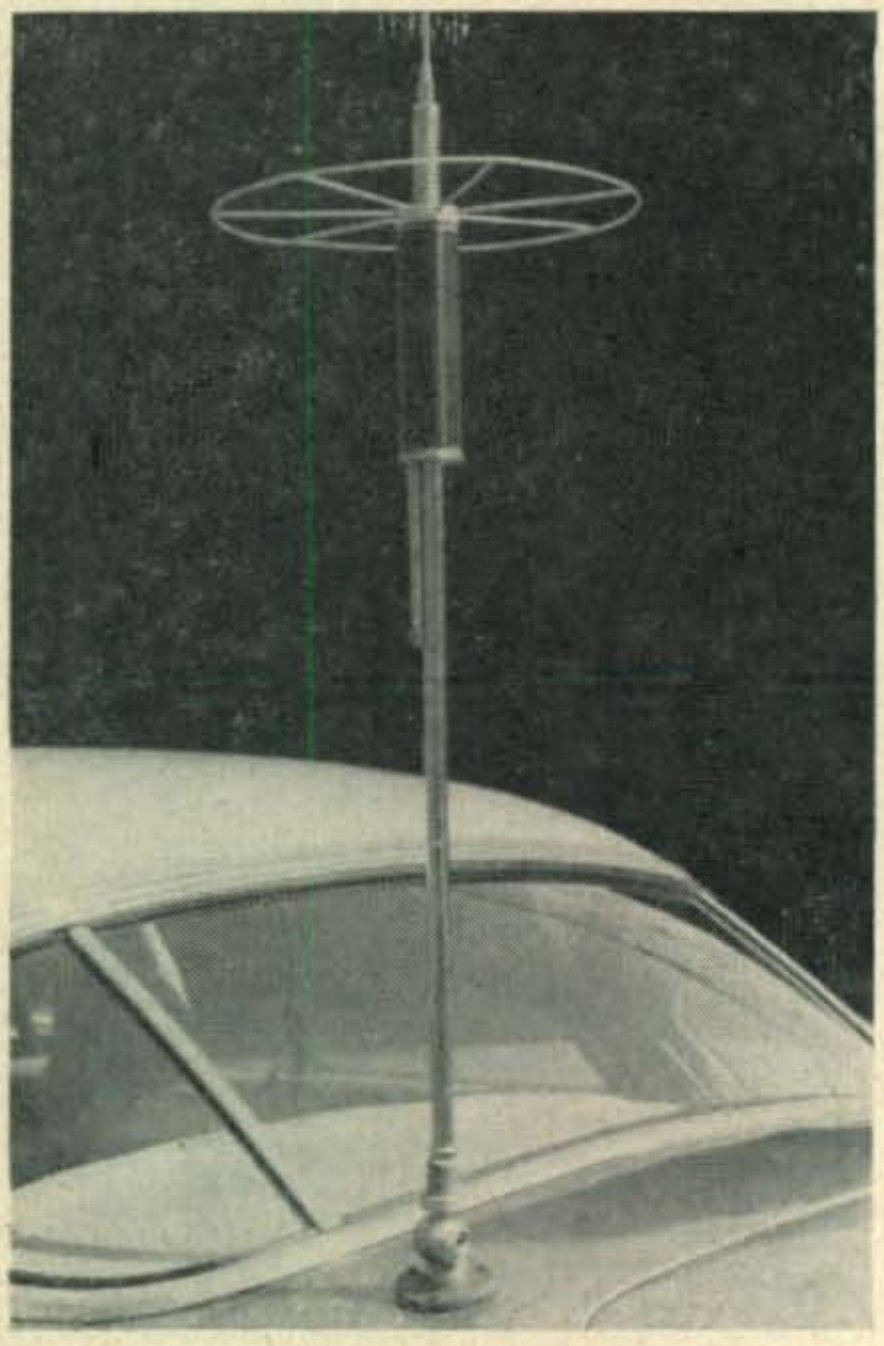
Department Editor, CQ

Whenever mobile operators get together the subject of antennas and loading coils soon becomes a major topic of conversation. By the very nature of his operation, the mobile Ham is at the mercy of his antenna—far more than the home station with a long wire or a beam.

Because there are a wide variety of combinations, electrical and mechanical, that will make for reasonable efficiency when attached to the family chariot, there has been an increasing number of mobile antennas on the open market. This article is a survey of those antennas—some quite familiar and some not so familiar. Regardless of their commercial advertising prestige this is the story of each one.

Base vs. Center Loading

Before diving into the "Review" with both feet, it might be advisable to say a few words apropros the old question of center vs. base loading a mobile antenna.



An example of near-center loading with a "capacity hat" and single-band fine tuning is this W3GH "Green Hornet" mobile antenna. See text for details.

VE3BLW has recently shown[1] mathematically that a typical 9-foot base-loaded antenna on 3.8 Mc. has a theoretical radiation efficiency of 3.1%. A center-loaded antenna under the same conditions has a theoretical efficiency of 4.86%. Experimentally, W2AEF has reported to me in private correspondence that his field strength measurements at a distance of one mile have approximately verified these figures. W2AEF says that center loading is about 1¼ db. better on 4 Mc., ½ db. better at 7.2 Mc., but at 14.2 Mc. the difference between base and center loading could not be measured.

Even at its best, the use of center loading without a "capacity hat" would appear to have a negligible effect on signal reports. Originally an advocate of center loading, W2AEF now supports base loading as the only solution. His 65 countries, plus mobile WAC, add some weight to these thoughts.

The mechanical problems involved in center loading can be overcome through the use of such items as the VAARO "Whip-Flexor." Many Hams experience remarkably good results with center loading and the opinion has often been expressed that the deciding factor may be the position of the antenna on the automobile.

The trend towards the use of "capacity hats" is worthy of considerable note. Obviously it adds something to the mobile antenna—even if it is only the reduction of the number of turns in the center loading coil. W8OGK believes that may have some effect on the vertical angle of radiation, but immediately concedes that this might be hard to prove. Similar claims have been made for base loading of the mobile antenna.

Commercial Loading Coils

Before describing the following coils I wish to thank the various manufacturers for their cooperation in supplying full information and sample coils for use in preparing this article without reservations or restrictions.

Do not conclude that any of the coils described are inefficient, because they differ from a theoretical ideal high-*Q* coil. All mechanically

1. "Short Antennas For Mobile Operation", J. S. Belrose, VE3BLW, p. 30, **QST** Sept. 1953.

practical loading coils represent compromises to obtain a high *Q*, physical strength and good weathering qualities in a size to minimize wind resistance and at the same time to be reasonably inconspicuous when installed on the automobile. Every manufacturer has his own idea of how to combine these and other requirements in one coil, as the descriptions plainly indicate.

All the coils may be used for either base loading or center loading, unless otherwise noted. When base loading is used, the coil should preferably be mounted about a foot up from the base insulator and a foot or more from the car body, to minimize loss of *Q*. A coil used for base loading will have about a quarter to a third less turns than one used for center loading the same antenna.

The 75-meter coils are described more fully than the others because this band (and 160 meters) demand the most of a loading coil. Incidentally, don't sell 160 meters "short" as a mobile band. It can render excellent local coverage. Although no 15-meter coils are described, there is no reason why a 20-meter coil cannot be pruned down for this band.

A capacity hat, described in conjunction with certain coils, may be used with any of them for slightly increased antenna efficiency, but will require pruning a few extra turns from the loading coil.

It is worthy of special comment that all manufacturers of mobile loading coils agree that polystyrene is not a suitable insulator where high strength is required. It shatters and breaks under impact, especially in low temperatures. When exposed to the weather and direct sunlight it discolors to a dirty yellow and eventually crumbles. If I remember correctly, it is the ultra violet content of direct sunlight that does the damage.

Beckwith "Skywave" Loading Coil

The *Beckwith* "Skywave" loading coils are handmade in order to have the highest possible *Q;* they are, therefore, quite large. The 75-meter coils, for example, are three inches in diameter. With the weather shield in place, this increases to almost four inches. They are wound of #18 wire, 12½ turns-per-inch. Four narrow insulating strips support the turns. A center rod of low-loss fiber capped with aluminum fittings supports the weight of the antenna.

Coils for 20 and 40 meters are similar, except they are smaller and wound with heavier wire. The weather shield is constructed of clear poly vinyl chloride, which retains its strength and insulating properties and does not discolor under exposure to the weather.

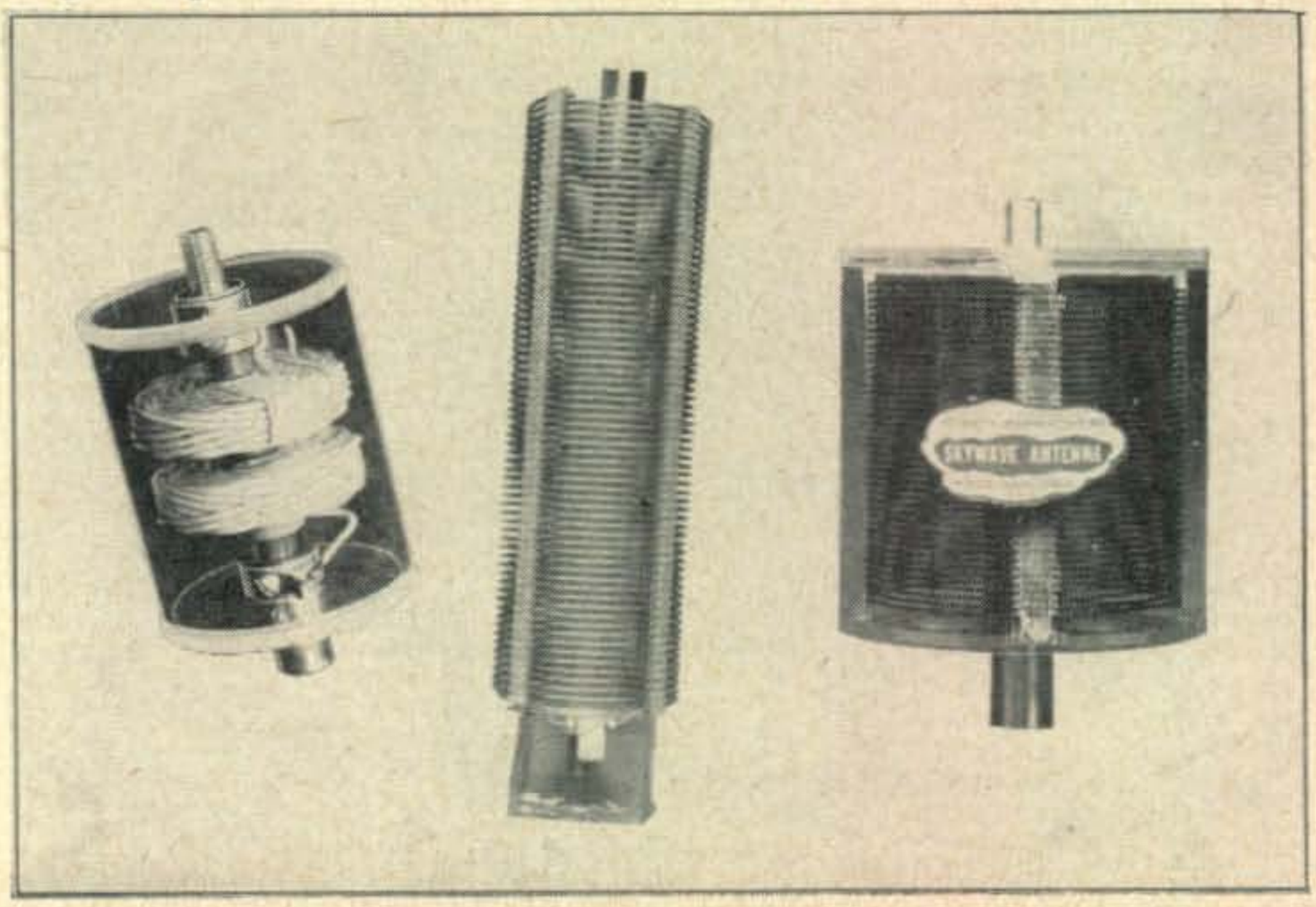
For best results, the manufacturer recommends installing the coil in the antenna about three feet from the base. This position gets the coil high enough so that its *Q* is not reduced too much by close proximity to the car body and permits the power radiated by it to reinforce that radiated by the whip itself. Also recommended is a ten-inch capacity hat mounted about four inches above the coil. Installing it requires pruning several turns from the coil, but improves the radiation efficiency of the antenna. Varying the upper whip length is suggested for shifting frequency in the band.

W8OGK reports that his 75-meter antenna, complete with coil, capacity hat and a total length of approximately eleven feet from the heavy spring equipped bumper mount, tilts back about forty-five degrees at a speed of seventy-five miles an hour.

A complete conversion kit, consisting of coil, hat, and fourteen-inch adjustable top section is available; the coil and individual components may be purchased separately from the *Beckwith Manufacturing Company, 208 Curryer Road, Middletown, Ohio.*

Dakota All-Band Coil

As the name implies this coil was developed in the Dakotas by WØOXC and WØBJV. It is particularly sturdy and will withstand considerable shock and abuse. The coil itself is wound



Three entirely different coil shape configurations are seen in this photo. On the left is the Mallard coil, in the center is the K-W "Dyna-Q" coil, and on the right the Beckwith "Skywave" coil.

on 2″ diameter lucite stock and consists of 70 permit resonating the entire antenna to the turns of #16 nylclad wire. The form has been grooved so that the coil turns are rigidly mounted.

The inductance of this coil is varied to secure loading on all the bands from 10 through 80 meters. The method used is to provide a shorting slider outside the coil. This slider is wound of ⅛-inch bronze welding rod coiled to fit the slider rod and to make contact with the coil winding. The insulation has been removed from the wire in a strip ½-inch wide the entire length of the coil.

The end plates are ⅜-inch steel tapped to accommodate standard mobile mounts and whips. Four self-tapping steel screws hold the plate to the lucite form.

The open weather construction has been reported as having worked very well and that contacts have been maintained in heavy rain storms without re-adjusting the coil.

Further information on this coil may be obtained from *Burghardt Radio Supply, Inc., Box 41, Watertown, South Dakota.*

The Johnson Bi Net and Whipload-6

The *Johnson Bi Net* is an unusual loading coil. Connected in the center of an eight-foot whip, it permits operation on the 14 Mc. and 28-Mc. bands without re-adjustment. It is a multi-resonant circuit, which is series resonant on 28 Mc. At the same time, it acts as a loading coil to resonate the antenna to 14 Mc.

It is theoretically possible to resonate a mobile whip to additional bands with *Bi Nets* of the proper dimensions.[2] However, better overall results are obtained on the lower frequencies with a conventional loading coil.

The *E. F. Johnson Company* has just announced a new "all-band" loading coil. It is their model 250-26 "Whipload-6." It will baseload a standard length whip to any frequency between 3.5 Mc. and 29.7 Mc. Frequency of operation is chosen by means of a built-in rotary switch. In addition, on the lower-frequency bands, a low-capacity variable condenser is connected across a portion of the inductance to permit resonating the entire antenna to the exact operating frequency.

The condenser is designed so that it will not vibrate out of adjustment, and a blank calibration scale permits exact calibration for the individual installation.

Much effort was spent in designing the *Whipload-6* for lowest losses. The inductance is "air-wound" with polyethylene support strips, and its form factor was chosen for highest *Q* on the 4-Mc. band. A maximum power rating has not yet been established for the coil, but it will handle the output of a 70 watt transmitter without difficulty. The coil may be used in conjunction with a *Bi Net,* if desired, although it will work equally well without it.

Johnson products are manufactured by the *E. F. Johnson Company, Waseca, Minn.,* and are available through amateur supply houses.

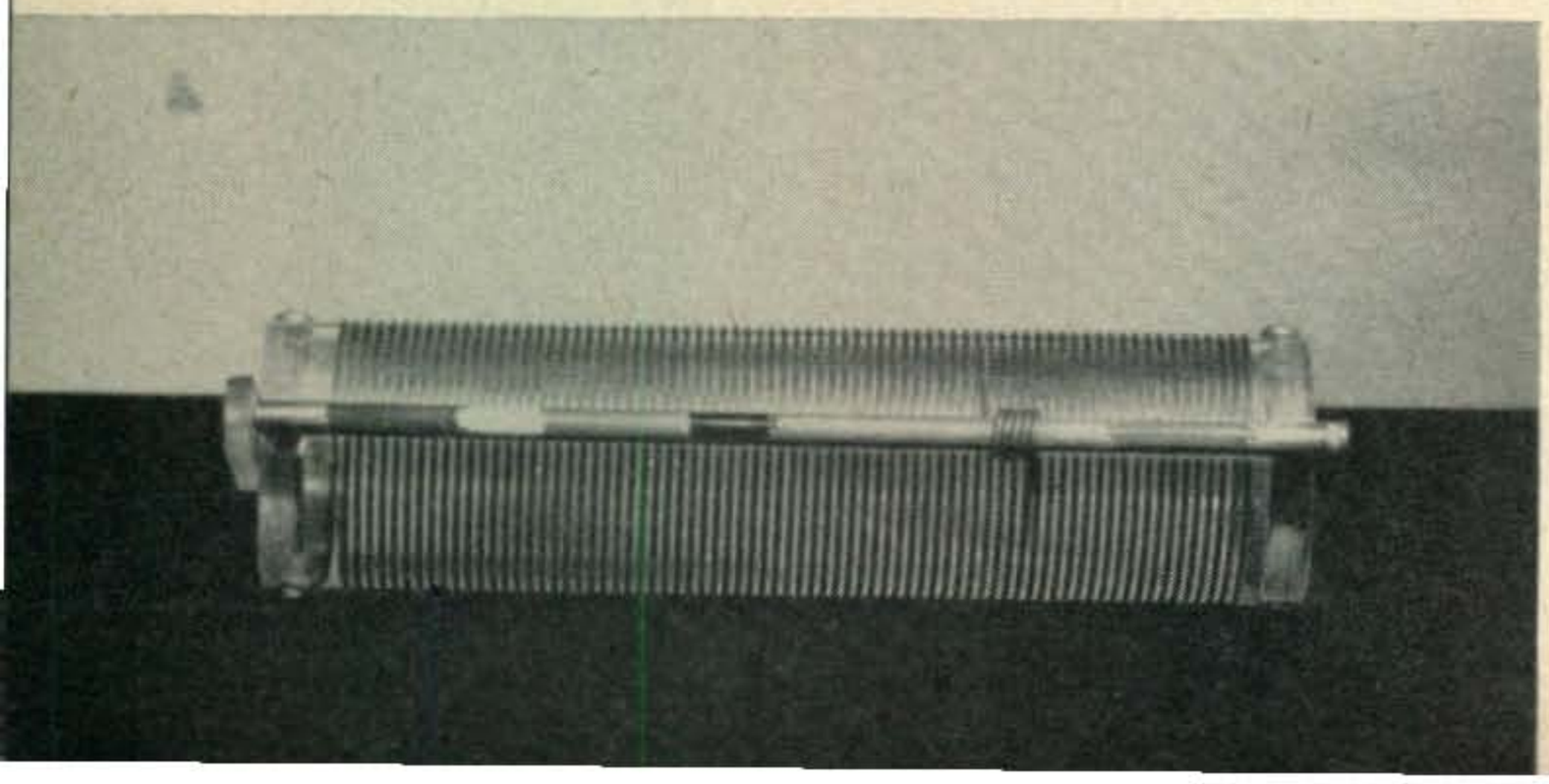
K-W "Dyna-Q" Mobile Loading Coil

The *K-W* "Dyna-Q" loading coil is an "all-band" (3.5 to 30 Mc.), air-wound coil. It is ten inches long and 2⅜ inches in diameter. A rugged center insulator of *Eastman* cellulose acetate butyrate plastic with heavily nickel-plated fittings carries the weight of the antenna.

Tuning is accomplished by means of movable taps. Once they are properly placed, changing the resonant frequency of the antenna from band to band is done simply by moving a copper clip to the proper tap. To minimize losses the turns are shorted out from the top of the coil where current is low. For 28-Mc. operation, when the entire coil is normally shorted out, a heavy silver-plated strap at the bottom of the coil accommodates the shorting clip.

A feature of the "Dyna-Q" coil is the absence of a weather shield. Its omission reduces wind drag, and Mr. Charles Kaetel, W9SNK, of *K-W Engineering,* reports that extensive tests in all types of Wisconsin weather indicate that it is no more susceptible to antenna detuning in inclement weather than antennas equipped with conventional covered coils. The bright finish of the wire is preserved by spraying the coil about twice a year with an insulating spray.

2. Orr, **RADIO AMATEURS' MOBILE HANDBOOK,** p. 109.



This is the Dakota All-Band coil. The inductance may be varied by moving the slider up and down on the outside edge of the coil winding. The coil form is designed to withstand considerable shock and abuse.

The *K-W Company* recommends that the "Dyna-Q" coil be placed not more than twenty-four inches up from the base. This position gives high signal strength and reduces both antenna sway and deloading while in motion. It also improves the eye appeal of the installation.

The "Dyna-Q" coil may be obtained through jobbers or directly from the manufacturer, The *K-W Engineering Works, 3145-A North 48th St., Milwaukee 16, Wisconsin.*

Mallard Loading Coils

Ul-Rad "Mallard" loading coils are manufactured for all amateur bands, 160 to 20 meters.* They are enclosed in clear plexiglass housings tinted a different color for each band. All are 2¾ inches in diameter and 2¾ inches long, except the 20-meter coil, which is about four inches long. The center rod that supports the weight of the antenna is Rexolite, a special form of bakelite noted for its strength and low-loss properties. The coils may be used for either center or base loading; *Ul-Rad,* however, recommends the latter.

Electrically, the coils feature controlled *Q* to match the band for which they are designed, a feature that merits some elaboration. The higher the *Q* of its loading coil, the better a loaded antenna will radiate on its design frequency. But an extremely high *Q* in the coil results in an antenna that will accept power and radiate well over only a very narrow range of frequencies—sometimes as little as ten kilocycles on 75 meters. On the other hand, a lower *Q* coil reduces antenna efficiency slightly on the design frequency.

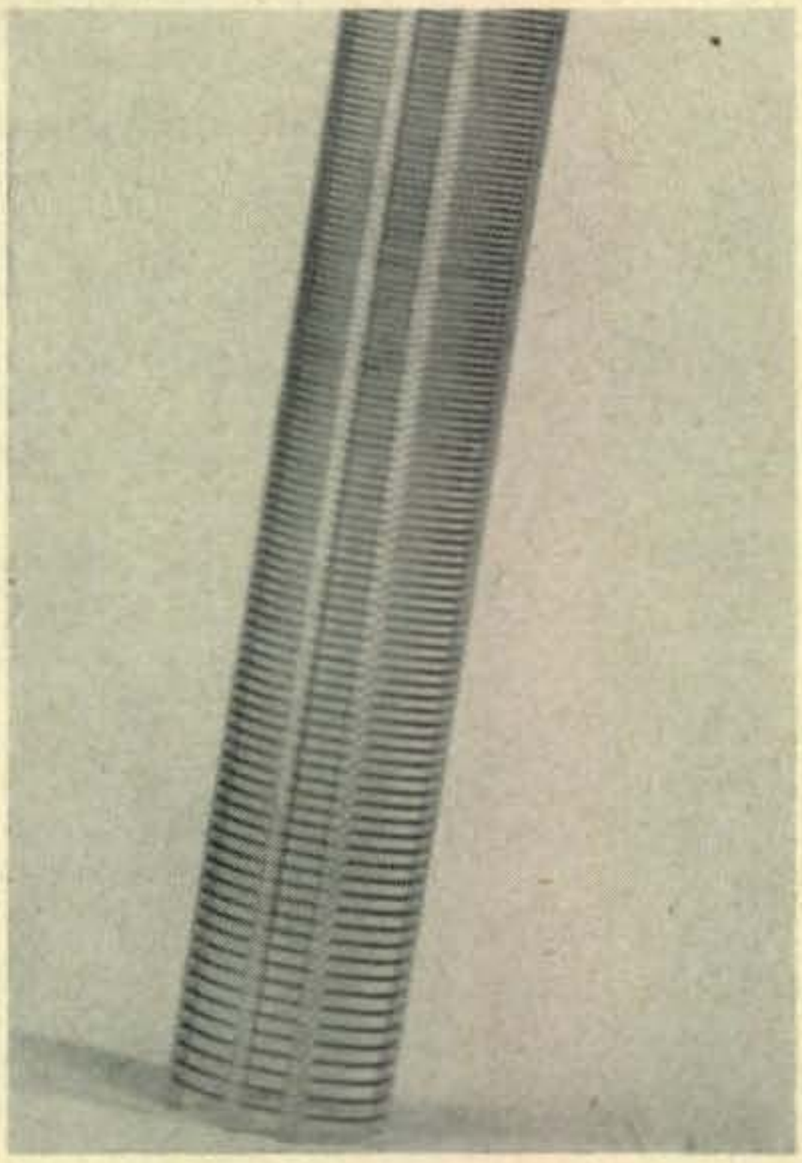
When a 75-meter "Mallard" coil is used in a base-loaded antenna (which is inherently broader tuning than a center-loading), the operating frequency can be shifted up to 100 kilocycles either side of the center frequency while still retaining high radiation efficiency.

Coil *Q* is controlled by design, not by increasing the d-c resistance of the windings. In fact, they have just been redesigned to use a larger size of wire in order to decrease their resistance. On 20 meters, it is not necessary to modify the *Q* of the coil to get full band coverage; therefore the coil for this band has extremely high *Q*.

"Mallard" products are available through your parts distributor or, if he does not have them, from *The Ul-Rad Corp., 2519 Niles Avenue, Saint Joseph, Michigan.*

Master "Hy-Q" Loading Coils

Master "Hy-Q" mobile antenna coils feature "air" inductors space wound on glyptal-coated wire and are housed in clear plastic cases for weather protection. A center rod of low-loss fiber, with plated brass fittings, supports the



The "666" Coil

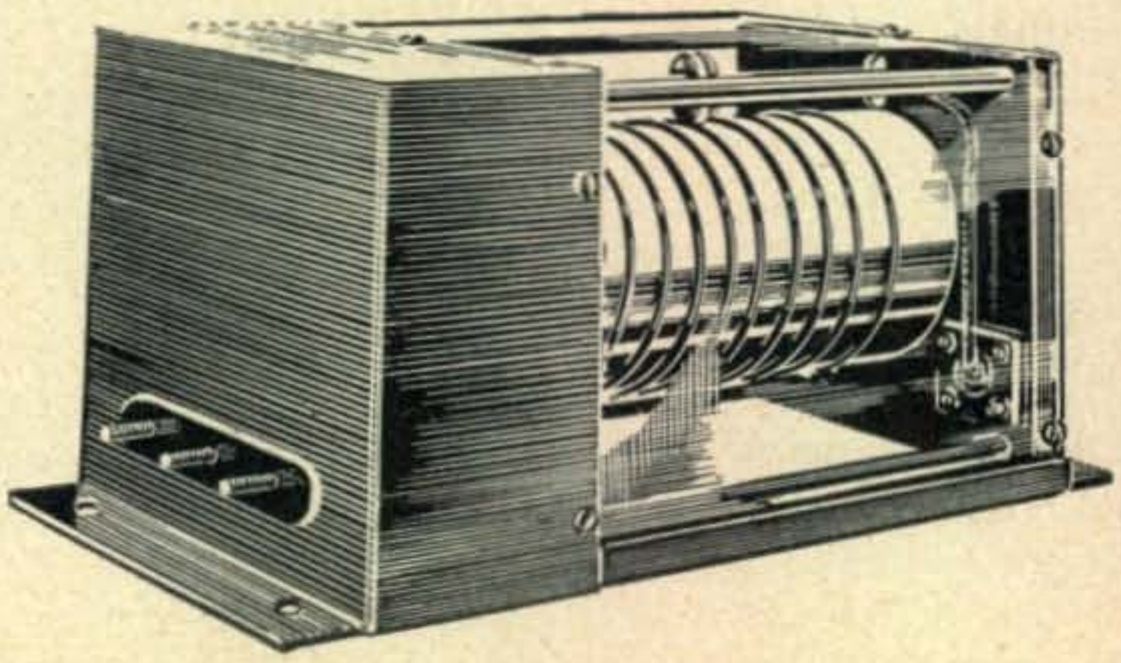
weight of the antenna. All coils are 2⅜ inches in diameter, and vary in length from 3½ inches for the 14-Mc. coil to 7½ inches for the 3.5-Mc. unit. Weights vary from 7½ to 12 ounces.

The latest addition to the Master Mobile line is the No. "666" All-Bander coil. This coil is an unusual departure in that the winding throughout the coil is tapered. This non-linear winding improves the constant *Q* characteristic of the coil and enables it to be loaded on all amateur bands and commercial frequencies between 3.7 and 30.0 Mc. The variable tapping arrangement consists of a slider making a strong positive contact. The support is a fibre-glass bar.

"Hy-Q" coils are manufactured by *Master Mobile Mounts, Inc., P.O. Box 1817, Los Angeles 36, Calif,* and are available from amateur parts distributors throughout the country.

Morrow Motor-Driven Inductor

Morrow has just announced a new motor-driven inductor, the "MVL-50." It is designed to be mounted at the base of a mobile antenna, usually in the automobile trunk, and connected



Morrow Motor Inductor

* The company also makes a special hidden loading coil for use in unmarked police patrol cars operating around 40 Mc. It is mounted under the hood to load an inconspicuous, broadcast whip.

between the antenna and feed line to supplement the regular loading coil. A three-wire control cable and a reversing switch permits resonating the antenna to the desired frequency from the operating position.

The inductor is wound of silver-plated wire on a rotary ceramic form and has a maximum inductance of 14 microhenries. This is sufficient to resonate the antenna at any frequency within an amateur band, after the external loading coil is adjusted to resonate the antenna at the high-frequency end of the band with the rotary inductor set at minimum inductance. In fact, the inductance is sufficient to resonate a standard mobile whip to 14 Mc. or higher without the aid of an external coil. However, losses are lowest when just sufficient inductance is used in the auxiliary coil to resonate the antenna across the band.

The "MVL-50" is very conservatively rated to handle 100 watts. Its motor and gears are completely enclosed to protect them from dirt and damage.

The new *Morrow* "Top Hat" is an all-aluminum capacity hat for use with any mobile antenna.

These products are made by the *Morrow Radio Manufacturing Company, 2794 Market St., Salem, Oregon,* and are available through amateur supply houses.

Premax Loading Coils

Premax series "B" mobile antenna loading coils are available for the 4 Mc. and 14-Mc. amateur bands and for the marine, CAP, and police frequencies between 2000 kc. and 4600 kc. They are wound on impregnated hardwood forms and are covered with flexible plastic insulation for weather protection. Like other *Premax* products, the coils are engineered primarily for commercial service; therefore, ruggedness and long life have been stressed in their construction.

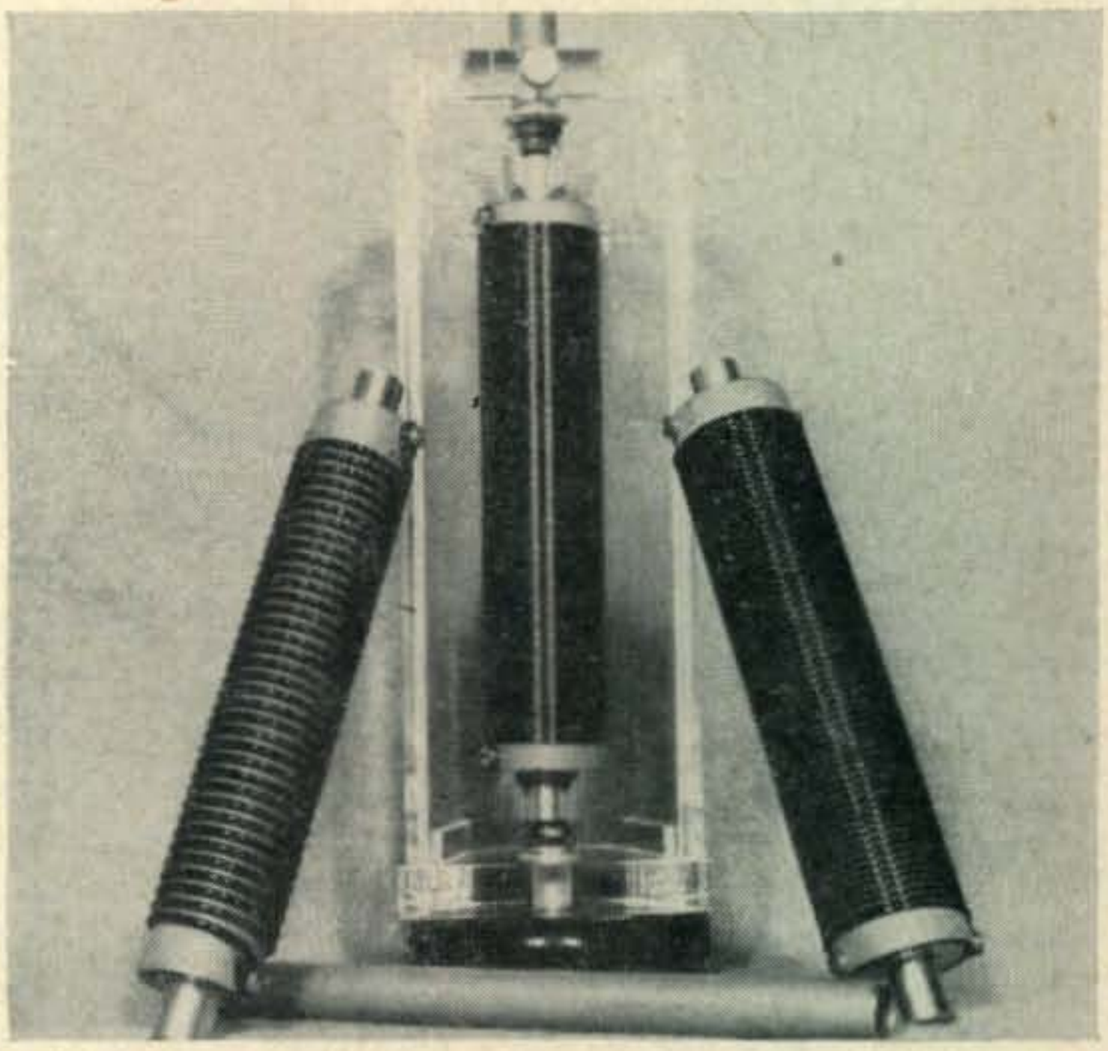
The coils are designed for center loading with a 6-foot whip above the coil and a 2-foot rod below it. However, they may also be used to base-load a mobile whip. The coils may be purchased individually or as part of a complete mobile antenna. The antenna is available with a flexing spring directly below the coil or without the spring. The coils and antenna will fit any standard mobile mounts and other fittings.

Premax Products are manufactured by a division of *Chisholm-Ryder Co., Inc., Niagara Falls, N. Y.,* and are available through most amateur supply houses.

Sherrick Antenna Loading Coils

The "Sherrick" loading coils combine the advantages of separate coils for each band with the ability to change them rapidly when it is desired to shift operation to another band. They are mounted in a crystal-clear lucite coil housing equipped with silver-plated fuse-type clips into which the coils snap. Changing bands is done by pushing up the sliding door on the housing, pulling out one coil and inserting another.

The coils themselves are wound on low-loss, moisture-resistant forms with machined aluminum end fittings to match the mounting clips. The 7 and 14-Mc. coil forms are slightly grooved to prevent the turns from unravelling when the coils are pruned to resonance. But the 3.5-Mc. form is smooth, making it easy to wind and rewind while experimenting. As a



Sherrick Coils and Housing

standard mobile whip requires no loading for 28-Mc. operation, a length of aluminum tubing takes the place of the loading coils on this band.

"Sherrick" products may be obtained from your dealer or directly from *Sherrick Products, 86-11 Sancho St., Hollis 23, N. Y.*

VAARO Single-Unit Coil

This coil is essentially the one described on page 55 with the exception that the ball and spring-loaded tap mechanism has been replaced. The latest models of the *Vaaro* V-102-B have a "knife-blade" that slips in between the turns of wire and maintains a very rigid contact. To tune the coil the "blade" is rotated out of the wire spacing and the arm pulled up or down.

The Vaaro products are available through distributors and jobbers or from *VAARO Electronic Engineering Co., P.O. Box 5035, Long Beach, Cal.*

Webster "Band Spanner" Antenna

The *Webster* "Band Spanner" is essentially a 3.75 to 30 Mc., center-loaded antenna with a

(Continued on page 80)

More on the TNS

WILFRED M. SCHERER, W2AEF

Contributing Editor

Many Hams Report That The "Twin Noise Squelcher" Was The Most Important Circuit Appearing in Any Ham Magazine in 1953—Have You Tried It?

The popularity of the TNS, described in the "2nd Special Mobile Issue" (May, 1953, page 29) and in the RADIO AMATEURS' MOBILE HANDBOOK* (page 71) has soared to justifiable heights.

Those who have made successful installations have been enthusiastic over its performance. Unfortunately, there is no hiding the fact that there are those that have run into difficulties getting the TNS correctly installed and operating properly. The troubles that have been reported to me are outlined below along with appropriate corrective measures.

How To Adapt To Your Receiver

Probably the first stumbling block that many potential users of the TNS encounter is the indetermination of how to adapt the TNS to an existing receiver.† One look at the schematic of the detector and audio circuit in some modern auto radios can easily make one throw up his hands and forget the whole thing! However, this problem is not as complicated as it might at first appear.

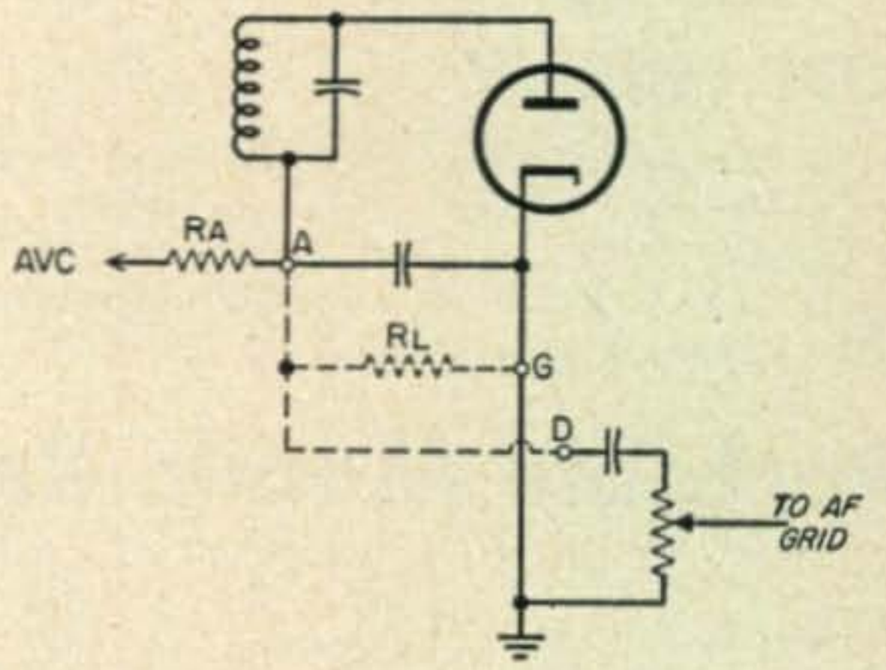


Figure 2.

A number of auto radio detector circuits are shown in *Figs. 2, 3, 4, 5 and 6.* Generally speaking, the auto radio manufacturer will try to use a duo-diode triode tube (such as the 6SQ7, 6AV6, etc.) as the detector, a-v-c rectifier and first audio amplifier. Only the important diode sections have been shown in these drawings. The input to the a-f section of the receiver is shown by the label, *To AF Grid* or *AF Out.* Resistor, *Ra,* is the usual a-v-c filtering resistance.

Before the TNS can be used with any of these circuits, the wiring shown as dashed lines must be disconnected. Points labelled *A, D* and *G* are then connected to the corresponding points on the TNS (see schematic, *Fig. 1).* The connecting leads for points *A* (input) and *D* (output) must be individually shielded.

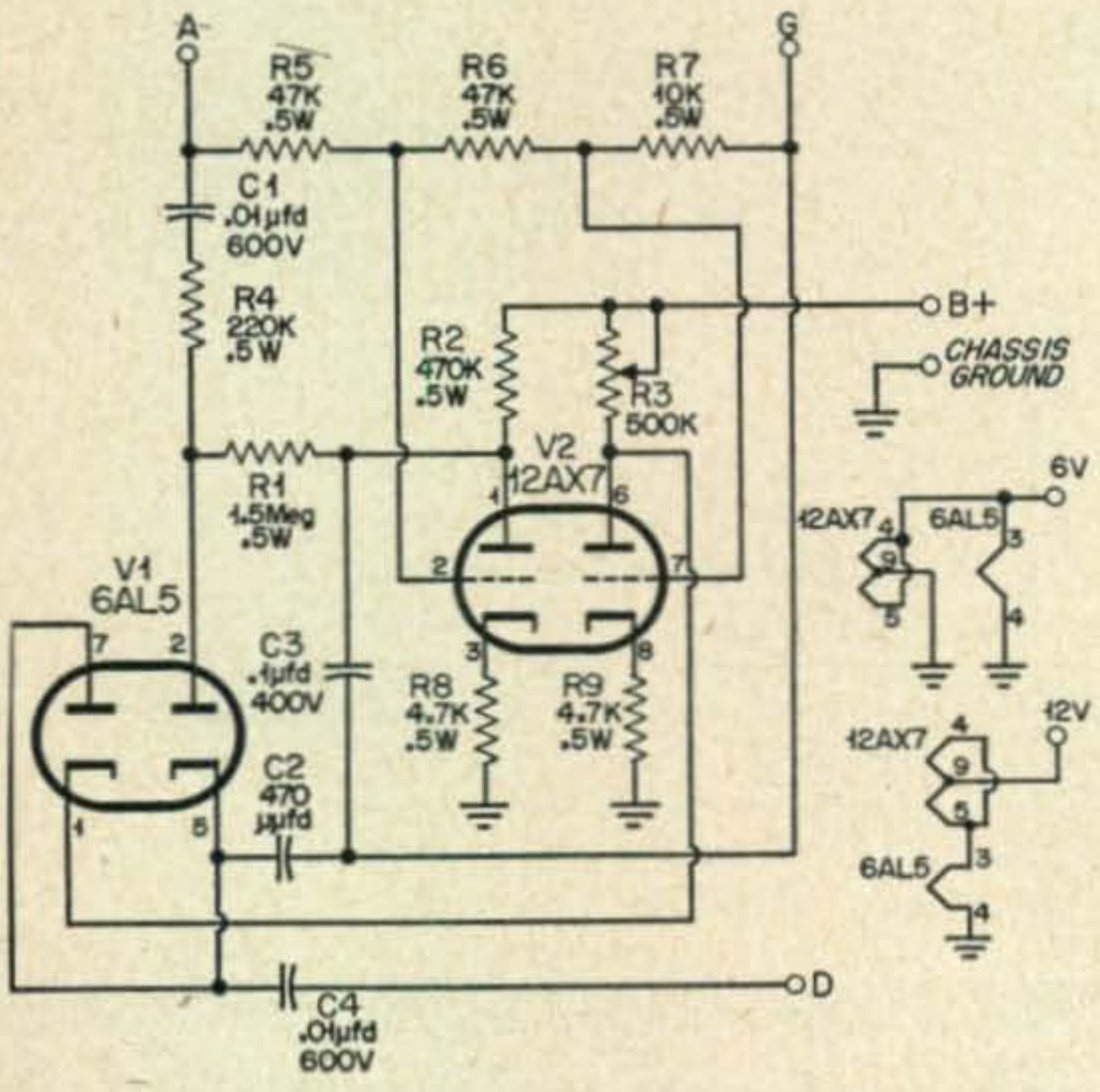


Fig. 1. Wiring schematic of the TNS.

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* **Ed. Note:** An unfortunate error appears in Fig. 4-3-A and Fig. 4-3-B. It consists simply of a misnumbering of the pins of the 12AX7. The schematic in Fig. 1 of this article is correct.

† It might be worthwhile to emphasize, at this point, that the TNS can be used with almost any superheterodyne receiver. This includes the home station "big" receivers as well as the mobile. The TNS is particularly useful at a QTH bothered by ignition QRN. The squelch feature is valuable to net control stations, or those monitoring a fixed channel.

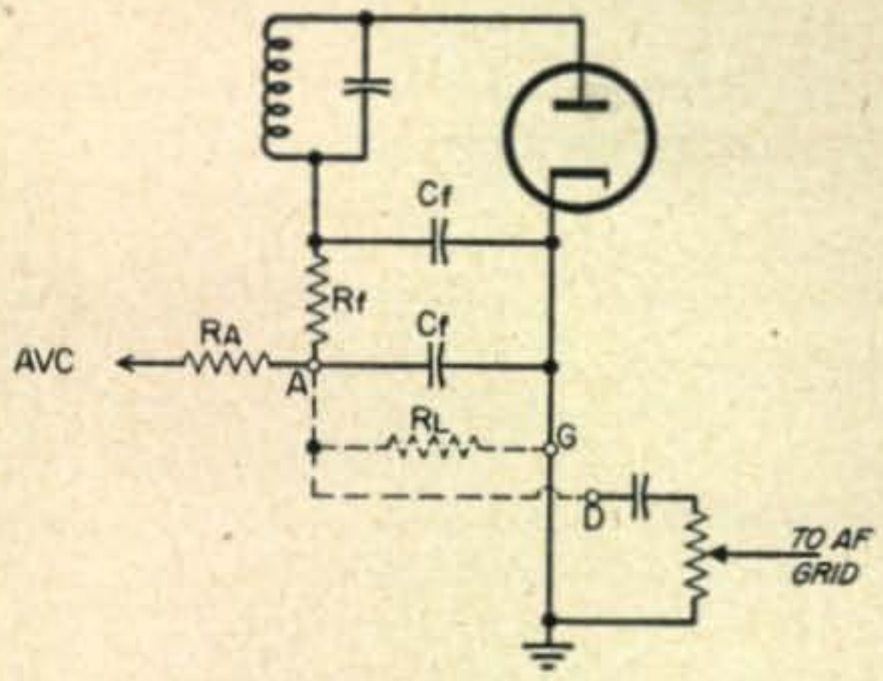


Figure 3.

The load resistor, *RL*, in *Figs. 2, 3,* and *4,* is replaced by the network consisting of *R5, R6* and *R7*. The point to keep in mind when installing the TNS is that these resistors must always take the place of the fixed value load resistor in the unmodified receiver. The output point, *D,* of the TNS must be connected to the input side of the volume control feeding the first audio stage. This is labelled point *D,* in all diagrams.

There is a "hot" ground lead, *G,* from the TNS unit. Do not connect the heater grounds through this lead. It must be connected directly to the diode cathode terminal to minimize possible ignition noise pickup from your own car. This would be due to the varying ground potential which might result if the ground were carried through the metallic chassis, or other ground leads.

Figure 2 is a fairly common example of the a.v.c. and second detector circuit. *Figure 3* differs from *Fig. 2* through the addition of an r-f filter composed of *Rf* and *Cf*. The condenser, *Cf,* will usually run to a value of 100 $\mu\mu$fd. and may be in the i-f transformer can. Resistor, *Rf,* will be between 10,000 and 50,000 ohms. If a value higher than this is encountered, it should be shunted by another resistor to bring it within the above range. If the value is too high there will be a loss of audio.

In *Fig. 5* the load resistor of the circuit originally consisted of the volume control, *RL*. When the TNS is installed it will continue to perform as the volume control. In the case of delayed a.v.c., shown in *Fig. 6,* the "hot" ground, *G,* of the TNS is connected at point *G (Fig. 6)*

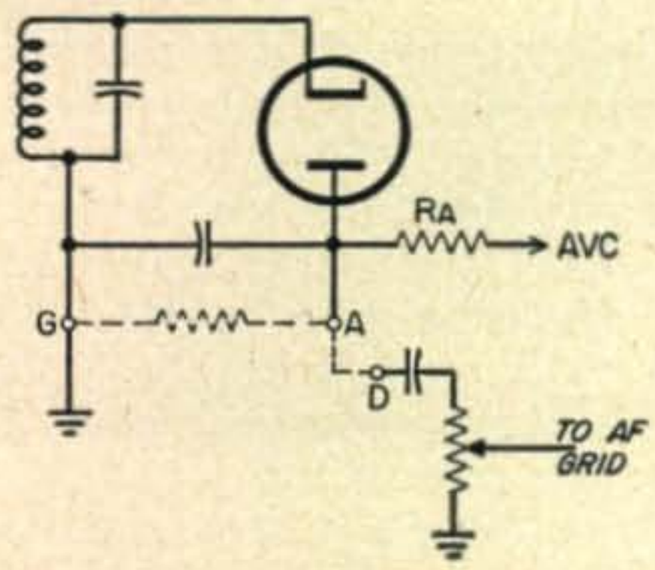


Figure 4.

where the load resistor (volume control) is connected, even though this point is above ground by an amount equal to the delay bias resistor, *Rb*.

Checking Through Your Receiver Circuit

Probably the easiest way to check the auto radio schematic is to start with the lead connected to the input of the volume control. Follow this lead back toward the detector. If it goes directly to the bottom of the diode i-f winding, or to an r-f filter at the bottom of the winding, break the connection and make the bottom of the i-f winding (or r-f filter) your point *A*.

Next check the other end of the volume control. If it is connected directly to ground this then becomes your point *G*. If this side of the volume control is connected to the diode cathode, it will probably be above ground through a self-bias resistor. The "hot" ground point, *G,* of the TNS is then connected directly

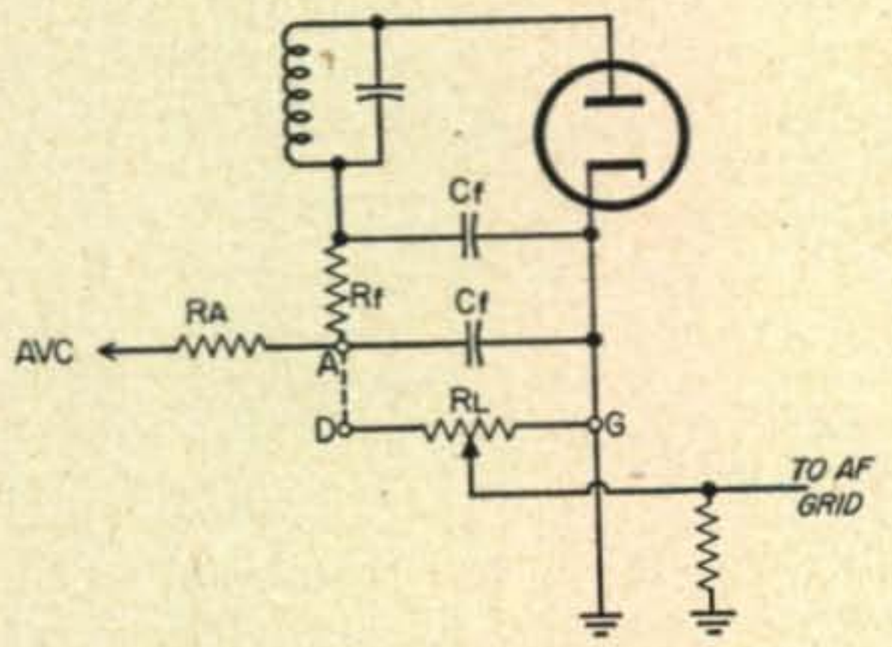


Figure 5.

to the diode cathode terminal—not to chassis ground.

Sometimes there will be two resistors in the diode cathode leg to ground. One end of the volume control will be connected to their junction. In this particular case, the TNS point, *G,* is attached to the same junction.

If there is a coupling capacitor connected between the input of the volume control and the bottom of the i-f winding, or r-f filter, then we will find some other resistor connected between one of the latter points and ground, or the diode cathode. *(see Fig. 2)* This will be the diode load resistor to be eliminated, as described earlier. Another way to check this is to start at the bottom of the i-f winding, or the r-f filter, and follow the path which provides the lowest resistance *d.c.* return path back to the diode cathode. This will indicate the diode load resistor.

Getting Around The Tone Control

Some of the most confusing circuits in the present day auto radios revolve around the weird combination of tone control arrangements. The manufacturers seem to delight in making a maze of various resistors and capacitors. They can be broken down and analyzed

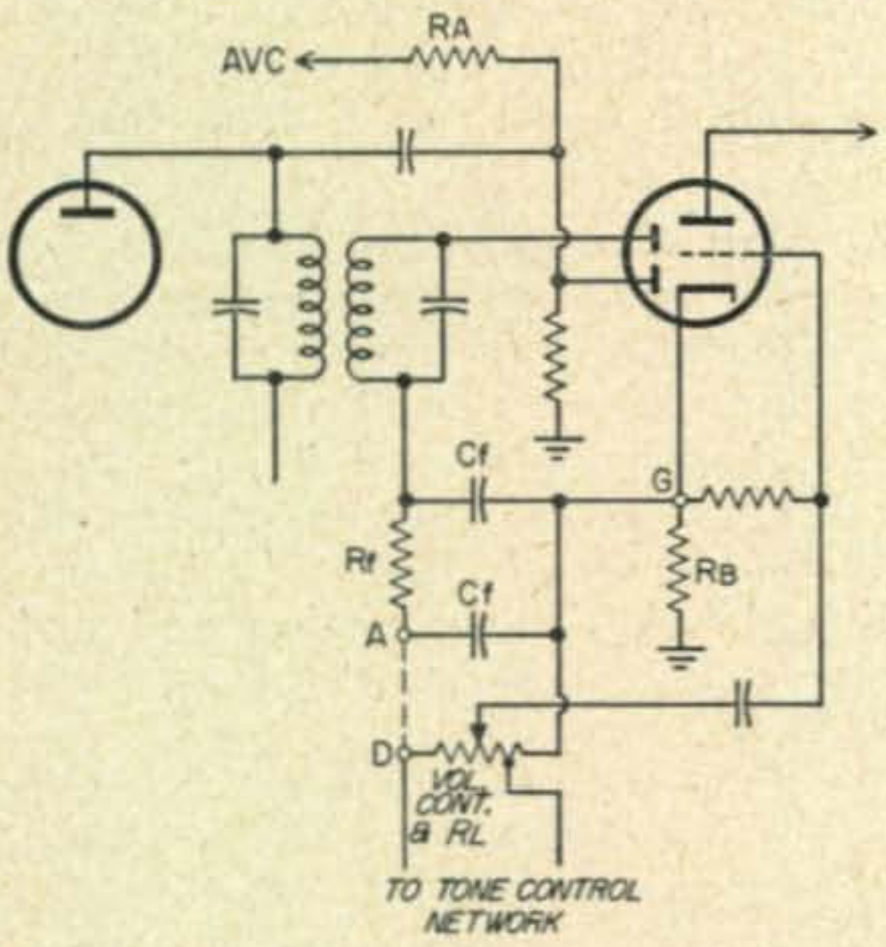


Figure 6.

if we keep in mind that they are usually tied across the volume control input and at the same time are tapped into the control itself.

To install a TNS, leave these networks connected (even if only for the sake of the XYL). The output of the TNS, point *D*, should go to the volume control input and hence will react to the tone control variations in the usual manner. *Figure 7* is a fair example of a circuit of this type with *Ct* and *Rt* forming the tone control network.

Checking for "Leakage"

Occasionally it will become impossible to obtain the optimum in silencing and squelch operation with the TNS due to audio "leakage." This results from the use of a duo-diode triode in the car radio as a detector and audio amplifier. There is bound to be a certain amount of coupling through the common cathode of the diode and triode tube sections.

To check your TNS installation for *leakage* turn the squelch control *(R3)* towards its maximum "no squelch" position and tune in a standard broadcast station. Remove the tubes from the TNS and turn up the volume control. If any audio from the broadcast station is heard there is *leakage* and steps should be taken to remove it. This involves separation of the detector and audio amplifier tube functions.

A similar check should be made using the high-frequency converter connected to the broadcast receiver. This check should be made at a location where the external ignition is heavy. Remove the tubes from the TNS and note whether or not the ignition pulses are leaking through. Ignition pulses from the car in which the equipment is installed may also be used, although complete *leakage* suppression may not be experienced in all cases, since heavy ignition pulses originating in your own car will often leak through in other portions of the a-f circuits.

With some type of noise limiters, *leakage* of this sort would not be noticeable. Usually it is light enough to be covered by other background noises coming through directly, under normal

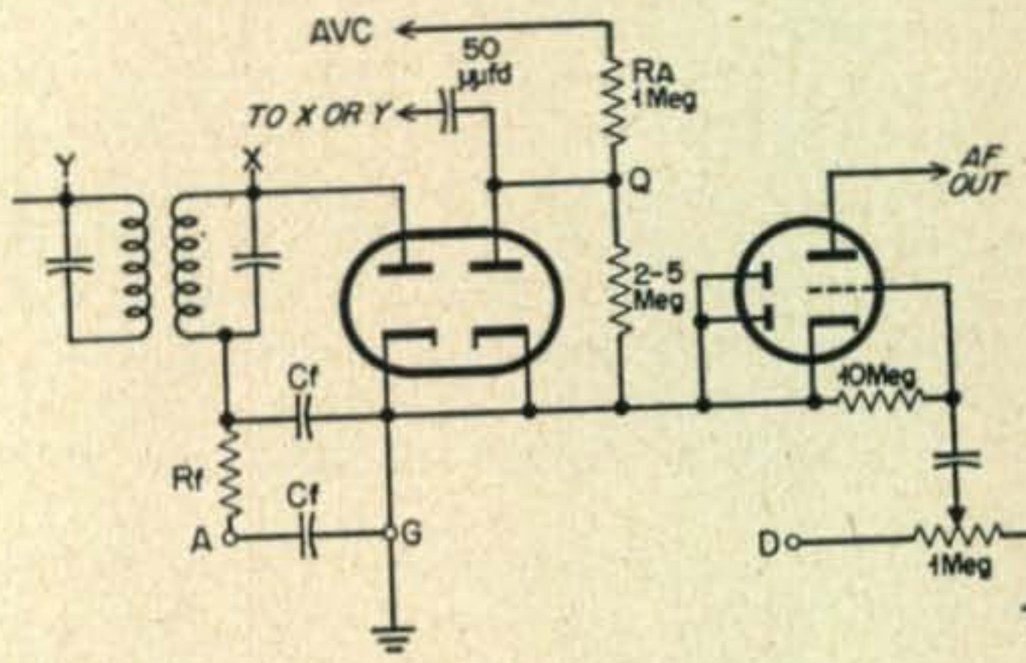


Figure 8.

operating conditions. When a squelching TNS arrangement is used the directly received background is quieted and any leakage naturally will be noticed.

When the *leakage* is severe there is no alternative but to separate the detector and a.v.c. functions from the audio amplifier. *Figure 8* shows such an arrangement with a 6AL5 added to the circuit. The dashed lines of *Fig. 7* show suggested changes to incorporate a 1N34 as the detector element. Point "X" must be broken. This arrangement will save considerable space over the use of the 6AL5.

The general procedure if this changeover is necessary is to disconnect the diode plates of the duo-diode triode tube from the rest of the circuit. Then ground these diode plates. The *new* diode plates should be connected to the leads removed from the *old* diode plates. The cathodes of the *new* diodes should be grounded.

Motorboating in the TNS

A common trouble with the TNS is its tendency toward motorboating when the squelch or volume controls are advanced. In some cases it will be inaudible and only evidenced through

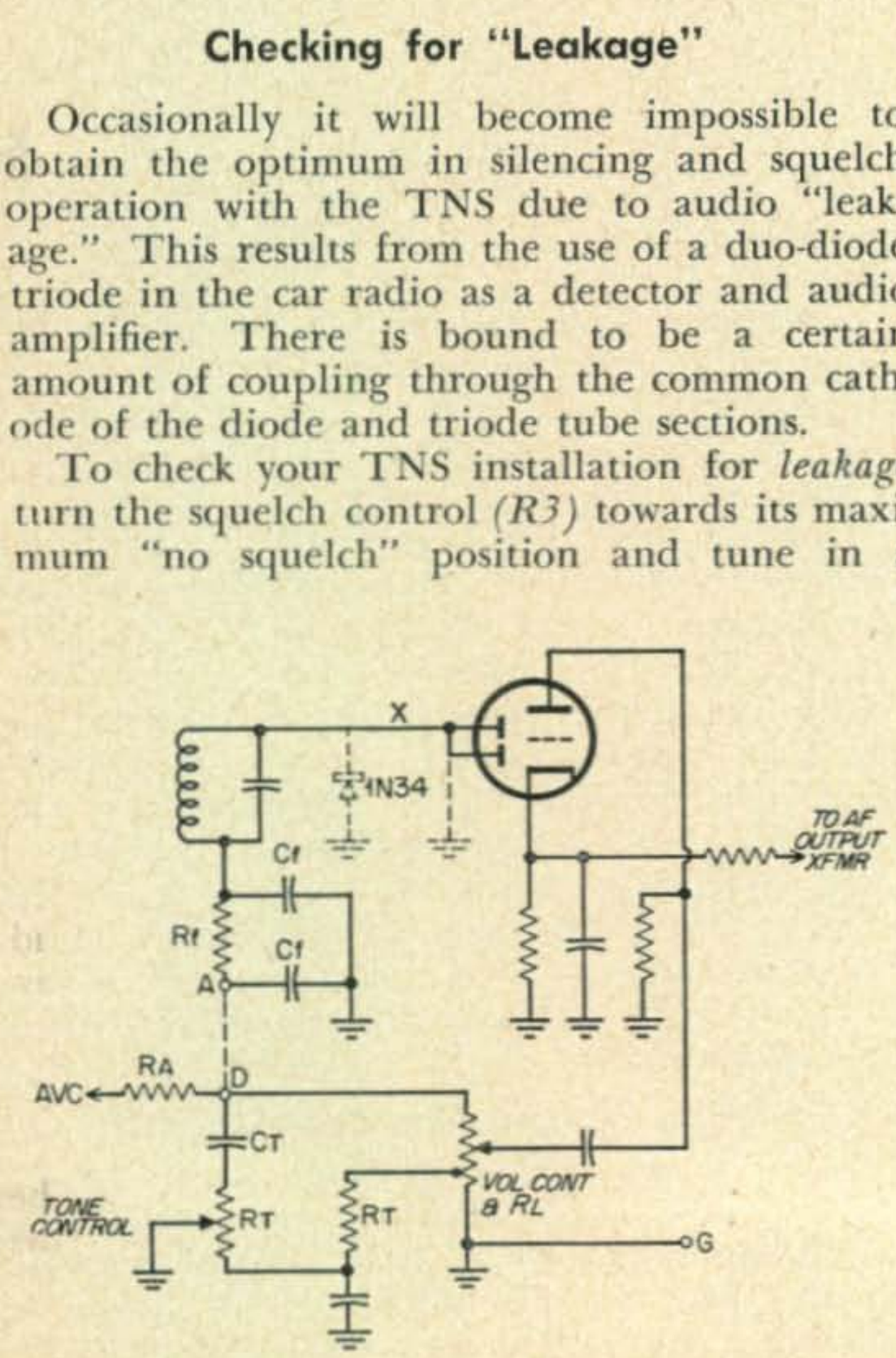
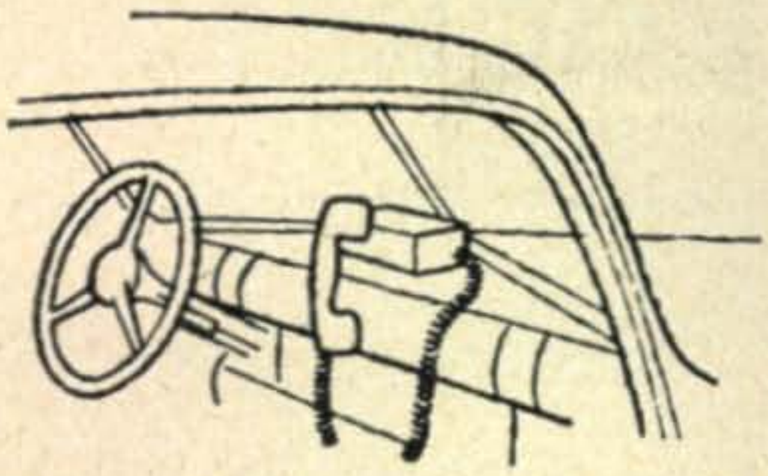
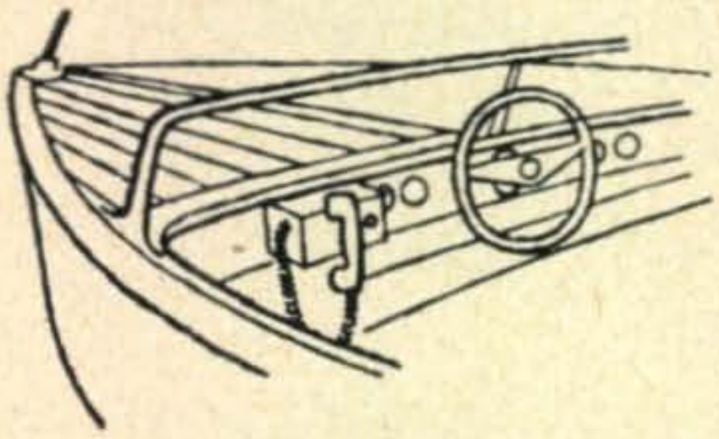


Figure 7.

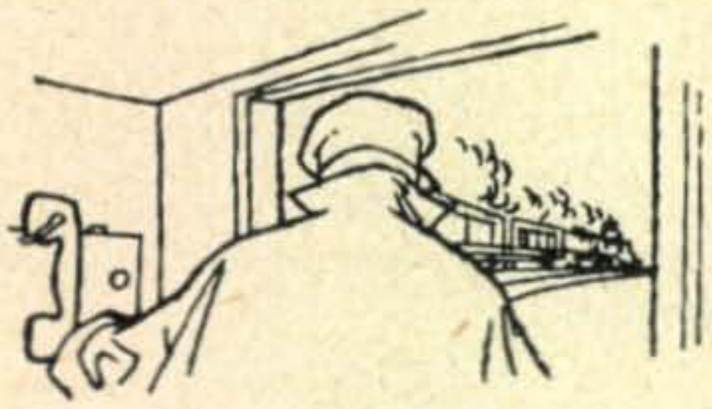
(Continued on page 78)



Private mobile phones, taxicabs, trucks, ambulances, fire engines, patrol cars.



Boating, police and fire patrol boats.



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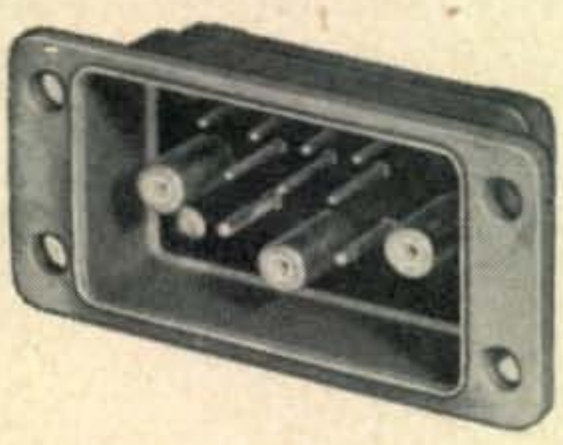
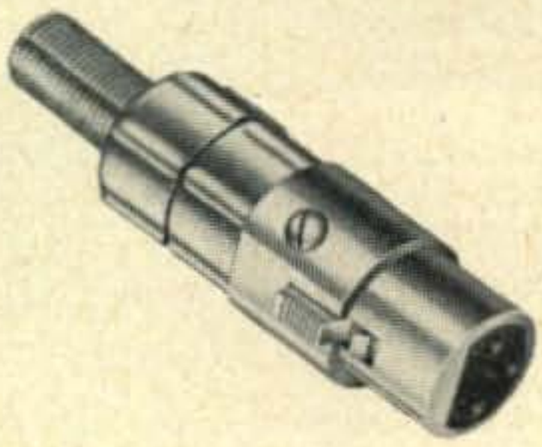


Rack-panel-chassis



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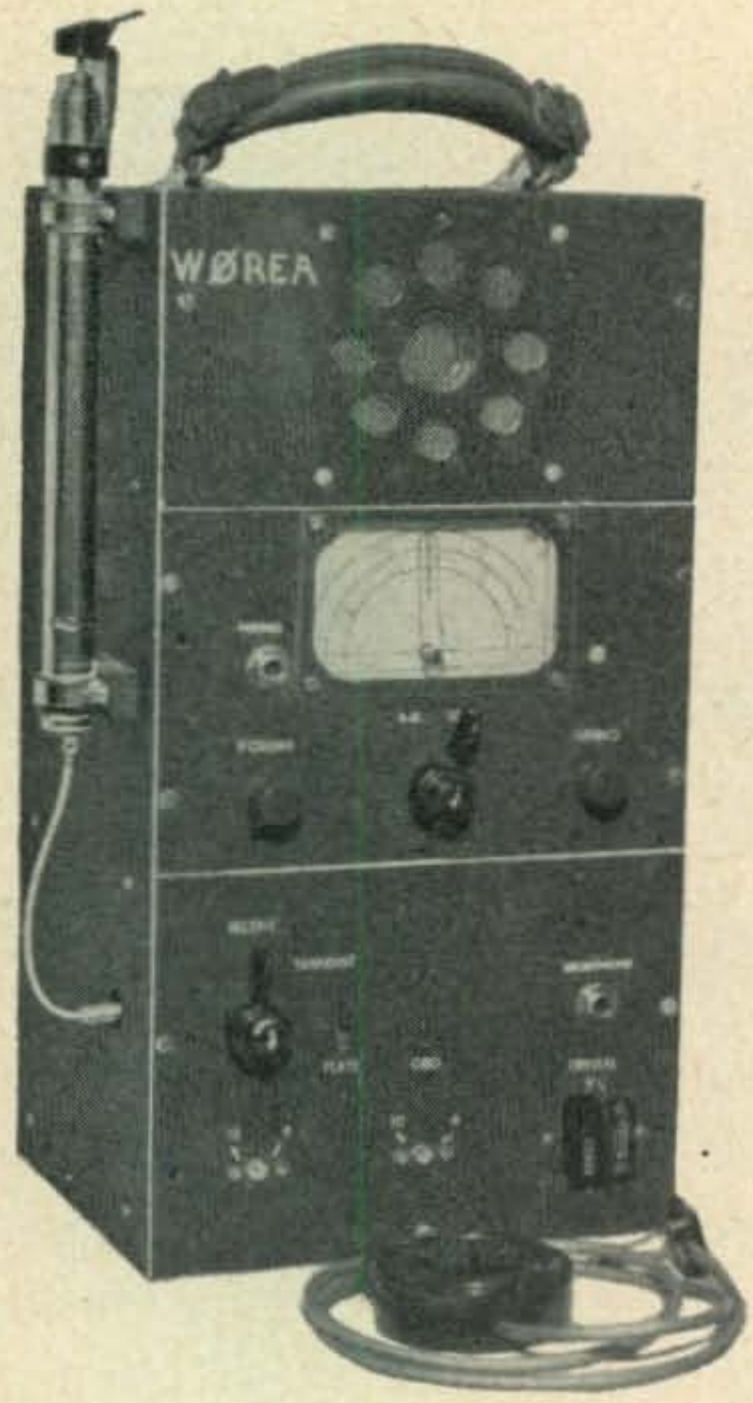


10/6 Packset

CLIFFORD C. JOHNSON, WØURQ

1258 Van Buren, St. Paul E-4, Minn.

This Is A Tested and Proven Emergency Portable Transmitter and Receiver Switching Between 6 and 10 Meters

(First of two parts. The second part will describe the receiver and show photographic construction details of the entire unit.) Present scheduling of the second part is for the June issue.)

The FCC regulations governing the operation of amateur radio outline, in effect, that the amateur should use his hobby in the public interest. Most Hams like to do this simply to put their equipment to good use. Ham band communication is now almost taken for granted in times of flood and storm disaster and is coming to be more relied upon for a considerable part of the communications needed in civil defense. The amateur also puts his gear to good use in other less important ways for the benefit of others. At the same time he enjoys himself providing communication at model airplane meets, auto races, parades, golf tournaments, boat races and many civic activities where a roving reporter is helpful to the general cause.

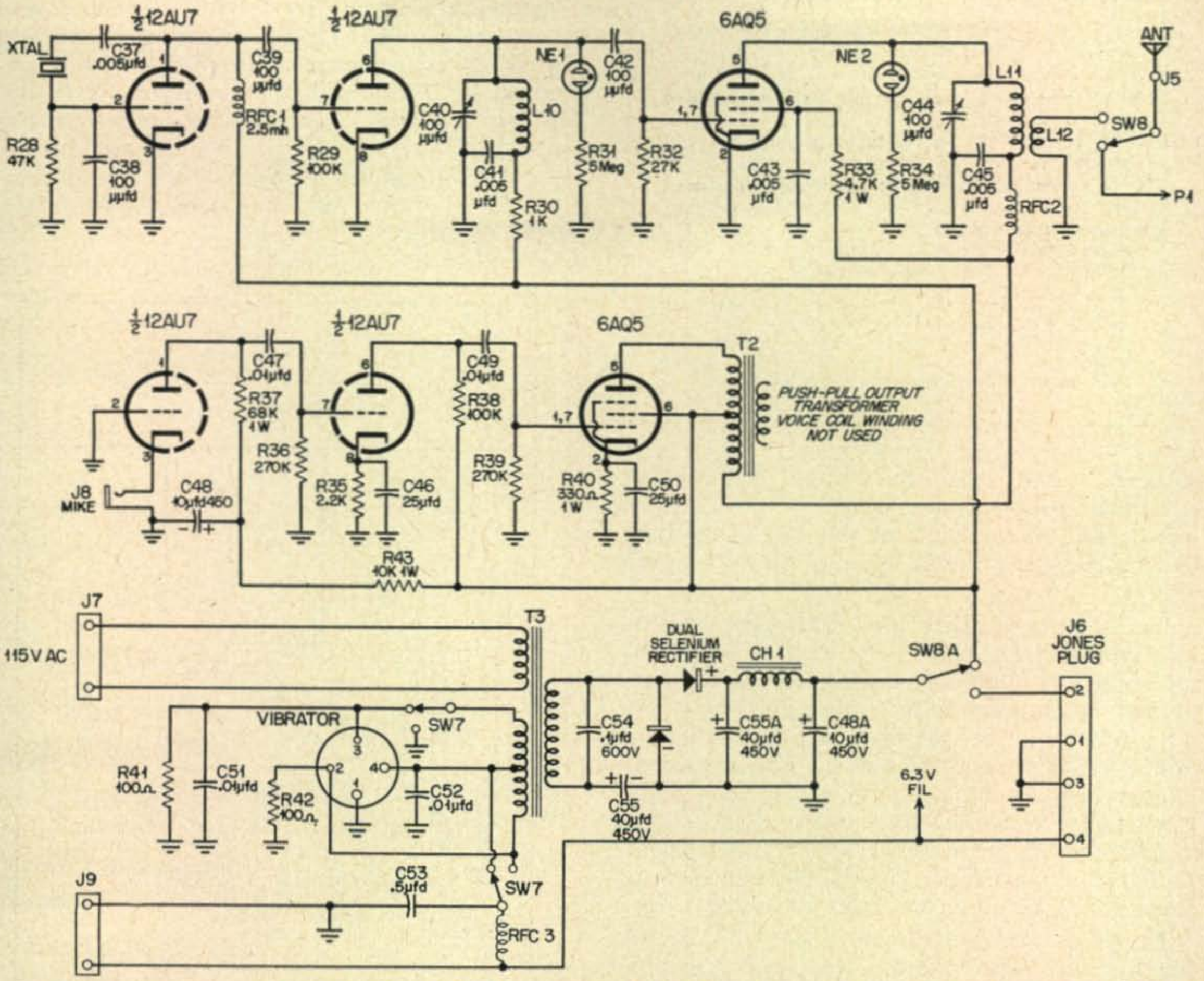
The mobile rig plays a big part in all these activities but quite often the need arises for some portable gear that can be easily carried and set up at a remote location. Civil Defense planning calls for emergency powered rigs that can be readily taken wherever they are needed. The "Packset" is one answer for equipment to meet these requirements.

Basic Requirements

The *Packset* shown here incorporates many features found necessary or desirable in this type of gear. The design is based on ideas and suggestions given by a number of amateurs who have had to use emergency equipment in the past. The design incorporates these specifications:

1. The equipment should operate from 6-volt battery or 117 volts a.c.
2. The power supply should be an integral part of the unit.
3. The entire *Packset* should be in one small cabinet.
4. The antenna should mount on the cabinet with provision for feeding a remote antenna as might be required.
5. Operation to be on both ten and six meters.
6. The design should be as simple as possible so anyone could build it.
7. The controls should be as few as possible and uniform so any authorized amateur could operate it without a book of instructions.
8. The cost should be reasonable.

The finished *Packset* is modern and up to date while at the same time not too complicated for the average Ham to build. Even at the current market cost of $90 for parts for the complete unit, the outlay of cash isn't too bad when you consider that while waiting for some emergency to arise, the rig can be used for a mobile job, and even makes a dandy high-frequency station for the shack. With an outside antenna you can work out very well on these frequencies with 6 watts input. The choice of operation on ten and six meters was made after considerable thought on the subject. We have to face existing facts. Ten meters is a popular band, especially for mobile, and communications with them is a must, not only in actual emergencies, but in practice drills. When the ten-meter band is open, however, even local contacts become difficult with DX pounding in on your net frequency, so we have available the



Wiring schematic and parts list of the transmitter section of the "Packset."

six-meter band. As yet six meters has not been given the attention it deserves, especially for local work, as it is a big wide band and even during its infrequent skip openings there is still room for lots of free channels. For an equal amount of power the actual ground wave coverage is better than on ten meters. Construction techniques are much the same as for ten meter gear.

General Circuit Details

The transmitter and power supply are built on standard 7″x7″x2″ chassis. The tube line-up starts with a 12AU7, one half being a Pierce oscillator while the other half doubles or triples as required. The final output stage is a 6AQ5 which doubles at all times. Another 12AU7 is used to energize a carbon mike and act as speech amplifier. The modulator is a 6AQ5.

The coil and condenser combinations in the r-f section were selected to tune the required frequencies without bandswitching. A Pierce type oscillator was used for the same reason. For ten-meter operation a 7-Mc. crystal is plugged into the operating side of the crystal

R28—47,000 ohms, ½w.
R29, R38—100,000 ohms, ½w.
R30—1000 ohms, ½w.
R31, R34—5 megohms, ½w.
R32—27,000 ohms, ½w.
R33—4700 ohms, 1w.
R35—2200 ohms, ½w.
R36, R39—270,000 ohms, ½w.
R37—68,000 ohms, 1w.
R40—330 ohms, 1w.
R41, R42—100 ohms, ½w.
R43—10,000 ohms, 1w.
C37, C41, C43, C45—0.005 µfd., disc ceramic.
C38, C39, C42—100 µµfd., ceramic (Erie GP1K).
C40, C44—100 µµfd., APC variable condensers.
C46, C50—25 µfd., 25v. electrolytic.
C47, C49, C51, C52—0.01 µfd., disc ceramic.
C48, C48A—10-10 µfd., 450v. can type electrolytic.
C53—0.5 µfd., 100v. generator type by-pass.
C54—0.1 µfd., 600v. paper.
C55, C55A—40-40 µfd., 450v. can type electrolytic.
T2—8w. push pull output transformer (Stancor A-3823).
T3—Power transformer (see text).
Ch1—85ma. choke not over 2-inches wide (Stancor C-1709).
J5—pin jack Motorola type.
J6—4 prong jones socket #S304AB.
J7—female end of TV accessory cord.
J8—single circuit mike jack.
J9—two lug screw terminal board.
Sw7—8 amp. d.p.d.t. toggle switch.
Sw8, Sw8a—d.p.d.t. wafer switch (Centralab #2003).
P1—Motorola pin type antenna plug.
Ne1, Ne2—#2, 1/25 watt neon bulbs with leads.
RFC1—2.5 mh. RFC.
RFC2—50 turns #28 on ¼-inch form.
RFC3—hash choke, 3 layers #14, 1¼-inch long on ¼-inch form.
Vibrator—Mallory 1501 or equivalent.
Rect.—dual selenium 100 ma., 160v. (Federal 1008A).
Xtal—7Mc. for ten meters, 8Mc. for six meters.

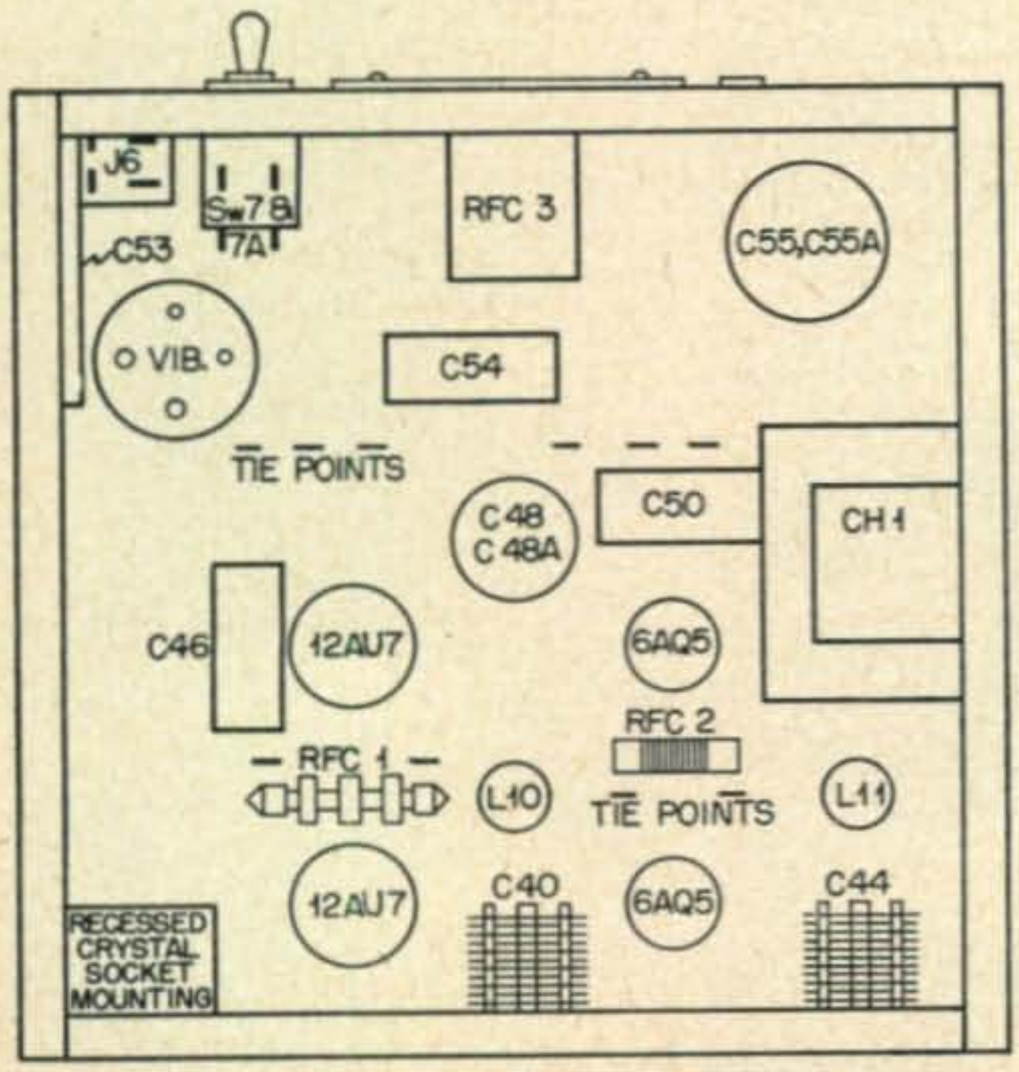
Transmitter Coils

L10—13 turns #24 on ½-inch polystyrene rod spaced ¾-inch.
L11—6 turns #16 on ½-inch polystyrene rod spaced ¾-inch.
L12—2 turns insulated hook up wire interwound at cold end of L11.
T3—power transformer
Core: 1¼-inch stack, 1-inch center leg laminations #24 gauge dynamo grade iron interleaved 2x2.
130v. secondary wound next to the core 800 turns #30 enameled wire.
110v. primary 660 turns #26 enameled wire
6.3v. secondary wound outside with 42 turns #16 enameled wire—center tapped.

socket. A dual socket was located here so that the inoperative crystal could be stored ready at hand. The second half of the 12AU7 doubles to 20 meters and the 6AQ5 final doubles to ten meters.

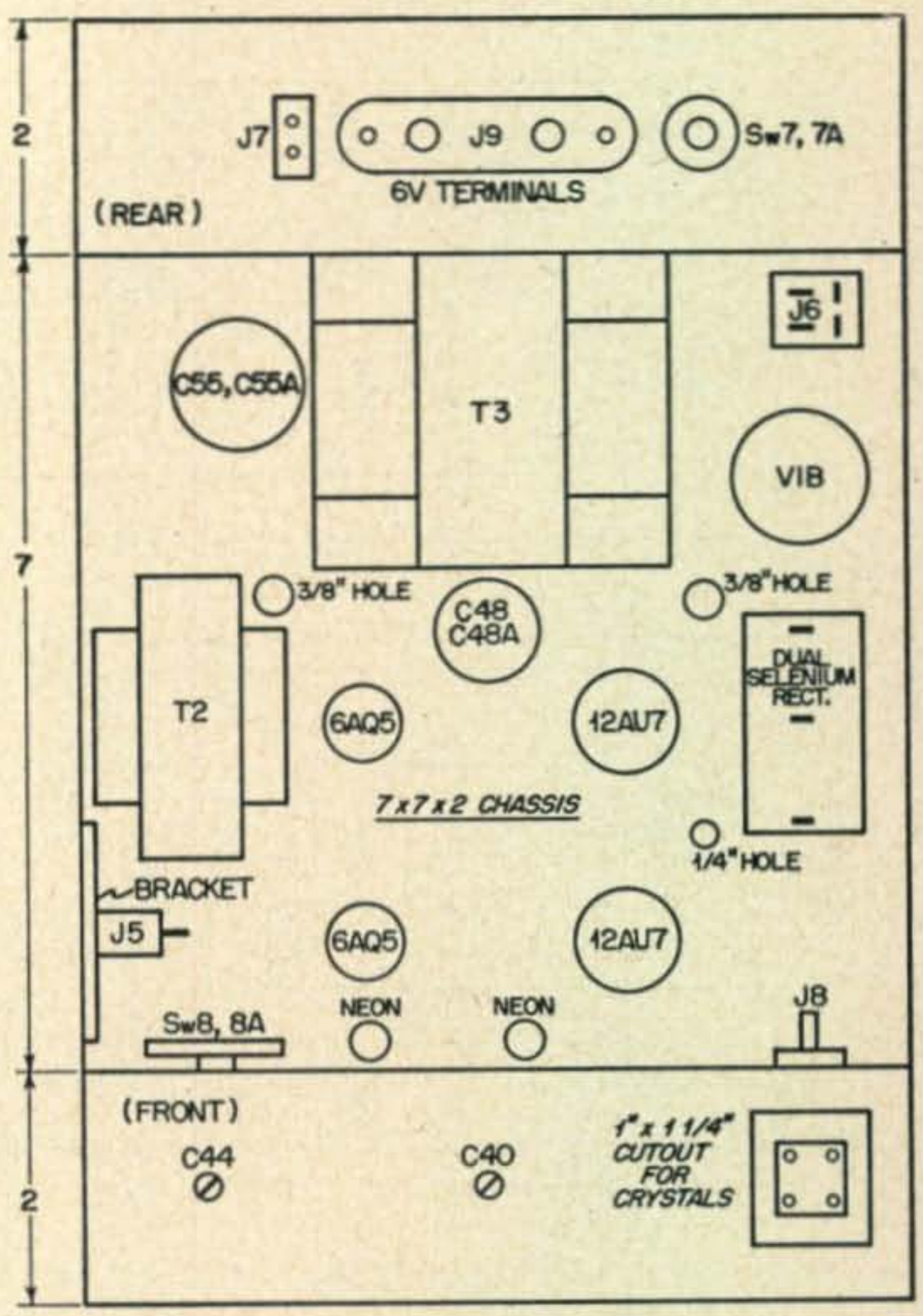
For six-meter operation, 8-Mc. crystals are used and the 12AU7 now triples to 25-Mc. by retuning the plate condenser, *C40*. The frequency is doubled to six meters in the final. The condenser in the final will be at almost minimum capacity at this frequency, and at almost maximum capacity on ten meters. The front panel is marked for condenser settings so band changing can be done quickly. The neon bulbs, *(Ne1* and *Ne2)* viewed through slots in front panel, indicate maximum output settings.

No special precautions are required in building the transmitter and power supply section. The filter choke *(Ch1)* and the two tuning condensers *(C40* and *C44)* are installed after all the wiring has been done. Small brackets are made up to mount the selenium rectifier, the antenna input jack, and the recessed crystal socket.



Transmitter chassis bottom layout.

Grommetted holes are used to bring wiring from the underside of the chassis to the panel-mounted antenna change-over switch *(Sw8)*, the output transformer *(T2)* and the selenium rectifier. The a-c line cord is a television accessory with a fitting at either end. The female end is cut off and mounted on the rear of the chassis for the 117-volt input and a regular a-c plug is attached to the remaining length of cord. The male end of the cord fits the jack on the chassis



Transmitter chassis top layout.

and is removed when battery operation is desired. Separate leads connect to the battery terminals for 6-volt operation. The d.p.d.t. toggle switch *(Sw7)* is thrown into the 6-volt position, which switches the filament winding on the transformer over to act as a primary for the vibrator supply.

The only unorthodox part in the *Packset* is the power transformer. No commercial transformer of this type was readily available so the transformer was wound up according to the specifications in the coil table. The output is about 200 volts under load from either 117-volts a.c. or a 6-volt battery.

Voltage and current measurements are made and recorded for logging before assembling the unit into the cabinet. Final grid current is about 1½ to 2 ma. and the final plate current loaded runs about 30 ma. with the 200-volt plate supply. The entire transmitter draws about 70 ma.

(End of Part 1)

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73, Bil W2AVA

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Elmac AF-67 Xtal or VFO. All bands	$177.00
Gonset "Commander"	124.50
Gonset VFO head for Commander	29.95
Johnson Viking mobile kit	99.50
Sonar SRT-120 kit, fixed or mobile	159.50
Sonar SRT-120 wired and tested	198.50

HARRISON HAS IT! XMTR-RCVRS

Gonset communicator. Compact, universal, works on 6 VDC or 115 VAC! With antenna, ready to go, less only microphone and crystal	$209.50
Deluxe Comm. II, with squelch and phone jack	229.50

HARRISON HAS IT! RECEIVERS

Elmac PMR6-A. 10 thru 160 AND BC	$134.50	
Gonset xtal controlled Super-Ceiver	$119.50	
Gonset Super Six converter	52.50	172.00
Morrow FTR fixed tuned receiver	$128.40	
Morrow 5BRF front end	67.95	196.35

HARRISON HAS IT! CONVERTERS

Morrow 5BR-1 with noise limiter	$ 74.95
RME MC-53 covers 2, 6, 10-11 meters	66.60
Gonset 3-30 covers 3 thru 30 megacycles	44.75

HARRISON HAS IT! MOBILE POWER SUPPLIES

Harvey Wells DPS-50 dynamotor pow. sup. 6 VDC	$ 87.50
Harvey Wells DPS-50 dynamotor pow. sup. 12 VDC	54.50
Elmac PSR-6 power supply 6 VDC	24.50
Elmac PSR-12 power supply 12 VDC	24.50
Carter dynamotors - write for free catalog.	

HARRISON HAS IT! ANTENNAS

Webster "Band Spanner", telescopic tuning to cover 10 thru 75 meters →	$ 29.50
Master Mobile Hy-Q center loader for 20, 40 or 75 meters	13.95
Additional Hy-Q coils Ea.	6.95
Sherrick lucite "Clip-in" coil housing, with coil for 20, 40 or 75 meters	15.00
Top and bottom sections to complete the whip	6.95
Additional "Clip-in" coils Ea.	4.00
Master Mobile 2 meter coax antenna	17.45
Master Mobile 10 meter (96") stainless steel whip antenna No. 100-96S	5.25

HARRISON HAS IT! DELUXE MOUNTS

Master Mobile "Any-angle" body mount (fits many back-up light holes). No. 132-XSS-C	$ 14.95
Master Mobile sturdy bumper mount No. 140-XSS	10.95
Premax "CA" clamp-on bumper mount	6.00
Premax SA-1 spring adapter for "CA" mount	6.60

MICROPHONES

(All with push-to-talk switch)

Electro Voice Noise cancelling, carbon	$ 9.90
Shure police type single button carbon	16.50
Shure Hi-Impedance reluctance	17.70

TO COMPLETE THE INSTALLATION

RG-58-U Coax cable, 52 ohms! Per Ft.	$ .08
Coax connectors, male to fit RG-58-U ea.	.96
Coax right angle connectors Ea.	1.68
Coax feed-thru connectors Ea.	1.80
Coax relay, choice of 6 or 12 VDC	9.44
Coax relay, as above, with external DPDT control contacts	10.53
Heavy Dynamotor cable Per Ft.	.18
Morrow genemotor hash filter	3.75
Gonset noise clipper	9.25
Gonset clipper with squelch	24.50
Sherrick "TNS" with tubes	15.08
Mike plug to fit transmitter	1.17
Gonset steering post mounting bracket	3.90
Crystals: Bliley or Petersen— 3, 5, 7 or 8 mcs. range	2.95
14 mcs. range	3.95

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The VHF-UHF News

FURMAN C. COBB

c/o CQ Magazine, 67 West 44th Street, New York 36, N.Y.

As the plans for the first trans-continental two-meter relay test began to take shape it was apparent that all the arrangements could not be made by the last week in May. Several rather wide expanses of the country have not been able to organize enough activity to insure links that will be operative.

However, as this column goes to press the following plans are fairly well established. The *Two Meter & Down Radio Club* will have their club station, W6EMM, in operation on Mt. Lee. This station will originate a message for the east coast on the morning of May 30th at about 0800 PST.

The route from that point will probably consist of relays to W6AEA, to W6WGT, to W6QR and then to W6BGM/6 located atop Santa Rosa Mountain. This station will easily reach W7LEE in Parker, Arizona who will then relay to W7SQM/7 who plans on operating from Mt. Havalapai (about 9000 feet high). The path is then to W7KFS, Phoenix and W7FGG, Tucson. After W7FGG, the message will be handled by W6IHK/7 who plans on setting up on Mt. Graham in northeast Arizona. The latter station will be on 144.45 Mc. with 100 watts and either vertical or horizontal polarization. Liaison frequencies from W6IHK/7 will be 3815 and 7210 kc.

Unfortunately after W6IHK/7 there is a very distinct blank spot until Amarillo. There may be some trouble on the other side of Amarillo, although the boys around Dallas and Ft. Worth are planning on turning out in force. It is hoped that the message can be moved as far as Little Rock. Possibly there will be portable activity east of this spot to get it safely across the Mississippi River. It is understood that once it has reached W4HHK, a path will be opened into the southern Illinois and Indiana areas, and hence on into Ohio.

There has not been too much cooperation from these areas, as far as laying out definite plans are concerned. It can only be suggested that an effort be made to reach the western New York state stations who may then relay it along the Mohawk Valley into the New York City area.

The final destination of the message has not been settled, however, it is felt that it would be important to get it as far eastward as possible. On this point we have arranged to present a three-year subscription to *CQ* to the station the furtherest east handling the message text. Send your reports to my attention at the address above.

Quite a bit of time has been spent in the past few months attempting to organize a message relay network from the east to the weast coast. Although there seem to be several nets operating we were unable to set up any definite schedules to bridge the gap to western New York state. It is hoped that the example set by the *Two Meter & Down Club* will show what can be done.

Good luck!!!

(A test run of the relay from W6EMM to W6ZOW/7 who will try operating from Mt. Graham is scheduled for May 21 to 23. The frequencies in use will be 144.138, 145.35 and 147.60 Mc.)

Eddie "Tap" Tapscott, W6TDM

W6TDM

Undoubtedly one of the most interesting personalities on two meters from L.A. is Eddie Tapscott, W6TDM. "Tap" is popularly referred to as the *24-hour station*, a title well-earned, even if he is only usually on the air about 14 hours out of each day. "Tap" is the kind of fellow that can be counted on for clever phone patch connections, tape recordings, good net operation and real entertaining rag chews —especially in the wee small hours. He seems to constantly monitor the band and is always available for checking out your new rig or antenna.

Quite often "Tap" is referred to as the *Gonset Laboratory* having given some of the *Gonset* equip-

(Continued on page 76)

What's NEW in HAM RADIO

Parts Products Catalogs

Always Say You Saw It In CQ!

Boy, do I wish I had this in my mobile rig, instead of that beat-up T-17 mike! The **American Microphone Co.**, Pasadena, Calif., announces the new line of hand-held microphones, known as the 501 series. This line includes both dynamic and carbon microphones for mobile, police, ship-to-shore and aircraft communications. And, oh yes, of course—amateur mobile! The mike has a transmit switch, is made of light, die-cast aluminum (only 10 ounces!) and has a gray, hammertone finish. Incidentally, these new carbon microphones are just the ticket for home use. The audio quality is outstanding, and a lot

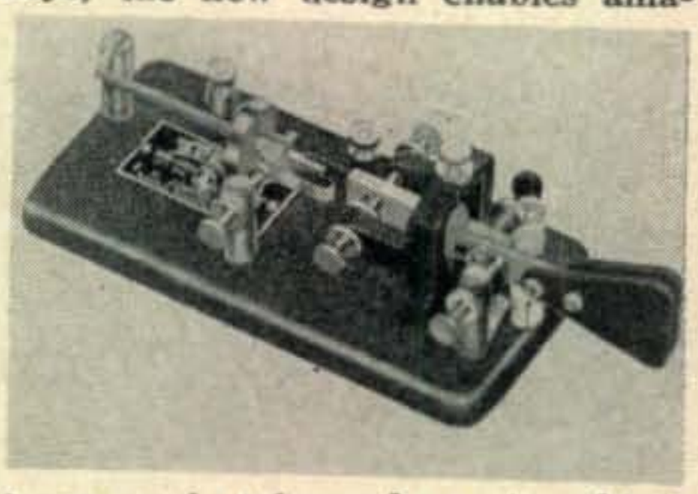
of high gain speech amplification can be junked when a high output microphone such as the 510 is used. The output is a good 25 db. over the usual crystal microphone. Both the carbon and dynamic models of the 510 series have a rising audio characteristic that helps to knock out the unwanted low voice frequencies some 5 to 10 db. In addition, the high frequency response drops sharply above 3000 cycles or so. Such a frequency response is very desirable when speech clipping is employed in the transmitter. A comprehensive dope sheet on the 510 mikes may be obtained by writing to: **American Microphone Co., 370 South Fair Oaks Ave., Pasadena 1, Calif.**

Here's a good deal for the mobile Ham! W2LPG is manufacturing reflectorized aluminum call letter plates to put on the back of your jalopy. The call plates come in two sizes (2x5", and 3½x12"), are made of aluminum, and have white letters, outlined in yellow against a black background. The plate may be attached directly to the car, or bolted to the license plate bracket. In addition, the plate may be attached to the big rig at home, so casual visitors may not mistake the shack for a branch outlet of NBC. The plates are very inexpensive, and may be ordered from **Joe Whitley, W2LPG, 133 Airsdale Avenue, Long Branch, N. J.** You better latch onto this today! Joe claims to deliver the goods back to the mailman in 24 hours.

Do you have all the operating information on the new **Amperex** 6360 tube? Or the **Amperex** AX-9905? No? Neither do I! We both need the new **Library Reference Edition of the Amperex catalog.** This brand, spanking new 578 page manual contains complete information about every **Amperex** electronic tube, and tube accessory —for communication, industrial, amateur, electro-medical and special purposes. The manual is bound in a loose-leaf ring binder, with a permanent, plasticized Fabrihide cover. All the information is there

—tube curves, charts, specifications —the works! The high-powered man would do well to study the information on the **Amperex** AX-9902 triode, or the AX-6156 tetrode. The v-h-f man will want the dope on the AX-9903 and the AX-6155 tubes. The **Amperex** line of VC vacuum condensers would be of interest to all Hams. Then, just to sharpen our wits, we can all read about the 6047 binary adder, the AGR-9951 Thyratron, and the C6J Xenon rectifier. The manual is priced at $2, and may be obtained from **Mr. Myron Smoler, Sales Engineering Division, Amperex Electronic Corp., 230 Duffy Ave., Hicksville,** New York.

For those Hams who delight in CW operation, this latest product of **E. F. Johnson Co.** will be interesting! This new "Special Model" semi-automatic key will definitely do away with the glass arm, the Lake Erie Swing and the Banana Boat Roll. Combining the outstanding features of former Speedex keys, the new design enables ama-



teurs and telegraphers to obtain a professional quality semi-automatic key at a moderate cost. The "Special" model key has a heavily chromed vibrator arm assembly and seven separate adjustments permitting operation at virtually any keying speed. An auxiliary circuit-closing switch and a heavy, "anti-creep" base are extra features of this fine key. Your dealer has one, no doubt. Go down and try this key out, and see what you think about it! You might write to **E. F. Johnson Co. (290 - 2d Ave., S.W. Waseca, Minnesota)** for additional information on the key. Even phone men would want one on the operating desk, for a decoy!

Old-timers remember the **Hammarlund** Super-Pro of 1929 vintage with fond memories. The latest grandson of the old "Pro" is the red-hot **Hammarlund** HQ-140-X, now in production. The 140-X is an 11-tube superheterodyne receiver, covering 540 kc. to 31 Mc. in six bands. Of great interest to the Ham is the separate, calibrated bandspread dial for the 80, 40, 20, 15 and 10 meter bands.

The all-important "front end" of the receiver has a 10 signal to noise

(Continued on page 73)

ALL TIMES IN E S T

EASTERN USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western Europe	Nil	0700-1400 (3) 1400-1700 (4) 1700-1900 (1-2)	1830-2230 (3-4) 2230-0200 (2)	1930-0000 (3)
Central Europe & Balkans	Nil	0600-1300 (2-3) 1300-1700 (3-4) 1700-1900 (1-2)	1900-2200 (3) 2200-0000 (2)	2000-2300 (2)
Southern Europe & North Africa	1300-1730 (0-1)	0600-1500 (3) 1500-1730 (4) 1730-1930 (1-2)	1800-2200 (3-4) 2200-0000 (2)	1930-0030 (2-3)
Near & Middle East	Nil	0600-1300 (1) 1300-1900 (2-3)	2000-2230 (2-3)	2030-2200 (1-2)
Central & South Africa	1430-1700 (1)	0700-1300 (1) 1300-1600 (2-3) 1600-1930 (3-4) 1930-2030 (1-2)	1900-2300 (3)	1930-2230 (2)
South America	1400-1700 (0-1)* 1200-1500 (2-3) 1500-1830 (3-4)	0600-1530 (2-3) 1530-1900 (3-4) 1900-0030 (1-2)	1900-0230 (3-4)	2000-0200 (2-3)
South East Asia	Nil	0700-1100 (1) 1800-2000 (0-1)	0300-0530 (0-1)	Nil
Australasia	Nil	1600-1900 (1) 1900-2200 (1-2)	0000-0600 (2) 0600-0800 (3)	0130-0600 (2-3
Guam & Pacific	Nil	0730-1100 (1-2) 1500-1900 (1) 1900-2200 (2-3)	2330-0800 (3)	0030-0530 (2)
Japan & Far East	Nil	0700-1000 (1-2) 1500-2100 (1-2)	0200-0700 (1-2)	0300-0530 (0-1)
West Coast, USA	1100-1500 (0-1)	1000-1700 (3-4) 1700-2100 (1-2)	2100-0000 (4) 0000-0300 (2-3) 0700-0900 (2)	2230-0600 (3-4)

ALL TIMES IN C S T

CENTRAL USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central	Nil	0730-1300 (2) 1300-1700 (3) 1700-1830 (1)	1800-0100 (2-3)	1900-2230 (2)
Southern Europe & North Africa	1430-1600 (0-1)	0600-1300 (2-3) 1300-1800 (3-4) 1800-1930 (1-2)	1830-2100 (3-4) 2100-0000 (2)	1930-2300 (2-3)
Central & South Africa	1500-1800 (1)	0700-1300 (1) 1300-1600 (2-3) 1600-1930 (3-4)	1900-2200 (3)	1930-2100 (2)
Central America & Northern South America	1400-1700 (0-1)* 1200-1900 (3-4)	0700-1600 (3-4) 1600-2100 (4-5)	1800-0430 (4) 0430-0730 (2-3)	2000-0400 (3)
South America	1230-1600 (1)* 1100-1500 (2-3) 1500-1800 (3-4)	0600-1500 (2-3) 1500-2000 (3-4) 2000-2300 (2-3)	1830-0430 (3-4)	2000-0330 (2-3)

ALL TIMES IN C S T

CENTRAL USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Japan & Far East	Nil	0700-0900 (1-2) 1500-2100 (2)	0200-0700 (2)	0330-0500 (0-1)
South East Asia	Nil	0800-1130 (2) 1700-1900 (0-1) 1900-2130 (1-2)	0230-0630 (1)	0300-0500 (0-1)
Hawaii	1800-2100 (0-1)	1000-1600 (2-3) 1600-2300 (3-4)	2230-0300 (4) 0300-0900 (2-3)	0000-0600 (3)
Australasia	1900-2100 (0-1)	1400-2000 (1-2) 2000-2300 (2-3)	2300-0400 (3-4) 0400-0800 (2-3)	0130-0500 (2-3)

ALL TIMES IN P S T

WESTERN USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	Nil	1100-1300 (1) 1300-1600 (1-2)	1930-2330 (1)	2030-2300 (0-1)
Central & South Africa	Nil	0600-1400 (0-1) 1400-1800 (2)	1930-0000 (2)	2100-2300 (1-2)
South America	1300-1600 (0-1)* 1100-1400 (2-3) 1400-1800 (3-4)	0600-1500 (2-3) 1500-2000 (3-4)	1900-0200 (3-4)	2030-0100 (2-3)
Okinawa	1900-2300 (1-2)	0730-0900 (1-2) 1300-2100 (2) 2100-0030 (3-4)	0130-0400 (3)	0200-0330 (2)
Guam & Mariana Islands	1700-2200 (2)	0700-0900 (2-3) 1030-1900 (2) 1900-0000 (3-4) 0000-0300 (1)	0100-0600 (3-4)	0200-0500 (2-3
Australasia	1500-1900 (0-1)* 1100-1900 (2-3) 1900-2100 (3-4)	1000-1800 (1) 1800-2000 (2) 2000-2230 (3-4)	2200-0600 (3-4)	2300-0400 (3)
Japan & Far East	2000-2300 (1)	1200-1900 (2) 1900-0100 (3-4)	2300-0400 (3-4)	0000-0300 (2-3)
Philippine Islands & East Indies	1900-2230 (1)	0700-1000 (3) 1300-2100 (1) 2100-0100 (2-3)	0300-0430 (1-2)	0330-0430 (0-1)
Malaya & South East Asia	2030-0000 (1)	0800-1230 (2) 1230-2300 (1) 2300-0200 (2-3)	0400-0600 (0-1)	Nil
Hong Kong, Macao & Formosa	1800-2230 (0-1)	0730-0900 (1) 1300-2000 (1-2) 2000-0100 (3-4)	0300-0500 (3)	0330-0430 (1-2)

Symbols For Expected Percentage of Days of Month Path Open:

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

*Indicates time of possible ten-meter openings.

Ionospheric Propagation Conditions

Forecasts by

GEORGE JACOBS, W2PAJ

144-40 72nd Ave.,

Flushing, Long Island, N. Y.

GENERAL PROPAGATION CONDITIONS

10 Meters—Fairly frequent short skip, sporadic E openings expected up to a distance of 1200 miles.

15 Meters—Fairly good DX expected on north-south paths to Latin America and from Western USA to Australasia.

20 Meters—Band remaining open for DX for considerably longer periods of time than during Winter months, with DX possible to all areas. This will be best daytime DX band.

40 Meters—Good DX to most areas during the evening hours. This will be best band from early evening to early morning.

80 Meters—Band becoming seasonably noisier, but fairly good DX possible to many areas during the night-time hours.

160 Meters—Higher atmospheric noise levels and Summer absorption will not permit much DX on this band until early Fall.

This overall picture of band conditions is intended to indicate qualitative changes in each band from month to month. For specific times of band openings for a particular circuit, refer as usual to the *Propagation Charts* on the opposite page.

These *Charts* are based upon a radiated CW power of 150 watts, where radiated power is equivalent to the power fed into an antenna multiplied by the gain of the antenna at radiation angles less than 30°.

These forecasts are, for the most part, based upon basic ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards. The forecasts are calculated in such a manner that they are valid until June 15.

During April and May, many communities in the United States go on *daylight saving time* for the Summer months. Times in the *Propagation Charts* are given in *standard time.* If your community is on daylight saving time, remember that local standard time plus one hour equals daylight saving time. If for a particular circuit, 20 Meters is forecast to open at 0700 EST; this is the same at 0800 EDST.

Sunspot Cycle

This month's **Propagation Charts** are based upon a predicted smoothed sunspot number of 7, centered on May, 1954. The observed monthly Zurich sunspot number for February, 1954, was 0.2, resulting in a smoothed sunspot number of 10.7, centered on August, 1953.

Scientists do not yet know the cause or the exact laws of behavior of sunspots. For this reason, only empirical methods based on the general pattern of recurrences can be used for making "educated guesses" or predictions of the sunspot curve. These predictions, while at times quite accurate, can of course be subject to error. There is, however, a more positive indication on the face of the sun itself at the time the minimum of the cycle is due.

It has been established that the sunspots of a new cycle appear high on the face of the sun. If a conventional latitude grid is placed on the sun, with an equator at the center, the sunspots of a new cycle occur in the high latitudes in the neighborhood of 40 degrees, either North or South of the Solar Equator. As the solar cycle progresses, new outbursts of sunspots occur at lower latitudes progressively. At the time of sunspot maximum, the clusters of sunspots are on the average in the neighborhood of 18 degrees, either side of the solar equator. As the sunspot cycle advances towards minimum, the spots occur nearer and nearer the solar equator. At the very end of the cycle, the few sunspots observed are only two to five degrees from the sun's equator. Shortly before the sunspots of a given cycle reach a minimum number, new outbursts of the next cycle of sunspots begin to be observed again at the sun's high latitudes.

Additionally, surrounding each sunspot is a magnetic field. Scientists have developed methods for measuring the intensity and polarity of these magnetic fields. The polarity of the magnetic field surrounding each sunspot is the same for a given cycle. The polarity of the magnetic fields surrounding the new cycle sunspots is reversed from that of the previous cycle. High latitude sunspots of reversed polarity, therefore, indicate that the minimum of the precent cycle is very near. In fact, for the previous three cycles, a noticeable increase in solar activity was observed about a year after the first new cycle sunspots were noticed.

On February 8, 1954, one of **the first** sunspots of the new cycle was observed at the high latitudes of the sun, with the usual reversed polarity of its magnetic field.

Total Eclipse

Possibly one of nature's most spectacular phenomena is that relatively rare occasion when the moon passes directly between the earth and the sun to create an eclipse. When such an eclipse takes place, there are certain locations on the face of the earth where it can be seen as a **total eclipse**—that is where the moon **completely** shields the view of the sun from the earth. Scientists travel to all parts of the world just to be at the right location to view the total eclipse and record certain scientific data that can only be obtained during such an event.

A total eclipse of the sun will occur on June 30. The eclipse will be visible in the North Central part of the United States. The path of totality in the United States, those locations at which it will be seen as a **total** eclipse, runs Northeast from where it rises in total eclipse near O'Neil, Nebraska, stretching across Min-

Periods of good short wave propagation conditions are expected during May 1-8 and 26-30. Moderate ionospheric disturbances are forecast for May 17-18 and 21-24.

nesota, Wisconsin and upper Michigan. The center line of this eclipse will pass through Minneapolis and St. Paul, Minnesota, and it will be seen as a total eclipse (weather permitting), up to 45 miles on each side of this line. At other locations, the eclipse can be observed as a partial eclipse, for example, in Washington, D.C., 73% of the disc of the sun will be covered by the moon.

The total eclipse of the sun has always had special significance to radio researchers. During such an event, **and only during such an event,** is it possible for the ionizing radiation of the sun (which forms the various layers of the ionosphere), to be cut off in the middle of the day. This affords radio researchers the opportunity to watch the effects upon shortwave radio circuits, as ionization changes take place.

As far back as 1925, Scientists discovered that during a total eclipse, radio waves of frequencies which are propagated best at night, showed a remarkable increase in intensity during the daylight hours when the moon obscured the sun. Daytime frequencies showed a corresponding decrease in the intensity of the received signal. The total eclipse effect was, in fact, observed to transform day propagation conditions into night conditions during the period of the eclipse. This of course, indicates a temporary decrease in the electron density of the ionized layers because of the blocking of solar radiation to the earth by the interposition of the moon.

In fact, it was as a result of similar observations made in 1927, during a total eclipse, that Scientists formulated the present theory that the ionized layers above the earth are formed principally by the ultra-violet radiation from the sun. Observations at subsequent eclipses have verified this theory.

This will of course, also be an unusual opportunity for Amateurs to observe the effects of the eclipse. The eclipse should transform day conditions into night conditions for those circuits whose mid-point (ionospheric reflection point), passes through the area of total eclipse. This will result in an improvement on 75 and 160 meter

(Continued on page 86)

Building An All-Band Coil

R. A. ROBERGE, W6OZS and R. W. McCONNELL, W6SCX

Vaaro Electronics Engineering Co.

For Those Who Might Want to Make Their Own

This "all-band" coil was designed for use in a base-loaded mobile antenna with a minimum over-all length of six feet. It will resonate an antenna of this length to any frequency between approximately 3.75 Mc. and 30 Mc. Using a longer whip or adding a capacity hat to the antenna will permit operation on still lower frequencies.

The continuously adjustable feature is valuable in emergency or portable operation. The car may be parked and a long wire antenna clipped to the end of the mobile antenna. Then the entire combination may be resonated to the operating frequency by means of the slider in the loading coil, resulting in an antenna that may often rival the home antenna in efficiency.

Figure 1 illustrates the constructional details of the loading coil. The fiber-glass rod that carries the weight of the antenna may be obtained from a sporting-goods store in the form of a "glass" fishing-rod blank. Obtain a fairly husky one and cut the piece required from the large end. Damaged blanks can frequently be picked up from larger sporting goods stores, where fishing rods are repaired, almost for the asking.

The necessary plastic may be obtained from plastic extruding firms or specialty shops. It should preferably be one of the new butyrates that resist shattering and do not deteriorate under exposure to weather and sunlight. Some amateurs, who have built similar coils, have utilized plastic household utensils as a source of this material.

Construction

Start construction with the plastic end pieces *(B,C)*. One of several possible methods of making them is described here. Cut two discs, three inches in diameter, from 3/16-inch or ¼-inch plastic. Then, cut two more discs of a diameter just sufficient to fit inside the ends of the *B&W* coil *(A)*. Cement them to the centers of the larger discs. Drill a hole through the center of each end piece, to pass the fiber-glass rod *(D)*.

Place these end pieces on the ends of the coil and measure the exact overall length. Cut the fiber-glass center rod one inch longer.

Now make the metal fittings *(E* and *F)*. They may be of brass or aluminum and are about ¾" in diameter and 1" long. Drill half way through them from one end and tap the hole for ⅜" x 24 threads to match standard mobile antenna fittings.

(Continued on page 75)

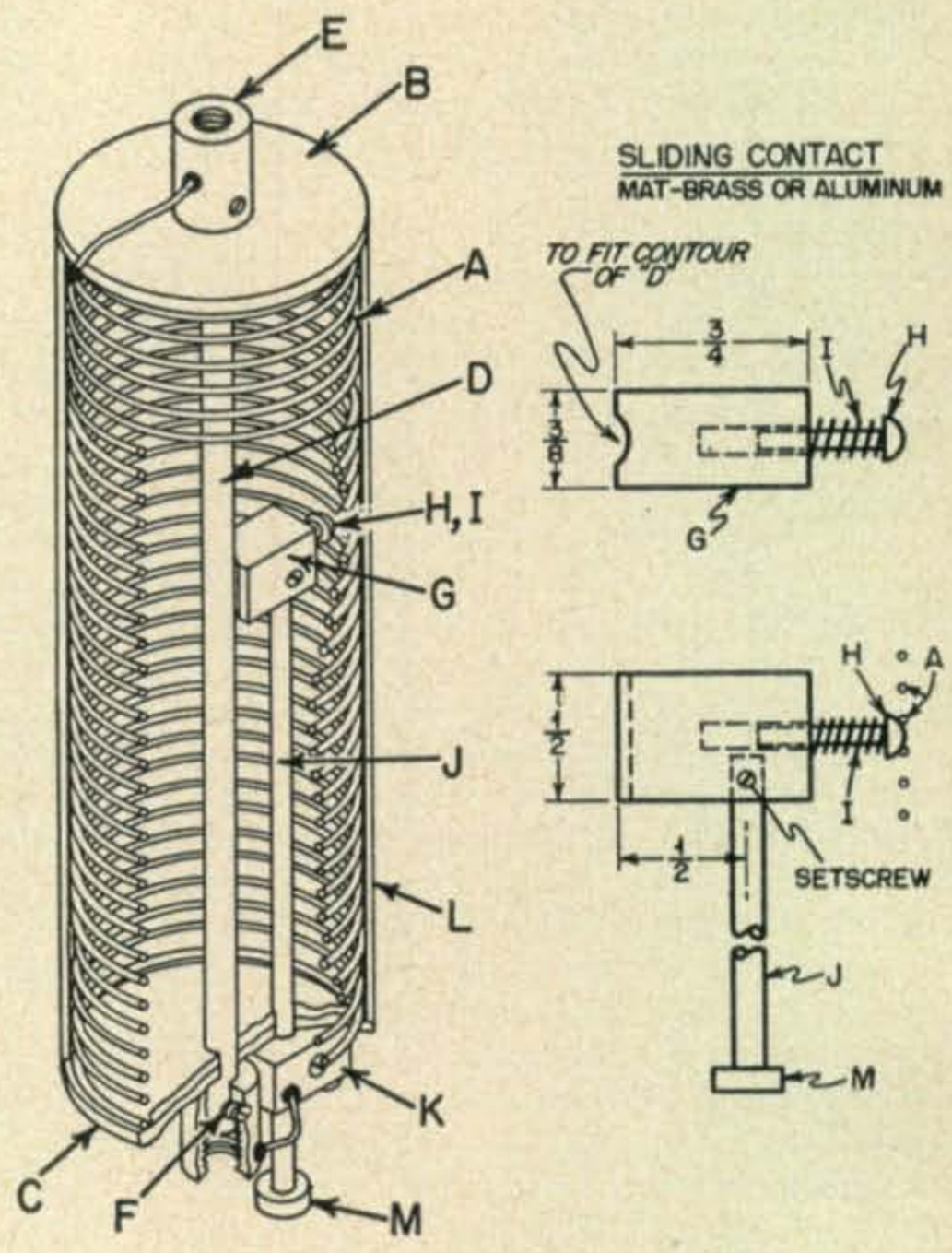


Fig. 1. Details of the "all-band" loading coil described in text. A—B&W, No.-3906-1, bulk loading coil consisting of #14 tinned copper wire spaced wire diameter, 2½ inches in diameter, ten inches long. B, C—Three-inch diameter plastic discs, ⅛ or ⅜-inch thick, to which are cemented smaller discs to fit inside ends of A. D—Fiber-glass rod, approximately ⅜ inches in diameter x 11½ to 12 inches long. E, F—¾ x 1-inch brass or aluminum, drilled and tapped as described in text. G—¾ x ⅜ x ½-inch, aluminum or brass block, modified as shown. H—brass contact pin. I—small coil spring. J—12 x ¼-inch brass rod. K—¼-inch shaft lock (Millen No. 10063). L—Outside plastic coil shield. M—Knob for adjusting rod.

XEIVA/Mobile — a Mobileer's Dream

Just before returning to Mexico after a wonderful visit in the Los Angeles area while making arrangements for the 22nd Annual LMRE Convention in Acapulco, XE1VA had a mobile installation built especially for his Cadillac. As described in the text, a complete GONSET low-frequency receiving and transmitting station has been worked into a leather traveling case. A separate case holds a GONSET "Communicator" used on 2 meters.

The mobile installation pictured on this page is that of Dr. Jose Polak, XE1VA, Vice President of Foreign Relations of the LMRE. The unit will be the official mobile station of the LMRE XXII Annual Convention to be held in renown Acapulco, May 27 through May 30.

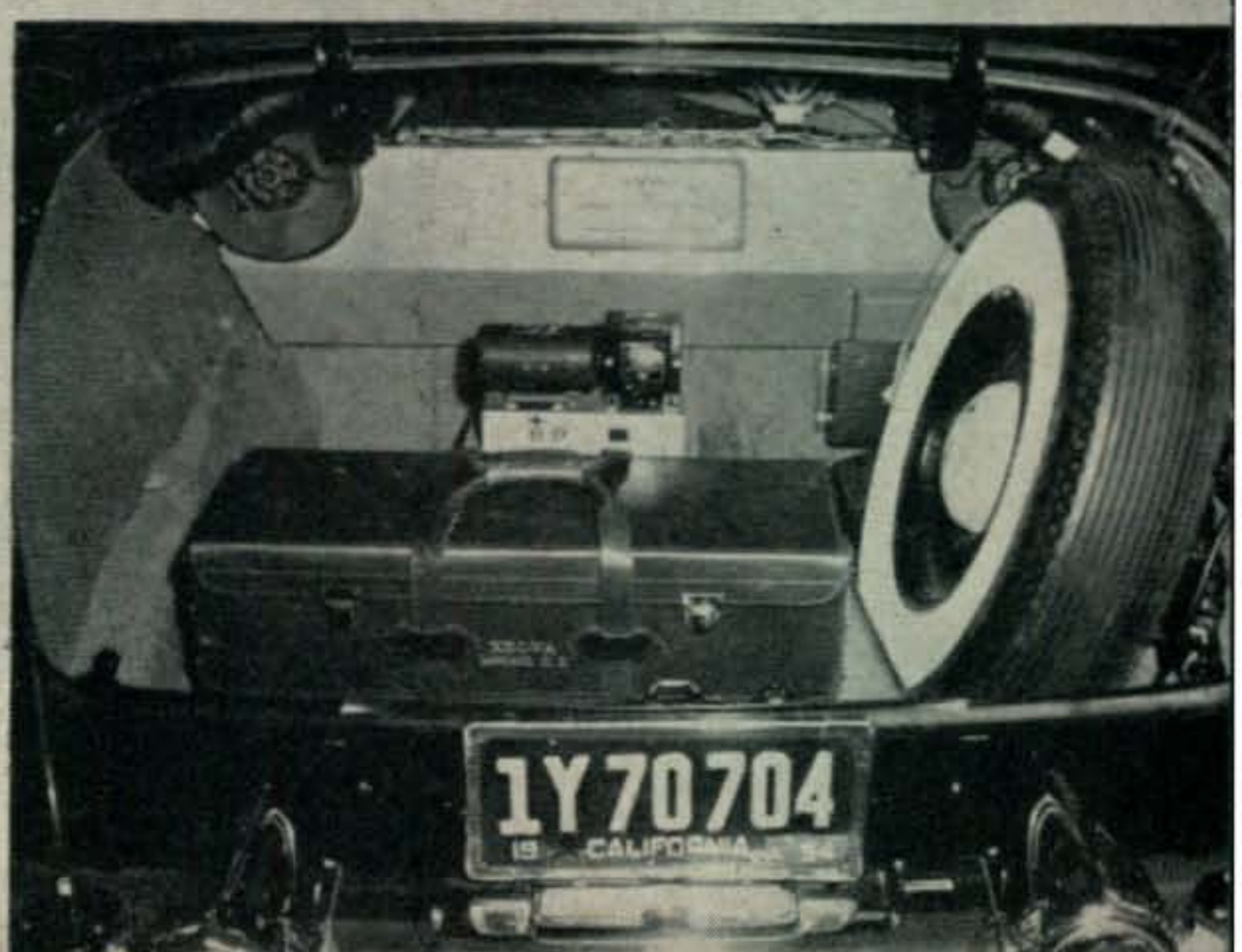
Most of the transmitting and receiving equipment has been built into a custom made leather case. This case has "drop-down" legs for placement as an operating position in front of the rear seat of a 1953 Cadillac. When not in use, the equipment is stored like a travel case in the luggage compartment. In a matter of a few minutes, the case may be set up by the passenger seat. A single cable, cleverly concealed in a pocket beside the rear seat, contains both power and co-ax antenna connections (Cannon SK-U4-21C-¾ straight plug with SK-U4-32SL receptacle). The front of the case drops down to form an operating desk. A rack for crystals and another for coils not in use, a compartment for storing the microphone, key and log were made a part of the leather travel case.

The equipment consists of a GONSET "Super-6" and "Super-Ceiver" for reception, a GONSET "Commander" for transmitting on the low-frequency bands, and a GONSET "Communicator" for 144-Mc. operation. Power is supplied by a Leece-Neville at 110 volts to the "Communicator" and by a separate dynamotor and filter to the remaining equipment.

The antennas were supplied by VAARO and on the left rear bumper is their variable all-band model. It consists of a 36-inch base extension, loading coil, whip-flexer and then an 8-foot whip. On the right rear bumper is a VAARO 2-meter coaxial antenna.

(Photos by K6AFM)

In the left photograph the two VAARO mobile antennas are shown mounted on the rear of the XE1VA Cadillac. The left hand antenna is the all-band variable loading coil model. The one on the right is the coaxial 144-Mc. antenna. In the right hand photo we see the leather traveling case in the luggage compartment. The dynamotor power supply directly behind the case is used with the low-frequency equipment and is mounted permanently in the luggage compartment.



Gathered by DICK SPENCELEY, KV4AA

Box 403, St. Thomas, Virgin Islands.

You won't believe it but here it is, yep, THE FIRST PHONE WAZ!! Our heartiest congratulations go forth to Robbie, VQ4ERR, for this hitherto impossible feat. A card from UAØKFB, acknowledging a three year old phone contact, did the trick:

PHONE WAZ NO. 1
VQ4ERR, E. ROBSON, 40-220

We also welcome the following newcomers to the HONOR ROLL:

W8DMD 39-228

W2AZS 35-142

At Time of Writing

With the exception of 3A2BB/3A2AW this section gives little to alert DX'ers on coming DX activity of a rare nature. Thus we hasten to give our report on happenings of recent date and one "lulu" which we hope has been brought to a successful conclusion as this is read.

MONACO, 3A2BB/3A2AW: Switching his activities from Liechtenstein, where he has been appearing each year (since 1948) as HE1JJ; Karl Ramser, HB9JJ, has been issued the license and call of 3A2BB by the government of Monaco. Charly will operate from this QTH for three weeks starting May 4. Power input will be 150 watts on all bands from 10 to 80. He will also be on 1829 kc. with low power and QRV for top band contacts. Accompanying him will be SM5ARP/3A2AW who will take care of the phone end. QTH, while active, will be Hotel du Siecle, Monaco-Ville. Watch 14050 and 14100.

COCOS, TI9AB/W6MHB: After assembling and stowing all Ham gear on board the "MARY ELLEN II" this expedition was cancelled, at the last minute, by the owners. It will probably take place next year. Our appreciation goes to John, W6MHB, and those who helped him in the considerable effort put forth in preparation for this trip.

CLIPPERTON ISLAND, FO8AJ, WØNWX/WØNUC: This long awaited expedition is to put this rare QTH on the air for the first time in Ham history. It was due to leave Iowa March 17, and go via car to Acapulco, Mexico. From there the 670-mile trip to Clipperton was to be made in an 83-foot boat. Plans called for all-band operation (including 160) during the second half of the ARRL DX contest, March 26-28. An additional operating period, March 29, was planned with special emphasis on DX contacts outside of W, and some phone operations. We have received word, however, that as of this date, (Apr. 9) the expedition had succeeded in covering only 65 miles of their 670 mile journey, and at the time of this report, was proceeding toward Clipperton at a pace of five knots. This is their second attempt at the trip, owing to an unfortunate navigational mishap on the initial try. Their ETA at Clipperton was estimated to have been plus or minus Tuesday (Apr. 12) a.m., and the duration of their visit limited to two or three days. Ham gear has been donated by Hallicrafters and in such quantity that simultaneous two band operation may occur if feasible. Maritime Mobile operation is likely to and from Clipperton. We can only say, at this time, that we hope the expedition has had the success that it deserves, that the hazards bound to be encountered have been overcome with no grief and that the estimated 2000 contacts have included you and me!

EASTER ISLAND, CEØAA/CE3DG: We have the log covering CE3DG's operation on Easter Island, January 22-25, in which the following 36 contacts were made: W6VOE, W6BOK, W6CUQ, W6GFE, TI2TG, W5VIR, W6HUA, W5VGR, W6CRT, LU1QB, W6QL, W6MX, W6CUQ, W6AM, W6TI, HR1AT, W6QHS, W8PQQ, KL7AOR, KV4AA, CE3DZ, CM9AA, W6BAX, W6AWT, W6LWP, W6TXL, W6GIZ, W6ZBY, W6PHS, W7PGS, W6WO, W6BUO, K6ALF/6, W6MYI, W6QMO and W6AWT. Transmitter was a BC-610, receiving on a NC-183 and using a long wire antenna. Installation work during Jorges stay made Ham operating periods unfortunately short. A 40-watt LETTINE transmitter was installed for Dr. Darfo Verdugo, CEØAC. The Doctor will operate on phone only in the vicinity of 14100 kc. (A recent report via CE3AG advises that CEØAC is having trouble with the gas generator and has not been on as yet). CEØAD was also installed for the Chilean Airforce using the Bc-610. This station will be operated by Ignacio Valdes on CW, 14001, and phone (CE3AG also reports that CEØAD has not, as yet, been heard on the Ham bands. Luis believes this is due to the fact that the housing, for this station, has not been completed as yet). A large airstrip is being built on Easter and a tourist influx is hoped for.

RIO DE ORO, EA9DE/EA2CA, EA9DF/EA8BI: This expedition dispensed many contacts from this rare spot, on phone and CW, during the middle two weeks of March. It helped many, who had missed

(Continued on page 90)

Here is a view of VQ4ERR, Nairobi, Kenya. Recent winner of PHONE WAZ No. 1, Robbie's present equipment consists of three transmitters, each with an 813, 150-watt final. Receivers are a 75A2, SX-42 and AR-88. Rotary beams cover 28, 21 and 14 Mc. Robbie says his Phone WAZ is due to plenty of listening and patience and, most important, good DX pals like W1FH, PY2CK, SM5ARP, etc., who keep him up to date when he goes on the air. Although 52, Robbie is well known for his fierce play on the Kenya Water Polo team (inset).

Robert Wahl, DL1DC, of Stuttgart-Mohringen, employs this neat set-up. An 807 final runs at 50 watts and the receiver is a BC-348. DL1DC is a new arrival to the WAZ ranks and holds certificate No. 298.

One of the outstanding Swiss signals emanates from HB9MQ, shown above. Felix has worked 184 countries. (Photo courtesy W2DKF)

Wyn McGee, VR2CG, from down Fiji way. VR2CG utilizes a home-made rig which winds up in an 813 final. The receiver is an AR-88. Wyn is an avid DX-34 and works SSB and Mobile. He may be found on 21 Mc. phone on weekdays from 0000/0100 and 0430/0830 GMT and at most any time on week ends.

Arthur Milne, G2MI, is no stranger to DX-ers. SM5KP snapped this photo during a recent visit. Art is the new president of the R.S.G.B.

W. A. Z. HONOR ROLL

CW & PHONE

WAZ

W1FH	256
W8HGW	253
W6VFR	250
G6ZO	249
W3BES	248
W6ENV	248
PY2CK	248
W2BXA	246
W3GHD	245
G6RH	244
W8NBK	244
WØYXO	243
W6AM	243
W6SN	243
W3KT	242
W3EVW	241
W2AGW	241
W6SYG	241
W8PQQ	241
W3JTC	240
W6MX	240
W8BHW	239
W3GAU	239
W8JIN	238
W6GRL	237
W6ADP	236
W6MEK	236
W3CPV	235
W7AMX	235
LU6DJX	234
CE3AG	234
VE4RO	233
W6AMA	233
SM5LL	233
G4CP	232
W6GDJ	230
W7GUI	229
W6DZZ	229
W8BRA	228
ZL2GX	228
W6EBG	227
W6PFD	226
VK2ACX	226
W7DL	225
W6TS	225
W6SAI	224
DL1FF	224
VK3BZ	223
SM5KP	223
W6VE	223
W3LOE	222
W6FSJ	222
W3BHV	222
W6MVQ	221
W6PB	221
G6QB	221
W7BD	220
W6TI	220
W6ITA	229
W6TT	218
WØNUC	218
W6PQT	218
G2PL	218
KH6IJ	218
WØPNQ	217
W9DUY	217
W6DLY	217
W6CYI	217
W9NDA	216
W2PEO	215
W3JNN	215
W6EFM	215
W3IYE	214
PY1DM	214
ZS2X	214
KH6BA	214
ZL1BY	214
G8IG	214
W6OEG	213
W4AIT	213
KH6CT	213
VK4HR	213
W6RBQ	213
CE3DZ	213
W6HX	212
VE7HC	212
OE1CD	212
W6NNV	211
WØDU	211
W6BPD	210
W6MJB	210
W6IBD	210
W9VW	209
W6RW	209
W6UHA	209
W2AQW	208
ZL1HY	208
W6EPZ	208
W6SC	207
VE7VM	206
W4BPD	206
WØELA	206
W6ERI	205
W6ZCY	204
W6PKO	204
W6DI	204
VK2DI	204
W6AVM	204
DL7AA	204
W4CYU	203
W6HJT	203
LU8EN	203
W6RM	202
W6OMC	202
W6AOA	202
W6BUD	202
G2MI	202
W5GEL	201
G3DO	201
W9KOK	200
VK5JS	200
W7OY	200
W6MHB	200
ON4QF	200
PY1GJ	199
W6RLN	198
W6SRF	198
W6UCX	198
W2IOP	197
KH6QH	197
W6BAX	197
PY1AJ	196
W6WB	196
G2FSR	196
I1KN	196
W6LW	196
W5KC	195
OK1FF	194
W6GAL	193
W6EHV	193
WØSQO	192
VK2NS	191
W6SRU	190
VK3JE	189
ON4JW	189
WØNTA	188
W8SDR	186
VK6RU	186
W6DFY	186
W4CYY	186
W6NTR	186
W2CZO	185
W1AB	185
W6IFW	185
W6SA	184
KH6VP	184
W6LRU	184
W2JVU	183
DL1IB	183
LA7Y	182
VK4EL	182
W6LN	181
W7ENW	181
W6SR	180
PY1BG	179
W9VND	178
W6NGA	178
WØUOX	177
VE6KW	177
W6UZX	177
CX1FY	176
KH6CD	176
W6LDD	176
PK4DA	175
W8HUD	175
W6WKU	174
W6CIS	174
W7FZA	174
W6PCS	174
W6KUT	174
W6TZD	173
W6JK	173
G5YV	172
OK1LM	172
W6WWQ	172
PY1ARL	171
OK1HI	171
ZS2AT	171
W6BAM	170
DL1AB	170
W6PZ	170
W5AFX	169
G2VD	169
W6JZP	168
W6ANN	167
VK3CN	167
W6BVM	167
I1XK	167
W6ATO	167
W6DUC	166
KH6MI	166
W6CEM	166
VE7GI	165
W6BZE	165
W6PM	164
ZS6A	164
W6EAK	165
W6YZU	163
G5GK	163
VE7VO	162
ZS6DW	162
I1IR	162
W6PDB	161
OK1SV	160
VE3EK	160
W6PUY	160
JA2KG	160
KH6MG	160
W6ONZ	160
WØFFV	158
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
W6NZ	148
OK1CX	147
W6LS	147
W7KMC	147
KH6PY	147
W7DXZ	146
W6AYZ	146
VE6GD	146
VS6AE	146
W6ID	146
W9NRB	145
W6MUC	145
OK2SO	145
OH5NK	145
DL1DC	145
ON4TA	144
KG6GD	143
W6BUO	142
W3IXN	141
W6AOD	140
VK2PV	140
W6BIL	140
G3BI	144
W7LYL	143
ZC1CL	138
OK1WX	135
W7BTH	135
G3AZ	133
W6TEU	133
W6RDR	133
W6AUT	133
VE7KC	133
W6OBD	131
ZS2CR	131
CR9AH	131
W6IDZ	130
W7ASG	129
W7GBW	127
G8IP	127
G5BJ	126
VK6SA	126
PK6HA	124
G5VU	124
W6NRQ	123
W6MLY	123
ZL1GX	122
VK5MF	121
ZL2CU	120
ZS2EC	116
ZS6CT	113
W7KWA	98
W6DUB	89
W7IYA	59

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W5ASG	238
W8KIA	238
KV4AA	235
F8BS	232
W2NSZ	232
W2WZ	231
W9RBI	230
W3DPA	230
W8DMD	228
4X4RE	226
W1ENE	225
W3OCU	224
W3EPV	223
W2QHH	222
W1GKK	221
W9LNM	221
W1JYH	219
W1HX	218
W5MPG	214
W3DRD	213
W4GG	211
W9FKC	211
W3DKT	210
W1BIH	209
W5LVD	209
W8SYC	209
W2HHF	208
VK4FJ	208
W8HFE	207
W2BJ	207
VE3QD	206
KP4KD	206
F9BO	204
W1ZL	204
W5FFW	204
W9HUZ	202
W9IU	201
W2HZY	200
W3JKO	200
W2EMW	198
W9MXX	197
W7PGS	197
SM5WI	196
W3KDP	196
W4RBQ	193
W2CWE	192
W4LVV	192
VE3AAZ	192
W2IMU	192
W2AGO	191
W1AWX	191
OK1VW	190
GM3CSM	190
OE3CC	189
W6GPB	189
WØEYR	186
VE3IJ	186
W8RDZ	184
W9TQL	184
W4INL	183
W2MEL	183
W1DQM	181
W2CNT	181
W2RDK	180
W4AZK	180
VO6EP	179
VK4DO	179
VE8AW	178
W9ABA	176
W8CVU	172
W4DKA	172
W2RGV	171
W4VE	171
W9LM	170
KL7PI	170
W6CTL	169
W1NMP	169
W3JTK	169
OZ7EU	169
HC2OT	169
PY2AC	168
W2CYS	167
W8LEC	166
W6WO	166
SM7MS	164
W4BRB	162
G6QX	162
W8VLK	160
W6LGD	160
W4OM	158
SM7QY	158
W6KYV	158
WØAIW	157
I1AY	157
W8WWU	157
WØRBA	157
W9NZZ	157
DL1AT	156
W9YNB	155
DL1FK	155
I1AIV	154
DL1KB	154
W6CUL	154
G3AKU	150
VE7VC	150
W1ZD	150
W2GUR	146
OK1AB	144
W6MUF	144
TF3EA	142
VS7NX	140
W6KYT	135
W7HXG	134
W7ETK	132
W9ALI	132
W6TE	131
W6WJX	131
W5CPI	130
KL7UM	129
DL1DA	127
W6EYC	126
VR5PL	124
DL3DU	118
W6NRZ	117
W6JWL	114
W6FBC	114
W6VAT	110
DL3AB	107
W7GXA	105
W6LEV	103
W6FXL	93
W7LEE	91
TI2TG	215
W2HMJ	206

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GM3EST	204
W1HA	198
CM2SW	183
WØTKX	181
W2PUD	181
W5KUJ	181
W2SHZ	180
W2GVZ	178
W8KPL	173
W8FJN	173
W8EYE	172
W3FYS	172
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W1KFV	177
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W9CKP	132
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W3LTU	206
W6DI	203
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W3BES	190
W1JCX	189
CE3AB	186
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W8REU	176
G3DO	175
VK3BZ	173
W7MBX	164
W9HB	161
W6PXH	159
GM2UU	158
W6WNH	157
W3JNN	150
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W2DYR	140
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W9HP	139
W8AUP	131
W8PDB	130
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W4INL	129
W1FJN	128
G6BW	127
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W8CYL	112
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W5ASG	171
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DL3DU	118

Monitored by LOUISA B. SANDO, WØSCF

c/o General Delivery, Cortez, Colorado

Congratulations to W1ULF, "Tweet" Hines, for winning the *Whiting Woman of the Month* award as a result of her "outstanding and meritorious service during the tornado which struck Worcester." Tweet was the first Ham to make contact outside Worcester after the tornado blasted the city last year. Handling traffic from the stricken area from which all normal communications had been cut, she had only two hours sleep during the first night and day. Tweet says it was a wonderful feeling to be able to pitch in and help in the emergency. But she is quick to add, "Every amateur in the city and surrounding area worked hard all that week, so I really didn't do any more than the others." Nevertheless, she appreciates the honor of receiving the Whiting Award, an engraved, silver "Paul Revere" pitcher.

Tweet and her OM got their tickets together in November '51, with calls W1ULF and W1ULE. The following year they went together again for Advanced class. John works mostly mobile, while Tweet works the home rig on 75 phone, 80 CW and a bit of 20 CW. She is an NCS of the *Deep Sea Dragnet* which meets Mon. through Sat. on 3970 kc., 11:45 a.m. to 1:15 p.m. Her rig is a *Viking I, VFO*, and a *Collins 75A2* receiver. Two jr. ops, Sandra Jean, 6, and Joyce, 3, also claim a good share of Tweet's attention.

W1ULF, "Tweet," receives the Woman of the Month award from manager of the Worcester Branch of Whiting Milk Co. in recognition of her services during last year's tornado.

Below: W4HWR, Hilda, (seated) snapped at the 1953 RSGB exhibition, together with (left to right) G8LY, Constance; G3ACC, Meg, and G2YL, Nell.

An Understanding XYL

Congratulations also are in order for Louise Surber, XYL of W9NZZ, Stan. Louise was cited as "the most understanding wife of the year" for the help and encouragement which aided her OM to win *General Electric's Edison Radio Amateur Award* for the outstanding Ham radio public service of 1953. Along with Louise's surprise citation from G.E. came a gold wrist watch.

The couple was honored at a dinner at Washington's Hotel Mayflower where Stan received both the *Edison Award* trophy and a special citation from the U.S. Weather Bureau. W9NZZ won his honors for QSP-ing over 12,000 letters last year between men at five isolated Arctic Islands weather stations and their

(Continued on page 86)

ESSE MAY SPECIALS

RA-105 POWER SUPPLY

Here is a 115 V. 60 cycle Power Supply ready to use with outputs ranging from 110 V. to 2400 V. Or a bargain just for parts alone. Here is what you get:

1—Power Transformer, 355-0-355 and 490 V. @ 325 Ma.
1—Power Transformer, 2400 V. @ 40 Ma.
1—Filament Trans. SI-6.4 V @ 12A; S2-6.4 V at 10.6A. S3-5 V. at 3A; S4-5 V. at 3A; S5-5 V. at 3A; S6-2.5 V. @ 1.75 A.
1—Filament Trans 6.3 V. at 10 A.; 2.5 V. at 5A; 2.5 V. at 5 A.
1—Dual Choke 12 Hnry. at 100 Ma.
1—Choke 59 Hnry. at 100 Ma.
1—H&K Circuit Breaker, 10 A. 117.5 V.
1—H&K Circuit Breaker Time Delay Magnetic
1—Interlock Switch
1— 7 Mfd. 800 V. DC Oil Cond.
3— 7 Mfd. 600 V. DC Oil Cond.
2— 4 Mfd. 600 V. DC Oil Cond.
1— 2 Mfd. 1000 V. DC Oil Cond.
1— 2 Mfd. 400 V. DC Oil Cond.
1—.2 Mfd. 5000 V. DC Oil Cond.
1— 1 Mfd. 400 V. DC Oil Cond.

Also misc. resistors, pilot lights, controls, etc. All the above, brand new, for..... **$14.95**

Size 23¾"x20"x10". Wgt. 120 lbs.

Kit of tubes including 3—5U5G's; 3—2X2/879's; and 1—6X5 ..... Additional $4.00

GUY WIRE — 5,000' spool — $1.95 per 1,000'

Extra strong snarl, and rust resistant cable. Originally used for aircraft control cable, has 21 strands alloy brass plated to resist corrosion. 350 lb. breaking test. OD 3/64". Ideal TV Antenna guy wire. Wound on wood & metal spool of 5,000' length.

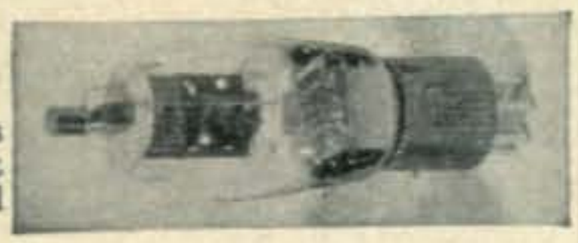
Per spool **$9.75**

3/16" Stainless Steel Aircraft Control Cable ideal for large Xmtg. Beams (over 1,000 lb. breaking strength. New...3¢/ft.
¼" Galvanized Stranded Utility Pole Guy Wire 500 ft. reels only. .....5¢/ft.

CH PRESSURE SWITCH

Controls pressure within any setting from 50—250 lb./sq. in. with a differential of 20—75 lb./sq. in. Use for any motor up to 1 HP. @ 110 V. or 1.5 HP @ 220 V. AC or DC. Has also manually operated push-pull on-off switch Cutler-Hammer Bulletin 9505. BRAND NEW ..... **$1.75** ea.

1625 TUBE 12 V. 807



These tubes are 807's with a 12 V. filament making them ideal for new 12 V. car mobile transmitters.

BRAND NEW, Guaranteed ..... ea. **59c**
Lots of 10 or more ..... ea. **39c**

TRANSFORMER PLATE POWER

355-0-355 Volts @ 325 Ma. Also 490 V. 325 Ma. Primary 117 Volts 60 cycle. Measures 5" x 5½" x 6". Shipping wt. 22 lbs. PRICE **$2.95**

6V VIBRATOR TRANSFORMER

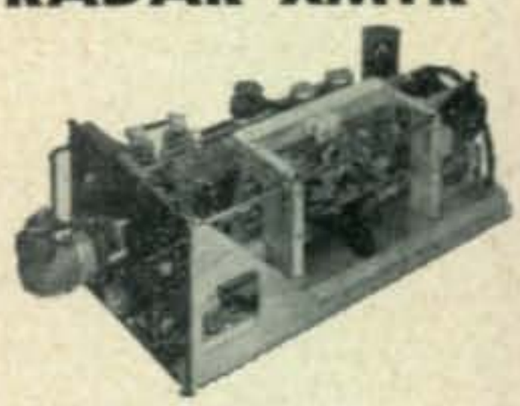
Philco 32-8313-1 6 V. Vibrator transformer 280 V. output @ 60 ma. Size 2-5/8"x2-3/16"x2" half shell chassis mtg. ..... **95c** ea.

CO-AXIAL CABLE

RG/8U..... 100 ft. **$4.95**
RG/29U Amphenol..... 100 ft. **$1.95**
1000 ft. or more, 20% discount

T-39/APQ-9 RADAR XMTR

Described in Feb. '50 "CQ" for conversion for the 420-450 Mc. amateur band and citizens band. Also contains many parts for the UHF experimenter such as 2—8012 tubes, fan and motor, switches, pots, gears, counter, etc. Equipment removed from aircraft. Our Close Out, quantity limited. **$4.95** ea.
Shipping wt, 43 lbs.



HS-16 HEADSETS

Famous hi-Z Air Corps type Trimm headset with pin end cord terminals. Brand new, moisture-seal packed .....ea. **$2.95**

DUMONT 3" OSCILLOSCOPE

These scopes used in research at Atomic energy plant, Oak Ridge, and are in good operating and appearing condition. Limited Supply. ea. **$34.50**

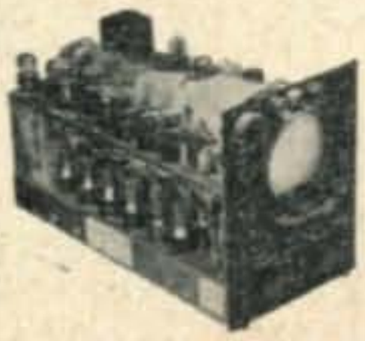
WELDING TRANSFORMER

Tapped Pri. 105-125 volt 60 cy. 1 phase input. 5.1 Volt 190 amp. output. 35 KV RMS insulation test. Case size 7"x10"x12". Ideal for use on spot welder. Wt. 80 lbs..... **$14.95**

12 V. VIBRATOR TRANSFORMER

300 V. @ 65 Ma. output. Ideal for your new car receivers. High quality type transformer designed originally for aircraft. Size overall 2⅞"x2½"x2⅝" ..... **95c** ea.

APN-4 RADAR SCOPE



Loran indicator scope. Ideal for conversion to service scope or other uses. Parts alone worth many times price. Contains 27 tubes such as 6SN7GT's, 6H6GT's, 6SL7GT's, 6SJ7GT's, and 5CP1CR. 100 Kc. crystal. In aluminum case approx. 9"x12"x18". Wgt. approx. 45 lbs. packed. Removed from surplus aircraft. PRICE **$47.50**

Conducted by HERB BRIER, W9EGQ

385 Johnson St., Gary 3, Indiana

FCC regulations limit the maximum power input of a Novice transmitter to 75 watts. Generally, the average Novice transmitter runs at less than half this power. But whether he has 5 or 75 watts, every Novice has probably thought of how much better he would get out, if he had just a little more power.

Some Novices do more than dream about a little more power. They seem to spend much of their operating time, with a book on their keys, tuning and retuning in an effort to get another watt of power into the antenna. Others succumb to the temptation to cram in every watt of power their transmitters will accept, without regard to the ratings on the tubes and other components.

As I have mentioned before, besides reducing tube life and increasing the possibility of burning out some component, overloading a transmitter is sometimes self-defeating. Many small transmitters give less output when overloaded than they do at rated input.*

Reggie, WN9ZQA, does practically all his operating on 3.7 Mc. in the daytime. So he has not worked a great deal of DX, but his 230 contacts in a few months keep Chetek, Wisc., "on the map."

Even assuming that they do achieve a fairly large increase in output, the effect in the other fellow's speaker will probably be disappointing. This is not to say that increasing transmitter power does not result in stronger signals. The rub is that the improvement comes much more slowly than most of us suspect. Let us look at a few figures, based on the experiences of telephone companies and other users of audio equipment.

Under ideal conditions, a trained ear can detect just a whisper of difference in the loudness of an audio-frequency signal when its power is instantaneously varied about 25%. Doubling or halving the power under the same conditions makes a definite, but still very small difference in its loudness.

A four-to-one variation in power is about the minimum that can be detected by the ear under practically all circumstances. It results in a change equivalent to one "*S*" unit in the standard amateur RST report system.

Translated to amateur equipment—if a 15 to 20 watt transmitter will transmit an S6 signal to a certain receiver, it will take 60 to 80 watts to produce an S7 signal. To bring the signal up to S8 will take 250 to 300 watts, and a kilowatt will bring the signal up to S9. Or, if a 75 watter will produce an S6 signal, it will require almost five kilowatts to bring the signal up to S9.

These figures explain why amateurs who thought that raising their transmitter power was going to make them the "Commander of the Frequency" have been disappointed. To make a worthwhile improvement in signal strength takes a power increase of at least four to one. And an increase of less than two to one is, practically speaking, a waste of effort.

They also illustrate why low power need not prevent any amateur from making many fine contacts. The thing to remember is that it is not how much power you run that determines your results. It is how much that is actually being radiated by your antenna. Therefore, no matter what your power, put up the very best antenna you can—it will pay off.

Decibels

One does not get very far in investigating the effects of varying power until he runs into the *decibel* or *db*. Our receiver *S*-meters are at least partly calibrated in db. The gain of directional antennas is usually given in db. TVI filters are rated by their attenuation in db. at the television frequencies. Audio amplifiers are "flat within *X* db." over a certain frequency range. The sensitivity of microphones is given in "db. down." Receiver selectivity is measured as being 6 db. down at a certain bandwidth

(Continued on page 74)

* For example, Mike, WN9EHH, can load his converted "Command" transmitter to 170 ma. at 450 volts, but he gets meximum output at 150 ma. Another Gary amateur, not a Novice, insisted upon loading his transmitter to 100 watts, although it was rated at 75 watts—until he measured its output with a calibrated dummy antenna. Peak output occurred at 60 watts input.—**Herb.**

What's New In Ham Radio

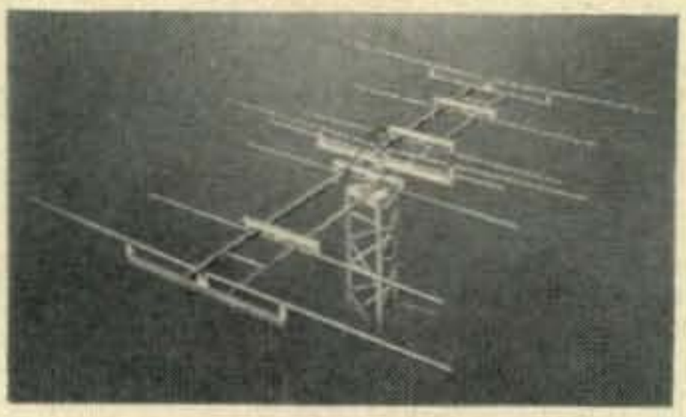
(from page 57)

ratio for a 1 micro-volt signal, and an antenna compensator designed to tune out reactance effects of various antennas. The r-f tube is a 6BA6 whose high mutual conductance makes for good 10 meter performance. A 6BE6 is used as the mixer, and a 6C4 is used as a separate h-f oscillator for maximum stability. The 6C4 oscillator is voltage regulated to help obtain those d-c notes on 10 meters—something sadly lacking in many so-called modern receivers. The new **Hammarlund** crystal filter is used in the i-f amplifier, followed by three stages of i-f, using 6BA6 tubes. Nine tuned iron-core circuits are used in the i-f amplifier chain to provide maximum phone selectivity. For the fellow living just off the main highway, a 6AL5 is used as a series, self-adjusting noise limiter. This will really take care of those Greyhound buses in fine fashion!

We suggest you drop into your radio dealer and try the new **Hammarlund** HQ-140-X. One quick spin over the bands will convince you a lot easier than will 1000 words! For all the technical information on this receiver, write to **Hammarlund Manufacturing Co.**, 460 West 34th St., New York 1, N. Y.

Interested in antennas? The **Trylon Tower Division of Wind Turbin Co.**, West Chester, Pa. certainly is! Just listen to this and this! A highly directional, high-gain rotary antenna for amateur, commercial and military communications systems has been announced by the aforesaid outfit. This new Trylon rotary beam is available as either a single or dual band unit for operation on any two bands between 12 and 50 Mc. Each array can be supplied with either three or four elements, consisting of adjustable, telescoping aluminum tubes, plus adjustable element stubs. The elements are constructed of 3S-H18 alloy with heavy walls to prevent sagging and whipping during high winds. Sturdy, cross-ribbed aluminum booms are furnished with standoff insulators, top guys, and other hardware.

If desired, the elements, stubs, T-matches, etc., are available separately for those wishing to construct their own rotary beams.



This is certainly a distinct advantage for those Hams who have thoroughly combed over the last scraps of corroded aluminum from the local junk yard. With the bottom of the sunspot cycle close at hand, 15 and 10 meters will soon be coming back into their own as DX bands. As one who has battled the QRM of the sunspot cycle peak, I can only say that the Ham who wants to work DX on these bands without a rotary beam had better go out and buy himself a good, long novel, or a new encyclopedia. He'll have a lot of time to catch up on his reading! The QTH of Trylon is: **Trylon Tower Division, Wind Turbine Co., West Chester, Pa.** Write 'em and get all the dope!

Are you one of the Hams who uses a 19c soldering iron and a dull Boy Scout knife to build your equipment? Are you the original "Rosin-joint Kid?" If so, **Alpha Metals** is doing all it can to get you out of your rut!

Whether you're Haywire Harry or a design engineer you will be greatly interested in the new **Cen-Tri-Core** rosin-filled solder. This foxy solder is built like a coaxial cable, with an inner and outer core of solder, and a "dielectric" of rosin. Even a dunderhead can't make a rosin joint with this new development! The solder is non-corrosive; in fact, in high-humidity cycling of rosin break down has been found. tests of over 1000 hours, no evidence The new **Cen-Tri-Core** energised rosin-filled solder is available in all alloys, diameters and flux core percentages from **Alpha Metals, Inc., 56 Water St., Box 34, Bergen Station, Jersey City 4, N. J.**

Tom Knott (11), operating his station WNØQQH, Iowa City, Iowa. Running 25-30 watts, Tom has worked 25 states and two Canadian provinces.

and so many more db. down at other bandwidths. Noise engineers will tell you that an elevated train has a noise output of 120 db. and so on.

Obviously, the db. gets along in any group. But what is it? It is nothing more than a power ratio, based on the common logarithm. Its value is equal to:

$$\text{db.} = 20 \operatorname{Log}_{10} W_1/W_2$$

where W_1 and W_2 are the power before and after amplication or attenuation. The larger of the two is made the numerator and the smaller one is made the denominator, and the answer is expressed in "db. gain" or "db. loss."

The value of expressing power ratios in db. is that they correspond quite closely to the response of the human ear. A power difference of one db. is the minimum change that can be detected by ear under ideal conditions. Ten db. is equal to ten such units. Sixty db. is equal to sixty of them.

It is not necessary to be familiar with logarithms to use db. Almost any electrical or radio handbook contains a complete db. table. And the abbreviated table that follows is accurate enough for any amateur purpose.

Billy, WN4DJB, Wilmington, N.C., claims he is surprised that his transmitter works, because he put it together. It must, because he has worked ten states and Canada in spite of a short antenna only sixteen feet high.

Shortened Decibel Table

db.	Gain or loss of power
1*	125% or 80%
3*	200% or 50%
6*	400% or 25% (One "S" unit)
10	1000% or 10%

*To nearest whole number. e.g., a power ratio of four is actually equal to 6.021 db.

An example will show how to use db. and the table.

A rotary beam has a rated forward gain of 7 db. over a ½-wave dipole and a front-to-back ratio of 23 db. What are the equivalent power ratios?

Seven db. equals 6 + 1 db. From the table, 6 db. equals a power gain of four-to-one (400%), and 1 db. equals a power gain of 1.25 (125%). Thus the antenna has a power gain of 4 x 1.25 = 5.

Twenty-three db. equals 10 + 10 + 3 db's. which represents a power ratio of 10 x 10 x 2 = 200. The beam will boost signals off the front a "strong" *S*-unit, and reduce signals off the back almost four *S*-units—a pretty fair beam.

Note that decibels are added, while the power ratios they represent are multiplied. Each ten db. when added multiplies the power ratio by ten: 10 db. = x10; 20 db. = x100; 30 db. = x1000, etc.

It is interesting to translate into a power ratio a report like "60 db. over *S9*." An *S9* signal is defined as being extremely strong, possibly 50 db. above an *S1* signal (100,000 times as strong). Therefore, a 60 db. over *S9* signal is one that is 1,000,000 times as strong as an extremely strong signal, or around 100,000 x 1,000,000 times as strong as the weakest signal that could be heard on the receiver in question.

Another frequently-heard report goes something like this: "That change didn't make much difference, OM. Only five to ten db. on the *S*-meter."

Either report could be entirely accurate, but 60 db. over *S9* signals are rarer than one might suspect from reports given on the air. And as for a five to ten db. change in signal strength not being very much, ask the amateur who built that beam we talked about a few paragraphs back.

Using Decibels to Express Voltage or Current Ratios

Decibels may be used to express voltage or current ratios. When the resistance in the circuit is unchanged, the formula becomes: db. = 10 Log_{10} E_1/E_2, or 10 Log_{10} I_1/I_2. A one db. voltage (or current) change is equivalent to a two db. power change.

For example, in a circuit with a fixed resistance, doubling the voltage across it will also double the current flowing through it. Therefore, the three db. voltage change is equivalent to a six db. power change.

On the other hand, consider two circuits. The first has a resistance of one ohm and has one volt across it. Of course, this means that a current of one ampere is flowing and the power is one watt. The second circuit has a resistance of eight ohms and has two volts across it; however, because of the higher resistance, only one-quarter ampere of current flows; therefore the second circuit only contains a half watt of power. Thus, instead of having a three db. gain in the second circuit compared to the first, as would appear from considering only the voltage ratios, there is actually a three db. power loss.

For this reason, expressing voltage and current

(Continued on page 96)

ALL BAND COIL

(from page 60)

Drill a hole through from the other end to be a tight fit on the fiber-glass rod. Drill and tap holes in the fittings for an *8-32* set screw to fasten them to the rods. Alternately, a small hole may be drilled through the fittings and rod to accommodate a brass drive pin.

Next, make the slider mechanism *(G, H, I)*. Obtain a piece of brass or aluminum about ⅜"x½"x¾". Cut a groove lengthwise along one of the ⅜"x½" sides to fit the contour of the center rod. This may be done with a file or by drilling a hole of the proper diameter in a piece of metal somewhat longer than desired and sawing it in two, lengthwise through the hole.

Drill a ¼-inch hole into the bottom of the block, ½" from the groove for the brass adjusting rod *(J)*, which should be about a foot long. Drill and tap a hole for a set screw to hold the rod to the block.

The contactor *(H)* can be formed from a round-head brass screw or pin. It is held in a small hole in the face of the sliding block *(G)*. The contactor is spring loaded by slipping a small coil spring over its shaft before inserting it into the hole.

Drill a hole through the bottom disc *(C)* to accommodate the adjustment rod. Fasten a *Millen 10063* shaft lock *(K)* to the disc in alignment with the hole. At this time, drill a few additional holes in the disc to allow moisture to escape from the completed loading coil.

Before assembling the various components, cement a narrow strip of thin plastic parallel to one of the ribs on the coil *(A)* about ⅜" from it. The contactor *(H)* will ride between these strips. Be sure that the turns between them are clean and free of cement.

Assemble the various parts as shown in *Fig. 1*, connecting the top of the coil to the top fitting *(E)*. The other connection is made between the shaft lock *(K)* and the bottom fitting *(F)*. Complete the job by cementing a thin wrap of plastic around the coil to the end discs.

Mounting The Coil

Although the coil is designed for base loading, it should be mounted at least a foot from the bottom of the whip. This position permits pulling the adjustable slider clear out when operating on the lower frequencies. Equally important, this is a very high-*Q* coil, and any large metal mass in its field will reduce its *Q* sharply. For this reason, too, the coil should

(Continued on page 80)

VHF NEWS

(from page 56)

ment rugged night and day "road tests." On top of everything else, "Tap" is a member of the Mission Trail, Golden State and Civil Defense nets. His XYL, Bea, seems to take it all in her stride and is quite popular with the gang of the *Two Meter and Down Club.*

Oh yes, "Tap" is blind.

The Argentine Story

(Continued from the April column)

LU4DI, Francisco "Frank" Emanuele, Avellaneda (B. A. Prov.)

Frank is a real old timer on the VHF's. His 50-Mc. transmitter ends up with a pair of 807's at ninety watts input. The 144-Mc. one starts with an 8-Mc. crystal-controlled 6AG7 oscillator-tripler, driving a 6V6 doubler, driving a 3E29 tripling to 144 Mc., delivering fifteen watts. For 420-Mc. work, the 3E29 drives an 832A tripler, delivering one watt output.

LU4DI's antennas consist of four-element rotaries for 50 Mc. and 144 Mc., and a "four-over-four-over-four" for 420 Mc., all on the same rotating mast. In addition, a 420-Mc., five-element linear array is also available.

Reception is handled by a home-constructed, low-frequency superhet fed by home-built converters for the v-h-f bands.

LU9MA, Eugenio "Gene" Fontana, Mendoza City

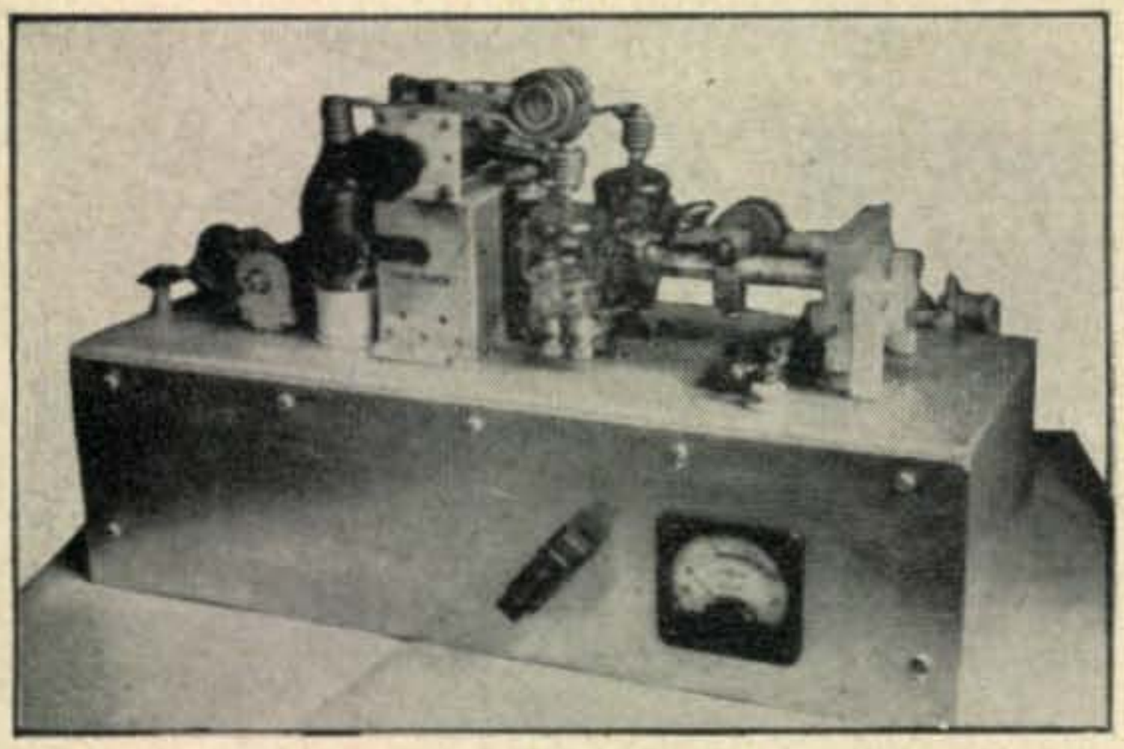
Gene is the only v-h-f man in the western part of Argentina. He participated brilliantly in **Project RASO.** Although he is alone, Gene has the true six-meter spirit, and he is always present when the band opens, either into Buenos Aires or for foreign DX. As a result, in spite of the recent poor band conditions, he has worked OA4CL, PY9AT, YV5AC, and YV5AE, in addition to working a majority of the Buenos Aires stations.

LU9MA's transmitter starts out with a Clapp oscillator at 6260 kc., feeding a 6V6 and two 6L6 doublers

Idea suggested by OA4ED ED

"O.K. OM, no QRM, BCI or TVI from this new QTH!"

that drive a 3E29 to ninety watts input on 50 Mc. The 3E29 is also used as a tripler to 144 Mc. Gene is



Closeup of the 420-Mc. amplifier at LU8AE. The shield cover has been removed. Push-pull 24G triplers drive push-pull 15E triplers to about 40 watts on 70 cm. LU8AE uses his regular 50-Mc. transmitter as the exciter.

presently building a separate 3E29 amplifier for more pep on 144 Mc. LU9MA's 50-Mc. antenna is an eight-element double "H," with provision for swinging it for either north-south or east-west coverage.

Other well-known stations are:

LU3BD: 150 watts on 50 Mc., a four-element rotary, and an eleven-tube, home-constructed receiver.

LU5CK: 100 watts crystal controlled on 50.106 Mc., four-element rotary, and a **Gonset** converter ahead of a **BC-348Q.**

LU6DO: Push-pull 807's and a four-element beam on 50 Mc. Forty-five watts to an 815 and a four-element beam on 144 Mc. Sixteen watts to an 832A tripler and a five-element beam on 420 Mc.

LUØAX is fortunate enough to have a **Harvey-Wells Bandmaster** in his car for excellent mobile results on 50 Mc. and 144 Mc. He also has a 522 for 144 Mc. at his home.

LU1AM and **LU8BQ** are also very active on 50, 144, and 420 Mc., while LU8DJE concentrates on 144 and 420 Mc.

As already mentioned, our work during 1954 has been and will continue to be directed to improving our coverage on 144 Mc. and 420 Mc. Nevertheless, serious work on 50 Mc. has not been entirely neglected, because the **Radio Club Argentino** and other clubs have sponsored 50-Mc. contests, as well as contests stressing work on the higher frequencies.

In conclusion, it might be said that most v-h-f work in Argentina is concentrated in the City and Province of Buenos Aires and Mendosa in the West, but there is also some activity in the interior cities of Rosario and Mar del Plata.

Ed Poledo, LU5CK

Tnxs Ed for the FB report and hope that we will continue to hear from you and v-h-f stalwarts in Argentina. I might add that I have been disappointed in the mail recently and would like to keep the column running—but it's beginning to look difficult.

OUR COVER

Cooperation between the local Kiwanis Club and the ingenious members of the Phil-Mont Mobile Radio Club produced this eye-attracting roadside sign in Glenside, Pennsylvania . . . a silent acknowledgment by the Kiwanis of the Phil-Mont Club's work in civil defense.

TNS

(from page 50)

distortion.* In practically all cases the motorboating is due to feedback through the B-plus circuits. A simple de-coupling filter will solve this problem (see *Fig. 9*).

Another source of motorboating is the audio feedback circuit between the a-f output stage and the cathode of the duo-diode triode. This is encountered in many auto radios, particularly those found in *Fords*. In these cases the feedback line is connected from either the primary

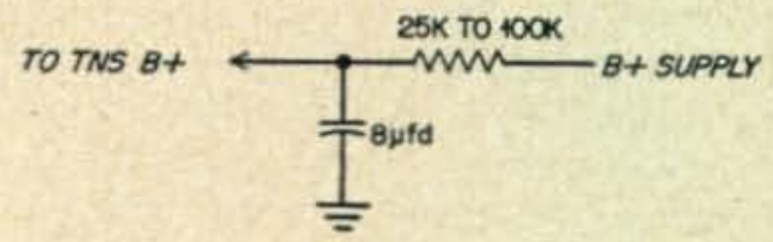


Figure 9.

or the secondary of the a-f output transformer to the diode cathode, which in turn is above ground through a resistor of from 68 to 2700 ohms (see *Fig. 7*). To get around this situation, the feedback line must either be disconnected and grounded, or the diode cathode must be grounded. Since this may eliminate the advantages gained in over-all audio quality, a better solution is to use a separate diode detector, as described above, leaving the feedback circuit alone. In *Fig. 7* this is shown as a crystal diode in dotted lines. The circuit is opened at point *X*.

In a few auto radios the motorboating may be due to the circuit shown in *Fig. 10*. Note that a tap has been made at the junction of

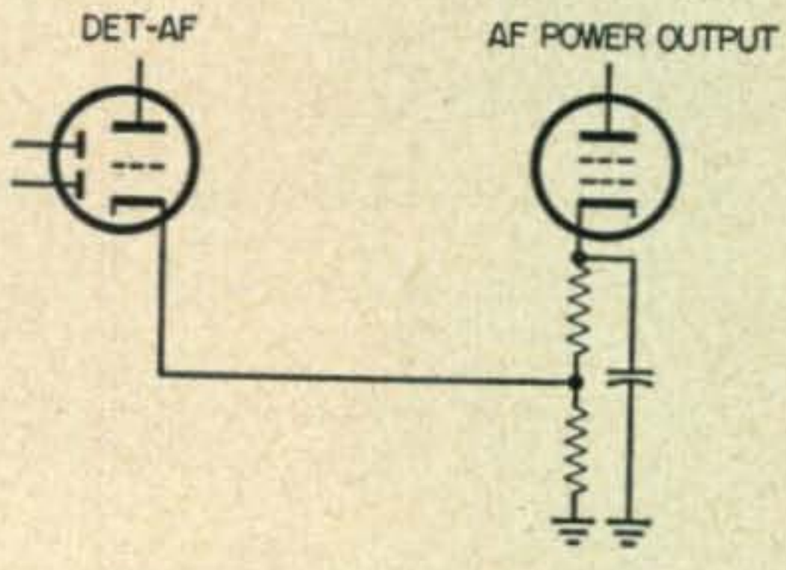


Figure 10.

the two resistors in the audio output stage to provide some biasing. Here again, the easiest and certainly the most effective solution is to replace the diodes in the duo-diode triode with 1N34's or a separate 6AL5. A very simple expedient might be to ground the diode cathode at a sacrifice in bias at this tube.

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* The TNS should introduce no distortion and need not be switched out of the circuit for regular broadcast reception.

Where the TNS has been installed in a communications receiver, or one having high i-f gain, audio distortion and blocking often occurs with the reception of strong signals. If the potential of a received signal developed across the TNS load resistors *R5, R6* and *R7* is greater than 10 volts, severe a-f distortion will result. This potential should be measured, and, if found to exceed the 10-volt limit, should be reduced by inserting a dropping resistor, *Rd,* as shown at *Fig. 11.* The value of *Rd* will usually run around 150,000 to 220,000 ohms. Some loss in a-f level will result, but it should not be excessive.

Loss of Audio with the TNS

Some Hams, upon installing the TNS, become victims of a high loss in audio output from the auto radio. Obviously almost any type of limiting or silencing device will somewhat reduce the audio, but the loss should be within reason. In the TNS the resistors, *R5, R6* and *R7* represent a lower series value than the common load resistance they replace. This, together, in some circuits, with a volume control

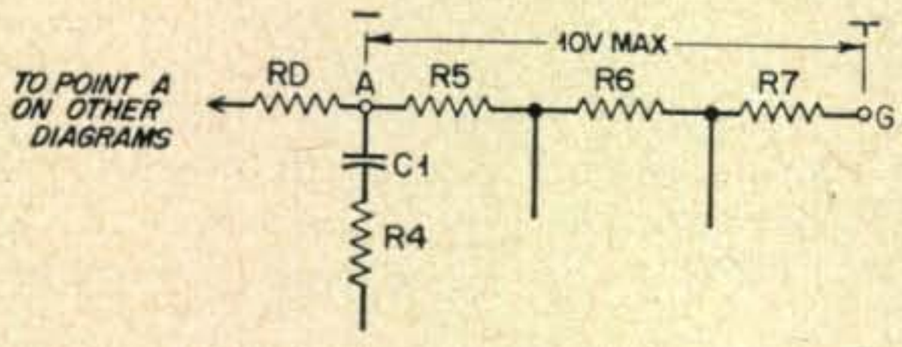


Figure 11.

higher than 500,000 ohms, will often drop the audio level to a half or a quarter of that of the unmodified receiver. A method to improve this situation is to increase the respective values of *R5, R6* and *R7* simultaneously by a factor of from 5 or 10 times.

In some receivers a resistor of approximately 220,000 ohms will be found connected between the volume control and the bottom of the i-f winding, or the r-f filter. This resistor should be shorted out when the TNS is installed. By the way, don't make the mistake of trying to tap the B-plus from the plate terminal of the first audio tube (it has been done!) B voltage should come right from the supply. The TNS will operate within the range of 75 to 250 volts.

Proper Operation and Adjustment

There appears to be some misunderstanding as to the correct method of operating the TNS. A few operators have complained about distortion which was later discovered to be due to an improper squelch control *(R3)* setting.

Turn on the converter and auto receiver and permit them to warm up thoroughly. Tune to a spot where there is no audible signal on the converter dial—just the background noise. Now adjust the squelch control to the point where the background level is just starting to drop

(Continued on page 103)

also be at least a foot from the car body.

The simplest way to adjust the coil is to install it in the antenna and couple the antenna loosely to the final amplifier tank circuit. Tune the tank to resonance, and adjust the coil slider for maximum loading. Then, increase coupling for normal amplifier plate current, resonate the tank circuit again, and lock the loading adjusting rod.

The first time these adjustments are made on each band, a remote field-strength meter is helpful in confirming the settings. Once made, the operator may cement decals to the plastic coil cover to mark the correct position of the slider for each band.

LOADING COILS

(from page 46)

built-in loading coil, to be used with a standard base insulator. It consists of a fiber glass support column, upon which is wound the loading coil, and an adjustable upper section. The upper section is connected to a circular contactor which rides inside of the coil.

The antenna is resonated by sliding in and out the upper section. This operation is facilitated by factory-calibrated marks for the center of each amateur band.

A plastic covering protects the coil from the weather, and a packing gland keeps moisture from entering the sliding joint. In addition, the upper whip is covered with flexible fiber glass. Maximum diameter is 1⅛ inches at the coil, tapering to ⅛-inch at the tip. Weight is less than two pounds, and length varies from 117 inches to 63 inches, depending on frequency of adjustment.

A similar antenna, less the adjustable feature, is available for any frequency between 1.5 and 30 Mc. Also available is an adjustable base inductor to lower the minimum frequency of any mobile antenna.

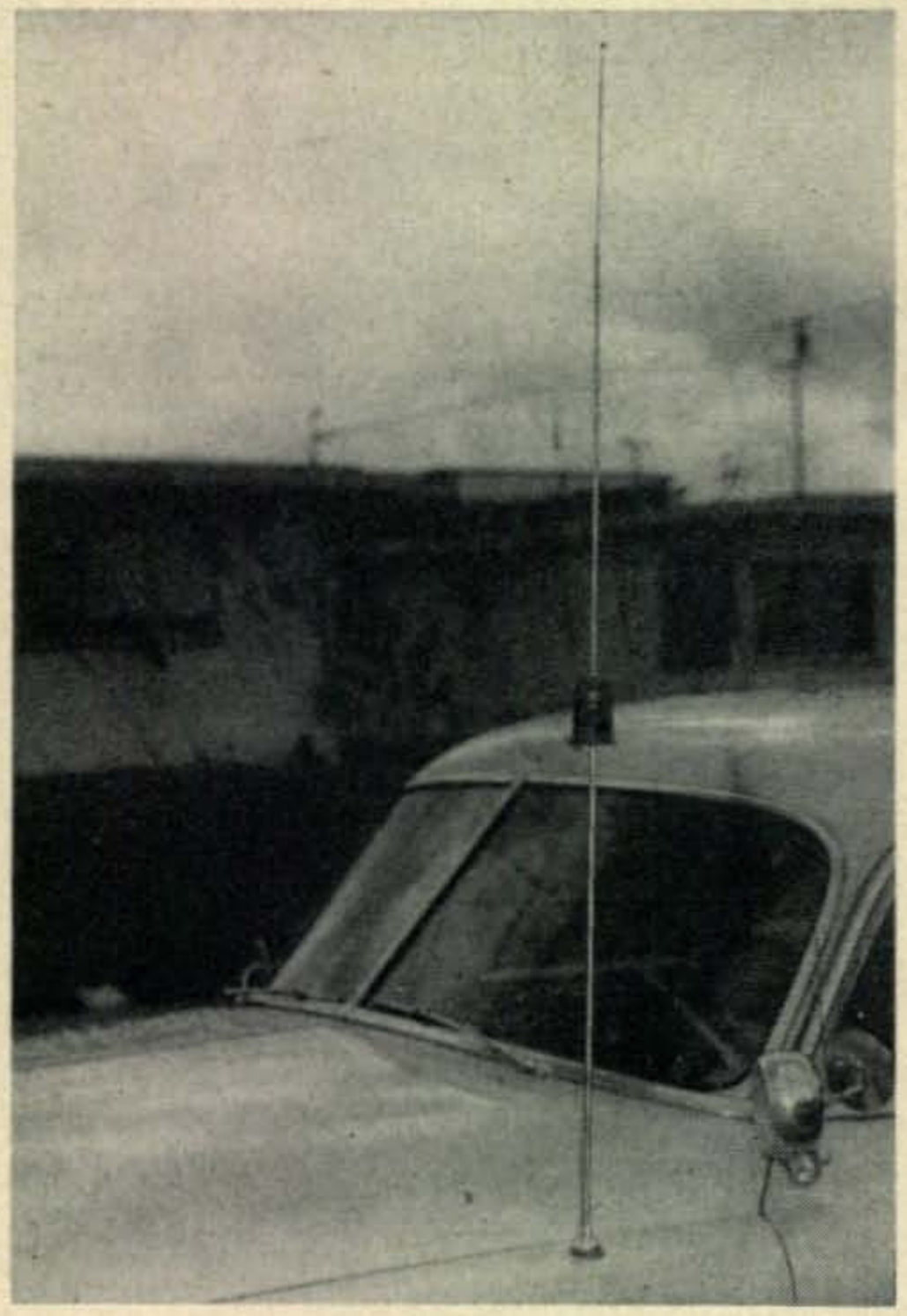
These products are manufactured by *Webster Manufacturing Company, 242 Shoreline Blvd., Mill Valley, Calif.*, and are available through amateur parts distributors.

VS Baby Mobile Antenna

It will probably surprise many of our mobile operators to find that some fellows are not on the air simply because the XYL objects to the "big" antenna.

To get around this objection Bill Davis, W6VS, has designed a cowl or fender mounted broadcast whip with midget loading coils. No claim is made that it will outperform the 9-foot whip, but it will give a good account of itself.

The modification is a matter of dividing the broadcast whip into two isolated sections. A 5"



The "VS Baby" is a very compact center loaded antenna for mounting on the cowl or fender. A plastic housing protects the loading coil.

length of fibre-glass rod is then formed and mounted through the use of fishing-rod ferrules between the sections. *B&W* coils are attached to this insulating rod and the antenna is loaded up in the usual fashion. What results is a form of center loading. The coils on the lower frequencies are tapered and are hand-made. A broadcast coil is available and has been tested by a member of *CQ* staff. He reports that resonating the BC antenna brought stations up over 24 db. on the low frequency end of the band and up over 36 db. on the high end of the broadcast band.

The coils and complete antennas are available from *Bill Davis, 225 Cambridge Ave., Berkeley 8, Calif.*

"W3GH" Mobile Antenna Coil

The heart of the W3GH "Green Hornet" mobile antenna is its loading coils. They are wound on rugged, low-loss Synthane forms, fitted with aluminum end pieces to accommodate standard mobile components. They are two inches in diameter, wound of *G.E.* Formex-insulated wire and coated with a *G.E.*, high-frequency weatherproof compound.

The 75-meter coil contains eighty turns of #16 wire and is eight inches long. Inside the form is an adjustable aluminum slug, which

(Continued on page 82)

(from page 81)

permits a resonant frequency shift of about 180 kc. The 7 and 14-Mc. coils are similar, except that they are only four inches long and do not contain the adjustable slug.

A whip at least five feet long should be used above the "Green Hornet" coil. It is recommended that the antenna below the coil be rigid, with any flexing spring mounted above the coil.

A fourteen-inch capacity hat is available as an accessory to the coil. W3GH believes that the hat not only increases the radiation efficiency of the antenna, but also adds a horizontal component to the radiated signal that helps in getting out under all sorts of conditions.

The coil, a complete antenna, or individual components may be obtained from *Van Kirk Radio, 92 East Pettybone St., Forty Fort, Pennsylvania.*

W5BZO All-Band Mobile Antenna*

The *W5BZO All-Band Mobile Antenna** is a base-loaded antenna with a built-in, adjustable loading coil, designed to operate on any frequency between 3.75 Mc. and 29 Mc. With the upper whip section "in," the loading coil is completely out of the circuit, and the antenna is self resonant in the 28-Mc. band. As it is pulled out, more and more of the coil turns are inserted, and the antenna resonates at progressively lower frequencies. The minimum resonant frequency is 3.75 Mc.

The coil is wound of #16 bare copper wire on a slim slotted and grooved lamicoid form, the bottom of which is terminated in a fitting threaded to fit any standard mobile antenna base mount. Another tube of lamicoid is slipped over the winding and sealed at both ends with glyptal to weatherproof the coil.

A phosphor-bronze "cup" on the end of the upper whip section makes contact with the inside of the coil turns through the slot in the lamicoid form. A knurled lock nut and a brass ferrule holds the upper whip in position, once it is adjusted for the desired frequency. A packing gland keeps moisture out of the assembly. All exposed parts of the antenna are constructed of stainless steel for strength and to prevent corrosion.

Average measured radiation resistance of the W5BZO mobile antenna is fifteen ohms at 3855 kc. The coil *Q* is 300 at the same frequency.

Up to the present time, these antennas have been custom made on order, but W5BZO has just enlarged his shop and obtained additional machinery to produce them on a production-line basis. They are available directly from the manufacturer, *G. R. Ellis Communications, 2520 Avenue E, Bay City, Texas.*

* Patent Pending

ZERO BIAS:

(from page 7)

Unfortunately, as with all attempts at constructive criticism or honest reporting, there are those that feel any unmasking of a detrimental factor will be tantamount to a complete destruction of the ARRL. It is surprising to find that the originators of these thoughts are not only quoting us out of context, but are insuring that the very thing they say they fear most will happen.

Fortunately, we of *CQ* have more faith in the overall strength of the ARRL membership than some of the members themselves. The ARRL will not vanish overnight because of constructive criticism—it may be temporarily weakened, but out of this weakness should grow strength and clear-cut purpose—not flounderings and inept direction.

The January, February, March, April and May 1954 editorials in *CQ* have pointed out symptoms of defects in the "political" affairs of Ham radio. Each of them should be closely examined and a diagnosis made to find "why" they happened.

Is the ARRL policy directed towards not rebutting the "lurid versions" (*QST*, March 1954, page 47) of Senator Wiley's remarks re Ham radio (*CQ*, January and March 1954, pages 11 and 11)?

Is the ARRL policy directed towards not fully informing its members when a group of them feel that their By-Laws are not being interpreted as written (*CQ*, February 1954, page 11)?

Is the ARRL policy directed towards spending money and fighting a rules amendment acceptable to the Department of State and the FCC (*CQ*, April 1954, page 13)?

Is the ARRL policy directed towards ignoring the National Convention of its sister organization in Mexico (*CQ*, May 1954, page 10)?

Is the ARRL policy directed towards a program of not telling its members the danger of McCarthy's bill *S 2125?* (*CQ*, May 1954, page 7)?

The answer to these diagnostic questions, as it applies to *membership* is NO! That is not what the members of the ARRL want. It is what they are *told* they want through the very clever maneuver of circumventing the League's own Board of Directors by the so-called "Executive Committee."

o.p.f.

Thoughts On This Issue

The annual event of the "big" mobile issue is something an overwhelming number of *CQ* readers look forward to. Whether or not you are particularly mobile minded, it is admittedly nice to pick up a jam packed "big" issue of *CQ*. But we wonder how many readers have thought *how* such issues are put together.

From the editorial viewpoint it means selecting the best topics, checking their reader appeal and seeing that they are correctly processed. The difficult part is securing the advertising support to "justify" the additional publication expense. Obviously many advertisers fully realize the extent of the demand for mobile equipment and are only too anxious to tie in with an important topical subject issue.

After the issue is out and on the newsstands the ball is then passed along to the reader. Essentially it means that if you are interested in any piece of equipment, or even a single component advertised in *CQ*, you serve two purposes by telling the manufacturer, the advertiser, the jobber and distributor that you saw it in *CQ*.

Advertising support pays for bigger *CQ* issues—not just this month but continuously throughout the year. If an advertisement in *CQ* pays off, that fellow is going to come back and advertise again. For every single page of advertising that goes in *CQ*, the editorial staff can add several pages of text material. Hence, the more ads in the issue, the more text.

When you identify *CQ* as the spot where you saw such and such an item advertised, you identify yourself as a Ham interested in the growth of the amateur radio hobby. It means that you want to see an independent publication devoted to the entire Ham field.

In plain terms it simply boils down to the economics of putting out a good magazine. There is no question of reader interest, there is no question about insufficient material—it is a plea from us to you—**scratch the back of the CQ advertisers and they'll scratch yours (with bigger issues of CQ).**

PROPAGATION

(from page 63)

transmissions, and a decrease in signal strengths on 40 and 20 meters. Since the total eclipse is to take place shortly after sunrise, this should result in a definite increase in signal levels on the lower frequencies at the time that they are usually fading out.

I would be very interested in hearing from readers who observe any of these effects during the total eclipse of June 30.

URSI-IRE Meeting

The USA National Committee of the International Scientific Radio Union (URSI), is sponsoring a Spring Technical Meeting jointly with the Institute of Radio Engineers Professional Group on Antennas and Propagation. The meeting will be held at the National Bureau of Standards, Washington, D. C., on May 4, 5 and 6, 1954. Papers will be presented, discussing the latest research in the fields of Ionospheric Radio Propagation, Tropospheric Radio Propagation, Radio Astronomy, Terrestrial Radio Noise, Radio Measurement Methods and Standards, and the Theory of Antennas and Electronics in general. In July this column will discuss some of the more interesting papers presented at this meeting.

THE YL'S FREQUENCY

(from page 70)

families in the U.S. Some of these weather stations receive air-dropped mail only twice a year.

Louise and Stan both work for the *Chesapeake and Ohio Railway*, Stan as a train dispatcher and his XYL as a telephone operator. Their hours are from 4 p.m. to midnight. Stan is at his rig from 7:30 or 8 a.m. till 3:30 p.m. daily—that's an average of seven hours a day, seven days a week!

When we asked Louise how she could be so "understanding" she replied, "There's no point in saying I don't mind at all, because I *am* human, and there are places to go and things to see that we are missing. However, I have had so much tangible evidence of the happiness Stan has brought to so many, as well as knowing the feeling of satisfaction he has in a job well done, that any complaints from me would be small in comparison."

W4HWR Writes from G Land

One of the best known YL signals has been silent for over 2½ years—that of W4HWR, Hilda Andrew. Most of you probably know she has been in England. Now you will be glad to share with Hilda an account of her stay and her joy in the prospect of coming home.

"Dear YLs and XYLs: It has been 2½ years since I had a QSO with any of you. Since I believe 'out of sight (hearing in this case), out of mind,' and since I have hopes of being back on the air soon, I am reintroducing myself by a letter to all.

"My call at the moment is my original one, W4HWR. I was licensed in 1940. The OM is a Chaplain in the U.S. Air Force. His call is W4EFG. I'm just an ole mountain gal from North Carolina. Met the OM up in those mountains at a children's camp. He was teaching religion and I was director of physical education. Hooked him by expressing an avid interest in Ham radio; I didn't even know what a Ham was! That didn't prevent me from listening. Even went so far as to promise, along with the love, honor and obey, that I would get my ticket within a year. Since I was downright fond of the man, I did just that. Married in 1939 and licensed in 1940. Have been active ever since.

(Continued on page 88)

(from page 86)

OM likes to build and I like to operate, so it works out FB at our QTH.

"I operated strictly CW until 1946; then we were stationed in Wiesbaden, Germany. It just wasn't satisfactory to handle personal QSOs for the people in Germany to folks back home on CW. Those were the days when 10 meters was so good. While there, managed to average three personal QSOs every day. Call, D4AAB, was the first call issued to a YL in Germany after the War. After D4, a W3, then W4HWR again in Ala., then a W9 in Ill., and back to W4HWR in Fla. Served as Sec. Treas. of YLRL in 1950-51, and in August '51 sailed for England and three starvation years—not food, Hamming!

"We have lived in a suburban district of Greater London surrounded by English neighbors. They have been wonderful, friendly and helpful. When I first learned that we were to come to England, I thought that it wouldn't be foreign duty. Sure didn't take long for me to realize how wrong my first thought had been. The country is different, houses are different, way of life is different, but the language is the same. Or is it?

"I will never forget my first shopping expedition. I wanted some cotton. Saw what looked like a drug store, only the sign outside said **Chemist.** Entered reluctantly, for I had already found that my Southern accent was no help in making myself understood in England. When I asked for a box of cotton the clerk (pronounced **clark**) sent me to a **haberdashery** store. After considerable questioning as to color and number I was finally presented with a spool of thread! Defeated and deflated I asked the price. 'Trupny-hapny,' said the girl with a smile. Poor ole me, I didn't know about the money either. Much later I learned that she had used a common term for three pennies and a half penny; just as we would say a nickel or a dime. The money isn't based on a decimal system, and I soon found myself relearning the 12-times table.

"Yes, I did finally buy my box of cotton. With the help of my English neighbor I found that I wanted **cotton wool** and I could get that at the Chemist. Wish I had the words to describe the time I tried to buy snaps. After practically drawing a picture, I learned they're called **press studs.**

"Yep, things are sure different. You don't go to a supermarket and stock up a week or two weeks' supply of food. (Did I say two weeks? It's always a **fortnight** in England.) Most of my neighbors shop every day, via bicycle or on foot. They do not use a car for shopping; gas is about 65c a gallon. Rather than a supermarket, we go to the **butcher** for meat, the **green grocer** for vegetables and fruit, and the **grocer** for canned goods, eggs, etc.

"Incidentally, when you are in QSO with a G and happen to say you have a long-wire antenna in your back yard, a G station will find it hard to believe that you do. A **yard** is a very small space in back of the house just big enough to hold garbage cans (called **dust bins**). Now you would have room in your **back garden.**

"It has been fun making friends with Nell, G2YL; Meg, G3ACC, and Constance, G8LY. Met G3GOX, Ann, and G3GYL, Nina, at a recent annual RSGB Exhibition.

"I was resigned when I arrived in England to the fact that I couldn't have a station, but had hoped to find a Ham real close. No luck, so. . . . What have I done with myself besides keep house for the OM and three jr. ops? First I was an avid SWL, but that was too frustrating. Imagine hearing a good friend coming through 5-9 and not being able to answer! I couldn't take that so have spent my time in other ways. For one, making talks to English women's groups about how the average U.S. XYL lives. Most know as little about us as I knew about them and we all had lots of fun. Former Ambassador Gifford's wife sponsored a speaker's group and lots of American wives gave their time to speak to groups all over England. I just pretended I had a rig and mike in front of me and talked on and on—hi!

"Yes, one can always find other hobbies; mine seem to depend on my QTH. In Florida and Alabama it was swimming and tennis. Photog-

raphy, always, especially here. Refinishing old furniture; this QTH has been FB for that—lots of antiques. Horseback riding, or just horses. Dogs—Toy Manchesters. Have three here now (wondering how I'll manage three children, three dogs, and the OM on the trip home!).

"Trip home, yep, oh happy month of May! The OM is installing a 75-meter rig in the car, so I can try for a QSO as soon as we land. We are assigned to Stewart AFB, N.Y.—near West Point. So if some time about June you hear a pleading CQ from a W2 YL with a combination Southern and English accent, please, please answer."

33, Hilda, W4HWR/2

Oregon Convention

The YLs of Klamath Falls, extend to all an invitation to attend the Oregon Amateur Radio Assn. convention June 26-27 at the Klamath Falls Armory. Registration fee, including banquet and prizes, is $7 for Hams and $3 for non-licensed persons. YLRL will be represented by W7SBX, Helen, president W7SBW, Pauline, secretary; and W7UFN, treasurer, of the convention committee. Pre-registration closes June 12th. Registration and reservations may be made with W7SBS, Luryne Conner, Lakeshore Drive.

Congratulations

To W8UDA, Dot, and OM, Don, our best wishes on the birth of a baby girl, Robin Renee, on March 6.

With the Clubs

The **YLRL Club of Milwaukee,** has these officers and members: President, W9MGT, Leonore; 1st vice president, W9OMZ, Jeanne; 2nd V.P., WN9ZBA, Marion; secretary, WN9WYJ, Florence; treasurer, W9QMA, Dorothy; sunshine girl, W9ZAD, Alma; publicity, W9VCE, Betty.

The **Los Angeles YLRC** held its annual YL-OM dinner on Feb. 13th. It was a Valentine party, and despite a day of rain (?) which kept a few away, thirty-nine turned out for the roast beef dinner, prizes and rag-chewing. Those present: W6 KER-MES, PJU, QGX-QGP, LBO-EJL, FEA-WPF, KW and XYL, K6ACF-K6UKC, CQV-VBN, PCO-QJW, JMC and OM, UHA-TS, MFP and OM, WRT-UTZ, WSV-WSW, KN6DPX-W6POP, JZA-GRW, K6ANG-W6PQK, DXI-AWI, JCA-NSH, KN6BBM-W6WGA.

Two new YLs at the YL-OM dinner were KN6BBM, Verdena, and KN6DPX, Shirley. Martha, W1UET/6, is now living in Venice and has joined the club. . . . The club is proud of member W6QGX, Harryette, for winning the recent VHF 2-meter sweepstakes in the section. . . W6WRT, Ruby, is also on 2 meters now with a **Gonset Communicator.** . . . Eileen, K6CDB, and Gladys, W6DXI, have recently recuperated after major surgery. Gladys' son (age 12½) is now KN6DRZ, making another all-Ham family. . . . New check-ins on the Southern Cal. YL net are K6CYZ, Sister Pat, and W6NAZ, Lenore.

Our sympathy to W6PHT, Cynthia, on the loss of her son. Nine year old James was much interested in Ham radio and was ready to take his Novice exam.

Around Phoenix

We've been enjoying visits and QSOs (via mobile) with the Phoenix area YLs, and joining the 75-meter YL net from W7KOY's QTH. Gert has been getting some nice publicity for handling traffic. She monitors the state net frequency of 3865 almost continuously and during the day takes most everything for Phoenix. She had quite a thrill when Governor Pyle and his staff "moved in" on her the first afternoon of the Short Creek emergency and she relayed orders from him and handled traffic during the remainder of the clean-up operation. . . . Another Phoenix YL, W7PUV, Inez, has been active on 40 CW. When her son went into service and his station sat idle she decided to get a ticket. She came up with a Novice call 2½ years ago and learned to like CW operating the Novice bands, so has stuck with it. Now her son is home; he operates phone and when the code starts rattlin' in he calls, "Mom, you come take it"! . . . During the annual Don's Trek to Superstition Mtn., March 6-7, YLs W7RIJ, Eva; OUE, Rosie, and PMQ, Eloise, helped with communications using portable and mobile equipment. . . . By the time this is in print your column editor will have said farewell to the Valley of the Sun. QTH for mail for a while will be c/o General Delivery, Cortez, Colorado.

33 till next month, WØSCF.

SOMETHING FOR TWO

(from page 27)

two amperes will power the transmitter. About another ampere of filament current and somewhat more plate current will be required, if the 6BK5 is substituted for the 6BA6 frequency multiplier.

For mobile operation, a vibrator-type power supply may be used. At 250 volts, the total current drawn from a six-volt battery by the filaments and the plate supply will be around eight to nine amperes. This assumes a normal vibrator supply efficiency of about seventy per cent. At 300 volts, the battery drain will increase to around twelve amperes.

DX NEWS

(from page 67)

EA9DD, to acquire a new country. Especially welcome were phone QSO's. QSL's should go to home QTH's as noted. MUCHISIMO GRACIAS! Juan y Cesar.

TROMELIN ISLET: (From F9RS) Another new country will shortly be heard on the Ham bands. This is Tromelin Islet, a ridge of coral rocks located north of Mauritius (VQ8). Its position is: Long. 52-11-9 east, Lat. 15-53-8 west. An expedition will go there in April or May to build a meteorological base as an advanced warning post for tornados. Two official radio stations will be on Tromelin and FB8BK has volunteered to go there in October.

DX Notes

Effective March 1, VR3D changed his call to **VR3A**. His name is Ray Baty and cards may be sent to him c/o Cable and Wireless, Fanning Island. Ray, ex-VK2ANB, runs 60 watts and will be there two years. His plans call for activity on 3.5 Mc. and 160 meters in addition to his present operating on 7 and 14 Mc. First mail delivery arrived at the end of April (Airmail included) . . . Dave, **ZC3AB**, left Christmas Island for good around March 24. All QSL'ing will be taken care of when he hits Singapore . . . **ZA2KAB** has been heard on CW, 14030, while **ZA1KAC** has been heard on phone, 14225 kc. . . . OK1MB reports **VR5AF** on 7035 around 2130 GMT. Beda also heard **EQ1AC** on 14048 . . . CN8MM reports **YA1AA** as giving his name as Jack and QTH, Box 18, APO 616, PM, N.Y. (??) . . . From W7RME we hear that **KG6SA**, Len, is the only active station on Saipan and is on every day, near 7026, from 0700 to 0930 GMT . . . Our Feb. report of TI9BR activity brought a speedy reply from W6LUE. Mike says he was the original TI9BR and active on Cocos from February to May 1949 and hates to see that call loosely used.

It is suggested that anyone wishing to help **CR1ØAA** get back on the air might contact W6RW who is also working along these lines . . . **VK1EG**, Bill, should now be on the air from Australian Antarctica. Requests for QSL's should go to VK4FJ, with IRC's for direct reply, Roy now has a supply of 500 VK1EG cards on hand . . . Recent phone activity from **MP4QAH**, Halul Island (Tony, the op, thinks he should be a new country) brings a query from Jim House, ex-MP4QAA/MP4BBB, who wonders what he is doing there. Jim says that Halul is

(Continued on pagt 92)

(from page 90)

a bare coral rock, with an area of about a half an acre, jutting out of the water some 55 miles from Doha, the capital of Qatar. MP4QAH may be found on A3 from 14130 to 14150. QSL's are handled by G4ZU . . . News from the Faeroes, via W5ALA, says that **OY3IGO** is inactive and plans to sell rig. Johan, **OY2Z**, is on phone every day, 14140, from 1230 to 1400 GMT. On Sats. and Suns. he is active from 2130 to 2330 GMT . . . G6ZO reports **MP4QBI** heard on 14075 . . . **UAØKFA** was heard on QSO with WØBMQ, 2300 GMT, 14006 . . . **EL2X** is ex-DL4EA. He works all bands, CW and A3, with **VIKING**. Ray was recently worked on 7003 at 2345 GMT 579. Favorite phone freq. is 7220. See QTH's.

The call of HK1GP, San Andres Island (A possible new country), has been changed to **HK1AI** . . . Additional activity in Ruanda-Urundi emanates from **OQØAV** and **OQØGJ** . . . **FU8AA** is QRT for a time with power supply troubles . . . **5A2FA**, Georges, operates the only known station in Fezzan province, Libya. He is on CW, 3.5 and 7 Mc. and may be heard from 1800 to 0100 GMT. QSL REF . . . W6SAI and W6LDD are toying with the idea of a DX-pedition for next spring and are shopping around for a QTH that will "count" . . . **HH2OT** returns to the States in June for several months stay. QSL via W4HYW . . . **KR6AA** can now use 7 Mc. and has been QSO'ed on 7135. Use of all 7 Mc. frequencies may follow soon . . . G3ID logged **VR6ZA** calling **VR6ZB** on 14 Mc. 1200 GMT. Any info? . . . A last minute flash via W4LAP and W4LVV comes from **FG7XA** who advises as follows: "New transmitter has been received and I shall be on the air immediately. The fellows who have been using my call have been caught by the Government and everything is now OK. Two of my friends have applied for licenses and soon there will be three stations on from Guadeloupe." . . . Another last minute item comes from Tom, TI2TG, who advises that **EA9DF**, ex-EA8BI, is a permanent station in Rio de Oro. Also, EA9DE plans a trip to IFNI in September and, possibly, another appearance in Rio de Oro.

DX-Ploits

Bill, **W6SN**, soars to 243 with VR3D . . . Dewey, **W6VE**, added EA9DD and VR3D to reach 223. This jumped him over G6QB, W6PB, W6MVQ, W3BHV, W6FSJ and W3LOE in the HONOR ROLL . . . **W6CYI** nabbed YJ1AB for 217 and passed W9NDA . . . Bert, **G8IG**, added FL8UU on CW for No. 214 and passed CE3DZ, W6RBQ, VK4HR, KH6CT, W4AIT and W6OEG, all in the 213 slot. He also added FL8BC and EA9DE on A3 to reach 186 . . . **W6ONZ** came up to date with eight additions such as ZS9I, VK1AC, FY7YC and VR3D for an even 160 . . . Geo, **W6BIL**, is now 140 with help from VP8AT, VP3RO and FF8NA . . . **W9LNM** nabbed EA9DE for No. 221 and leapfrogged W1JYH . . . **W3DRD** came up to date with 30 additions which put him on 213 . . . Roy, **VK4FJ**, passed KP4KD, VE3QD and W8HFE by adding CT2BO and M1B for 208 . . . Ray, **W2BJ**, is right behind with 207 thanks to VS9AS and VP8AW . . . Sam, **W3AXT**, upped to 154 with VQ6UU and KX6BU while Lou, W1MCW, augmented her phone total with LU6ZM and EA9DE to hit 210! . . . **WØSMV** received a fast QSL from VQ3EO to complete his WAC . . . **W2QJJ** nabbed VP2GX on 14260 . . . **W4VRS** came up with VQ3EO and ZE3JJ on 21 Mc. . . . **W1DHO** went to 94 with HR1AA, VP4LZ and ZK1AB . . . **HB9MU** and **ON4WX** nabbed KC6AA (Yap) . . . **W9WHF's** 35 watter hooked KG6FAA for No. 59 . . . **W7KVU** added YI2AM, VS9AS, ET2PA and ST2AR . . .

W9GIL went to 155 with VS9AS . . . Bill, **W8JGU** is now 136 with 4W1UU, VS9AS and VQ6UU . . . **KL7PI** hears FB8XX 1700/1800 GMT on 7019 and 7040 . . . **DL7BA** now has 95 on 21 Mc. after a ZS9G QSO . . . **W3LMA** reports PX1AC 1430 GMT, 14100. Anyone have a card from him? . . . Mirko, **YU1AD**, went to 206 with VP2MD and FB8XX. His 3.5 score stands at 75 with HZ1HZ and VP9BP . . . **W7RME** keyed with VP7NS, KAØIJ, CR6AI, PJ2AJ and KG6SA (Saipan) . . . **W3RXM** got his beam up and immediately nabbed HZ1HZ, VQ2IM, OQ5CP and ET2WW . . . **W4BQY**, ex-W6EHV/KG4AF, put up "the" beam and has 105 to show for it . . . During 13 weeks operation with the VIKING at K2CRE on 14 and 21, Steve came up with such as VQ1NZK, VQ4RF, FQ8AF, TF5SV, IS1AHK, ZE5JA, FF8AZ, 3V8AN, SP1KAA, GD3FBS, GC2FZC, 5A4TG, ZD9AA, YS1RA and HZ1BC . . . Geo. **VE4RO**, has reached 102 on 21 Mc. . . . Hal, **VE3IG**, added VP7NM, KG4AO and EL2X on 3.5 to reach 48 on that band . . . Bob, **K6AHV**, running 30 watts, snagged VP1RO,

(Continued on page 94)

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(from page 92)

VP4RO, DU7SV and JA's 1AA, 1CR, 1CB, 5AL, 3WA on 7 Mc. and followed it up with KA9OR, KAØIJ, KX6BU on 14 and ZL1BY, ZL1ADU and KL7AWB on 3.5 . . .

Bob, **4X4CJ**, reports 135 worked in 36 zones. He holds DXCC, WAC, WBE and BERTA . . . Al, **K2BSM**, made it 46 with KV4AA, ZE3JP, ZS2BC, EA9AP, VP4LZ, ZP5AY, FP8AK, HH2LD, HR1AA, SP5KAC and FF8AC . . . New ones on 3.5 for **W3AXT** were SU1GH, 9S4AX and ON4IV . . . 21 Mc. activity at **W6ZZ** accounted for CP5AB, DU7SV, HR1AA, KG6AEX, VK2ID, VR2CG, ZL1GW and ZS6AJC on phone. CW brought in CP5EK, KJ6BA, VK3AHH, ZS3K and ZL1MQ to mention a few . . . Alan, **VK3CX** pulled in VR3D for No. 183 while VQ3EO was 116 for **WØARH** . . . Willis, **W1CWX**, ran off a five hour WAC on 7 Mc. with KR6AA, G3FXB, ZS6ABK, VK3AE, PY6FN and KV4AA . . . **W4CEN** nabbed VR3D while W5VIR pulled in CEØAA with CE3DG at the throttle . . . CEØAA was No. 112 for Oscar, **HR1AT** . . . **W8PQQ** went to 71 on 3.5 Mc. with IT1AGA and CR5AF . . . Charles, **F9RS**, has been awarded the first Italian "C.D.M." Certificate for CW . . . Paul, **W7PQE**, stands at 60 on 7 Mc. with such as C9AA, VU2AT, CR9AF, OK1MB, VP8AX, ZS6RB, C3BF, VS1FE and VP6AG.

Here and There

Bill **KV4BB**, is Ass't Director for the Southeastern Section instead of Ass't SCM as noted in March **CQ**. Sorry! . . . **WØECS** says the MP4BAU he worked in Feb. is NG . . . **YO3RF**, Geo., is active on 14040, 2000 GMT, and seeks QSO's with VP1/2/3/5, HH, TG, HR, XE . . . **VE7AEU** now sports the call of VE7ZK . . . VE3YC advises that **FA8GO** now lives in Montreal . . . Irv, **ex-W1BTE**, now keys from W4CGS, Ft. Lauderdale, Fla. . . . Bob, **KZ5AM**, should now be heard from W3QML in Hyattsville . . . **F7CP** is radio op on Gen. Gunthers plane . . . **VP6GQ** visited VP2VA (Tortola) while **W2BBK** and **VP2KM** dropped in on KV4AA . . . **G6ZO** seeks QSL from KJ6AH. Any help? . . . **F7SHP** can work RTTY on any band and seeks W contacts . . . Frank, **VR4AE**, pulled the big switch in March . . . **G3IZJ** now ops from VP8AZ, Grahamland, and is interested in 3.5 and 160 . . . **4S7XG** returns to G-land in August and will probably op from G8VG . . . G6LX advises that the only genuine calls to be heard from Monaco, barring expeditions, are **3A2AH, 3A2AJ, 3A2AM, 3A2AU, 3A2AX** and **3A2BA**. They are all residents and all "phone only" . . . **WØEKY** now Hams from W1AAC, Newton, Mass . . . Jim, **W4KVM/VO6**, is located at Northwest River, Labrador . . . Jack, **ex-W6YYW/W4DCE/KH6PY**, now keys from W6GBG . . . **W8HEV** sports a new 500 watt rig and 50 foot high 3 element beam. VP8AW gave him No. 111 . . . Ted, **TI2BX**, is now on with his 0.001 KW rig, does right well too! His QRO should be heard from by now.

The Gothenburg Radio-amateur Society offers an award known as the **"WGSA" Certificate.** Two confirmations for contacts with Gothenburg Hams and three IRC coupons must be sent to SM6ID for this award and QSO's must have occurred after Dec. 31, 1952. Europeans need ten QSL's to qualify for this one and Hams in SM/OZ/LA need 20. There are, roughly 100 SM6's in Gothenburg . . . We regret to report the passing of Bing Beimler, **W4JAQ**, and Bill Mayes, **W6AYZ**, both last December . . . Commenting on a letter from **ON4QX** (Page 58, Feb. **CQ**) G3DBT advises as follows and we quote: "The present ZB2A has been active since November 1953, its operators being **G3GFM** and myself, **G3DBT**/ex-DL2NH. We realized at first that this call sign had a bad reputation among amateurs due to certain of its past operators failing to QSL. To date we have done much building at ZB2A, considerably improving the equipment previously in use. In addition we have had 1000 QSL's printed and these are being sent out to the ARRL and RSGB QSL Bureaus for all contacts for which we have received cards. You will appreciate our reluctance to QSL to operators who have worked ZB2A before Nov. 1953. Regarding operation on the lower freqs: We would like it known that we have a 3.5/7 Mc. 30 watt CW rig nearly completed. The present ZB2A will be active here for the next two years. Best way to QSL is **via ZB2I** and please include an IRC coupon if direct reply is wanted." unquote . . . Ford, at **F7SHP**, suggests a W.A.F.O. (Worked Armed Forces Overseas) award. He lists some 28 prefixes where "armed forces" stations have appeared . . . From W7SGN we hear that Bob, of **KAØIJ**, is moving to Guam . . . If any **5A2TO** QSL's are missing, Charles Unfried, W4LNL/ex-5A2TO, may be reached at Box 106, UHF/LORAN Phase, Bldg 198B, EMS School, Treasure Island, Calif. . . . Duane, **W9CAQ**, is now in Japan and won't be heard at the old

QTH for 21 months. He will try to fire up on 7 or 28 Mc. from the Far East whenever able . . . Doug, VE1OM, seeks QSL's from **FM8AD** '48, **EK1AR** '47 and **ZD1LQ** '48. He has 104 worked but only 94 pasteboards in . . . Another patient boy is W3DRD who could use QSL's from **PK6TO** '47, **VR2BD** '48 and **VS1DC** '49 . . . **W3RVM** and XYL, **W3UWW**, visited KV4BB while TI2TG played host to **CP1CB, HP1EV, HP1ON, HP3DA, HP3GV** and **HP3MB** . . . TI2TG advises that all **TI9AA** QSL's should be on their airmail by March 26.

W4LAP is again on from his home QTH after a two year stay at DL4JN . . . **VP2KM**, Ken (St. Kitts, B.W.I.) is building a PP 4/400 phone rig . . . Via W9SZR we hear that there is a new club station on Kwadjelinn with the call of **KX6BU**. Chief op is Bert. See QTH's.

NEW ADDRESSES

EL2X (ex-DL4EA)—Nelson Raymond, Roberts Field, Liberia.
HH2OT—Via W4HYW (Herb, Box 1027 Port-au-Prince, Haiti)
KP4YC—Jim, Box 67, Ramey AFB, Puerto Rico.
KX6BU—Bert, Navy 824, Box 34, FPO, SF, Calif.
VO3M—Frank Sorensen, St. Anthony, Newfoundland.
W6GAL/7—George Sinclair, Route 8, Box 270, Tucson, Ariz.
YU1AD (New QTH)—Mirko Voznjak, 152, Baje Sekulica, Belgrade-Zvezdara, YS.
ex-ZC5VM—Sgt. Mills, Beauval, Wise Lane, Bordon, Sittingbourne, Kent, Eng.
(Thanks to Short Wave Magazine, W3AS, W9SZR and W4HYW)

160 METERS

As W1BB reported, nothing much was doing for the Feb. 21 unscheduled tests. Conditions were generally poor with QRN at a S7 level. No European signals were heard but **KP4KD** was coming through well and **VP4LZ** was heard for a brief period.

The scheduled tests of Feb. 28, coinciding with the ARRL CW contest, were more productive in spite of even heavier QRN levels. Only known transatlantic contacts were produced by **W2EQS** who knocked off HB9CM and GW3ZV. **KV4AA** had no difficulty in working VE1ZZ and all W districts but W6 and W7. DX known to be on were HB9CM, GW3ZV, KV4AA, KP4KD, VP9BDA, VE1EA, VP9BF and KP4UE.

For the March 7 non-sched test, noise levels were low but no European DX was heard. **KH6MG** and **KP4KD** came through and the former provided quite a thrill by working many W stations including W1BB, W RGQ, W8ANO, W5WEH and several W9's and WØ's. KH6MG uses a vertical 113 foot antenna, PP 814 final and a 75A2 receiver. His QRG is 1933.5 and, possibly, 1901.

For the last scheduled test, March 14, no reports are in as yet. KV4AA was on at 0500 GMT and the only CW signal heard was **VE1EA**. Clarry was QSO'd and then "yours truly" hit the sack. G2PL reports that **VP4LZ** was copied 579 on 1807 kc and 559 on 1875 kc between 0500 and 0645 GMT.

From Short Wave Mag G6OB reports that **KV4AA, KV4BB, KP4KD** and **KZ5DE** have been heard consistently in England but worked only by a lucky few. These stations are heard when W's are inaudible which seems to show that the West Indies path is open when the more northerly path is closed. **VP7NM** has also been heard and worked while **VP6EG** has been worked by W's. KP4KD claims **G6BQ** and **EI9J** as a couple of "firsts" while a somewhat obscure debate continues concerning "first" claims on the respective QSO's of **GC2CNC/W2QHH** and **GC3ZML/W1BB**. Active on Cyprus are **ZC4GF** and **ZC4JA**. These seem to be the best bet for that Asian QSO. Items from W1BB's report give a good idea what may be done on this band when one looks at the exploits of **W3RGQ**. Shely has had the following QSO's this season: G2HX, G2PL, G3PU, G3ERN, G3BKF, G3ATU, G3GGN, G3HRW, G5RI, G5JU, G6CJ, G6BQ, G6GM, G8JR, G8AX, GW3ZV, EI9J, CN2AO, HB9CM, VP7NM, KV4AA, VP6EB, VR2BJ, KZ5DE, KP4KD and ZL3RB!! . . . **W9PNE** QSO'd ZL3RB, Feb. 13, 0930 GMT, and again on Feb. 15 at 0810 GMT. **W8GDQ** was S6 on phone at ZL3RB the same day. **W9FIM** has worked ZL eight times up to Feb. 23 and **W8GDQ** about the same. **W6KIP**, in Death Valley, has worked ZL3RB twice . . . **LU4DM** advises that he has never been on 160 . . . DX contest devotees cannot overlook 160 as this band can give a big boost to those scores. Witness **W9PNE's** activity in the first

(Continued on next page)

(from preceding page)

half when KV4AA, KV4AQ, VP9BF, VP9BDA, VP7NM, KZ5DE, KP4UE, ZL3RB, KH6MG and KH6IJ were contacted! . . . Mac of **W6NBI** ran a TRANSISTOR RIG in '53, powered by a 22½ volt battery and received a report of 339 from W6IRO, seven miles away. Macs "DX" with this rig includes 500 feet on PHONE! . . . VE1EA nabbed his first South American when VP4LZ was contacted on Feb. 23rd at 5 AM . . .

Duct Theory for 160 ??? (Via W1BB)

We recently had a note from Brice, **W9PNE**, who has been working on the ZL's, saying that one particular morning he knocked off ZL2ABB. ZL1WW and ZL3RB between 0900 and 1100 GMT. Their signals were S5 on peaks and at one time ZL1WW was QRM'ing W9FIM! BUT, **W8GDQ**, who usually works them, handily was only able to hear them about S2. Brice says "Apparently conditions were good here but nowhere else." This experience checks with observations made over several years to the effect that 160 meter signals often do come in at one locality much better than at others. W1BB's experience checks with this as, last Summer, W2WWP would hear the ZL's on every schedule and not a peep could be heard at Stews QTH. This is also borne out with European DX which rolls in and out of various W sections at different times. (This leaves the field open for a good DUCT theory propagationist—any takers?)

73
Dick KV4AA

NOVICE SHACK

(from page 74)

ratios in db. is a little "trickier" than when using them to express power ratios.

Licenses By Mail

Effective June 10, 1954, all Novice and Technician Class Licenses will be issued by the FCC by mail only. After that date, to obtain either license, write to the nearest FCC office requesting the material for the license that you are interested in (you can apply for both, if you wish). The FCC will forward the necessary material with full instructions for its use.

Briefly, there will be four steps to be followed in sequence:

1. Fill out the application blank and get it notarized.
2. An amateur with a valid license other than Novice or Technician Class or a holder of a commercial operator's license requiring a code test administers the code examination and certifies that you have passed it.
3. An adult, who may be the code examiner if he is at least 21 years old, opens the sealed envelope containing the written examination and hands the papers to you for you to complete. He then certifies that you did so in his presence without help.
4. You mail all papers to the Federal communications Commission, Washington 25, D.C., and wait.

If you fail the code test, you must return the unopened written examination with your application to the FCC. You can try again in thirty days.

Also effective June 10, 1954, the distance that an applicant must live from the nearest point where amateur license examinations are given at least quarterly, to be eligible for the Conditional Class license, becomes seventy-five miles, instead of 125 miles.

The Conditional Class license grants the same privileges as the General Class license and the scope of the two examinations are the same. The difference between the two is that the Conditional license is issued by mail and the General Class requires a personal appearance at

(Continued on page 98)

CQ RADIO AMATEURS' JOURNAL

Dear Reader:

As mentioned on this page in the March issue, the big item we are looking forward to in the June issue is Bill Scherer's (W2AEF) new "ANTENNASCOPE." I was over to see Bill a few days ago and found that he had built up two separate Antennascope units. One of them has an external metering arrangement for the fellow that doesn't want to invest in a meter strictly for his Antennascope. The other is a beautiful little job that is easily built and balanced out mechanically for that split driven element measurement. I might also mention that Bill is using in these models the new crystal diodes commonly found in UHF TV receivers.

Not too long ago another member of the CQ staff was playing with the 6216 tube and found that although it does a nice job as an iron-core choke replacement (for which it was intended), it will work out better as a clamp on the sometimes irascible 6146. This feature is also scheduled for June.

Naturally there are several more interesting stories set up for the June issue—and for July, August, September, etc., etc. In fact, when it comes right down to it—CQ has something first rate scheduled for every issue—why not insure your getting a copy—through a subscription.

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an examining point. If eligible for the Conditional Class license, you may follow the procedure outlined above, although you may still obtain a General Class license, if you prefer, by appearing at the examining point and passing the examination.

Apparently, the new set up will prevent appearing in person at an examining point and applying for General, Technician, and Novice licenses all at the same time, because the latter two will be issued only by mail.

Letters And General News

Bill, W2HAZ, writes, "Dear Herb, Being a QSL card printer, I was much interested in your article on QSL's in the March column. Congratulations, you covered just about everything. If you ever run a follow-up on it the following points might be mentioned:

1. Write your name and address plainly, even when writing for samples. (Bill sent me a sample of a request with an illegible address—**Herb**).
2. Send the right samples to the right printer. Other-

Former Novice Frank, W6TTU, who offers to help anyone obtain an amateur license. See text for his address.

wise, he may not be able to fill your order, especially if there are special "cuts" used. Most printers have their imprint somewhere on their cards.

3. In designing your own card by cutting apart samples and pasting the parts together, do not include too many cuts. Too many focal points tend to confuse and destroy the "punch" and overall appeal of the card.
4. The color of the card stock does not normally count as a color in figuring the price of cards. For example, a QSL printed in black ink on a white card is a single-color card."

Neal, **WN7USB**, writes, "Dear Herb, I agree wholeheartedly with your article on long CQ's (January column). I run about 50 watts to a **TBS-50-C**, and my receiver is an **S-38C**. I live in the country and have room for a full-wave antenna. So far, I have had 37 contacts, 22 confirmed, and have received one SWL card. I hope to get my General Class in May."

Dick, **K6BBD**, writes, "Dear Herb, I have my General now, but still work on 7188 kc. most of the time. But I often shift up in the 7-Mc. phone band to work Novices, phone to CW. I am trying to work Novices in all states. Have forty of them so far. Need some W1's. I hope they will look for me on Friday and Saturday evenings on 7188 kc. I run sixty watts to a **TR-75** transmitter and have a **BC-342** receiver. By the way, I was looking through the SWL cards I collected before getting my license and found one from W9EGQ. Quite a coincidence."

Lou, **KN2GKY**, seems a little bitter. "Dear Herb, I have sent out 100 QSL cards and have gotten twenty-two in return! No percentage! Please print my address for future QSL's that I won't get anyway. It is #488 4th Ave., Brooklyn 15, N. Y. Also, this hint may help Hams who have a time hanging QSL cards. Get photo corner mounts, 300 for 25c, from any dime store. You can switch your cards all around with them without damage to the wall. They come in all colors."

Doug, **WN8NFT**, says, "Dear Herb, I run 40 to 50 watts input to a converted "Command" transmitter on 3.7 Mc. In one month, I have worked thirteen states, all east of the Mississippi. I'd sure like to work a W5 or a WØ. I am fifteen years old and am a Sophomore in high school."

Jeff, **KN6BFB**, makes a good suggestion. "Dear Herb, I wish more new Novices would study up on how to operate an amateur station before getting on the air. It

certainly would help them and the rest of us. I run 35 watts to a 6AG7-6L6 transmitter, have a full-wave, 7-Mc. antenna, and an **S-40B** receiver. I have worked eleven states."

"Cork," **WN4BUS**, is another of those unusual Novices. He reports "Dear Herb, I am twenty-three years old and an RM3/c in the Navy. I have just taken the examination for RM2/C. Sure hope I make it. I am now stationed in Norfolk, Va. But my last duty station was in the Arctic. Boy, it gets cold up there!. . . . The Navy will certify that I can copy 40 w.p.m. and send 22 w.p.m. (straight key), and I have a Navy license to use a 'bug,' but I am a Novice, because I was weak on theory. I will go up for my General in a few weeks now. . . . If anyone around Norfolk would like a little help on their code, have them look me up. I have code oscillators and keys galore. My address is: Carlton "Cork" E. Bohn, 289-E MEMQ, U.S. Navphibase, Little Creek, Norfolk, Va. (No wonder I have trouble getting my address through for QSL's, especially as the address in the Call Book is incorrect!)"

Bill, **WN9ZGB**, writes, "Dear Herb, I thought I'd drop you a note while sitting here listening to you talk to W6TTB on 21 Mc. 21 Mc. is my favorite band, but there are not enough CW signals on it. I have an **SX-71** receiver and use my 7-Mc. doublet on 21 Mc. I have worked seven states and Puerto Rico. I work a W6 about every day I get on the band. . . . I am sixteen and a Junior in High School. I took my General Class examination last week. I passed the code, but I am awfully worried about the theory examination. They asked questions that were not in the License Manual (That is true, if you have an old Manual—**Herb**). DX to you on 21 Mc."

Dick, **WN3WVG**, reports, "Dear Herb, I've had a lot of fun since I got my license in September, although I have not worked as many stations as I would have liked. The trouble is that Titusville, Pa., where I live, is in a valley. Within a half mile in any direction the hills rise 300 to 400 feet. At present, my station consists of the "Modern Exciter," described in **CQ**, July, 1952, and an **S-76** receiver. I am planning on going on 147 Mc., and was wondering if there was much activity on that band in northwestern Pennsylvania."

Help! Help!

If you cannot help them yourself but know of a radio club near any of these lads requesting help in obtaining their Novice licenses, let them know about it.

George Roberts (14), 1452 Sterling Pl., Brooklyn 13, N.Y. Tel. PR 3-8371.
Philip Parent, 16 Parent St., South Berwick, Maine.
Robert Kerner, 39 Bayview Ave., Newark 8, N. J.
Bill Jansen (16), 28 Bronx St., Tuckahoe, N. Y.
Donald Funk, 816½ E. 13th St., Okmulgee, Okla. (Air Force veteran).
Buck Stratton (25), 8181 West Grand River, Brighton, Mich. (Professional aeroplane pilot.)
John D. McKenzie (30), 1124½ Broadway, Toledo 9, Ohio.
Dr. J. R. Shreve, Brown Summit, North Carolina.
Richard J. Petersen, 3516 Chicago Avenue South, Minneapolis 7, Minn. Tel. LO 3834. (Just out of military service.)
Dick Morrison (15), 41 Progress St., Sayleville, R. I. (Interested in starting teen-age radio club.)
Karl E. Jensen (16), 1140 Arobor Road, Menlo Park, Calif.
Terry Snyder (13), and his father, 82 Undine Road, Brighton 35, Mass.
Carl M. Mitchell (14), 56 Sparhawk St., Amesbury, Mass.
Dick Ross (17), 7353 Claire St., Reseda, Calif.
Jim Brown (15), 1450 South 4th East, Salt Lake City, Utah, Tel. 7-1184.
David H. Lower, New Bethlehem, Penna.
Don Borson (17), Minneota, Minnesota.
Cary Norman, 2117 Del Rio Dr., Stockton, Calif.

W2HNG and **W2HNI** offer a weekly code and theory class, free of charge. Write to: Educational Training Program, Box 131, Jamaica, L.I., N.Y.

More Letters

Frank, **W6TTU** writes, "Dear Herb, I now have my General, but I still work Novices now and then. My gripe is that some of them try to put their life history in their first transmission. One KN2 I worked recently gave me his address, repeated it four times, described his rig, told me when he was going to get his General ticket, and I think several other things. By the time he had finished a 15-minute transmission without signing his call, he was just about covered up by QRM. . . . When you printed my last offer to help others to obtain their licenses, I got letters from all over the country. I

(Continued on page 100)

ADDRESS CHANGE . . .
Subscribers to CQ should notify our Circulation Dept. at least 5 weeks in advance regarding any change in address. The Post Office Dept. does not forward magazines sent to a wrong destination unless you pay additional postage. We cannot duplicate copies sent to your old residence. Old and new addresses MUST be given.

CQ MAGAZINE
67 WEST 44th STREET NEW YORK 36, N. Y.

(from page 99)

am now repeating the offer. My address is: Frank Bates III, W6TTU, 14332 Roblar Pl., Sherman Oaks, Calif.

Dick, **KN6BZZ**, writes, "Dear Herb, In my seven months on the air, I have worked 25 states and Canada. My transmitter runs twenty-five watts input to a 6L6 driven by a 6AG7. Antenna is a long wire end fed, and my receiver is an **S-38C**. I have only one complaint about Novices. It never fails. When I am working a DX station, some guy comes right smack on the frequency and just lets his carrier run. The FCC ought to go after them. . . . I am still trying for WAS, so would be glad to make schedules with stations needing California. I need mostly W1, W4, and WØ."

Winston, **WØLDY**, says, "Dear Herb, I have been a General for three months, but I still like to work Novices. I run fifty watts to a **TBS-50**, and the receiver is an **NC-173**. So far, I have worked thirty-nine states. I have just built a new Ham Shack and welcome visitors. My address is: 607 South Oakland, Webb City, Mo."

Hank, **W2EZJ**, has some advice for W8KBT. "Dear Herb, If W8KBT wants an antenna for 14 Mc. (**Novice Shack**, January), tell him to try the one I used one day. I took a 28-Mc. whip and leaned it up against my chimney with the base in the top of a soda bottle. Although I could only load it up to thirty watts, I worked KH6USA in Hawaii with it." (Hank did not say what flavor pop was in the bottle—**Herb**).

Until next month when I hope to have a letter from you, 73—*Herb.*

MORE MOBILE POWER

(from page 31)

steel type and not cast iron as used on older cars. They match a narrow V belt.

To make room for the battery box it was necessary to move the *Ford* regulator. Both the *Ford* and *Chevrolet* regulators are to the rear of the battery box and are accessible for adjustment.

The dynamotor is mounted on a metal shelf beyond the regulators. The battery and generator wiring was done with #8 automobile cable. The generator mounting will have to be made up, but this is not difficult if a cardboard pattern is made first as a guide. The auxiliary generator must be attached to the motor block or head and not to the car body or frame. The belt used to drive the generator is a *Gates #1280 V belt.*

PE-101-C Supplies 650 Volts to Final

The results obtained with this hook-up were above expectations. About 600 volts output was expected but under normal transmitter load the voltage is between 650 and 750, depending on whether the automobile engine is running.

The transmitter supplied by this system uses a 6146 final and 5881 push-pull class B modulators operating at full dynamotor output voltage with the speech stages operating from the 350-volt tap. The average input power is about 75 watts. This gives an output of 2.25 amperes 75-meter r.f. into a 10 ohm antenna resistance. The dynamotor requires 15 amps. input current. The receiver plus the transmitter filaments takes 11 amps. from the auxiliary battery only.

CLASSIFIED ADS

Advertising in this section pertains to amateur radio activities. The publishers of CQ do not guarantee any product or service advertised in this section. Please print or typewrite copy. Remittance in full must accompany copy (no agency or term or cash discounts allowed).
RATES: 25c per word per insertion for commercial business organizations.
5c per word per insertion for idividuals on a non-commercial basis.
CLOSING DATE: May 25, for the July issue.
WRITE: CQ Magazine, 67 West 44th St., N. Y. 36, N.Y. Attention, Jeanne C. Gillespie.

Mobile Equipment:

ATTENTION MOBILEERS. Announcing the Dakota All-Band Mobile Coil, $15 postpaid. Covers 3.8 through 29.7 megacycles. Instant band change. Order yours today or write for full descriptive literature. Guaranteed satisfaction or full refund. Burghardt Radio Supply, Inc., Box 41, Watertown, So. Dakota.

Very Sweet BABY MOBILE ANTENNA is efficient and good looking. Its plug-in center loading coils make it a "natural" for Gonset, Elmac, Viking, etc. Band switching transmitters. Installation is simple. Complete antenna with coil for one band 75 through 10 $12.95. Antenna with broadcast coil $13.95. Additional Ham band coils $2.75 each. Broadcast coils $3.75 each. W6VS. Bill Davis, 225 Cambridge Ave., Berkeley 8, Cal.

For Sale:

SELL: SYLVANIA 7" oscilloscope #132 like new $100; BC342-N receiver used little $75; Garner 18A frequency standard like new $25; Rider Chanalyst like new $55; HP audio oscillator 200B excellent condition $75; Triplett modulation monitor rack mount #1696A new $25; Western Electric audio amplifier 40w Class A limiter compressor excellent mod. driver $75. W2QUE DeSavino, 625 18tb St., Union City, N.J.

SX-71 excellent condition, 10 hours total time $220. Following equipment new, wired, tested: Heath 5" model 0-9 oscilloscope $86.35; vacuum-tube voltmeter model V-6 $32.45; grid dip meter model GD-1B $27.80. H. Lorrilliere, Jr., 66 Beech Ave., Aldan, Pennsylvania.

SURPLUS SPECIALS! RG-8/U cable 100 ft. $5.95; 250 ft. $13.25; 500 ft. $25.00. Coaxial connectors—PL-259 5 for $2.25, SO-239 5 for $2.00. New tubes—807 $1.65, 811A $4.25, 812A $3.50, 813 $10.50, 866A $1.48, 304TH $8,75, 872A $3.95, 24G $1.85, 1N21 $1.19, 1N21A $1.69, 1N21B $2.75. Postage extra. Request free bulletin and visit our new store for thousands of bargains. Want to buy or swap Selsyns, Synchros, Servo Motors, Amplidynes, RTA-1B Aircraft Radio. Lectronic Research, 717 Arch Street, Philadelphia 6, Pa.

TELETYPE GEAR, 21A Printer $30. Model 12 RD WID AC motor $25. Model 12 complete with printer, keyboard, distributors, power supplies, table top and cover; FB WKG condition $100. Keyboard tape perforator with power supply $60. 7B tape head with jack base $20. Speedx bug $4. MonKey $10. NT17 transmitter with coils; guaranteed to cause TVI $20. 10" GE TV $40. Swap any above for receiver. What say? W5WUW, Dave Abell, Paragould, Arkansas.

75-WATT TRANSMITTER KIT; 6AG7, 807-807 tube line-up; complete instructions. $50 plus shipping. John Hopkins, Box 327, Brattleboro, Vermont.

SURPLUS FOR SALE by Government, radio electronics, tube, trucks, jeeps, boats, mach, etc. Latest listing $1.00. Box 213H, East Hartford, Connecticut.

SALE OR SWAP for Ham or test equipment. Presto enlarging printer. Up to 4" x 6" prints from miniature negatives on production basis. Free photo and description. What do you have? Anderson, 110 Church, Jamestown, New York.

FREE BARGAIN LIST. 10 mfd/600 WV oil capacitors 98c. Sacrificing 15 tons hot electronic items. Mark Electronics, 1888 Randall, Bronx, New York.

SELL AS NEW National NC-240D with speaker $80. William Jenkins, 809 Wm. Penn Ct., Wilkinsburg, Pa.

NOVICE 25-watt transmitter kit, $19.95. Includes punched chassis, tubes, 80-meter crystal. 40-meter crystal, coil kit $3.00 extra. Details free. Hart Industries, 467 Park, Birmingham, Michigan.

QSL Cards:

QSL's—Samples 10c Plenty of styles. W4AYV, Drawer R, Umatilla, Florida.

QSL's—amateur radio's favorite QSL printer. Samples and catalogue 25c, refunded. Stronberg, P.O. Box 151, Highland Station, Springfield, Massachusetts.

QSL's TWO COLORS, $2.00 hundred. Samples for stamp. Rosedale Press, Box 164 Asher Station, Little Rock, Ark.

QSL samples. Dime, refunded. Gale Press, W1BD, Waterford, Connecticut.

QSLs of DISTINCTION. Three colors and up. Uncle Fred. Box 86, Lynn, Pennsylvania.

QSLs—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pennsylvania, Samples 10c with catalogue 25c.

QSLs! "America's First Choice!" Samples 10c. Tooker Press, Lakehurst, New Jersey.

QSL's, SWL's. High quality. Reasonable prices. Free samples. Write Bob Teachout, W1FSV, Box C124, Rutland, Vermont.

QSLs "Eventually, Why Not Now?" Ham's "super-speed specials" will please your contacts and your wallet. Samples 10c. Robinson W9AYH, Dept-M, 12811 Sacramento, Blue Island, Illinois.

QSLs. Taprint, Union, Mississippi.

QSLs! SWLs! See this month's 2-color special—$3.00 See our 3-D card!! Free samples. Acme Printers, 707 West 8th, Los Angeles, California.

QSLs? Largest variety samples 10c. Sackers, W8DED, Holland, Michigan.

Positions Offered:

ELECTRONIC TECHNICIANS: For permanent positions with Sandia Corporation. Armed Forces acquired radar or electronic experience desirable; trade school certificate with minimum five years' experience. Versatility, capability and willingness to work most essential. Sandia Corporation, a subsidiary of the Western Electric Company, operates the Laboratory under contract with the Atomic Energy Commission in Albuquerque, New Mexico. Excellent working conditions and liberal employee benefits, including paid vacations, sickness benefits, group life insurance, and a contributory retirement plan. No housing shortage in the Albuquerque area. For further information write to: Section 1, General Employment Division, Sandia Corp., Sandia Base, Albuquerque, New Mexico.

Wanted:

WANTED: K.W. modulation transformer handle PP 810 500-watt or more. Victor Barry, 224 South 10th, St. Joseph, Missouri.

WE NEED used receivers: We give highest allowances for S-20R; S-40A, B; NC-57; NC-100; NC-125; SX-24; SX-25; HQ-129X, and similar receivers. World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

WE WANT YOUR USED GEAR. Highest trade-in allowance on National, Hallicrafters, RME, Hammarlund, Gonset, Morrow, Johnson, etc. Write or call, C & G Radio Supply Co., 2502-6 Jefferson Ave., Br 3181, Tacoma 2, Washington.

NEED R5A/ARN-7 Bendix compass receiver and BC788 altimeter. Advise at once price condition. Also buyer of all surplus aircraft electronics. Write James S. Spivey, Inc., 1406 G St., N.W. Washington 5, D.C.

WANTED: ART-13, TCS, BC348, HQ-129X, SX-71, NC-183, etc. Write for free list Ham bargains. Farr Electronics, Box 273, Lexington 73, Massachusetts.

WE NEED USED receivers and transmitters of all models. We will give you the highest trade-in allowance or pay you cash. Don't trade or sell until you get our offer. Henry Radio, Butler, Missouri.

WANTED: ARC-3. Advise price, condition. Bob Wegelin, 1406 "G" St. N.W., Washington 5, D.C.

WANTED: Surplus or used electronic equipment taken in trade for new Johnson, Viking, Hammarlund, National, Elmac, Gonset, Harvey-Wells, Central Electronics, Hallicrafters. Especially want ART-13, DY-17, BC312, BC342, BC348, APN-9, BC610, AR-88, BC-221, 32V, 75A, 310, test equipment, technical manuals, teletype, ARC-1 ARN-7 parts for these sets. Alltronics, Box 19, Boston 1, Mass. RIchmond 2-0048.

For Sale:

WE ARE NOW in our new ultra modern building with fresh stocks to serve you. Bargains: with new guarantee: Gonset 10-11 converter $19.95; VHF-152 $49; HF 10-20 $59; S-72 $69.50; S-40A $75; RME-45 $99; HRO Senior $99; Lysco 600 $109; S-27 $109; SX-43 $129; S-76 $149; SX-71 169; SX-42 $189; HRO-50 $275; 75A1 $275; 90800 exciter $22.50; HT-17 $32.50; EX Shifter $69; Globe Trotter or Globe Scout $69.50; TBS-50D $99; HT-9 $199; Globe King $295. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

SELL: 225-watt modulation transformer Kenyon T478—$16.00 Marmax MO-52 Rothman modulator 100 watts $9.50. FOB Philadelphia. Edward Brauner, W2URF.

VFO, stable. 3500-3750 or 3750-4000 kc. For Viking or similar. Takes power from transmitter. $25. W8JSH, 1035 Fisk, Cincinnati, Ohio.

FOR SALE—Brand new 72-A2 Collins receiver. Also brand new RCA tape recorder, will sell at a sacrifice. W9LQI, Ashton, Illinois.

FOR SALE: Pair 4-125A tubes used but good $30. R. E. Baird, W7CSD.

FOR SALE: SX-25 receiver $70, BC-453 new $15, RA-20 power supply for BC-342 $12, AX-4-125 tubes, new $30 pair, SCR-522 transmitter with crystal, tubes, power supply, microphone, ready to operate $65, 600-watt modulation transformer $25, AN/ART-13 driver and modulation transformer $15. Send for complete list of Ham gear. Seidman, W2GNZ, 1535 Longfellow Ave., New York, N.Y.

COLLINS 74A-2 excellent condition $300. WØNHR, 1231½ 5th St., N.W., Cedar Rapids, Iowa.

SWAP 6-tube 4-band superhet receiver, 35W 80-meter transmitter, Heathkit tube-tester plus multimeter att., Amco senior code course, phones, key, hundred parts, dozens tubes, 54 Handbook, etc. Want: camera, stamps, HO RR, or? A. Jaffray, 508 East Locust, Belvidere, Illinois.

FOR SALE: Riders TV Volumes 1-9 complete like new. Best offer. W3HPO, Fred Kost, 431 Flamingo Street, Philadelphia, Pa.

SONAR SRT-120P 1953 model never used, complete with power supply, original price $279.50. Can be had for only $165. Jerry Klein, 235 Lyons Ave., Newark, N.J., Phone WA 3-3025.

TELETYPE: Model 12 page printer complete. 21A strip printer, several model 12 printers only. PE-103s. W6DOU, 1558 "B" St., Hayward, California.

SELL: Boehme automatic perforated tape keyer for Morse code with McElroy three-key tape perforator, $145. Dumont #241 scope $245. Collins 32V-3 $585; 32V-2 $485; 75A-1 $265; 75A-3 $425. 30-J transmitter $350. AR-88-D $275. SX-42 $165. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. RIchmond 2-0916, RIchmond 2-0048.

Miscellaneous:

NECKTIES: Your handle, call and antenna towers handpainted in contrasting colors. Write: Henry Schanding, W3RRF, Harrington, Delaware.

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

FREE! Reflectorized aluminum call sign through special plan. Whitley, W2LPG.

EXPERIMENTERS' MAGAZINE—straight from Britain—"The Radio Constructor." 6-month trial $1.25; 12-month subscription $2.50. Gilfer Assoc., P.O. Box 239, Grand Central Sta., New York 17, N.Y.

CALLBOOKS? (latest) $3.60. W8DED. Holland, Michigan.

FOR DXers—"Ham Interpreter," Ham words and phrases translated into seven languages, $1.00. For SWL's—"World Radio Handbook," complete information on international stations, $1.50. For SWL Novice—"How To Listen," 40c. World Radio Publications, 47 Mounthaven Drive, Livingston, New Jersey.

INCREASE CODE SPEED. New method. Free particulars. D. H. Rogers, Fourth Street, Fanwood, New Jersey.

For Sale:

NC-57 excellent condition. Best Offer. Trade Retina 1B Xevar F3.5, synch flash, chrome for Novice equipment, table TV. Gursh, 1481 Shakespeare, New York 52, N.Y.

FOR SALE: All equipment like new: Class B modulator pair 809's complete on 13x17x3-inch chassis; CX-49A B & W condenser with Neut condensers; CX-20A B & W condenser; Cardwell TL-100UD dual; National TMA 60DB; Eimac VC 50 $\mu\mu$fd.; PE-103 dynamotor with cables; Stancor transformer 1000, 1200 each side of center 380 mills; Stancor fil. trans. 2½ V. 10 A.; Thordarson smoothing choke 6407; Signal Corps. speaker LS-3; RCA Class B transformer; Bud five-section rack 60"; Prop pitch motor for rotary beam; James C. Gill. 710 Harding Way West, Galion, Ohio. W8BCA.

FOR SALE: Novice transmitter Eldico TR75 TVI-proofed $49. New Sonar CFC VFO exciter $39. New Vibroplex de-luxe key $20. New items with original packing cases. Or all for $100. Shipped postpaid within 500 miles. Eugene Lai, W6SAY, 151 Loe Medanos, Pittsburgh, California.

URGENT REQUIREMENT for AN/APR-4 UNITS: new high prices. Also need other APR-, APS, APT; ARC-1, ARC-3, ART-13, BC348, BC221, 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.

VAN SICKLE has S-53A $65; NC-88 $98; NC-125 $165; SX-71 $199; HQ-140X $219. All guaranteed like new W9KJF, 1320 Calhoun St., Ft. Wayne, Indiana.

MUST SELL practically new Lettine Model 240 transmitter (40 watts phone or CW) complete with ruggedized version of 807; crystal and coils for 10 meters. 300-ohm low pass transmitter filter included. Total value well over $100. Will accept best offer. William L. Firestone, W9SXY, 9127 N. Keating, Skokie, Illinois.

BARGAINS: Stock up with these assortments. 12 rotary switches; 40 ceramic condensers; 20 wire wound resistors; 40 mica condensers; 20 toggle switches; 10 volume controls. Your choice of assortments $1.49; any 3 assortments $3.99. Also giant 20-pound assortment of parts $2.49. Aviation Accessories, Inc., Box 4178, Fort Worth, Texas.

CRYSTALS: Tailor-made FT-243's 3500 to 8700 kc. ±2 kc. $1.00 each. .01% setting $2.00 each. Write for price list. Hundley Crystal Company, 2951 North 36th, Kansas City 4, Kansas.

BC696 $20, J. W. Miller FM tuner kit $15, two new 2C40 lighthouse tubes $10, new 6J6's and 6C4's best offer. James Nugent, 1259 Third Ave., S. E., Cedar Rapids, Iowa.

HALLICRAFTERS SX-24 with crystal and matching speaker, excellent condition, $50. Charles E. Horvath, Jr., 17110 Glendale Ave., Cleveland, Ohio.

SELL: Eldico 813 250-watt transmitter, complete 50-watt mobile equipment. W2OHP, 4720 Avenue D, Brooklyn 3, N.Y.

COLLINS 32V-3 transmitter, nearly new, excellent condition, must sacrifice $590. Write Box HP, CQ Magazine.

JOHNSON Viking II transmitters wired and tested, modified with RK4D32 final $339.95; also available with regular 6146s $319.95. Viking VFOs wired and tested $54.95. We trade and offer terms. Largest variety of used equipment in New England, write for latest list to W1BFT, Evans Radio, Concord, New Hampshire.

CLEANING SHACK: All new. BC1206 L.F. receiver; Q5-er with conversion info $7.50. Dumore DC Motors 24V, .05HP, beam tuner $3. each. Solar 5 μfd 1000v oil filter $1. each. W.E. 717A's 50c each, 807's $1. each. R.G. 22/U 95-ohm twin co-ax 200 ft., $7.50; RG 7/U 97.5-ohm co-ax 200 ft., $7.50. 75 ass't capacitors, micas, ceramics, bathtubs, etc. $1.50 per package. Postage extra. W2PAJ, G. Jacobs, 144-40 72nd Ave., Flushing 67, N.Y.

FOR SALE: American Tel. & Radio model 110RSC inverter. Practically brand new. Input 110 volts dc.—output 110 volts ac., (List $54.95); with 600 volt WVDC—10 μfd. oil-filled condenser (List $15.85). Will accept best offer. Box RS, CQ Magazine, 67 West 44th St., New York 36, N.Y.

ARE YOU MOVING? Please allow four weeks for a change of address and be sure to include the old as well as the new address. It saves us time and assures you of getting each copy of CQ. Circulation Manager, CQ.

Instruction:

Hamfest Announcements:

In accordance with our announcement in the December 1953 issue of CQ, we are herewith publishing Hamfest announcements in the classified section. Special insertion rates are as follows: 25 words $1.00; 25-50 words $2.00. No special discounts for fractional ads. We suggest each announcement include the name and address of a person to contact for further information about the Hamfest.

ROCHESTER AMATEUR RADIO ASSOCIATION is again sponsoring the WESTERN NEW YORK Hamfest at the Doud Legion Post, Buffalo Rd. on Saturday, May 15. Contests, prizes and speakers. Registration from 1:00 p.m. to 5:30 p.m. Dinner at 7:00 p.m. $3.75 per person. Free parking. R.A.R.A., P.O. Box 1388, Rochester, N.Y.

WONDERFUL WYOMING in July. July 16-18 Sheridan, Wyo. Rodeo, Yellowstone Park; July 24-25 Annual Wyoming Hamfest; July 26-31 Cheyenne Frontier Days. Write: W7QPP for information.

ST. LOUIS RADIO AMATEURS Hamfest, May 23, 1954. Attendance prizes, games, entertainment. Refreshments on grounds. Adults $1.00—Children free. Mollerus' Grove, Highway 66, St. Louis County, Missouri.

NORTHFORK AMATEUR RADIO CLUB of Southwest Oklahoma is holding its Annual Hamfest and picnic at Quartz Mountain State Park, June 12 and 13. Lots of prizes and fun in store for those who attend. Reservation to be sent to Elmer Triplett, Sec., Sayre, Oklahoma.

MORE ON THE TNS

(from page 79)

out. Find the point where the background is causing the TNS to "chatter." This is because the TNS cannot make up its mind whether to squelch or let the background pour through. This is the critical threshold point where the weakest signal can be heard. If this chattering is annoying while on the road, turn the squelch on just a little bit more. If you turn the squelch control too far, the sensitivity will drop and the strong signals will become badly distorted. The stronger the signal the more the control can be advanced before distortion sets in.

On some potentiometers, the taper of the winding may crowd the threshold point until it becomes too sharp to set comfortably. This may be smoothed out by using a lower value at *R3* and placing it in series with a fixed resistor to make up the difference.

3rd Annual MISSISSIPPI VALLEY HAMFEST, May 23, 1954, at Rock Island County Conservation Club Grounds on Big Island, Milan, Illinois. Plenty of good fun, food and prizes for OM, YL, XYL's and Harmonics. Tickets are $1.25 advanced registration or $1.75 at the gate. For advanced registrations write Robert Hutchins, W9OXZ, Preemption, Illinois, before May 16, 1954.

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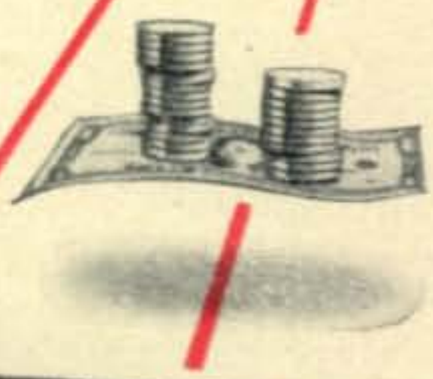

NC 88

NC 98

THE NC-88 No other receiver at this price gives you:

Cal. bandspread for 80, 40, 20, 15, 11 and 10-meter bands (on large, indirectly-lighted lucite scales with minimum paralax). Delayed AVC. Exceptional Sensitivity. 8 Miniature Tubes. Ant. Trim. Outstanding Selectivity. Most Compact. RF Stage. Two I F Stages. Two AF Stages.

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THE NEW NC-98 One quick comparison proves it's in a class by itself — in performance and price!

CRYSTAL FILTER · S-METER · 550 KCS. TO 40 MCS. RANGE · CALIBRATED AMATEUR BANDSPREAD OR CALIBRATED SWL BANDSPREAD (FOR SW LISTENING) · NEW MINIATURE TUBES · AN RF STAGE · ACCESSORY SOCKET · TWO I F STAGES · EDGE-LIGHTED LUCITE DIAL SCALES · NOISE LIMITER · SEPARATE HF OSC. · 3-POSITION SELECTIVITY · ANT. TRIM. · PHASING CONTROL · SENSITIVITY CONTROL.

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