CQ

The Radio Amateurs' Journal

DECEMBER 1946

25¢

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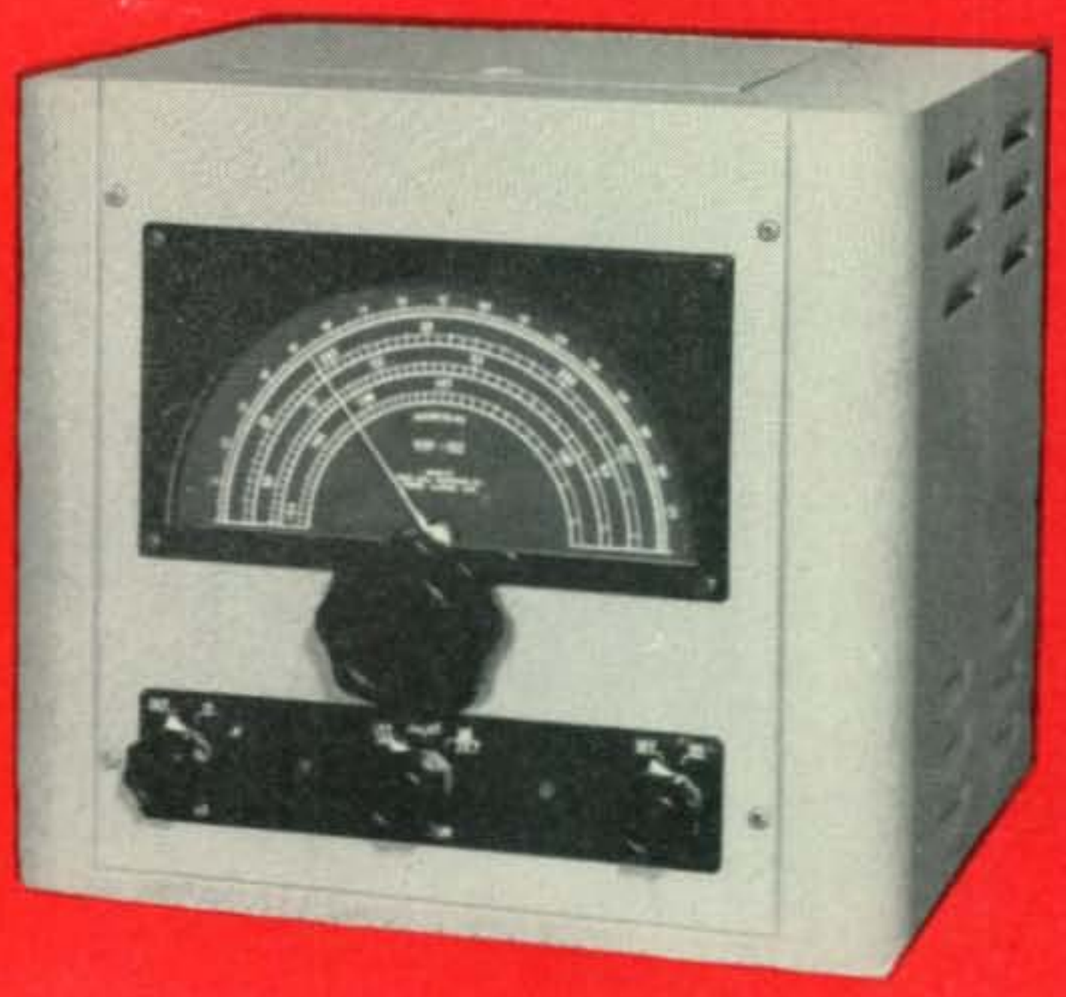

THE NEW VHF-152, used with any communications receiver, will give you peak performance on the 28 to 29.7, 50 to 54 and 144 to 148 mc. bands, utilizing the extremely efficient *double detection system.* Not only can you enjoy reception on these frequencies economically, but you'll do so more efficiently and effectively than is possible with any higher priced, specifically designed VHF receiver.

Features

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New miniature tubes are used for sensitivity, stability and extremely low VHF circuit noises. A Built in power supply includes voltage regulator tube.

SENSITIVITY AND IMAGE REJECTION
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Provision made for use of four separate antenna connections.

OTHER FEATURES INCLUDE
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			*	†	
Plate Voltage	2000	2500	3000	4000	volts
Plate Current	350	350	333	315	ma.
Driving Power	25	30	32	36	watts
Power Output	460	625	750	1000	watts
Power Input	710	875	1000	1250	watts

TYPICAL PHONE OPERATION ONE TUBE, 250TH OR 250TL					
		**		†	
Plate Voltage	2000	2500	3000	3200	volts
Plate Current	200	200	240	235	ma.
Driving Power	20	25	35	35	watts
Power Output	300	375	555	585	watts
Power Input	400	500	720	750	watts

* Recommended for 1-KW input.
** Recommended for 1-KW input (two tubes).
† Typical operation at maximum rated plate voltage.

CLASS-B MODULATOR—TWO TUBES, 250THs						
				*		
Plate Voltage	1500	2000	2000	2500	3000	volts
Zero—Sig. Plate Current	200	150	150	140	100	ma.
Max.—Sig. Plate Current	750	550	700	450	560	ma.
Grid Voltage	0	—30	—30	—50	—65	volts
Driving Power	50	24	34	14	32	watts
Plate-to-Plate Load	4300	6000	6000	10,000	12,500	ohms
Power Output	650	650	900	650	1150	watts

CLASS-B MODULATOR—TWO TUBES, 250TLs						
				*		
Plate Voltage	1500	2000	2000	2500	3000	volts
Zero—Sig. Plate Current	200	150	150	140	100	ma.
Max.—Sig. Plate Current	750	550	700	450	560	ma.
Grid Voltage	—40	—80	—80	—140	—175	volts
Driving Power	50	17	32	9	30	watts
Plate-to-Plate Load	4300	6000	6000	10,000	12,500	ohms
Power Output	650	650	900	650	1150	watts

* Recommended for modulating 1-KW input—allows for 25% transformer loss.

OVER A DECADE OF PROVEN PERFORMANCE

Today, the Eimac 250T is as far ahead of the times as was its predecessor over a decade ago. The ratings shown above are conservative ones, but they plainly demonstrate why the Eimac 250T is an outstanding triode for amateur or industrial use.

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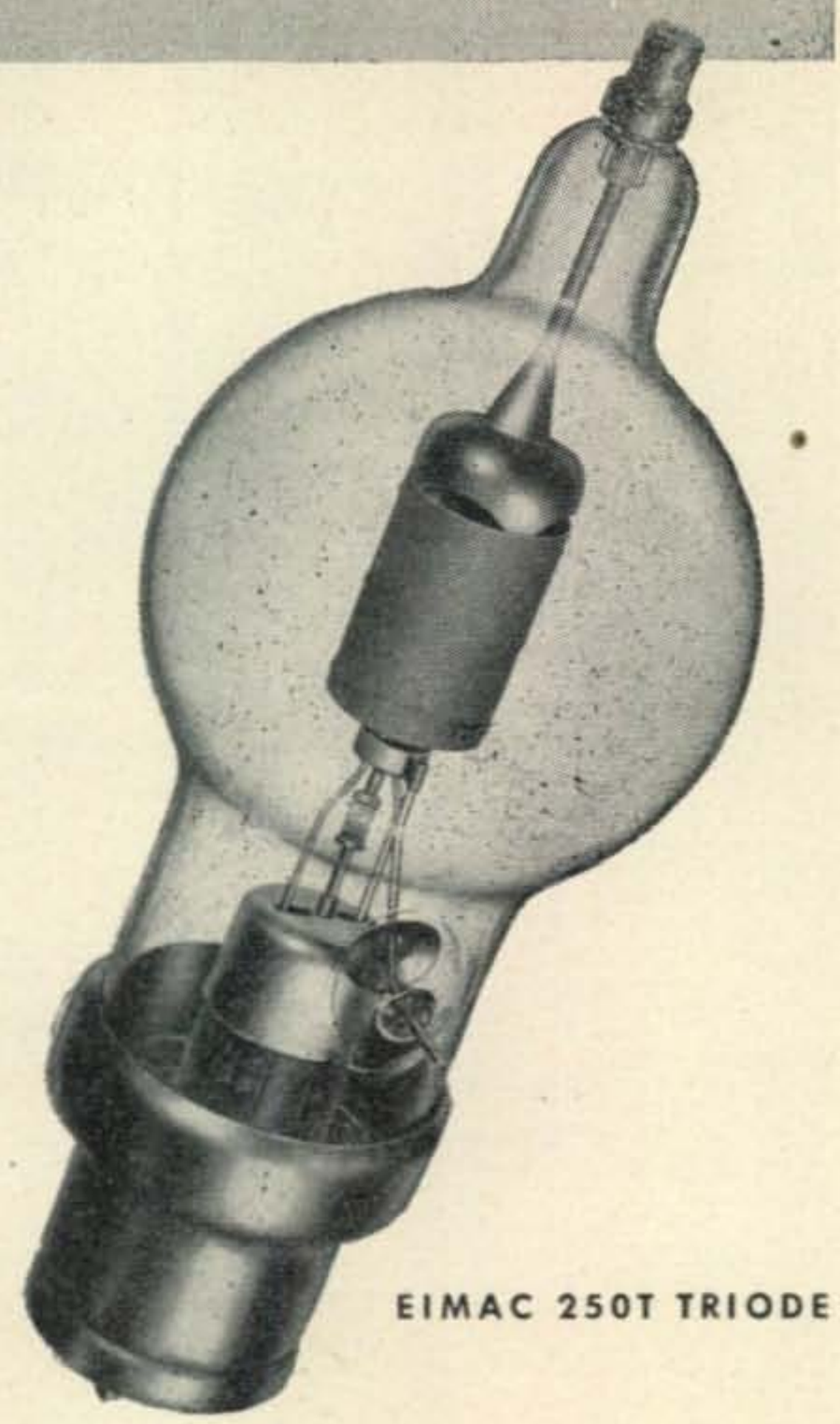

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CQ The Radio Amateurs' Journal

JOHN H. POTTS, *Editor* SANFORD R. COWAN, *Publisher*

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Vol. 2, No. 12 DECEMBER, 1946

COVER

Great circle maps have been drawn on but a few of the larger centers of population in the United States. DX men living outside these areas are well acquainted with the problem of properly orienting a beam. Modifying a world globe into an effective great circle direction indicator is outlined in W7IDF's story "Laying A Beam On the Target."

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. . . Zero Bias . . .

Public Service

Once again an instance of amateur public service is reported in a widely circulated Associated Press dispatch. On November 4th an unusually severe snow storm in New Mexico disrupted transportation and trapped nearly 300 motorists on the open highway. Dale L. Hauck, W8VAX, with a mobile rig in his car was among the stranded motorists. A distress call was picked up by Paul L. Hughes, W8UIL, Canton, Ohio, who in turn worked Foy A. Roger, W5HGV, in Albuquerque, New Mexico. W5HGV promptly notified the New Mexico state police. A rescue party was under way twenty-six minutes after the first call for assistance.

Another recent case we have heard about is of an Ohio ham who came upon a serious automobile accident on the road. Assistance promptly summoned to a relatively isolated spot is credited with saving the lives of several victims.

Amateurs should make it their business to call such examples of public service to the attention of the local press as well as the ham publications. Wide publicity for amateur contributions to public welfare can aid immeasurably in obtaining additional support from legislative agencies.

To all our readers

Merry Christmas

and

Happy New Year

Phone-C.W. Subdivision

Editorial comments concerning the equitable division of amateur frequency allocations have, as expected, aroused considerable interest. Partisans of both principal forms of emission have advanced arguments for each case. But, in general, the feeling that a referendum among U. S. amateurs is the fairest way to settle this question, seems to prevail.

Overlooked entirely by us when discussing foreign phone QRM in the c-w bands is the fact that perhaps the biggest offenders are G. I. operated stations abroad. Foreign amateurs have made the point that they object principally to the relatively high power run by the G. I. stations in comparison with their own national restrictions. However, these objections merely point up the need to create DX regions for phone operations as well as c.w. Now that the remaining frequencies have been opened, perhaps the condition may stabilize itself in a satisfactory manner.

Desirability of retaining the status quo until a referendum on the question can be carried out is sharply emphasized by a recently enacted law, the Administrative Procedure Act. It is understood that within the meaning and intent of the act, the F.C.C. could legally return the remaining portions of the amateur bands immediately upon their release by the Military, if they were returned on exactly the same basis as they existed at the time they were taken over, provided that immediate restoration of these frequencies to the amateur service would be in the public interest and would not adversely affect the interest of any party or group. Only because the F.C.C. recognized the controversial nature of the recommendations made by the generally accepted spokesman for U. S. amateurs and could legally postpone a hearing on the question of phone–c.w. subdivisions within the amateurs bands, was it possible to have the rest of the bands returned immediately.

At the international conference we believe the best plan is to request that amateur frequencies be assigned solely on the basis of occupancy by amateur stations with no reference whatsoever to subdivisions. The question of subdivisions should be settled between amateurs of all countries after the next international conference to be held during the summer of 1947. A protracted wrangle between American factions will involve amateurs in all other countries who might face great difficulties under certain conditions that might be established solely to meet the situation in the United States. We have said before that this question must not degenerate into a factional dispute.

Narrow Band FM

In the postwar period, CQ was the first publication to re-introduce narrow band FM to the amateur. While not new to ham radio, the editors of CQ felt that narrow band FM warranted far more attention than it had been given. The interest shown by our readers, followed by the increasing prominence given to narrow band FM throughout the field, has substantiated these beliefs.

Now the Federal Communications Commission has granted special limited authority to a small group of amateurs to test narrow band FM on frequencies previously restricted to AM--in other words on 20 and 75 meter phone. Tests will also be conducted using frequency shift telegraphy. CQ is privileged to participate in these tests. Every effort will be made to evaluate the relative merit of narrow band FM as compared with conventional AM. Tests under all types of operating conditions are being conducted and extensive reports will be made to all amateurs as well as the F.C.C. The economy of narrow band FM may be overshadowed by more efficient use of existing frequencies. It is toward this end that the tests are being conducted.

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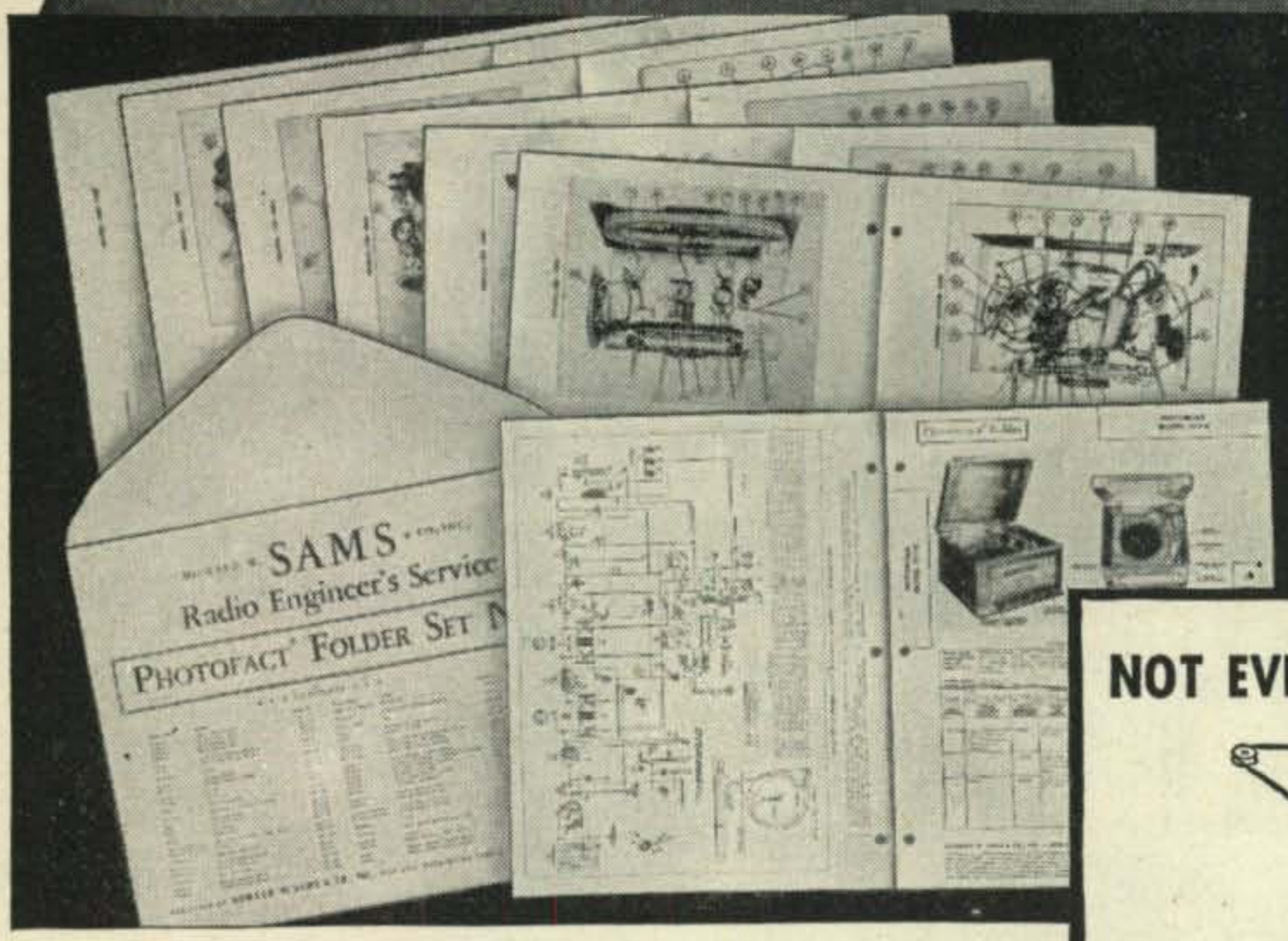

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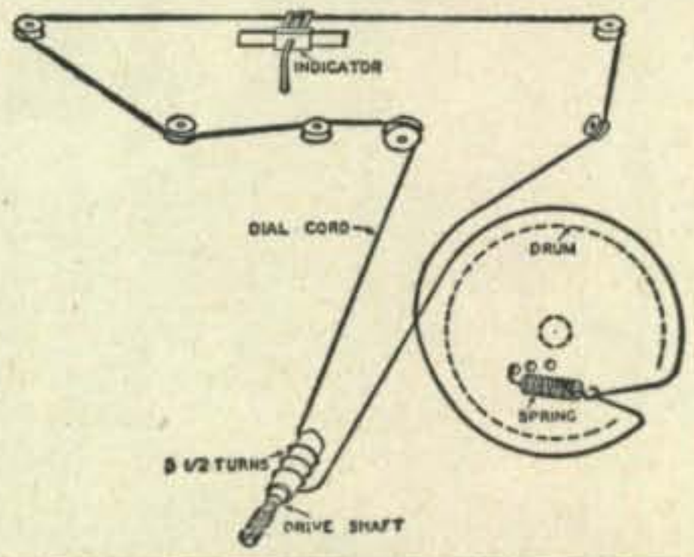

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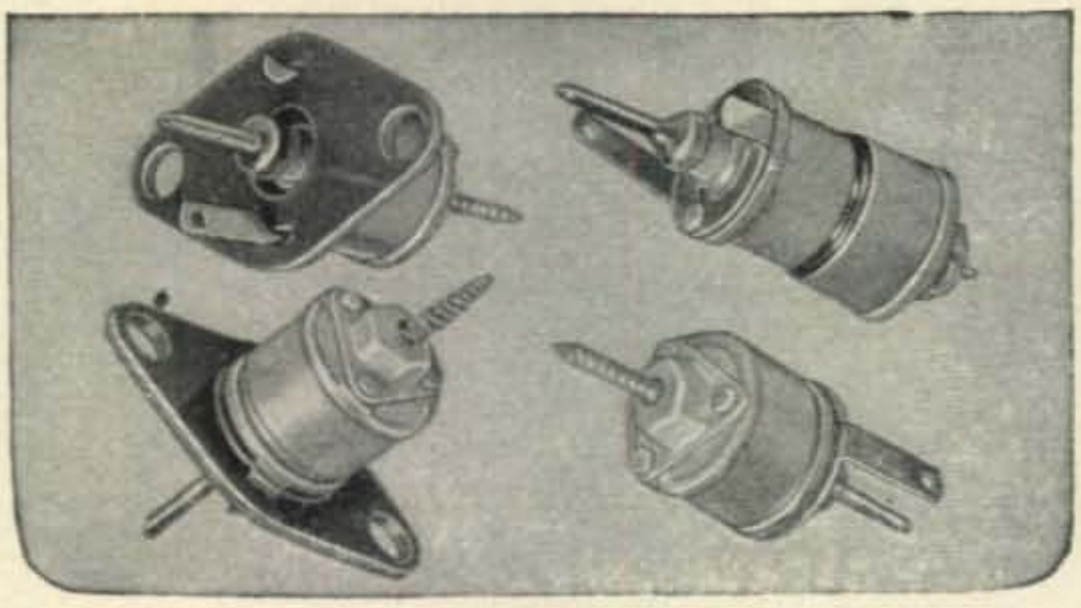
MODEL 700 TRANSMITTER

MODEL 700 xtal controlled transmitter. 144-148 and 235-240 mcs. 6AQ5 Tritet drives 6C4 doubler, 6C4 doubler/tripler, 832 longline push-pull final. Built-in 14 watt 6AQ5 push-pull voice modulator. New "ATOM-X" construction, size only 5" x 10" x 5¼". Matches MODEL 800. Makes serious home-station or mobile rig. Factory built or kit.



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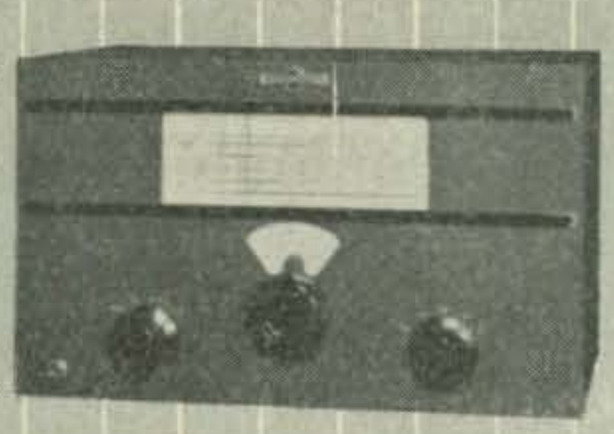
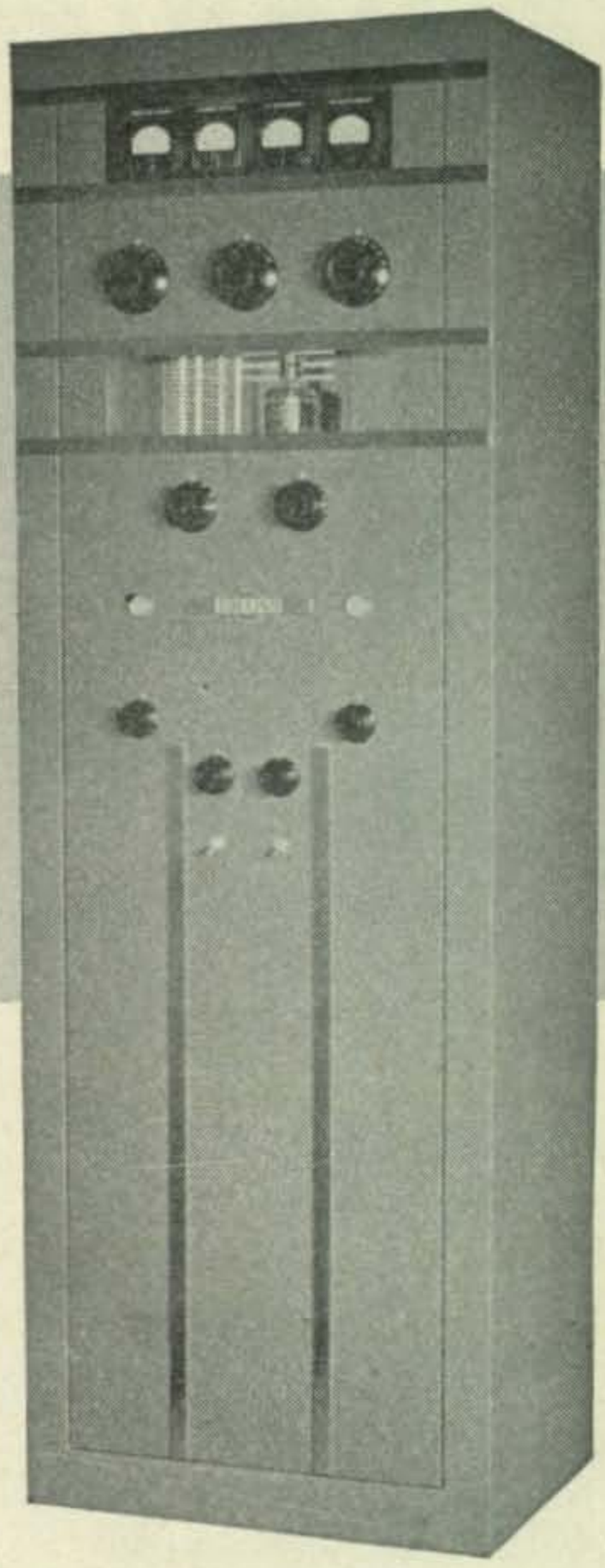


Collins 310A Exciter



Collins 30K Transmitter

1 **RELIABLE**— The Collins 30K is designed to give continuous satisfactory service on the amateur bands. When you want to go on the air, just throw the switch. The components utilized in the 30K are rugged and long lasting. They are built to back you up when the DX starts coming through.

2 **EFFICIENT and CONVENIENT** — The 30K is designed specifically for amateurs. It utilizes modern circuits and wartime electronic developments. It's easy to operate. The 310A exciter is placed right on the operating desk. PTO (permeability tuned oscillator) control gives you accurate *direct reading* frequency control. The 30K is rated at 500 watts input on cw or 375 watts on phone.

3 **ATTRACTIVE**— Both transmitter and exciter are finished in St. James gray. You'll be proud of their up-to-date, pleasing appearance. They will give a professional look—and performance—to your ham shack.

There are several more reasons why the 30K is a winner. For instance, the PTO is accurate to within 2 kc on twenty meters, and the audio circuit contains a speech clipper for more effective modulation. We suggest that you write for an illustrated descriptive bulletin. The 30K and 310A come complete with tubes and interconnecting cable.

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Completed transmitter has sufficient power to provide reliable short-haul communications. Under good conditions DX is entirely possible.

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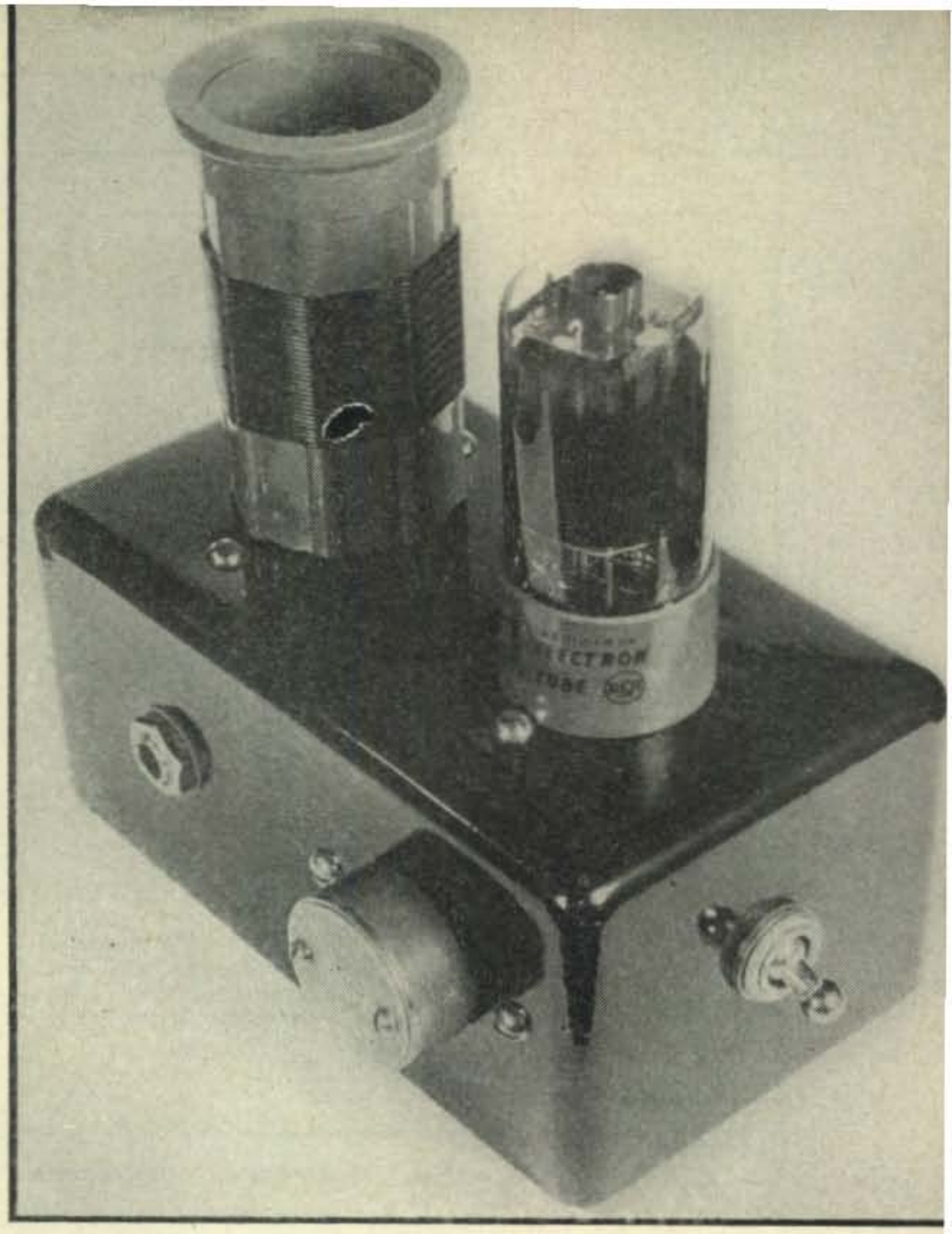


LLOYD V. BRODERSON, W6CLV*

Miniature OSCILLATOR-TRANSMITTER

A one tube a-c/d-c transmitter ideal for the new amateur

THIS TRANSMITTER is a practical 80-meter low-powered midget rig that will enable the newcomer to occupy his chosen frequency quickly and economically.

Neat and compact, the miniature five-watter may be duplicated in its entirety without access to machine shop or engineering laboratory. With a little judicious planning, its cost can be kept surprisingly low.

Circuit

Figure 1 is an elementary circuit employing a 117L7GT tube as a tetrode crystal oscillator and half-wave rectifier. Those components usually associated with higher powered oscillators have purposely been omitted.

Due to the relatively low voltage employed, the customary screen dropping resistor becomes unnecessary. *C3*, playing a dual role, effectively by-passes the screen grid to ground and adequately filters the a-c output. Antenna matching and loading is simplified by capacitive coupling.

The 117L7GT may be replaced by any of the "117" series, all of which have similar characteristics. Slight changes in socket wiring will be necessary, however, because the base connections of substitute tubes are not indentical.

Construction

The entire unit is mounted on a rectangular aluminum chassis measuring 2½" high by 5¼" long by 3" deep. These may be obtained at reasonable cost or may easily be duplicated from sheet aluminum. While other supporting materials are entirely satisfactory, small gauge aluminum lends itself admirably to work of this nature. Being inherently "soft" it may be drilled and filed easily. Aluminum also furnishes an excellent base for crackle-finish and fast drying enamels, or it may be buffed and polished.

The front panel supports the keying jack and crystal. Antenna feed-thru insulator and a-c rubber grommet are mounted on the rear panel,

*State Dept. of Agriculture, Sacramento, Calif.

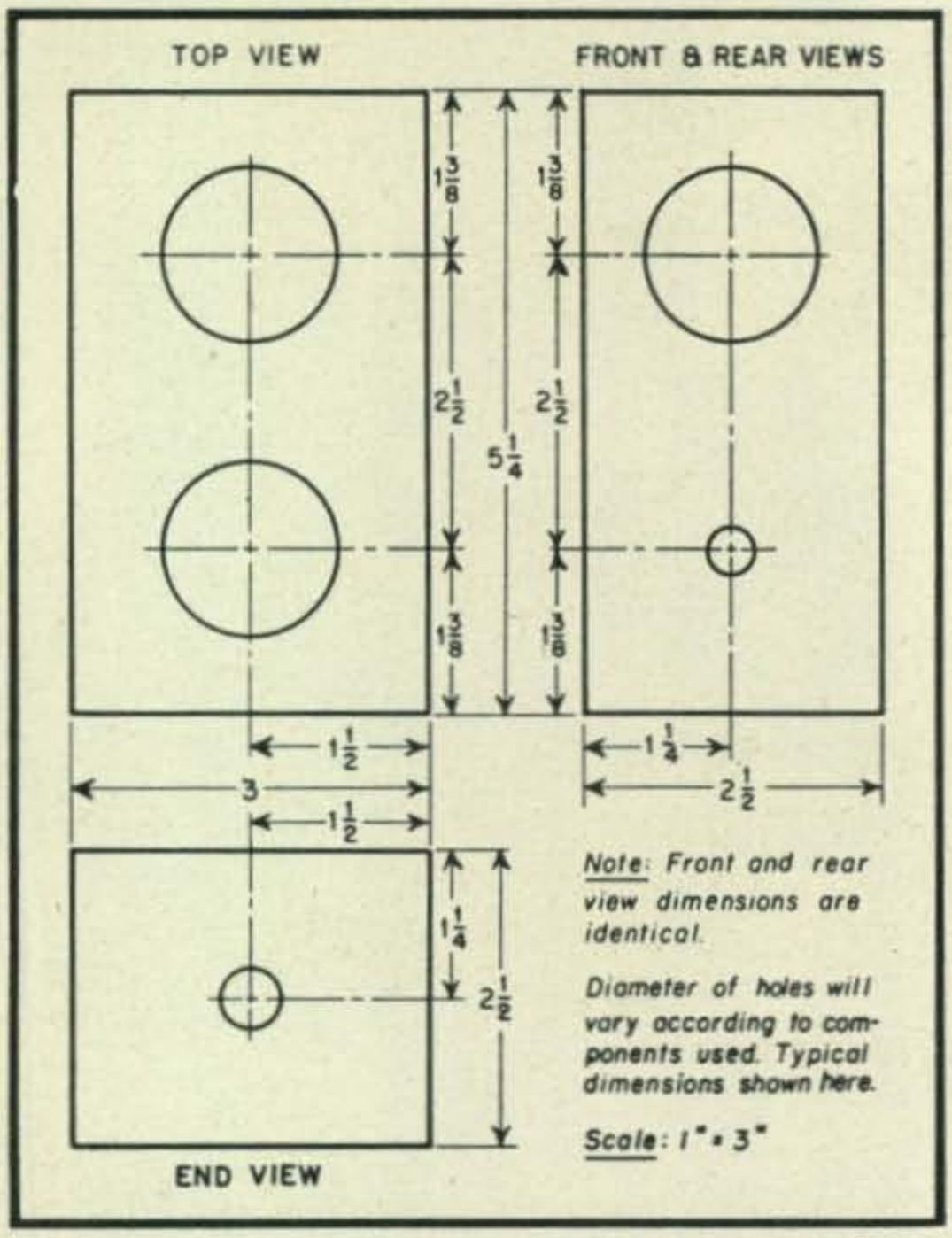


Fig. 2. Layout diagram for placement of components. Dimensions are not critical and serve only as a guide.

while the on-off toggle switch occupies the center position on the right end apron. Coil and tube mounted above deck for accessibility, complete the unit mechanically.

The layout diagram (*Fig. 2*) and under chassis view clearly show the placement of parts. All leads are run direct to their connecting points. While right-angle bends and cable lacing may present a pleasing appearance, short, direct connections are more practical when wiring a chassis of such small dimensions.

In keeping with the simplicity of the unit itself, a half-wave, end-fed (voltage-fed) antenna is capacitively coupled to the plate circuit. It is well to remember that the total length of a half wave end fed radiator is measured from its far end to the point of connection on the plate tank coil. Antennas of this type operate on a voltage node; therefore its point of entry into the radio room should be well insulated.

The antenna coupling condenser, *C2*, serves to isolate the high voltage from the antenna proper. Its capacity, while not too critical, should not be less than 100 $\mu\mu$f, and a breakdown voltage of 500 d.c. is well within the accepted safety limits.

Theory and Operation

Although not mandatory, a 0-50 ma milliammeter in series with the oscillator cathode lead to ground will aid materially in the tuning-up process. With the antenna connected and appropriate coil and crystal in place, *C1* is varied until the cathode current is approximately 45 ma. If the signal as checked on a monitor indicates excessive a-c ripple, *C1* should be varied for less capacity. When properly loaded, keying will be positive and the signal pure d.c. Depending on commercial line voltage and loading capabilities of the radiator, power input will normally run between 4.5 and 5.5. watts.

While a ground connection is automatically provided for because one side of the a-c or d-c line is already grounded, efficiency can sometimes be improved by connecting a direct ground to the transmitter. However, there are several factors to be considered before indiscriminately making this connection.

If an a-c line is used as a source of power, the grounded lead may be determined by connecting a 110-volt lamp in series with the transmitter negative lead and ground. If the lamp does *not* light, it is permissible to ground the transmitter. Should the lamp light, the a-c plug must first be reversed before making the ground connection. In either case, carefully note in which position the plug should always be inserted.

In some instances, when using d-c mains, it will be found that the positive side of the line is grounded. Should this be the case, it will be impossible to directly ground the transmitter and an r-f ground must be substituted. This may be a small mica capacity of approximately .002μf in series with the negative lead of the transmitter and ground.

Coil and Condenser Data

The 80-meter coil *L*, consists of 32 turns of No. 20 enameled copper, close-wound on a 1½" diameter form. The antenna coupling condenser tap is taken off six turns down from the plate end.

In order to conserve space, the plate tuning condenser, *C1*, is mounted within the tank coil, *L*.

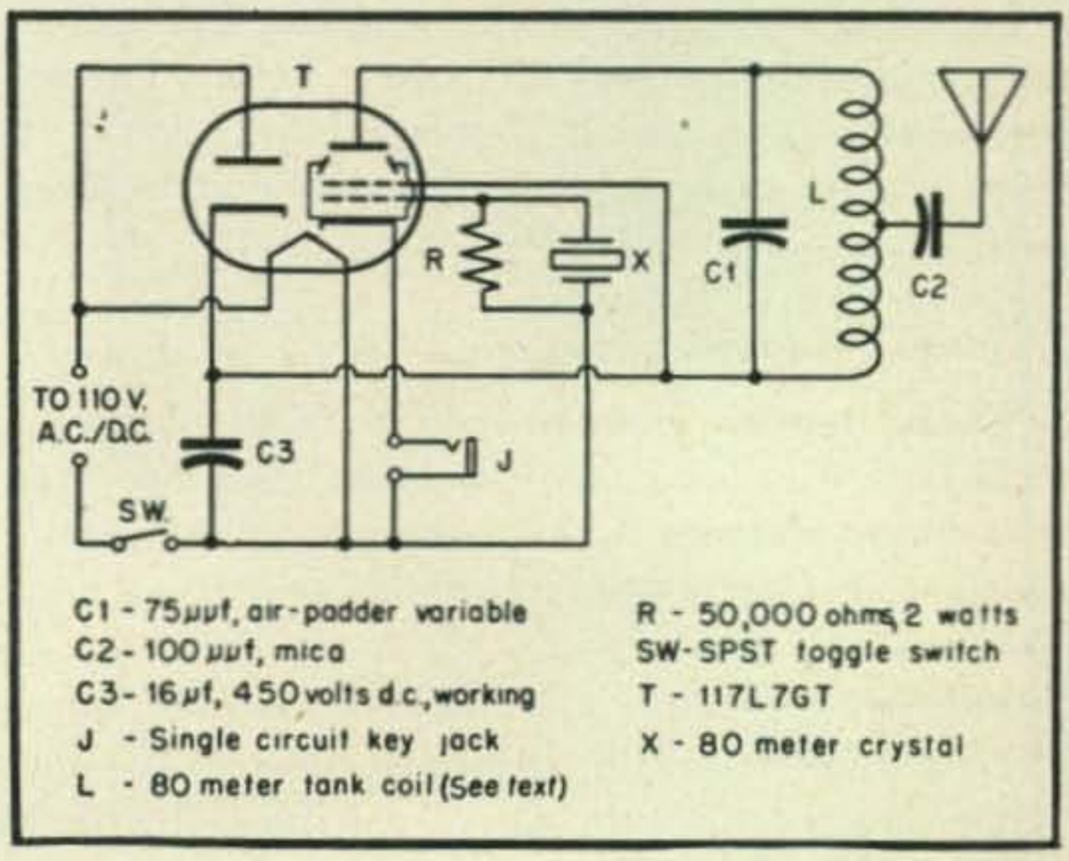
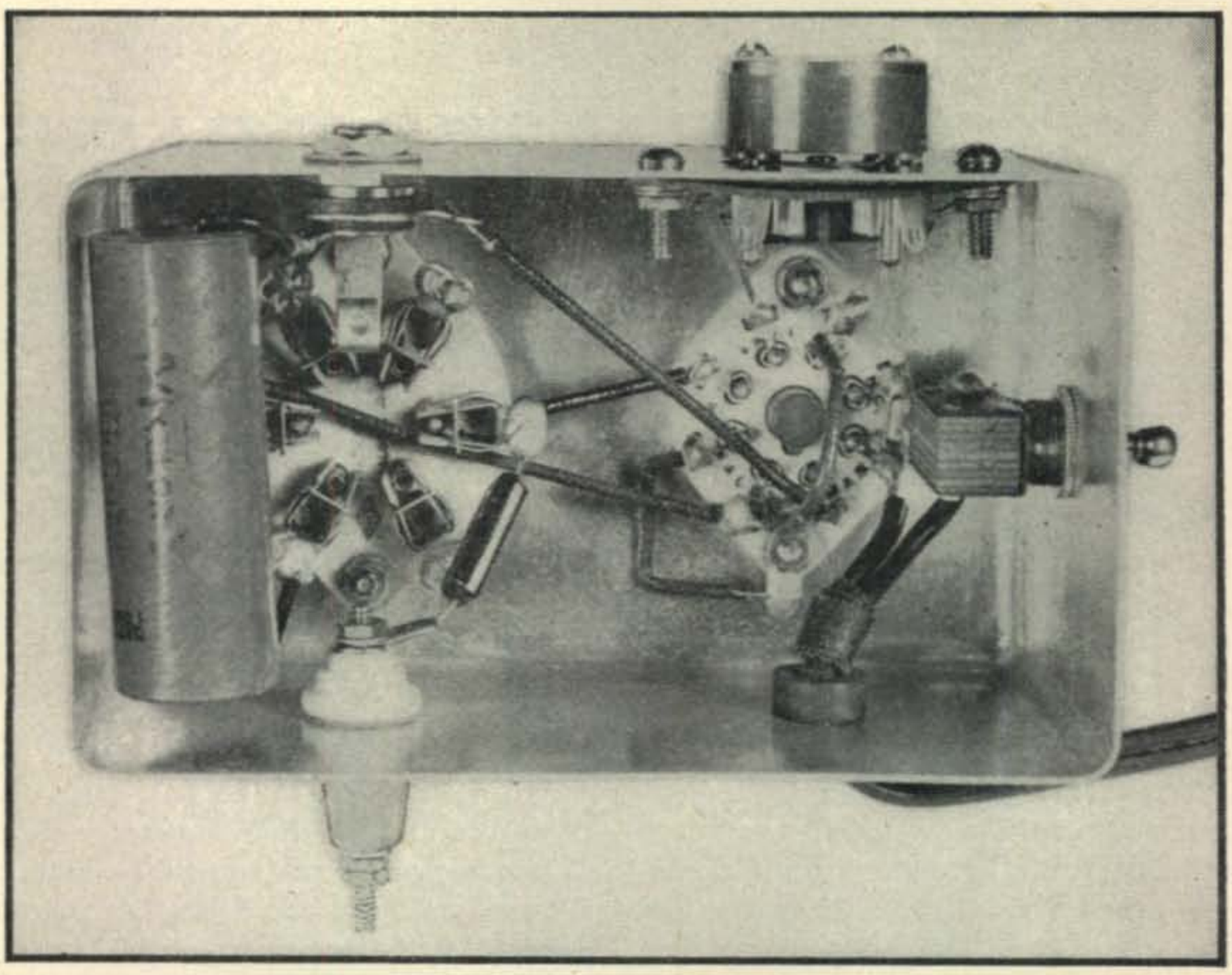


Fig. 1. Circuit diagram of one tube transmitter. 117L7GT serves dual function as crystal oscillator and half wave rectifier.



Under chassis view of transmitter. Individual parts may be readily identified from parts list in Fig. 1. Short, straight leads are desirable.

The condenser shown in the photograph is an APC-75 (air padder condenser, 75 $\mu\mu$f)capable of resonating L over the entire 3.5 mc band.

Although designed for 80-meter operation, other frequencies may be covered with appropriate L/C values obtainable from any handbook, and suitable crystals.

Five watts represents but a fraction of the maximum permissible amateur power input, but its capabilities are endless. Each contact, be it local or DX, assumes added importance.

A well designed, low-powered oscillator feeding an efficient antenna is quite capable of out-performing a poorly engineered transmitter of much higher power, coupled to an inefficient radiator.

Under favorable conditions, fractional power can be entirely readable over great distances, and, if operated with intelligence, will afford the user many pleasant contacts.

Additional miscellaneous parts required for the one tube transmitter are:

Octal socket (National XC-8).
Coil form with inner condenser shelf (Hammarlund SWF-6).
Coil form socket (National XC-6).
Crystal socket (To fit type crystal available).
Midget feed thru insulator (Johnson 40).
Crystal for desired frequency and band.
A-C line cord and plug.
Spaghetti tubing.
Miscellaneous 6-32 hardware.
Rubber grommet for line cord.
(Equivalent parts may be substituted).

SOLAR STATIC POLARIZATION

Scientists throughout the world are investigating the characteristics of the solar radio frequency hiss or static. The hiss, which sounds like a greatly intensified version of the thermal background noise of a good communications receiver, was discovered during severe ionosphere storms of the radio signal fadeout type. The great sunspot group of July 26, 1946 produced several occasions when the hiss could be heard with great intensity on the frequencies above 50.0 mc. During these daylight bursts the hiss was recorded on a frequency of 200.0 mc at Canberra, Australia by the Commonwealth Observatory. D. F. Martyn has reported in a recent issue of *Nature* that the hiss is a definitely polarized wave front. The accompanying illustration depicts the arbitrary signal intensity on a special v-h-f receiver using a rotatable Yagi beam antenna. It will be seen in the graph that when the

[Continued on page 61]

R-C SUPERHETERODYNE

for 1 1/4 and 2 Meters

FRANK C. JONES, W6AJF*

Ease of construction, alignment and tuning, at low cost, makes the r-c superhet a good bet after many years of proven use

THE R-C (RESISTANCE-COUPLED) superheterodyne receiver in various forms has been used since the early days of five-meter band operation more than ten years ago. The writer designed a simple autodyne converter, peaked r-c amplifier and second detector receiver for that purpose to use in place of super-regenerative receivers. This type of receiver caused much less radiation interference and was often more sensitive than the super-regenerative sets.

The 1-¼ to 2-meter (250 to 130 mc) receiver shown in the circuit diagram and photographs has been in service for several years with various circuit modifications built into it from time to time. The present system has a modified cathode-follower oscillator-detector, several stages of peaked r-c circuits and a balanced r-c discriminator for FM reception The latter becomes an ordinary AM detector by switching off one diode detector. The selectivity is much better than with a super-regenerative detector and it performs in a manner similar to any standard superheterodyne receiver except that no attempt has been made to eliminate the image signal. In other words, there are two spots on the dial about one degree apart which produce reception on any one signal. This occurs because the i-f amplifier is operating below 100 kc. The r-c values between each 6SK7 tube are set up to peak the amplifier at any desired spot between 30 kc and 100 kc. The value used in this set at present is 40 kc, which gives better selectivity than a higher i-f value but rather poor reception quality of modulated oscillators or transceivers in the 2-meter band due to the better

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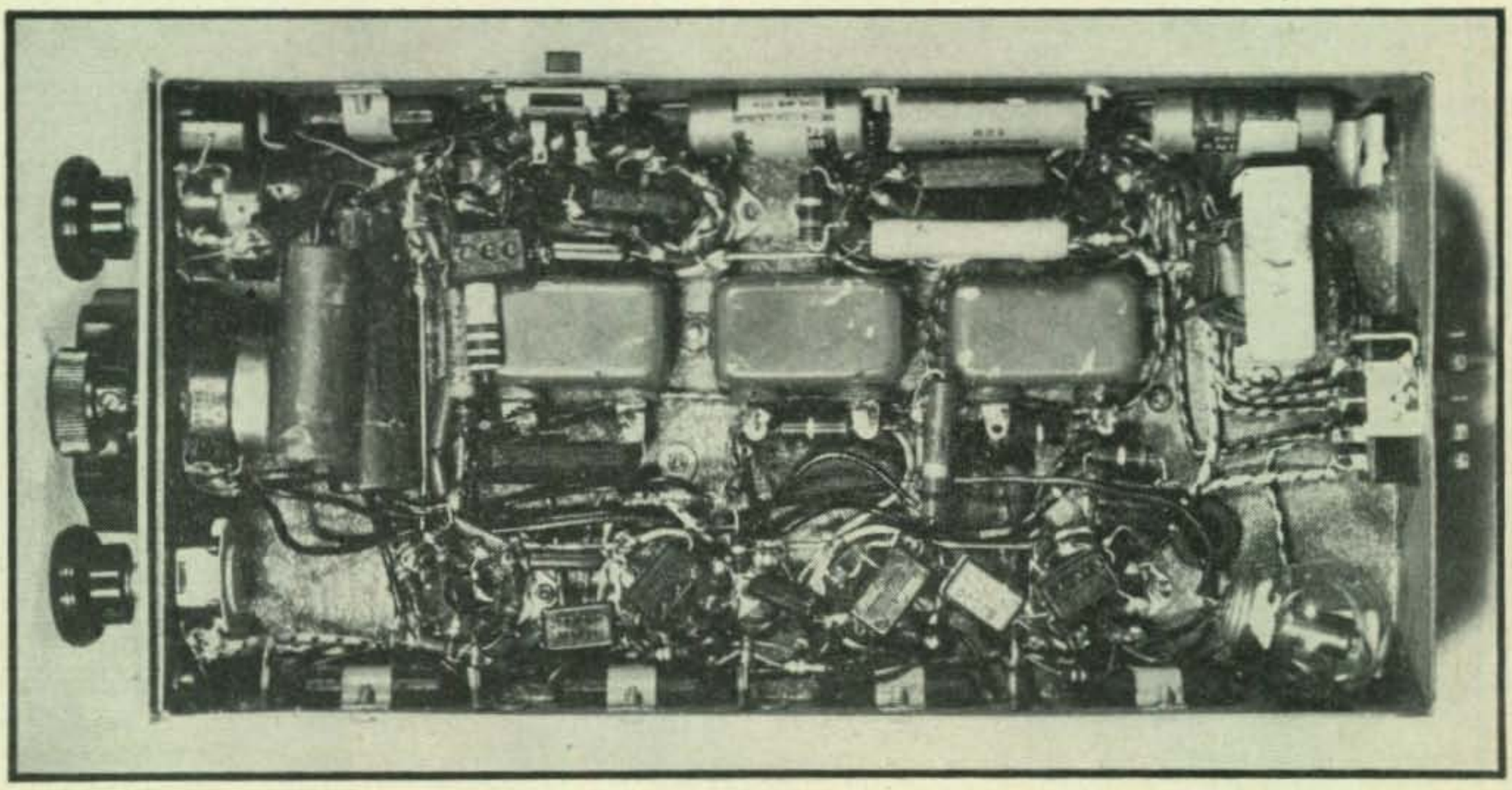
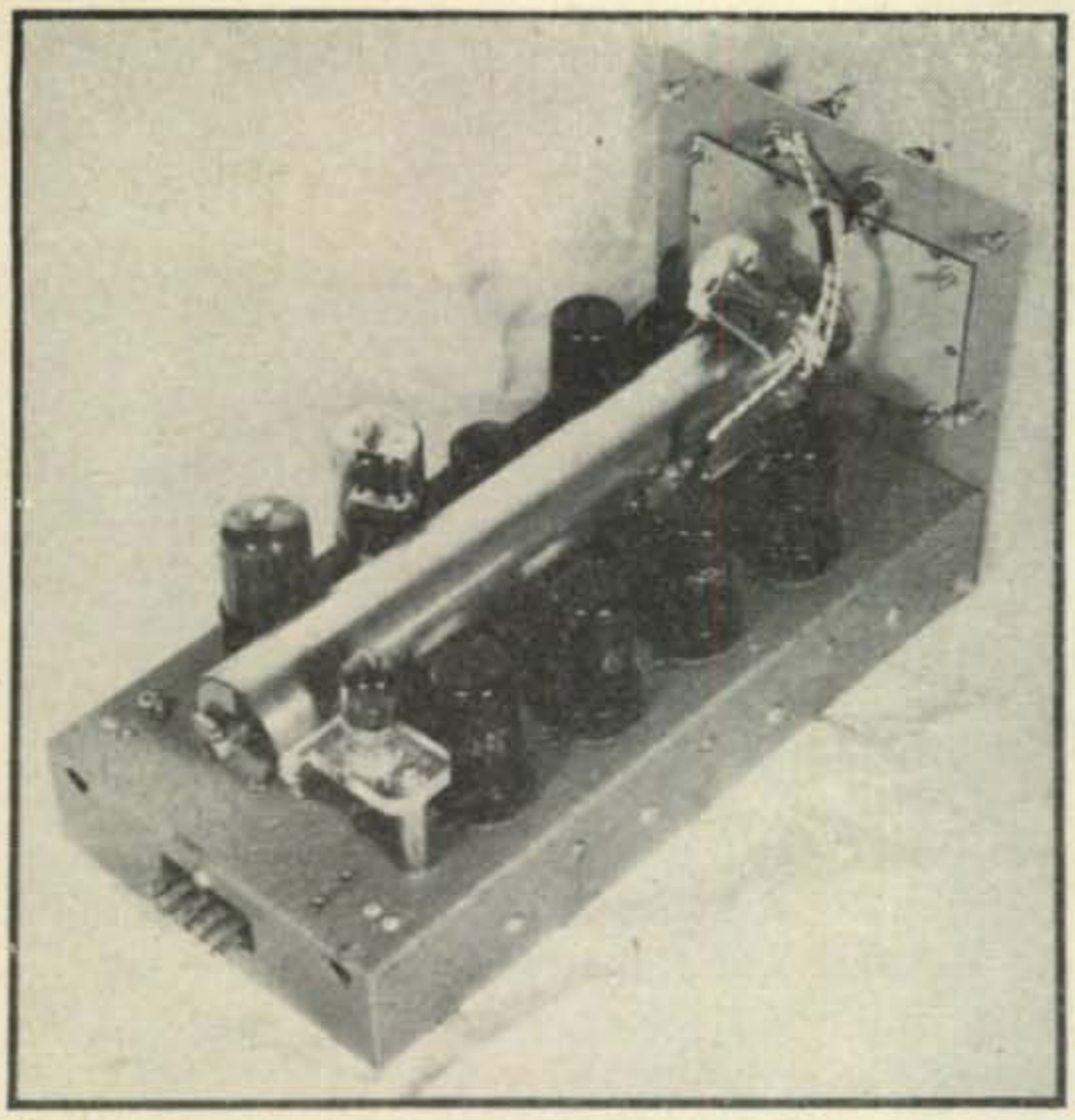


Bottom view of receiver. Placement of components is not critical.



The copper tubing coaxial line occupies the center of the receiver chassis. The oscillator-detector is mounted on the polystyrene shelf on the rear of the chassis.

selectivity characteristic. The first detector is of the autodyne type which oscillates weakly, thus becoming a very sensitive detector of v-h-f signals.

Autodyne Detector

The autodyne detector may be of any type which will oscillate at the signal frequency. Actually this tube is tuned to oscillate either 40 kc above or below the signal frequency. For example a 2-meter signal might be at 146 mc or 146,000 kc. The first detector oscillates at 146,040 or 145,960 kc, which are so close to the signal frequency that nearly full advantage of the regeneration is present if the tube is oscillating weakly.

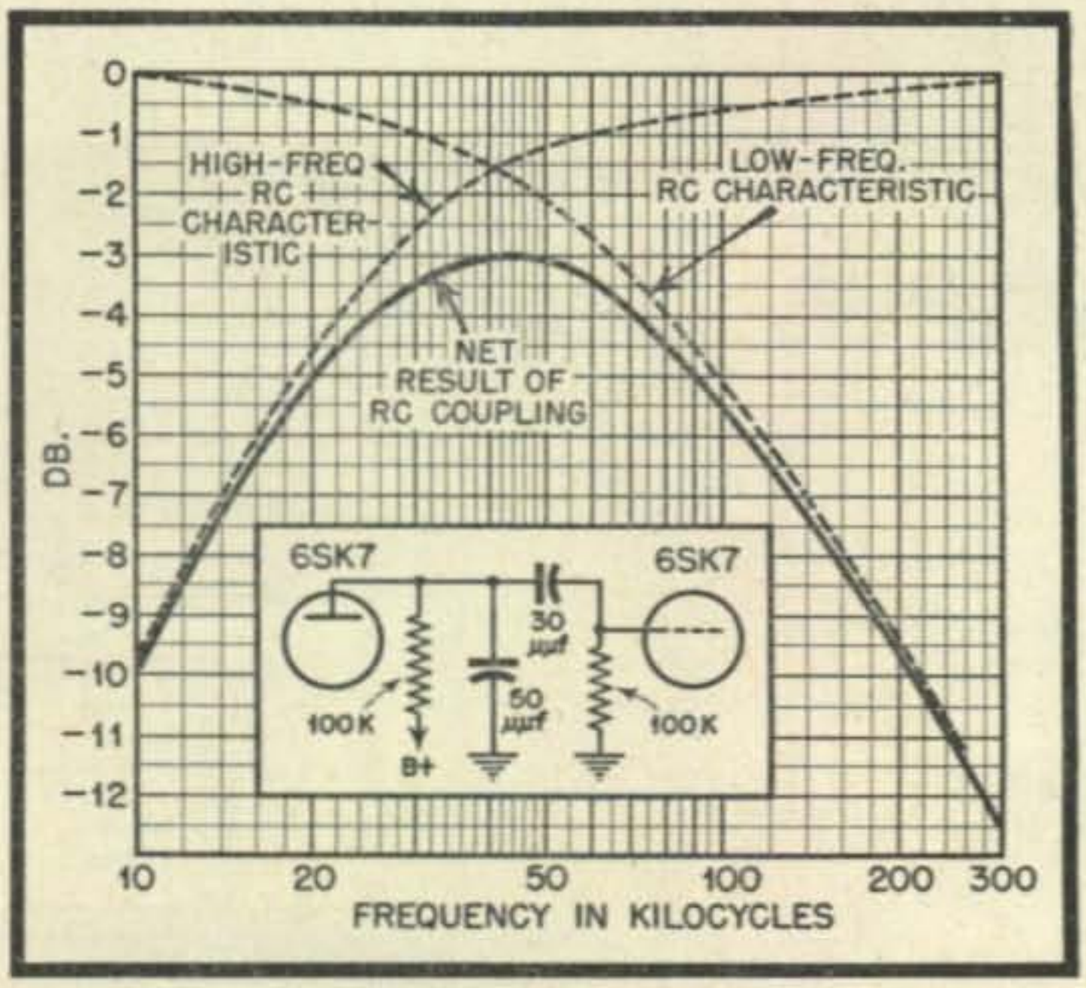
The 9002, a 6C4, or a 955 triode may be used to good advantage as the autodyne detector in a cathode-follower oscillator. The latter has an r-f impedance consisting of a 2,500 ohm cathode resistor in series to ground, with a tuned circuit connected from grid to ground. The plate is by-passed for r.f. to ground so the tube acts as a cathode-follower oscillator. The 40-kc heterodyned signal in the plate circuit is coupled by an r-c network into a multistage r-c amplifier. The 9002 acts as a grid-leak detector or mixer as well as an oscillator.

The capacity-shortened half-wave concentric line circuit in the grid of the 9002 tube has a high Q and is not difficult to construct. A piece of 1½-inch diameter copper tubing 9 inches long serves as the outer-grounded conductor of the concentric line. A similar length of $^5/_{16}$" o.d., ¼" i.d. tubing becomes the grid line. It is held in the center of the big tube by two polystyrene "washers" about ¾" thick. A piece of ¼" diameter brass rod extends through the smaller tube and becomes a tuning control shaft. One end is coupled to the dial through a ceramic shaft coupler and the other end has a semi-circular one-plate rotor on it. The stator consists of one plate over half of the end of the large tube with about $^1/_{20}$" air gap between the rotor and stator plates. Connection to the 9002 grid has to be made to the $^5/_{16}$ inch tube just in back of the rotor plate. If the usual grid coupling condenser of 50 $\mu\mu$f is left out as in this set, the antenna "hair-pin" loop should have its center tap grounded or a pair of small resistors connected to ground to prevent a-c hum from modulating the desired signals.

A band-setting condenser of 5 or 6 $\mu\mu$f minimum to 75 or 100 maximum is connected across the other end of the half-wave circuit. The 1¼-meter band is near minimum capacity setting and the 2-meter near $^2/_3$ of maximum with this condenser. This method of band-setting has the advantage of not reducing the tuning condenser frequency range nearly as much as in a quarter-wave line in which both condensers are at one end. Apparently, single section condensers function satisfactorily in this circuit as no trouble has been in evidence from "ground contact" noises in the rotor shaft bearings. In some types of oscillators, a split-stator condenser must be used with the rotor floating and one stator grounded to avoid introducing extreme noise into the oscillator-detector when varying the tuning control.

I-F Amplifier

The intermediate-frequency amplifier was



Attenuation versus frequency characteristic of i-f coupling network.

peaked at various values, from 30 kc to 150 kc, in different r-c superheterodyne receivers. It is possible to obtain enough gain with two r-c amplifier tubes but usually 4 or 5 stages are desirable in order to obtain better selectivity in the receiver. FM reception requires high i-f gain so as to make the last stage or two act as effective limiters in order to wipe out AM signals and auto-ignition noise. When receiving AM signals, the i-f gain is reduced by a manually controlled potentiometer in the cathode circuit of the third and fourth i-f amplifiers to prevent limiting (overloading) in the last i-f stage.

The r-c stages were designed by choosing the grid coupling capacity so it begins to attenuate frequencies below 60 or 70 kc and is down about 3 db (70.7%) at about 25 kc in each stage. The plate and grid resistors are effectively in series with a generator in making this calculation. The total circuit and tube capacity is in shunt with the grid resistor, etc., for high frequencies, so a value was chosen to produce 3 db attentuation at about 65 or 70 kc in each stage. These two characteristics produce a cross-over at about 40 kc with a net loss of about 3 db at 40 kc and relatively good attenuation on the side. The total shunt capacity needed in this case was about 70 $\mu\mu$f. This was obtained by shunting a 50 $\mu\mu$f mica condenser across the tube capacities at the plate of each 6SK7 i-f tube. The same design procedure was used in the triode first detector, but due to the lower plate resistor and tube plate resistance, a larger shunt condenser was needed to peak that stage at 40 kc.

The Discriminator

The FM discriminator has a unique balanced r-c circuit with two opposing diode rectifiers. This circuit is balanced to give zero d-c or a-c voltage output at the i.f. of 40 kc. The FM signal swings several kc each side of this center and one diode output increases as the other decreases whenever the carrier signal differs from its center point of 40 kc. The discriminator characteristic can easily be made linear over 25 to 50 kc, and by using a higher i.f., over about 200 kc bandwidth. The r-c circuit consists of a high-pass and a low-pass section with the center-point at the center of the i-f channel. The two r-c slope filters coupling the last 6SK7 amplifier or limiter to the two reverse connected diodes add differentially and the linearity is not affected until the frequency becomes so high that the shunt tube capacities begin to affect it. Better discriminator linearity can be obtained by connecting this r-c circuit to the output of a cathode follower tube instead of directly to the plate circuit of the limiter. One of the 130 $\mu\mu$f condensers or one of the 30,000-ohm resistors in this 4-element r-c circuit can be made semi-variable in order to align the system to 40 kc. The other condensers and resistors in the diodes are not critical in value.

The receiver needs no alignment if the condens-

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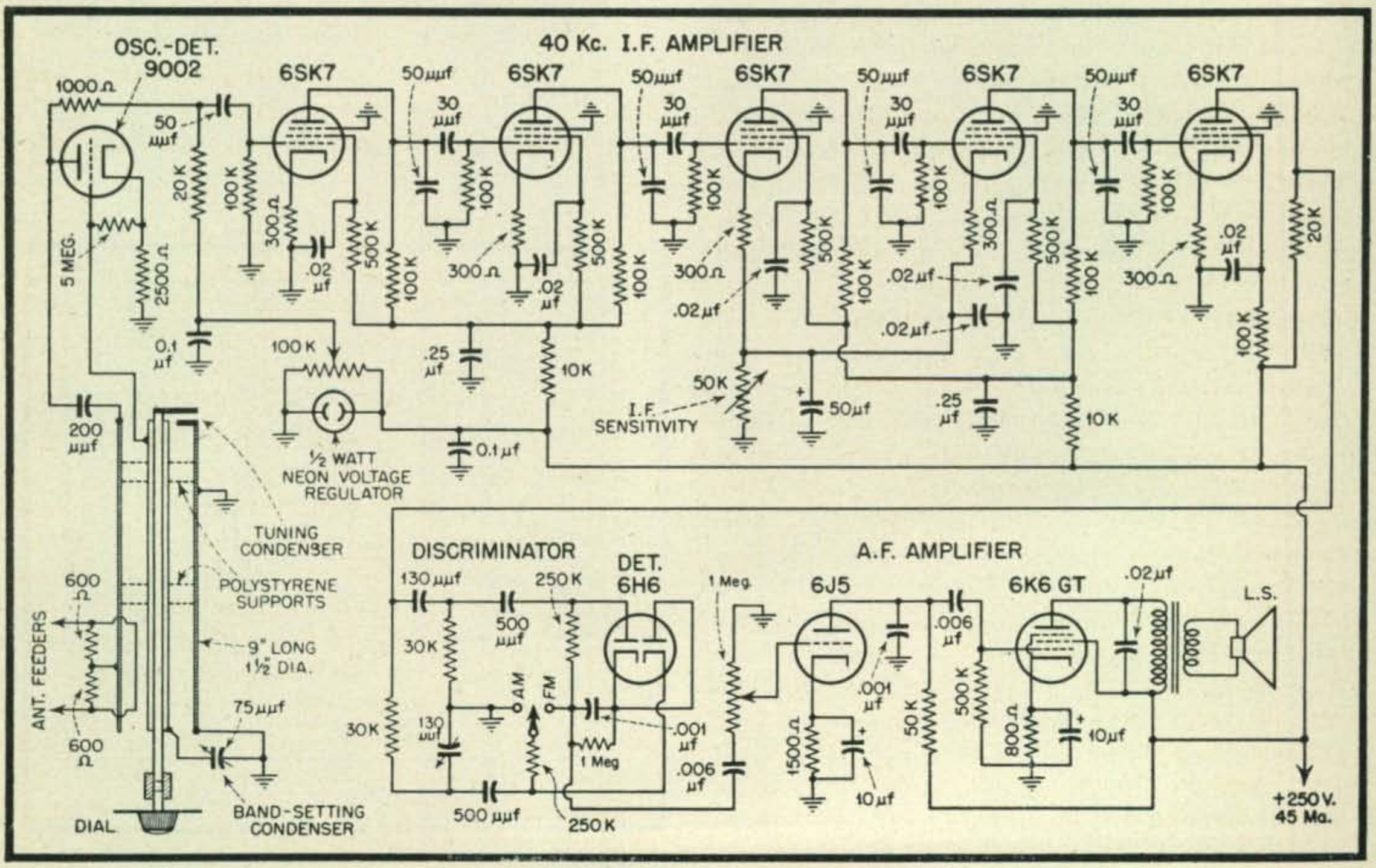

Circuit diagram of r-c superhet.

A C-W Man's Kilowatt

The complete station at W6EAK showing the kilowatt amplifier at the left-hand side. The bottom panel is the power supply. Next above is the driver with an HK-54. The top panel the pair of 250THs in push-pull.

COURTNEY MATTHEWS, W6EAK*

Built by and for the DXing c-w man, this conservative kilowatt provides reliability and ease of operation. With a pair of 250THs barely blushing in the final, you are assured of a fighting chance on the low end of 20.

IF A THOUSAND DIFFERENT amateurs were given pencil and paper and told to write specifications for their *ideal* transmitter it is quite probable that nine hundred and ninety-nine different designs would be forthcoming†. We realize, therefore, that this transmitter to be described will not represent the ideal to many prospective constructors. However, it is our personal approach to a very involved subject and is presented with the thought in mind that others may benefit from our conservative practical approach.

Undoubtedly, the first decision to be made in designing any transmitter is the amount of power to be used in the output stage. Considering the present availability of transmitting components at reasonable costs there is little reason for a DX man redesigning at anything less than the legal limit—one kilowatt. A critical survey of the sources of supply generally open to amateurs on both the East and West coasts disclosed several tube types that will handle a kilowatt input with comparative ease. However, our own past experience had convinced us that the *low C* tantalum element triodes produce excellent results from a standpoint of reliability, as well as ease of handling. Our final choice of a pair of 250THs will call for some raised eyebrows among the proponents of the newer high power pentodes and tetrodes. But, this is not as scandalous as it may first appear for we just naturally prefer triodes and have a good idea of how to handle the critters.

Final Amplifier

Since the overall design features of the transmitter will be dictated mainly by the final amplifier, it will be described first. The 250THs are used in a conventional push-pull arrangement with no startling unorthodox departures in circuit design. The schematic of the final amplifier appears in *Fig. 1*. To reduce the hazard of flashover, the high voltage is fed directly to the rotor of the plate tank tuning condenser and to the center tap of the tank coil. With this arrangement only the r-f voltage appears across the condenser since there will be little difference between the d-c potentials on the rotor and stators.

Fig. 2 and *Fig. 3* perform the duty of the immortal ten thousand words by picturing the general layout of the high power components. The plate tank condenser is mounted in an inverted position and in the interest of push-pull symmetry, is lined up parallel to the front panel. This necessitates a right-angled offset drive from the

†One wise guy decided to buy his transmitter.

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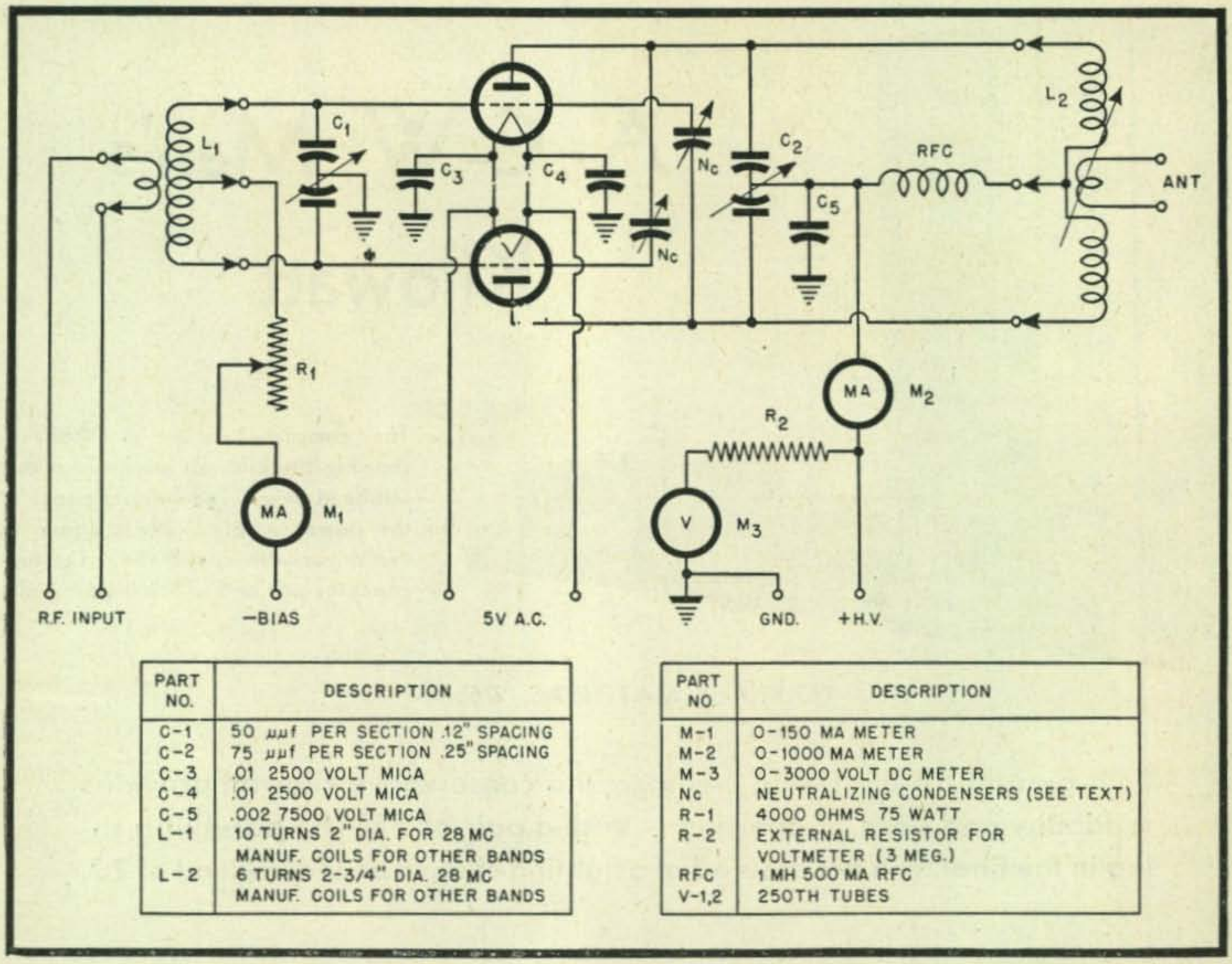


PART NO.	DESCRIPTION
C-1	50 μμf PER SECTION .12" SPACING
C-2	75 μμf PER SECTION .25" SPACING
C-3	.01 2500 VOLT MICA
C-4	.01 2500 VOLT MICA
C-5	.002 7500 VOLT MICA
L-1	10 TURNS 2" DIA. FOR 28 MC MANUF. COILS FOR OTHER BANDS
L-2	6 TURNS 2-3/4" DIA. 28 MC MANUF. COILS FOR OTHER BANDS

PART NO.	DESCRIPTION
M-1	0-150 MA METER
M-2	0-1000 MA METER
M-3	0-3000 VOLT DC METER
Nc	NEUTRALIZING CONDENSERS (SEE TEXT)
R-1	4000 OHMS 75 WATT
R-2	EXTERNAL RESISTOR FOR VOLTMETER (3 MEG.)
RFC	1 MH 500 MA RFC
V-1,2	250TH TUBES

Fig. 1. Circuit diagram of the c-w man's kilowatt using a pair of 250THs in the final amplifier.

front panel. This drive assembly is visible on the extreme right end of the condenser and consists of a pair of one-to-one bevel gears and a universal shaft. These were acquired at a war surplus sale for 25 cents and were originally intended to turn some inaccessible gadget on an airplane. The tank coil and swinging coupling link assembly are mounted directly on the frame of the condenser and so positioned that the ends of the coil are directly opposite the tube plate connections. The actual base of the 250THs is two inches below the chassis level, thereby greatly reducing the length of the plate leads. One of the neutralizing condensers can be seen just behind the flexible shaft amplifier chassis in *Fig. 2*. These are homemade from sheet aluminum and the top plate of each neutralizing condenser is bolted directly to the associated stator section of the plate tank tuning condenser. The lower plates of the neutralizing condensers are mounted on 2" standoff insulators and can be rotated for adjustment. The plate r-f choke is not visible in *Fig. 2*, but is located on a standoff insulator directly between the two tubes.

Symmetry is preserved as much as possible below the chassis, as can be seen in *Fig. 3*. The .01 μf 2500 volt filament by-pass condensers are mounted alongside of the 250TH sockets. The 10 meter grid coil is in place. A 90-degree offset flexible drive is used to tune the grid condenser. The wiring is mostly 15,000-volt automobile ignition wire while #6 copper buss is used in the filament leads of the 250THs.

Driver Stage

The push-pull 250THs require more drive than some of the newer tetrodes. This did not prove to be an exceptional problem as it is possible to operate our driver from the same power supply as the final amplifier. The HK-54 was finally chosen, although the 35-TG will perform equally as well. Either of these only require 10 to 12 watts from the exciter and once neutralized need no further adjustment when changing bands.

The wiring schematic of the driver stage is in *Fig. 4*. The circuit is conventional and the stage is complete with a separate bias supply mounted on this chassis. The topside layout can be seen in *Fig. 5*. The filament transformer in the lower righthand corner also supplies the filaments of the

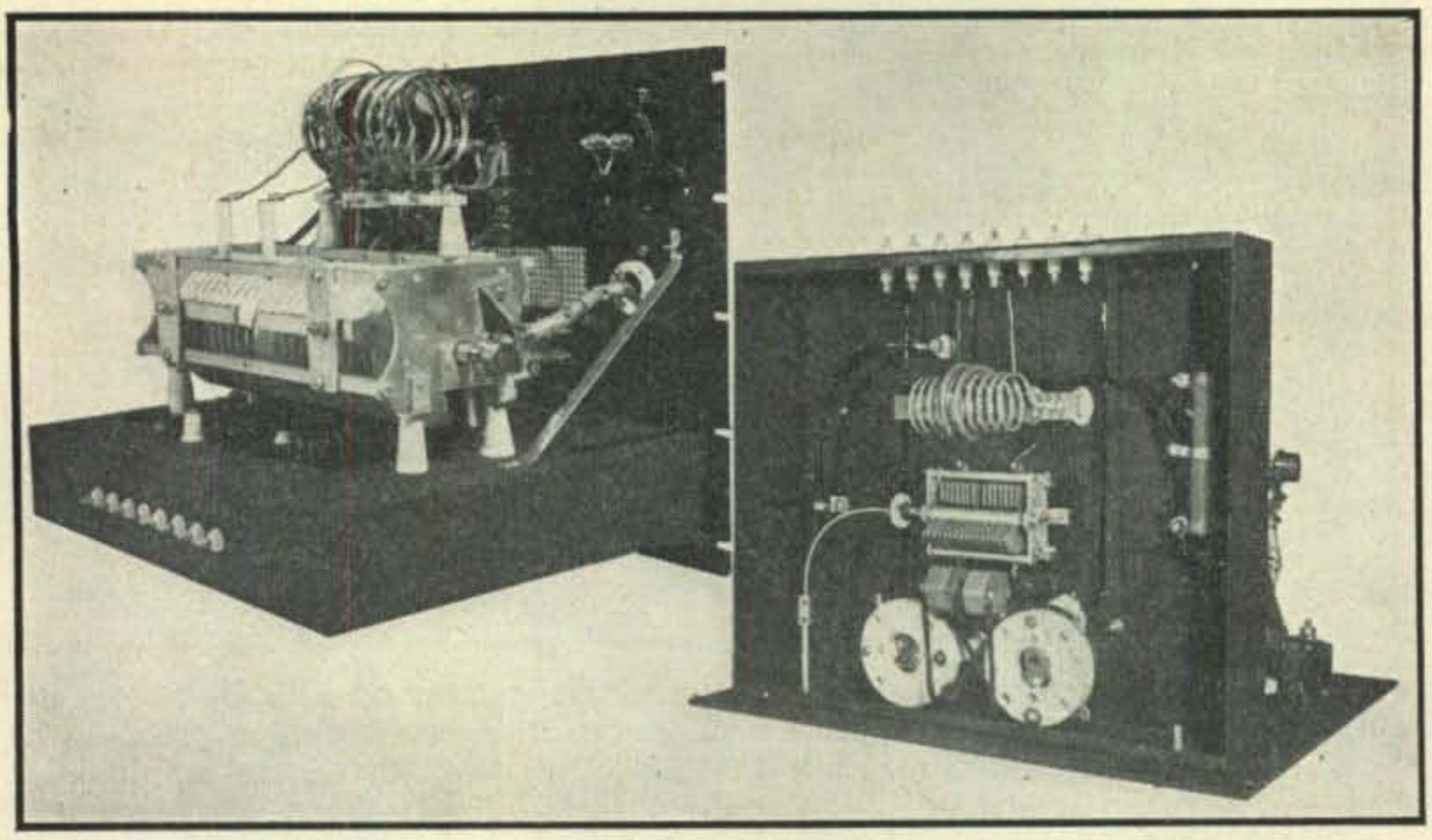
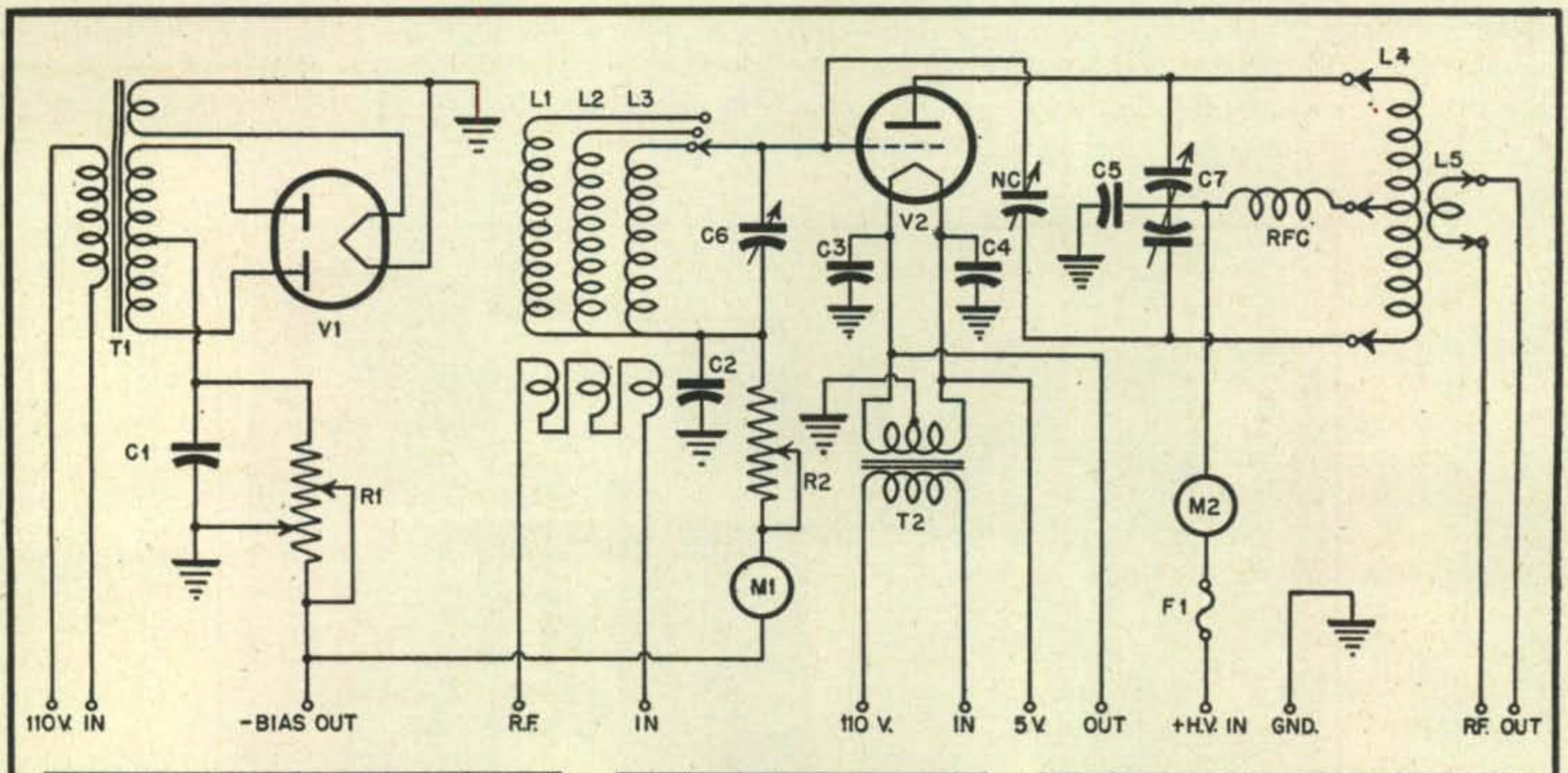


Fig. 2 (left). Clean cut and straightforward are the by-words in this symmetrical lay-out for a conservative kilowatt. The universal drive and the one-to-one bevel drive control the plate tank condenser from the front panel. Fig. 3 (right). Bottom view showing mounting of the 250TH sockets below chassis level. The adjustable grid resistor is mounted on the right hand chassis wall. The 10 meter grid coil is in use.

250THs in the final amplifier. The 5Z3 rectifier and bias power transformer are in the lower left-hand corner. Since the major portion of the weight of the chassis is on the side containing the two transformers, a metal strap runs from the rear of the chassis to the top of the panel to give extra support. The plate tuning condenser, the r-f choke and the plug-in coil are mounted on the opposite corner of this chassis. The neutralizing condenser for the HK-54 is directly below the 10 meter coil in *Fig. 5*. It is also homemade and consists of two pieces of sheet aluminum 1½" x 1" mounted on small pillar standoff insulators. The length of the insulators is such that the



PART NO.	DESCRIPTION
C1	8 µf, 800 V.D.C. WORKING
C2,C3,C4	.01 µf, 2500 V. MICA
C5	.002 µf, 5000 V. MICA
C6	150 µµf, .071" SPACING
C7	100 µµf PER SECTION, .171" SPACING
F1	.25 A. LITTELFUSE
L1	7 MC 22 TURNS 1-1/2" DIA.
L2	14 MC 13 " " "

PART NO.	DESCRIPTION
L3	28 MC 7 TURNS 1-1/2" DIA.
L4	7 MC 22 TURNS 3" DIA.
	14 MC 16 TURNS 2-1/2" DIA.
	28 MC 10 TURNS 2" DIA.
L5	7-14 MC 2 TURNS
	28 MC 1 TURN
M1	0-100 D.C. MA
M2	0-200 D.C. MA

PART NO.	DESCRIPTION
NC	NEUTRALIZING COND. (SEE TEXT)
R1	25,000 OHMS, 100 WATT
R2	3000 OHMS, 20 WATT
RFC	2.5 MICROHENRY, 200 MA
T1	1000 V.C.T., 150 MA, 5V., 3A.
T2	5V., 26A.
V1	83 OR 5Z3
V2	HK54

Fig. 4. Wiring schematic of the HK-54 driver stage for the c-w kilowatt. The separate bias supply is mounted on the driver chassis. Filament transformer T-2 also feeds the filaments of the 250THs.

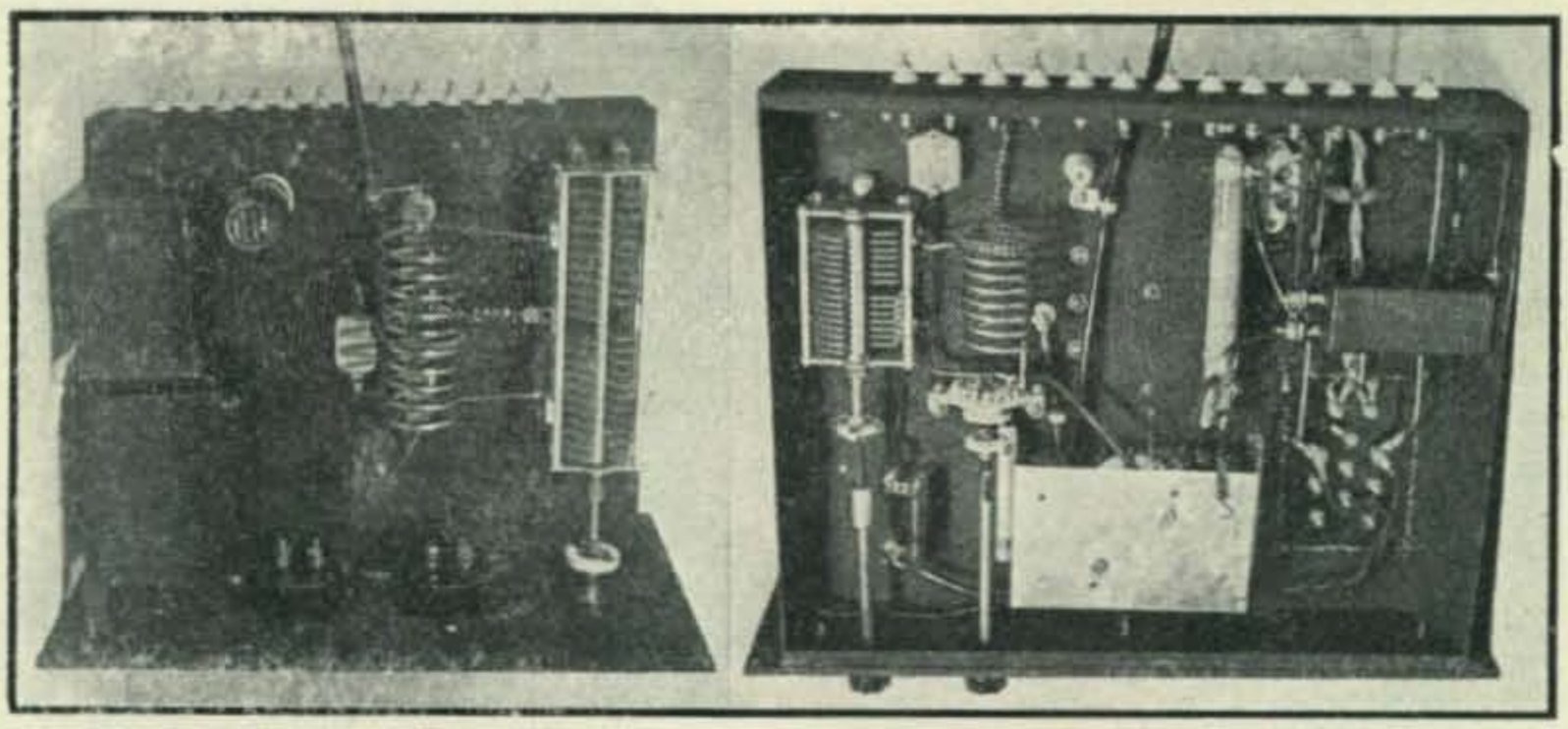


Fig. 5 (left). Layout of the driver stage. The meters read the driver plate current and the driver grid current. Fig. 6 (right). Layout of the driver stage using an HK-54. The black cable leading off to the left is the co-ax coupling to the final amplifier.

plates are spaced by approximately three-eighths of an inch. The black lead to the left is the 52 ohm co-ax (RG8U) cable feeding the driver stage to the final amplifier.

The arrangement under the driver chassis is pictured in *Fig. 6*. A large *U* shaped aluminum bracket at the left center serves as a solid support for the HK-54 tube socket and the associated filament by-pass condensers which are not visible. At the top of *Fig. 6* are the parts comprising the driver grid circuit. These include the tuning condenser, bandswitch, coil (only 10 meter one mounted), coupling link from exciter and by-pass condenser. Due to the practicability of using an 803, 813, 203A, 35T or 35TG as a driver we allowed considerable latitude in space for mechanical changes and for variations in the grid current bleeder. The unorthodox bleeder connections for the bias supply (*Fig. 4*) permit the current carrying capacity of the portion in use for grid current to be doubled. The preferred arrangement would probably be separate heavy duty bleeder resistors.

Power Supply

The power supply requirements of the transmitter are fairly simple since both driver and final amplifier stages operate at the same plate voltage and there is no necessity of separate screen supplies. In actual operation a power supply delivering approximately 2150 volts under load at about 500 mils was employed. As shown in the power supply schematic *Fig. 7*, a bridge

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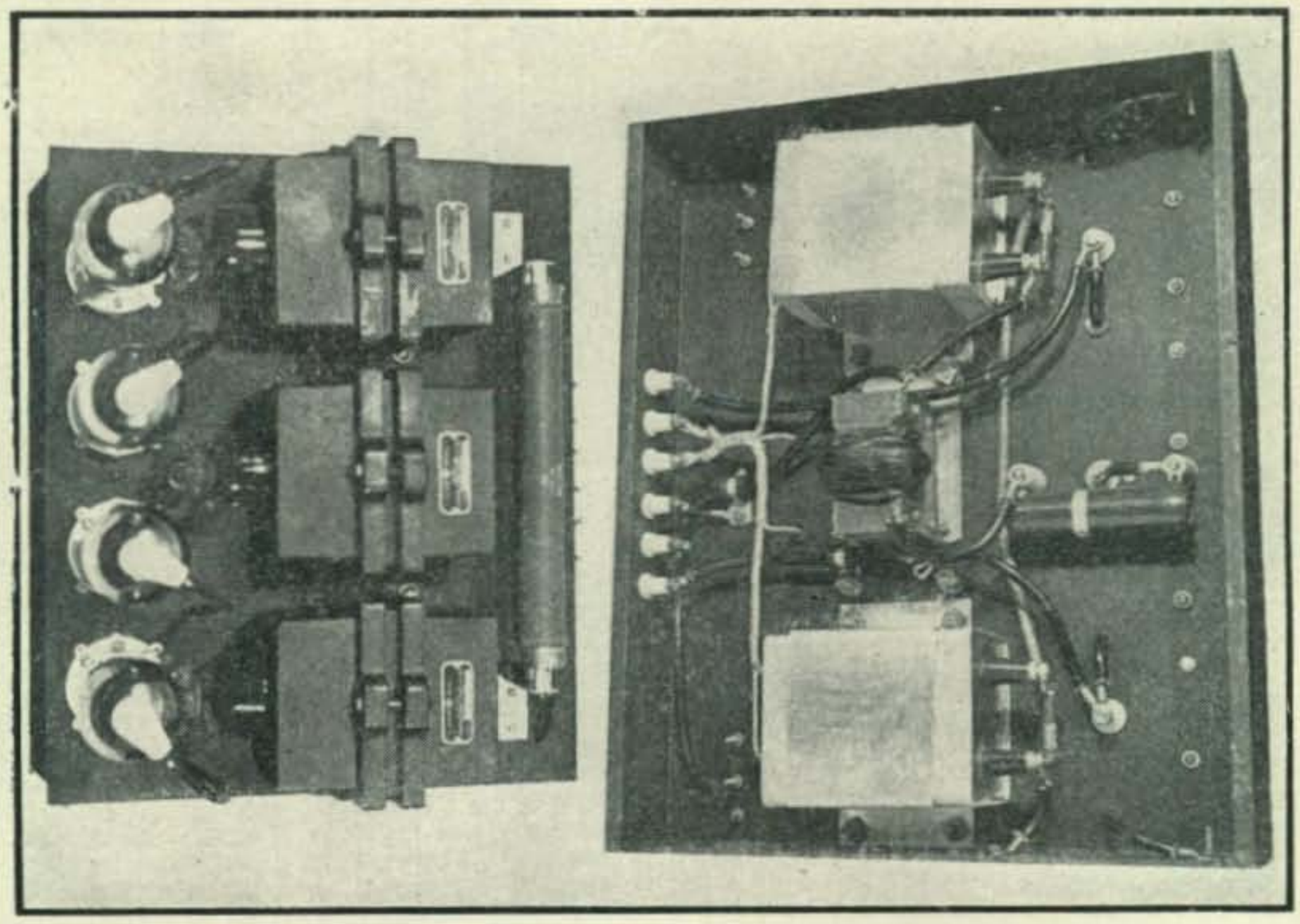


Fig. 8 (left). Topside of bridge type rectifier for the kilowatt amplifier. The filament transformers are in the center with the bleeder resistors in the rear. Fig. 9 (right). The underside of the power supply chassis. The two 8 mfd oil filled filtering condensers are mounted with large aluminum *U* shaped brackets.

SPORADIC E

A Problem for Amateur Research

The question of short-skip on the v-h-f bands should be a problem of interest to many amateurs. How is Sporadic E formed and what can be done to solve this riddle? A possible experimental program is shown which will indirectly aid other sciences, including meteorology and astronomical physics.

OLIVER P. FERRELL*

THE REALM OF AMATEUR activity is now under the abnormal stimulus of the post-war era. Scarcely a week goes by without mention of one field of radio technology or another, wherein amateur radio has made some notable contribution. However, much of this work has dealt principally with the broader aspects of these random subjects. But, today the calibre of the radio amateur is the highest in its entire history. Because of this fact, many amateurs will attempt to use their hobby as an experimental platform upon which they will be able to construct and test "pet" ideas gleaned from the erratic research period of World War II.

Along with these amateurs seeking to improve receivers and transmitters will be many who have had an opportunity to see at first hand the flimsy status of our working knowledge of the ionosphere. It is to the betterment of the hobby and to radio communication that these amateurs align themselves with an experimental program which, through the reporting of v-h-f short-skip contacts to responsible investigators, will enable a careful study of the cumulative effects of sporadic E (E_s). Because the frequencies above 30.0 mc are almost entirely utilized for ground-wave services the effects of E_s are most easily recognized. Of particular importance is the assignment of the new 50-54 mc band. Thorough examination of the recorded number of DX contacts via E_s should provide a picture of the number of

* *Propagation Editor*

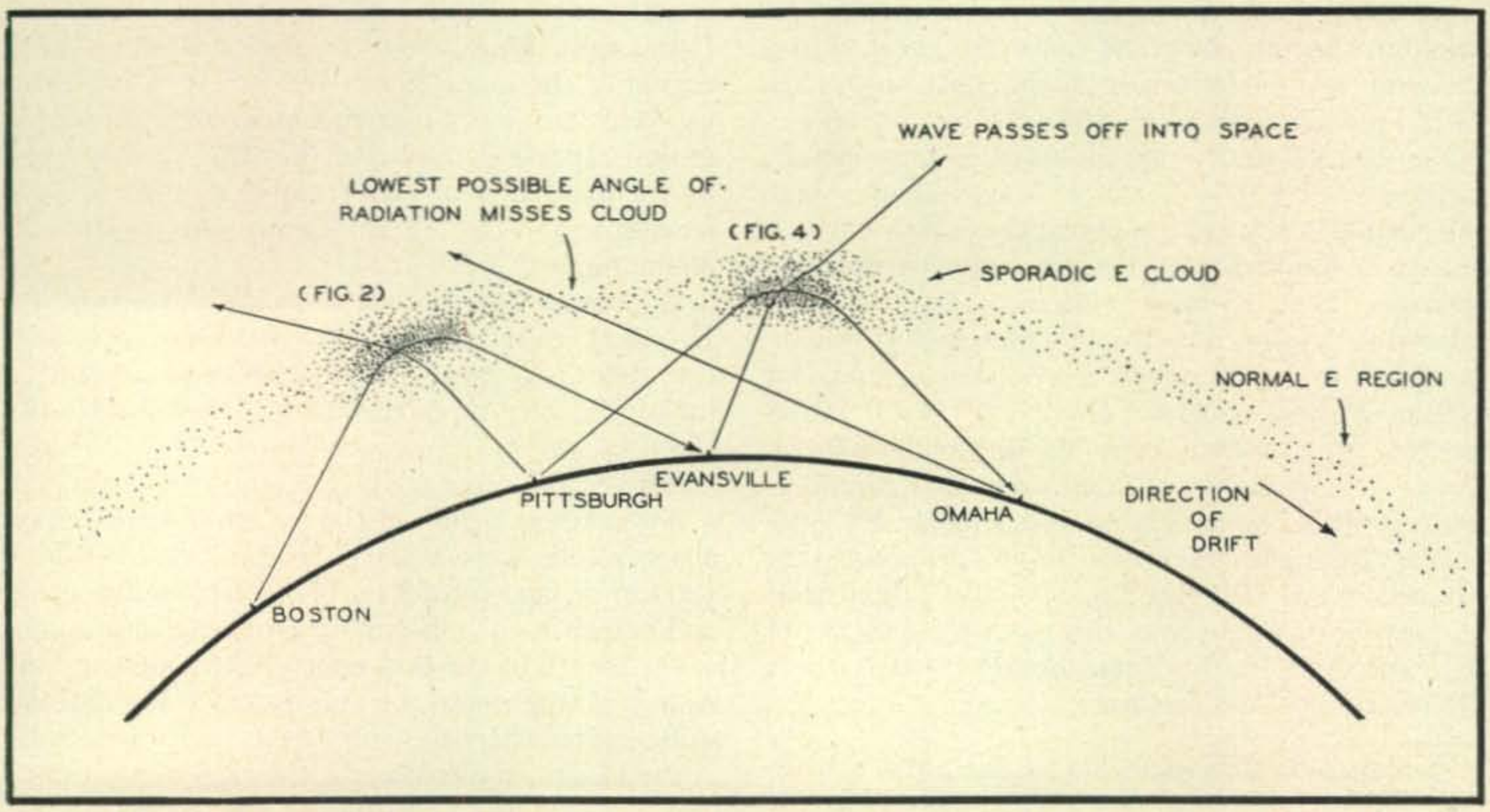
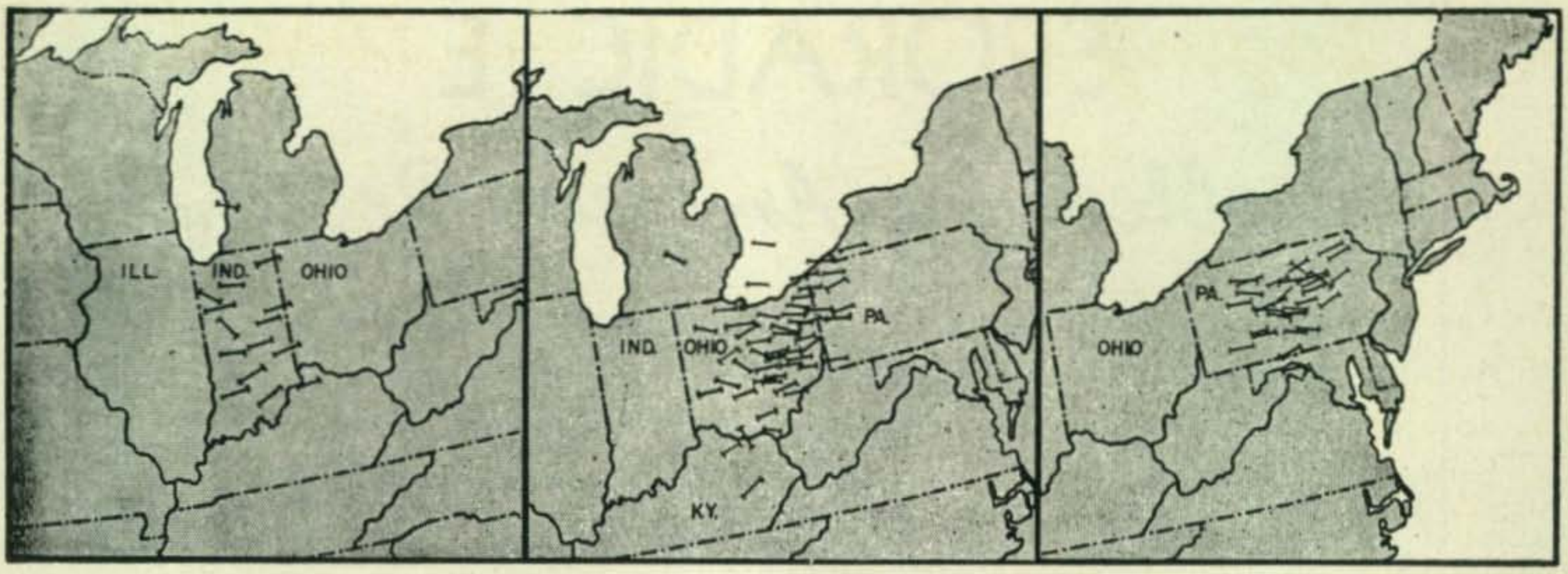


Fig. 1. Drifting of the sporadic E cloud in the ionosphere causes a shifting of the skip zone on 5 and 6 meters. Positions of the cloud correspond to Figs. 2 and 4 on the maps.



Points of incidence for single hop transmission with virtual heights 110-120 km., June 5, 1938, between, Fig. 2 (right) 1730-1800 EST, Fig. 3 (center) 1815-1845 EST, Fig. 4 (left) 1930-2000 EST.

hours that the vertical incidence of E_s exceeds 15 mc (for a 55-60 mc skip), a basic quantity now employed by the National Bureau of Standards and similar agencies. Eventually when sufficient information on the effects of E_s have been obtained it may become possible to further ascertain the relationship with the sunspot cycle.

What We Know About Es

Unlike the normal ionosphere which may be attributed to certain ultra-violet rays from the sun, the cause of E_s today is unknown. At present, it would appear that E_s is the result of a corpuscular radiation from the sun. However, again unlike the normal ionosphere there is little evidence to support this hypothesis. Sometimes the sporadic E short-skip is accompanied by brilliant aurora, at other times the short-skip is present without affecting in the least any of the other geomagnetic elements[1].

To the amateur, experimenter or physicist E_s appears as a patch or confined area of very high electron density 110 km above the earth's surface. Early in the history of the ionosphere it was conjectured that E_s was related to the run-away electrons produced by thundershowers. However, a direct correlation has never been found, for where E_s was observed there were no thunderstorms for hundreds of miles, and conversely in areas where there were innumerable thunderstorms little E_s was observed. Recently, once again Swedish scientists have proposed the thundershower correlation, but have added that it may be possible that the patchy condition of E_s will drift in the ionosphere to areas where there are no thunderstorms.

[1]Continuous measurements of the earth's magnetic field are made for the vertical and horizontal intensity and the declination. The aurora will disturb these elements sharply, producing the ionosphere or magnetic storm.

The apparent drifting through the ionosphere is an interesting but not an entirely new theory. Ivo Ranzi, the famous Italian radio experimenter, proposed a similar effect in 1932 to account for the unusual ionosphere reflections obtained during certain meteorological conditions. Later Eyfrig in Germany set up two ionosphere sounding stations several hundred miles apart. In this manner Eyfrig found that the E_s area would appear ½ to 3 hours later and disappear 1 to 2¼ hours earlier when passing from one station to the other.

In the United States, Mimno and Pierce estimated the vertical thickness of the E_s area to be less than 5 or 6 km and since the lateral distance to the area is a function of time, the E_s patch might truly be termed a type of cloud. They also found that the E_s cloud or mass drifted in the E region of the ionosphere. Wilson, W1DEI in his excellent paper summarizing amateur v-h-f propagation expressed the belief that the E_s cloud was like a disturbance whose speed was apparently constant, but whose direction was continually changing.

Because of the limited vertical thickness of the E_s cloud, radio signals must undergo an almost complete reflection. This has been accounted for by the very rapid rise in the density of the E_s cloud.

These E_s clouds have been found to occur only in a very narrow region of the ionosphere, since few observations have located true E_s clouds above 120 km or below 105 km. The factors of density and height in the ionosphere are the determinants of the length of the skip zone. Assuming the constancy of height and the maintenance of a density sufficient to reflect 6 meter signals, any variations in the length or direction of the skip must, therefore, be due to a motion of the reflecting E_s clouds.

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Laying a Beam on the Target

EDWIN K. COLE, W7IDF*

A simple sure-fire method for determining great circle directions from any location anywhere. The trick is to modify an ordinary globe as outlined by W7IDF, who got the idea from well-known DX'er CE1AO. One of these globes is illustrated on the cover.

SWINGING A BEAM is like pointing a gun. True, a blast of r.f. wide of the mark may still bring some results; a miss is not necessarily as good as a mile, but it will frequently break up an innocent QSO. Laying a beam right on the target is good operating and works to everyone's advantage.

To do this, you must use the great circle bearing from your antenna to that of the old boy on the other end.

Great circles *can* be easy. Spherical trig is the hard way; shorter approaches such as Dreisonstok, Ageton, H. O. 214, 218, etc., are compromises. For our purposes, the practical solution is a cinch.

In fact, this particular cinch will solve your great circle problems as fast as you can twirl a globe, and without computation . . . without anything except a finger for twirling purposes and a globe.

Chain drug stores, for a lead, sell twelve-inch world globes for $2.50 to $3.00, and it shouldn't concern a DX hound if the national boundaries be somewhat pre-war. So you've got a globe.

You will notice that the north end of the axis is supported by a metal arc pivoting both poles. If your globe is like most, this arc will be calibrated in degrees of latitude, increasing from zero at the equator to ninety at each pole. And if you pull gently and firmly on the north end of the arc it should be easy to slip the globe free. Try it.

Mounting Changes

Now, if you're in an honest mood, you will admit that, in a manner of speaking, the world revolves around that little old DX machine of yours. Fix it that way. Drill a hole through the globe at a point representing the electrical center of your hideout. Drill another hole directly opposite this, accurately spotted so that the globe will revolve evenly on this new axis. Pop the world back into the frame, but with the north end of the arc centered on your antenna, and the south end in the opposite hole. If you rotate the globe now, you will see that it is simple to align the arc with any DX target on the planet, and note that by doing so you establish a great circle track from your location to that of the DX station.

The next step is to provide a means of marking the great circle "initial course." At the center of the arc where "0" formerly marked the equator press the point of a pencil against the globe's surface and slowly rotate the globe. In this manner a new "equator" will be constructed. Now adjust the globe so that the geographic north pole is placed directly under the arc. Where the arc now crosses your private "equator" make a mark and name this "North". Rotate the globe again so that the geographic south pole is placed under the arc and, similarly, make a mark and name this point on your equator "South."

With the globe in this last position—that is, with "South" directly under the arc, measure the distance on the new equator from the "South" point around to the left to the "North" point; mark the half-way point "West." Repeat this procedure, but from "South" around to the *right* and name the midpoint "East." You now have four points—want to try for eight? Bisect each of the quadrants developed above and establish "S.W.", "N.W.", "S.E." and "N.E." There are thirty-two points to the compass, and plenty of room for all of them.

If you prefer, it would be equally simple to use degrees instead of compass points. Divide the constructed equator into 360 equal divisions and name each by counting clockwise from your "North" point, zero through 359.

Using the Globe

That's all there is to it. When you want to nail a new country, rotate the globe until the DX is under the arc; read the direction where the arc

[*Continued on page 61*]

**6818 32nd St., N. E., Seattle 5, Wash.*

. . . The Magic E.C.O. . . .

BOB RYAN, W7GWA*

THERE HAS BEEN a lot of talk for and against the electron coupled oscillator since its rebirth in the QRM filled amateur bands. You can take either side and find plenty of hams to agree with you.

This story is written about an ingenious ham who built one of the things all by himself.

Arlow was his name, and his call isn't important to the story. He was a young, glassy-eyed fellow with an extreme case of acute radio-mania, and you could hear him every night on almost any broadcast receiver. People, in fact, thought he was one of the characters on the Lux Radio Theatre, so often did his voice appear when they listened to that program. The neighbors knew him as "CQ 160", and affectionately called him that whenever he surprised them at night trying to saw down his antenna pole.

Arlow was a fine amateur engineer, and all by himself designed an e.c.o. with, of all things, a bandspread dial that would enable him to accurately control the movement of his frequency wherever he decided to move . . . he said.

Shortly after the e.c.o. went into operation, the neighbors discovered that "CQ 160" was not only on the Lux Radio Theatre, but appeared as a guest artist on other programs too. They formed the S. O. P. S. (The Secret Order of Pole Sawyers) and held meetings on Monday nights in the schoolhouse to decide who would be chosen to saw down CQ 160's antenna pole. It was a job none of them really wanted, because Arlow had slyly placed high voltage signs everywhere within sawing distance of the pole.

Arlow was very happy with his new e.c.o., that he built all by himself. With it in operation, he was able to get out from under anybody's kw carrier. The FCC even noticed that he could move right out of the band with it, and sent him a letter congratulating him on his flexibility.

Now . . . not far from Arlow's shack, there lived a young lady ham. She was to be heard nightly on the band, and her rich, pleasant modulation sent warm tremors into the young male ham's r-f section. No evening was complete without a QSO with Irmatrude, the lady ham.

Arlow called Irmatrude many times, but she talked to him rarely. He felt that perhaps she was snubbing him. The truth of the matter lay in the quality of Arlow's modulated signal. You see, Arlow made his microphone with his own hands, all by himself. He called it lovingly, the magic ear, because he had read in CQ once of the magic eye. Irmatrude thought perhaps it was a magic nose when she heard its effect on the ether.

Arlow didn't know about this lack of fidelity, however. He had never bothered to listen to his own signal. He knew he was modulating, because the final plate current meter swung wildly whenever he talked.

After careful thought regarding Irmatrude, the lady ham, Arlow decided that the only way to get a QSO with the YL was to use his ingenuity, a doubtful quality in this case, to be sure. He turned on the beat oscillator of the receiver, took off the antenna, and turned on his e.c.o.

He noticed that his note was a little rough. Distinctive, he thought, and smiled. He moved his hand near the tuning condenser of the e.c.o. The signal vanished. He found it up at the other end of the band.

He moved the e-c-o dial carefully, and noted a pleasant change of pitch.

Suddenly . . . a brilliant idea came into being in the young ham's mind. He tuned the e.c.o. a little in the other direction. Another pleasant pitch change. He grabbed his clarinet and a piece of paper.

After wetting the reed, he blew open G on the woodwind. Then he carefully synchronized his e.c.o. until the note was G. He wrote the e-c-o dial setting on the piece of paper. He blew other notes and matched them with the e.c.o., being careful to write down the dial settings of each corresponding note of the scale. He paused briefly from this very scientific task, and opened the window of the shack to let the smoke out. Have to get a new power transformer, he thought.

Under the table was a pile of sheet music. He dug through it hastily. Determination was written on his face. His glassy eyes sparkled with a new light. He looked under the receiver, and up on the shelf, and finally discovered the sheet of music he sought. It was in the power supply, insulating one of the high voltage leads. He removed it and replaced the insulation with another less important song.

"Now," he mused, "for a little practice." He carefully looked at his dial setting numbers that corresponded to the notes of the scale. He noted that the score was in five sharps, and set his jaw in determination. The line voltage in the neighborhood dipped low as Arlow hit the airlanes with

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his transmitter. "Hello, test," he said, and the neighbors confirmed his signal under their breaths.

He shut off the transmitter, and listened on the band. "Nope!" Irmatrude wasn't on this night. Another stroke of genius. He ran into the house and called her on the telephone.

"Hello . . . Irmatrude? This is Arlow. I sure got a surprise for you. Yeah. Listen for me on 160. Yeah. Right now. Okay. So long."

He hung up, and ran back to the radio shack. He listened carefully to the receiver. His heart pounded wildly. His blood current rose to several amps. "There she is," he exulted, and as she sighed her call, he threw the five switches that put him on the air. After turning down the receiver and eliminating the feedback, he called Irmatrude.

"Go ahead!" he commanded.

The receiver uttered unbelievably rich tones, as Irmatrude responded to the call. "You're coming in fine, Arlow," she said. "Your modulation is too heavy, though. Go ahead with your test." She signed it over to him.

Again, the five switches clicked, and Arlow was on the air. "Turn your beat oscillator on," he gasped. "Come in, please."

She returned with a throaty . . ." All right Arlow. I think your modulation is too heavy though. I think you said turn on the beat oscillator. All right . . . go ahead."

He beamed as his hand went toward the e.c.o. He pulled the antenna off the receiver and shorted out the antenna coil with a screwdriver. Expertly he tuned for a zero beat in the receiver.

Now! . . . He placed his music before him . . .

In Irmatrude's receiver, things began to happen. Never before had anyone heard anything like it. The ham band went dead. Receivers were tuned to Arlow. Love was supreme.

On the airlanes that night, the strains of "I Love You Truly" were unmistakably evident.

For an encore, he played "If I had to do it again, I'd do it all over for you."

If you were to visit Arlow now, you would find him sitting in his bare gray room, his glassy eyes fixed on the magic e.c.o. lying in the corner of the cell. Only five more years of the ten remain, and then freedom and the problem of finding ten thousand dollars for the government.

Irmatrude giggles when she thinks of him. "Oh, the *silly* boy," she laughs.

Lightweight Mast for a Beam Antenna

R. J. HAGERTY, W6JMI*

DURING THE WAR many of us have had some experience with lightweight hollow wooden masts. They were marvels of simplicity and for a given amount of weight we know of no other mast that approaches it in strength. The secret of this mast is the hollow type of construction with joints so spaced that strains and stresses within the structure are evenly distributed. It has other advantages too, such as being easy on the pocketbook and easy to assemble. Ours cost less than $6.00 including wood, nails, putty and paint. We were able to make it up and give it one coat of paint in the first afternoon.

The ideal wood to use is fir, but inasmuch as none was available we chose hemlock. It is very important to have a straight grain—one that runs the entire length of each piece—and not one that runs out at the sides. The lengths from which the mast is constructed must be of identical width and thickness. The lumber yard can run them through a planer so that all lengths will be uniform and all will have their edges squared. The main pieces for the hollow mast are dressed to ¾" by 2½", thus making a mast of 3¼" square outside dimensions and a hollow inside opening of 1¾" square running the entire length of the mast. Incidentally, the hollow core makes an excellent place to run co-ax cable or twin-lead feed lines. For a 40 foot mast 8 pieces 20 feet in length are required. Refer to *Fig. 1* where the four sides *G*, *H*, *J* and *K* are shown. Four of the 20 foot sections are used as is. Two are sawed off at the 15 foot mark, leaving two 5 foot pieces. The last two lengths are sawed in half, leaving four 10 foot lengths.

The sides of the mast are joined as shown in *Fig. 1A*. There is now a maximum of two joints in each side and these are 20 feet apart. On adjoining sides the closest joint will be 5 feet away and on opposite sides—diametrically—it is 10 feet between joints. Spacing in this manner adds immeasurably to the overall strength and rigidity of this mast. Butt-jointing the sides gives additional strength besides making a much smaller cross-section. It is best to use a quick-drying glue along each joint length-wise on the mast and nail every 12" with 2" finishing nails. This makes the inside core of the mast watertight and weatherproof.

The easiest and quickest method of assembling the mast is to first nail the 15 foot section of *H* to the bottom 20 foot section of *G*; next, the 10 foot section of *K* to the 15 foot section of *H* and then the 5 foot section unto *K*. Now in the same order add all 20 foot lengths and finally fasten in all top remaining sections in reverse order. All edges of the mast should be rounded off with a plane for ease of handling and offering the least wind resistance. One or two coats of outside paint will be necessary after the undercoat. The result is a mast that is strong enough to support almost any type beam, but is flexible enough to give in very strong winds and yet will not break, warp or buckle.

The mast itself can be put up by one person provided the anchor points and the guy wires are

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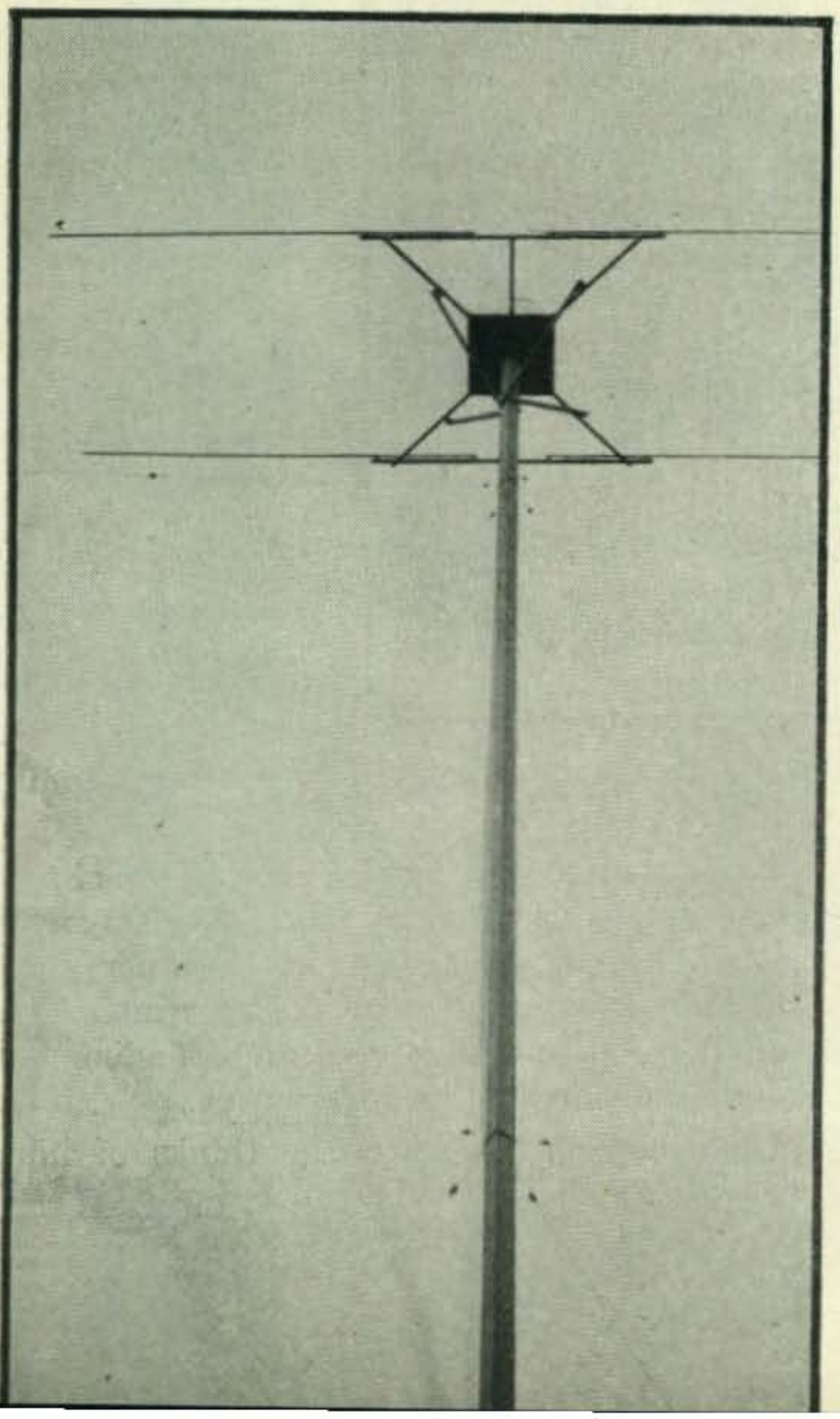


Fig. 2. Hollow type mast supporting a fixed 8JK 10-meter beam.

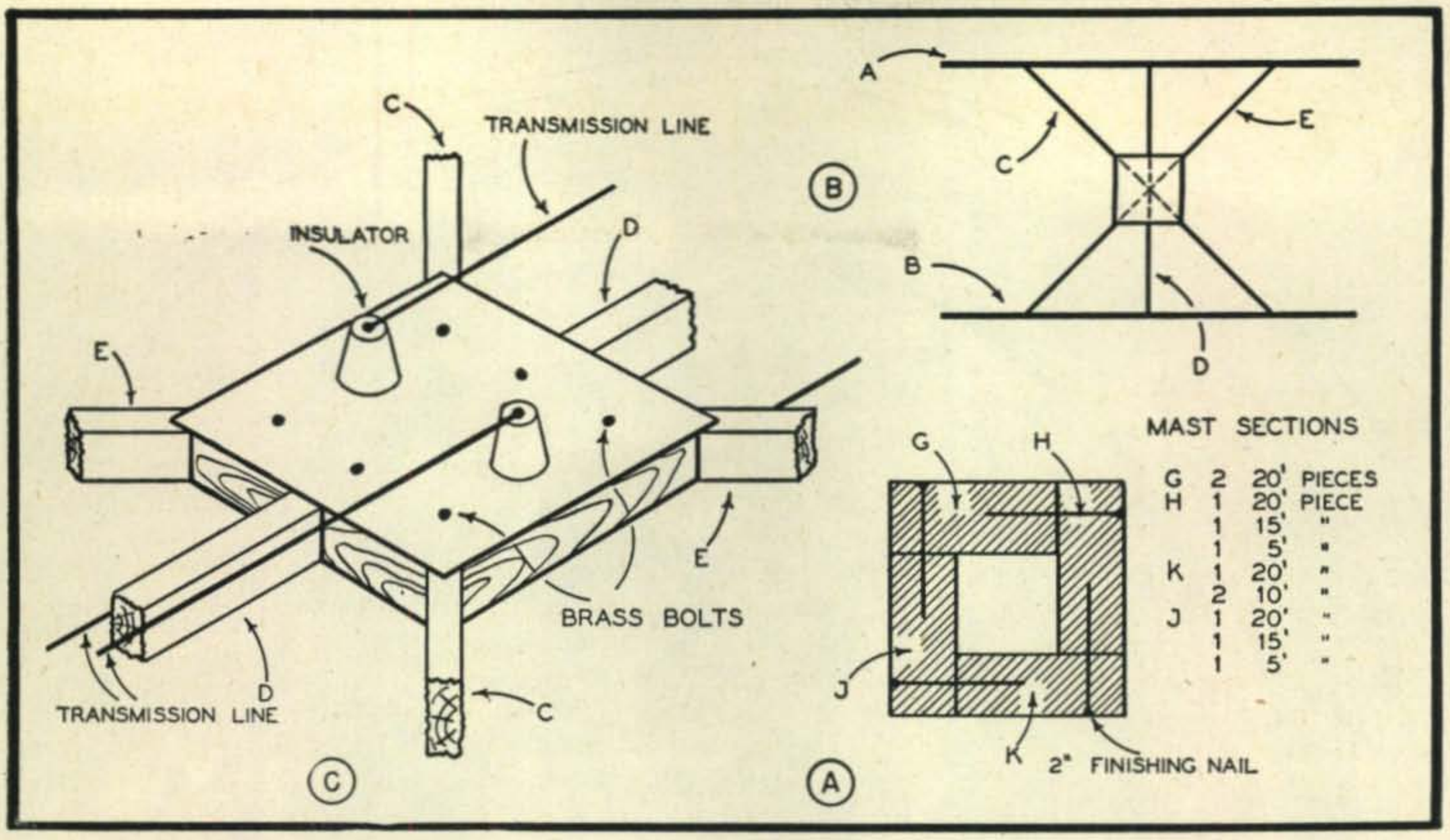


Fig. 1. (A) The hollow type mast consists of 8 lengths of 20 foot x ¾" x 2½" straight grain wood. Each side has only two joints, while adjoining sides and joints are only 5 feet apart. Diametrical assigned joints are 10 feet apart. This provides greater strength for the weight. The method of assembling the mast is described in the text. (B) The top view shows the location of the braces. Lengths *A* and *B* can be used to hold a fixed two element beam array. (C) Closeup of the boxed reinforced construction of the junction point of the three braces. *D* is in two pieces while *C* and *E* are suitably notched for flush mounting. The top and bottom of box is made of 5 ply plywood. The sides of the box are mitered pieces of ¾" x 1¼" wood. The feed through insulators are optional, but provide a foolproof method for feeder line crossover.

measured beforehand with a fair amount of accuracy. The first step is to dig a 2 foot hole near the spot where the bottom end of the mast is due to rest. Fasten all guy wires to the mast and secure at least three to their anchor points. Put a tall ladder under the top half, take a firm grip on the free set of guys and hoist the mast upright. Fasten in the last set of guys after the mast is erected, leaving sufficient slack to lift the mast out of the 2 foot hole on to its permanent base.

For guy wires we used No. 12 iron wire with egg strain insulators about every 10 feet. Although one set of guys probably would suffice, two sets were used as faintly visible in *Fig. 2*. The set at the halfway point eliminates all tendency toward vibration in the mast itself. Do not fasten the guy wires to the mast with screw eyes. Rather, insert four brass screws into the mast corners and then pass the guy wire completely around the mast, fastening it to itself, so that the pull upon the guy will make it more secure. The screws prevent the wire from sliding down the mast.

For a 32 foot mast all measurements in length can be divided by 0.80, while for a 48 foot mast, it will be necessary to use 24 foot lengths of wood for the sides.

In some locations a fixed beam can be used to good advantage. Our mast was designed particularly to support a fixed 8JK beam for 10 meters. The beam frame and mounting platform are other examples of reinforced hollow construction. The top view of the basic frame is shown in *Fig. 1B*. This consists of sides for the elements *A* and *B* and cross braces *C*, *D* and *E*. All of these are made from ¾" by 1¼" by 8 foot pieces cut to the length for the correct spacing of the elements. Braces *C* and *E* meet at right angles and are notched to permit a flush mounting. Brace *D* is cut in two lengths and is mitered to fit at the junction of *C* and *E*. A trial assembly is made with nails, by fastening *C*, *D* and *E* to the two 18" 3 or 5 ply plywood squares that cover the junctions. This is shown in *Fig. 1C*. Holes are then drilled through the plywood top and bottom pieces and through the braces for 2½" length brass bolts.

The next step is to cut to length and miter 1¼" pieces for the sides of the box mounting. This helps keep the braces in place and makes the junction water and weatherproof. For final assembly the edges are coated with quick-drying wood glue and nailed in place with 1" brads.

The entire beam mounting is held in place by the four braces shown in *Fig. 2*. A particular point of interest is the method of setting two sets of feedthrough insulators through the plywood box to accommodate the feeder changeover for correct phasing of the 8JK. In many beams this is sloppily done, but as shown in *Fig. 1C* the feeders are fastened fairly taut with little or no danger of touching or shorting.

. Scale: 1 inch equals 1200 statute miles

GREAT CIRCLE MAP OF THE WORLD

Centered on Washington

The great circle distance from Washington to any other point on the surface of the globe may be scaled off directly on this map, using a straight-edge and the scale of miles shown directly below the map. For example, Panama scales roughly 2000 miles from Washington. Distances of points from other cities in the Eastern United States can also be scaled off directly with sufficient accuracy for most purposes. To determine distance in kilometers multiply miles by 1.6.

The great circle direction of any point from Washington may be determined by laying a straight-edge from Washington to the point whose direction it is desired to determine. The point at which the straight-edge crosses the numbered circle will give the direction. Thus, Paris, France, lies about 51½ degrees northeast from Washington. This is the second in a series of great circle maps of the world to be presented. (*Reproduced by permission of the Navy Department, Hydrographic Office*).

DEPARTMENTS

- *Monthly DX Predictions*
- *CQ DX*
- *UHF*
- *YL'S Frequency*
- *Parts and Products*
- *Letters*

Monthly DX Predictions - - DECEMBER

OLIVER PERRY FERRELL*

Comments and Problems

Comments from the users of the Band Predictions are invited and are of interest to CQ and to the IRPL. If you have some transmission problem directly involving conditions for DX-ing or want to know what would be the best average hours for working a certain city from your location you are invited to write to the Propagation Editor, CQ Magazine, 342 Madison Ave., New York 17, N. Y. Please enclose either a penny postal or a stamped self-addressed envelope for reply. Allow 7 to 10 days for reply.

ONE OF THE MORE interesting sidelights of that complex phenomenon known as radio transmission is the correlation of DX conditions to ionospheric and geomagnetic variants. There have been so many raised eyebrows recently when comparisons were made, that it becomes necessary to define characteristics of ionosphere storms. These disturbances will often manifest themselves in very deceptive fashions. Generally however, a DX man will get to know his particular band. Certain signs can be accepted at face value to mean good, bad or mediocre conditions. On the other hand the ham who is only allotted a few weekend hours may both fondle and curse his rig within a short time because of the vagaries of an ionosphere storm. Ionosphere disturbance in any one of its three classifications should be easily recognized and upon it and it alone should be vent the frustration of a near-miss DX contact.

The ionosphere storm may be described as a period of from 12 hours to several days during which the uniformity of the ionosphere changes to one of heterogeneous patches of ionization. Its most common feature is the decrease in signal strength of all sky-wave transmissions. This is due in part to the increased absorption within the ionosphere and in part to the lower densities of the ionosphere layers. Overall effects are much more noticeable at night than in daylight hours. The ionosphere storm fade—which resembles the well known Asiatic flutter—is very rapid and is generally of abnormal severity. During the first few hours of the storm the ionosphere is turbulent and the layer stratification is destroyed. This results in all signals becoming very erratic; in numerous instances radio signals will be heard from points normally within the skip range or in localities normally closed to sky-wave transmission. The most severe effects of the storm do not appear to last over 12 to 16 hours. Latter stages indicate that the F_2 region is diffused at very great heights lowering considerably the critical frequency and the maximum usable frequencies.

Effects of ionosphere storms are more noticeable on signals that are crossing near the auroral zones. As the paths approach the equator the effects lessen. During minor ionosphere storms this condition may be observed on 10 meters when South African, Central and South American stations can be heard and Northern Europeans can not. In varying degrees this may also be observed on 20 and 40 meters. Radio signals passing through the auroral zones during ionosphere storms are reflected by the ionized patches created by charged particles sweeping in from the sun. This auroral zone scattering produces many other off-path transmissions, including the well known auroral effect on the 6 meter band. It also appears to be the principal source of the long scatter during very severe ionosphere storms.

The auroral zone is generally referred to as the belt of latitudes above 50°. Actually this belt is flexible and the severity of ionosphere disturbance determines the true location of this belt. The more severe the storm, the greater the radius of the auroral belt. This is the reason that aurora is sometimes visible as far south as the 38th parallel. It has been found that the actual belt of maximum radio disturbance is only several degrees wide and during these severe disturbances, conditions near the pole may be better than those much farther south. A secondary effect in the auroral zones in some disturbances, is the production of an intense sporadic E layer capable of reflecting signals up to 20 meters.

For DX paths during an ionosphere disturbance that do not pass through the auroral zones, the transmissions in daylight hours will be much weaker than predicted in the graphs (lower value of the inner line of optimum working frequencies) and probably will not be possible on 10 meters. During the night practically all signals will have a rapid fluttering fade with the 20 and 40 meter bands closing down early, although moderate to strong scattered signals may be heard throughout the night.

December DX Conditions

Transmitting and receiving conditions for an average day in December of 1946 will be somewhat below those of the November peak conditions. On amateur bands this very slight slump will not be noticed because of very low static and noise levels and increased length of the daily openings. From the eastern half of the United States we find in *Graph A* of *Fig. 1* average conditions to South and Central Africa. Tracing the outer line—the line of maximum usable frequency—we see that an MUF of 36.0 to 37.0 mc may be reached around 1130 hours EST. Conditions over this path are generally very stable at this time of year and are not affected by minor ionosphere storms. On 10 meters the first South African signals may be expected as early as 0700 hours EST. The inner line—the line of optimum working frequencies (OWF)—indicates that this band will be very active from 0730 to 1230 hours EST, with peak conditions between 1100 and 1200 hours EST. 20 meters may be expected to be very active after 1400 hours EST with strongest signals probably one or two hours later.

In *Graph B* average conditions from central and eastern United States to the South China Sea Areas is depicted. The MUF is expected to be about 34.0 mc resulting in a sharp 10 meter opening from 1430 to 1730 hours CST. However, since this path crosses the northern Pacific auroral zone even slight

*Propagation Editor, CQ

ionosphere disturbances may lower this MUF considerably. A minor 20 meter opening may occur about 1000 hours CST and the length of the 10 meter opening may vary from day to day with the possibility of scattered weak signals as early as 1130 hours CST.

Average conditions for a December day are illustrated in *Graph C* for a path from the eastern portion of the United States to Central Europe. Although the average MUF probably will not exceed 40.0 mc this month, conditions on 10, 13 and 20 meters are expected to be very good. The first signals on 10 meters will be heard between 0730 and 0800 hours EST. Best conditions can be expected around 1030 hours and a 10 meter closing at about 1330 hours EST. 20 meter conditions will be excellent over this path with an opening time as early as 0600 hours EST and a closing time around 1800 hours EST.

The fourth, or *Graph D* illustrates the average conditions from eastern and central United States to Japan and North China. A scattered 10 meter opening may be expected around 1615 to 1730 hours EST. 20 meters will remain active until 2130 hours EST, although as this path crosses the auroral zone many departures may be expected. There is also some possibility of a scattered opening around 0700 hours EST which is not indicated by the MUF outline. Generally, openings of the latter types are erratic, but are utilized to good advantage by the amateur because of the much lower local QRM.

Trans-Pacific conditions to Australia and New Zealand from the western United States will be very good with an MUF of about 41.0 mc expected at 1700 hours PST. Eastern Australia and New Zealand may be heard on the 10 meter band as early as

[*Continued on page 64*]

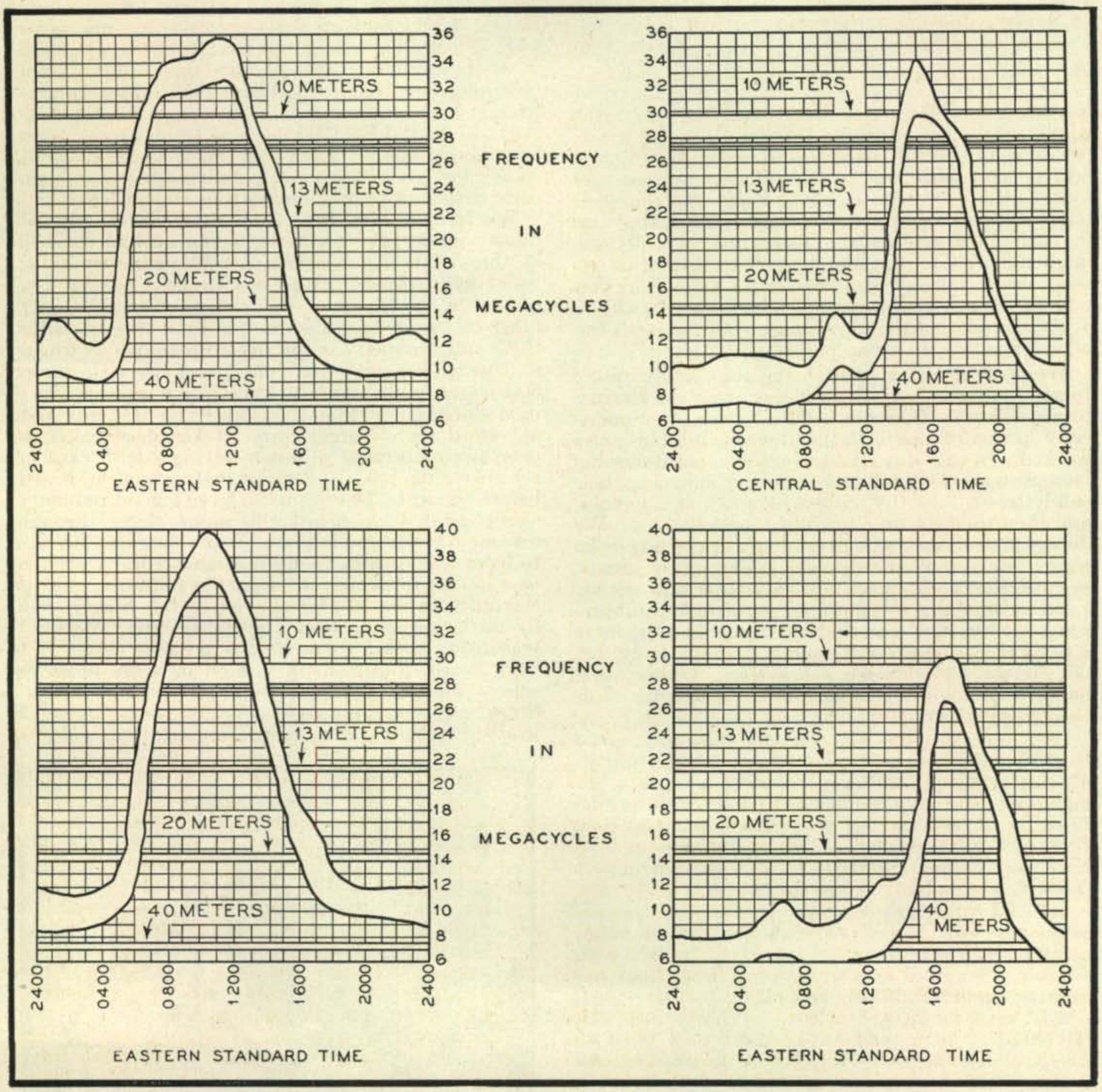


Fig. 1. December 1946 average conditions. Left to right (top). Eastern half of the United States to South and Central Africa. Central and Eastern United States to South China Sea areas. (bottom) Eastern half of United States to Central Europe. Eastern and central United States to Japan and North China.

CQ DX

By HERB BECKER, W6QD

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

During the past couple of weeks, I have received inquiries from some of you fellows wanting to know how soon we would be able to get them a new Zone Map. As mentioned last month, our honorable editor was probably working day and night trying to get these things printed for you. As soon as they are off the press, don't worry, you're going to hear about them. We want to get those Zone Maps out as soon as possible, because we know there are a lot of you who have lost the ones you had before the war, and then too, we have a lot of newcomers who have never seen a Zone Map.

We are also working on a country list. As you can well imagine, the country list we used before the war would not be too accurate. The new list will incorporate a number of changes, the nature of which is now being hashed out by our DX committee. As soon as the final country list is decided upon, we'll put it in print along with the zone number applying to each country. In the meantime, you fellows might as well begin compiling your lists of zones and countries in accordance with the knowledge you now have on what constitutes a country. It will be a very simple matter to compare your list with the official country list when published.

When we get started with the zone and country totals, we expect to show post-war as well as all time totals. The list, however, will be tabulated numerically in accordance with the post war total of zones worked. In this way, the fellows who are doing the best post-war DX will be listed, and following their call letters will be the post-war zones and countries, and then their all time totals if they have any. We do not plan to show the calls of any of the boys who send in only their prewar zone and country totals, because this world indicate they are not now active. I can see now this will put a lot of the high total prewar boys way down on the totem pole, and the more I think of it, the worse it sounds to yours truly too. Oh, shucks, let's devise a new system. On the other hand, this might be the shot in the arm some of us need to get out of the cellar.

Now more to the point—let's get on to some of this DX. In the first place, it looks as though a little life did begin on "40" for W6ENV, because a few nights ago, he hooked up with G6ZO who was on 7145 kc. The time was approximately 10:00 p.m. PST: later, Andy worked NY4CM also on 40. ENV reports hearing HB1CE, who, no doubt, was HB9CE on a holiday across the border.

W9RBI is feeling pretty happy lately, all because of the nice work he has been able to do on ten meter phone. He says he gave 20 back to the Indians with interest. Some of the better stuff who Ross has worked include J9LG, VP4TF, VP4TK, EI9J, GW3AX, GW3UO, I1RM, I1AW, OZ7PH, HR1MB, OQ5BL, and OX1Z; and then on c.w., ZD4AB, VQ2FR, and OK1AW. After working this stuff, W9RBI managed to knock off VU2AQ, XU1RP, and ZB2A, 10 phone, of course. After reeling off this stuff, he wound up the day by working GW5XN, ZS2AZ, VE1EL, KH6FD, and YV5AE for a six hour phone WAC. Ross said he heard that W7BKC worked VS9AB in Aden. Total countries now for RBI is 60.

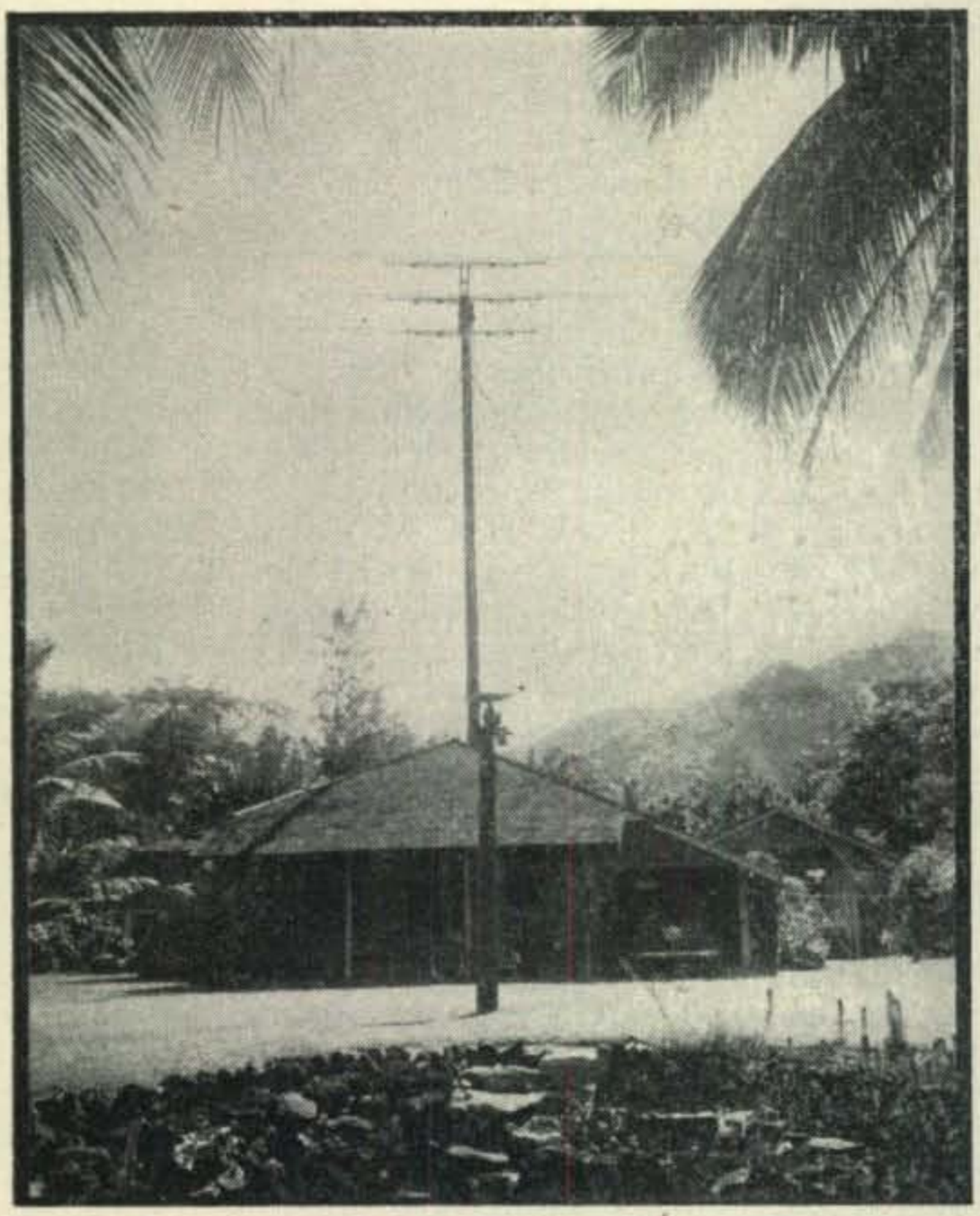
Frequencies for most of the stations listed in the individual reports will be found in one composite list. Just turn the pages, you'll find it!

W6ITA worked ET1JJ in Ethopia, and VS7ES, both on 20 c.w. W6PBV up in the northern part of the state kicks through with a report on working EI6G, Charlie McCarthy of Cork, and among other things, EI6G said he was enjoying our magazine CQ. Naturally, we like to hear these things, and most of you know it takes a little time to build up a new magazine, but with the cooperation we're getting, it won't be long now.

W5ALA, and W5JBD, both of Dallas, live only a few blocks apart. Each put up a three element rotary for ten meters, and on successive mornings, their first European contacts were with G8MN.

We have a line here from that old left-handed brass pounder, W9YNB. He's complaining because he thinks QD has forsaken the W9's for the WØ's; 'taint so! Anyway, W9YNB broke loose on ten meter c.w. in March of this year, and worked only nineteen countries. Then he put up a twenty meter "Q", and bumped his countries up to 64. Norm is still using his nine year old 100-THs with about 500 watts input. 9YNB brings forth another little itemwhich has me somewhat puzzled. It seems that a certain Dr. George Stary of Czechoslovakia is complaining because of not receiving a QSL card in return for his report on my signals which he heard before the war. Doc seems to have a good publicity agent, as I have heard this same thing through several other of you fellows. Now then, I would like to have it known here and now that I have written two letters in answer to separate inquiries, and if this information can be relayed to Dr. Stary, even by carrier pigeon, it would be appreciated. My only reason for taking space here is because surely if I have heard from some of you on it, there must be others who have heard the same thing from Dr. Stary, and this may save a lot of time. In other words, "I seen my duty, and I done it."

George Morrow, W8BKP, well-known DXer from Washingtonville, Ohio. The Jr. op is in training.



KH6CT, Lanikai, Oahu, T. H. 66 ft. above sea level, the station is only 250 ft. from the Pacific Ocean.

W6FEX, one of the old timers in LA, worked W6GRL who is now in Shanghai, China. As mentioned before in this column, Doc was going to China for a few months, and it looks as though he has finally made the grade. Anyway, Doc has been operating at the station of W8CJR, mostly on ten phone: the frequency used is usually about 28,420. Doc is over there to supervise the installation of a 10 kw broadcasting station (and of all things, it covers the Ham bands too!) However, Doc has his own portable transmitter which he probably will set up when he gets into his so called semi-permanent location. He was figuring on moving from Shanghai to Nanking very shortly, at which time, he will probably get on the air from W6JIM.

Ah, another W4 heard from, in fact, a couple of W4's! W4BRB of West Palm Beach has worked PK6HA, PK6TC, ZC1AR, ZC4NX, VS1BX, VS7ES, J2EUG, J2UVW, and W3HMO/J2. The W4's really have to get in there and dig for Asians like those. A few other good ones include: ZD4AB, CN8AB, OQ5BY, SU1US, W6VKV/I6, and LX1AX, as well as a flock of UA's. Gene also worked G3AGC on the Isle of Man on good old 40. He says his friend W4ISF hooked CR7AD with his 30 Watts on ten meters, and W4BPD is over 70 post war countries; as is W4BRB himself. Nice going, you W4's. Keep it up.

W3FDH sends in the following list of recent stations worked as well as the address information. I believe information of this type is valuable to you fellows because of so many new foreign DX stations and location changes. If you feel we are wasting time by giving these QTH's, let us know, and we'll cut it out. W3FDH runs 400 watts on ten meter phone, and the same on twenty meter phone and c.w. His post war countries now total 42.

HP1A	Panama City, Panama
YN1RA	Managua, Nicaraugua, Box 78
KA5EA	Leyte, P. I. No Navy QTH Given
PK6HA	Biak Island, Dutch New Guinea
UO5VW	Kagul, U.S.S.R. QSL to Box 88, Moscow
PZ1A	Surinam, Neth. Guiana
VU2AQ	Bombay, India QSL via R.S.G.B. Great Britain
LA2UA	Stavanger, Norway. QSL to Box 898 Oslo
LX1BO	Luxembourg. OK last C.B.
CN8MZ	Rabat, French Morocco, Robert Corde Bois, Rue De Quercy, #38, Rabat.
EL4K	% American Vice Council Monrovia, Liberia, W. Africa
EL5B	% Pan American Airways, Roberts Field, APO 605, Liberia, West Africa. % P. M. Miami, Florida.

The past month, the boys have been really going to town on ten meters. Two or three of you fellows in writing in have asked, "Hey, why aren't you on ten phone, it's really hot." Well, that I can't answer except for two things. In the first place, lack of time, and the second place, lack of a modulator. Although funny things do happen. I'm going to play around with one of these new little narrow band FM exciter units. So if you hear some strange sound in the FM portion of the ten meter band, be easy with me, will you, gang? Speaking of ten meters, you can hear the funniest things sometimes, for example: The other day, I heard a certain W apparently having a heck of a time, for this is what he said, "Calling TG9L question mark, TG9L question mark, TG9L question mark, here is W——, hear me, amigo? " And then, there was a guy who was both frank and honest, and quoting him, "Will you PLEASE QSL, and I guess why I'm so anxious is because I'm just a newcomer in this game." Then I twisted the dial a little further and heard a guy in the act of giving a report to the station he was working which went something like this, "Say, old man, you were R5, but I have just adjusted my meter, and now you're R7". To wind up this dial twisting urge, there was the perennial discussion between two stations on how to make the 300 ohm twin lead work as a transmission line as well as a radiator. When I heard one of these fellows say, "I can't make this stuff load with a six turn pickup coil," I twisted the dial the opposite direction just in time to hear ZL2CU say that VP8AD is on South Georgia Island. So much for the eavesdropping.

For those who want to send a card to W9DPZ/KB6 who was on Guam, they can send it directly to him at the following QTH: (incidentally, he is now W5LSP), Art Robertson, 7307 Courtland Street, Dallas, Texas.

Well, look who we have here! W4JBS in Norfolk, Virginia. You ask who the heck is 4JBS? . . . He's ex-W3FQP. Anyway, P. B. White is now a W4 and has worked 61 countries all on ten meters, mostly phone. He's running kilowatt to a pair of 250-TH's with a three element rotary beam on ten. Now in the construction stage is a new final using 304-TH's with a 4-250A buffer. I guess that crack I made about the W4's being inactive really struck home, because you guys are really breaking loose with a few contributions now. Keep it up, yo'all!

A line from Doc Westervelt whom you might remember as K6QYI, as well as having had W3 and W6 and W9 calls, is now stationed at Ft. Sam Houston, Texas; only now he will be known as W5MY. Doc. hopes he will stay put for a while, because this business of being transferred around the world by the Army doesn't lend itself very well toward getting his call established. Another old timer back in what he hopes is a permanent spot is Bill

[*Continued on page 54*]

U. H. F. . . .

By JOSEPHINE CONKLIN, W9SLG*

To our surprise and pleasure, v-h-f communications have held up in October beyond past history and our expectations. While a recurrence of sporadic-E layer transmission is frequently encountered in December, a few good days have been reported in October. One thing about it is that if the band opens now, there are quite a number of the fellows ready to cash in on the DX. Similarly, the two-meter band has not gone as dead as it did in the autumn before the war.

A surprising thing about 50 mc equipment used by some of the gang is its simplicity. C.W. is acceptable—and used entirely by some such as W9PK, we hear. The rig at W7QAP that has done so well this year is a three-tube affair, 6AG7-7C5-829B with 52 watts on the final. Similarly, on two meters, straight a.c. on the plates of the tubes, or i.c.w., are not only usable, but actually are recommended by such as W6CLV who points out that tone will frequently come through after signals are too weak for voice.

But getting back to that DX, W7QAP is building a converter for CE3FV down in Chile, so a contact is a possibility there, almost any time of the year. In February, when conditions may be at their peak for F2 layer hops this year, the British are running a 58 mc contest. This is also the time—December and February—when 2000 or 2200 mile F-layer 50 mc hops may be experienced, particularly for such paths as from California to Hawaii, or to points in Central America. Ken Bryan, K6MVV, up there on the north point of Oahu would be well-situated to encourage while "Red" Orrick, K6RVG at Kahuku, Oahu, would be another, not to mention some of the fellows on the other islands. We also wish that somebody would stir up interest in Cuba. We have heard from CO2WL, secretary of the Radio Club of Cuba, Lealtad 660, Havana, but have no favorable word on 50 mc. The "OM," Commander Bill Conklin, has accepted a regular Navy commission and hopes to make a 50 mc contact himself at XU, KB6 or K6.

In fact, it is Bill's acceptance of the Navy appointment that leads us to announce that we'll probably move one of these days, so the column will be turned over to G. Vincent Dawson, WØZJB, Route 1, Gashland, Missouri, next month.

Eager Beavers

Vince is "Big Beaver" of the middle-west Eager Beaver V-H-F Net. Vince was the first to work all call areas on 56 mc (in 1939), while Cliff Simpson, WØYUQ, is the Supreme Beaver and was the first to work all call areas on 50 mc. WØJCQ is the Little Beaver, "who hopes."

WØJCQ, incidentally, started a message from Ft. Riley, Kansas, to W1HDQ which reached its destination via 50 mc on September 17. It went ground-wave to W8SLU near Detroit, then to W2BYM on "aurora skip," and on to W1HDQ the same evening.

Meteor Shower Skip..

A letter from John Taylor, W3OMY, ran into a very nice bunch of DX on the night of the comet meteor shower on October 9. From Pittsburgh he enjoyed a lot of what looks like short sporadic-E distance or long ground-wave or low-atmosphere-bending DX when he worked W8CIR/1, W1PFJ, W1HDQ, W1AEP, W1JLK, W1KJC, W2BYM, W2IDZ, WØJCQ, and heard W3JAY, W9NFM and W5FRD. That's seven districts heard. The beam was very sharp on the stations and had to be right on them—suggesting that these were not the loud signals of sporadic-E hops. All had a fast fade from R3 to R9. There were numerous other W1 and W2 stations in heavy QRM and weaker.

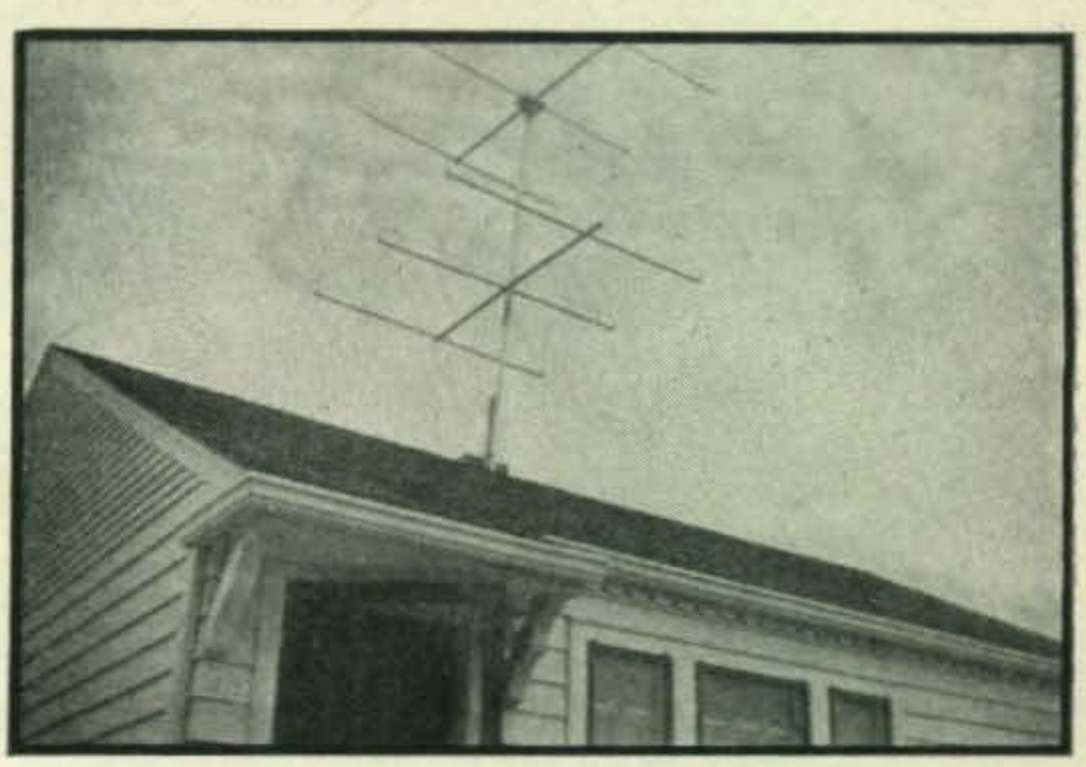
This is a very interesting phenomenon. Bill recalls that several of the periodical meteor showers before the war coincided with what was taken to be skip DX, but has not gone into the astronomical records to work out a connection with the skip. Somebody who wants to work on a college thesis might look into this, because we can make use of this type of information which is fairly predictable. Possibly the meteors burn up at such a height that the particles form a temporary layer in the upper atmosphere. For that matter, could the sporadic-E layer itself, which is spotty in nature, be directly associated with small gobs of matter that hit the upper atmosphere? That's a good problem to give to G2XC, or some of the other experts.

The Two-Meter Problem

W3GKP for one—and there are many others—find that it is next to impossible to work out of one large city, and into another, because of super-regenerative receivers and modulated oscillators swooshing by. These fellows don't realize just how much they sweep around, because their receivers won't tell them.

One possible solution is to get the serious DX men on two meters to use horizontal polarization, and let the broad, radiating receivers and swooshing transmitters use vertical antennas. It might help, but many would dislike that solution. Also, it might be hard to enforce.

Another proposal is that a small part of the band be reserved for stable signals, in the hope that the radiating receivers and modulated oscillators will stay in their larger portion and be content.



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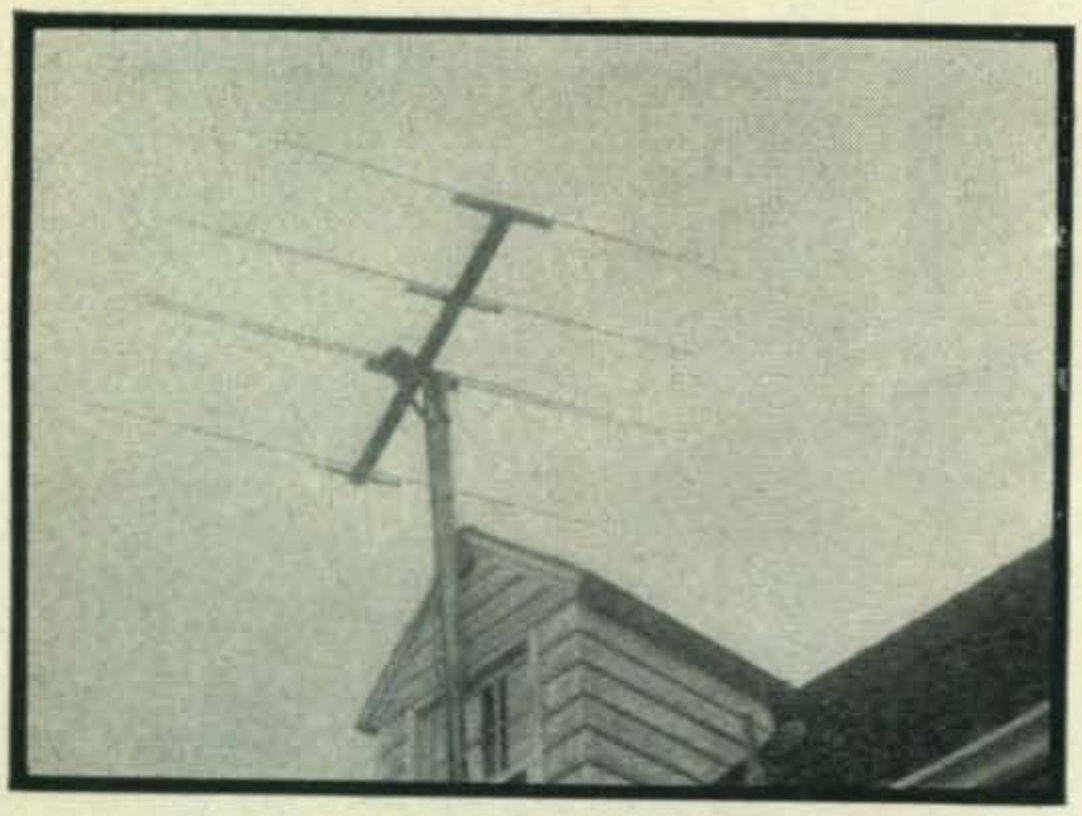

WØZJB's "Whirligig" Beam. Full details will appear in a feature article now in preparation. The performance of the beam is well known to u-h-f men everywhere.

Jim Brannin, W6OVK, and many others, are always working on the lads to put in crystal control, which will solve local problems where the population is not great. Jim favors a move to give 144-145 megacycles to the crystal controlled stations and the rest of the band to the modulated oscillators—although that would hurt those where the whole band is not yet open.

Serious workers on the band get rather definite ideas. Brownie at W2PAU—formerly W1IRV—has the following to say:

"As for receivers, there are just plain too many super-regeneratives. A plague on the blasted things! Not only do they radiate (unless they have a good r-f stage—Jo.) and cause needless QRM, but it looks as if they simply won't stack up with the super-heterodyne in sensitivity. This is indeed a sad state of affairs because many of the stations who put in good signals up here at Mount Ephraim, New Jersey, have trouble with the receiving end of the deal. And they cannot blame it on the location, either. I know that I would not believe that signals were coming in from New York and Lancaster until I got the super-heterodyne going. W3JAU had exactly the same experience.

"A lot of credit should go to W3EKK for his missionary work on this band. He acquired a beautiful 13-tube narrow-band super-heterodyne from Uncle Sam. Bernie handed out a lot of honest reports on splash, over-modulation, drift, and so on. And he was the first of the gang to receive any DX signals on two-meters. For a long time, no one would believe him! Now a lot of the fellows have super-heterodynes, including W3BYJ, W2PFQ, W3GQK, W3JAU and W2PKF. Some of the gang have converted radar receivers into good communications jobs by altering the tuning range, narrowing the i-f bandwidth, and so on. W3GQS, W3BNU and W3BZQ pioneered in this approach.

"Getting more super-heterodynes on this band is the best way to clean it up without legislation. With a critical receiver, a station can hand out honest reports and thus, eliminate some of the raw signals before they get well started. With nothing but super-regenerators in general use, a fellow may be on the air with a punk signal for a long time before he contacts a station using a discriminating receiver. When he does get a real report, the comeback usually is, 'Well, you're the first to notice any troubles, so why should I worry about it?' "

Six Meter Skip DX

Although the frequency of 50 mc DX openings by sporadic-E layer, aurora, or perhaps meteor ionization, has decreased more or less steadily since July, with the prospect of an off-season peak again in December, the openings that have occurred have brought out an astonishing number of contacts. This may be due to constant occupancy of the band by a large gang, or more likely by careful observation of the action of the ten-meter band looking for short skip under a thousand miles or so.

It is very evident that we do not receive reports from any great percentage of active stations, because a "calls worked" list will frequently show twenty stations or so who were active on that day but who did not write to us. However, as the gang keeps sending in the dope, a fair picture of conditions can be obtained. All reports of September skip DX are from Vince Dawson, WØZJB, your conductor next month, but there are four covering openings in October. Here is the dope:

September 2. When ten meters opened for weak Florida signals and shifted to W3, Vince heard a station on 51.6 mc at 1216 CST.

September 4. At WØZJB, the band sounded like aurora buzz, but it turned into a good night for Illinois and Iowa extended-ground-wave work from Kansas City, and W9ZHB broke through for a short time again.

September 5. Vince worked W7KAD from 1930 to 2005 CST, KAD's signals going out at 2145 after he worked the whole middle-west gang.

September 8. With the ten-meter band hot, at 1120 Central time Vince hooked W7KAD again for a few minutes before he faded out. In the evening with ten hot in all directions, there was no evidence of six-meter skip but good contacts were made on low-atmosphere-bending, or extended-ground-wave, with even W9QUV coming through to Kansas City from Illinois.

September 17. Vince reports that there was a lot of aurora DX on this night, but he missed it.

September 18. This time, there was still aurora buzz on extended-ground-wave signals. including a W9ZHB-WØZJB contact at 2135 CST. Vince had his beam at 50 degrees while ZHB turned his north instead of southwest. The rest of the Illinois and Iowa gang had the buzz on their c-w signals but none came through on phone. This is just another illustration that c.w. or modulated keyed carrier will frequently bring DX contacts on six or two meters when phone will not.

October 9. W3OMY in Pittsburgh on this night of the meteor shower worked W8CIR/1, W1PJF, W1HDQ, W1AEP, W1JLK, W1KJC, W2BYM, W2IDZ, WØJCQ and heard W3JAY, W9NFM, and W5FRD. He also heard numerous other W1 and W2 stations but they were in heavy QRM and were weak. John Taylor has now been added to the list of stations that have worked all call areas, having made his W2 contact on this peculiar set-up on October 9. He has 19 states.

October 16. Leroy May, W5AJG, reported the band wide open from 1830 to 2115 CST on this date. It is noted, however, that the time agrees with several reports of the band being open on October 17, and a number of stations are on the several lists—W8DAL, W9ZHB, W9PK, WØIFB, WØYUQ and WØJCQ. There is not time for us to write these stations to confirm whether they worked DX on both dates. Anyhow, W5AJG lists contacts with W8QYD in Dayton, W4EDD/3, W8DAL, W9ZWF, W4HVV, W9ZHB, W9PK, W9PHV, W9UNS, WØIFB, W9UIA, WØYUQ and WØJZQ

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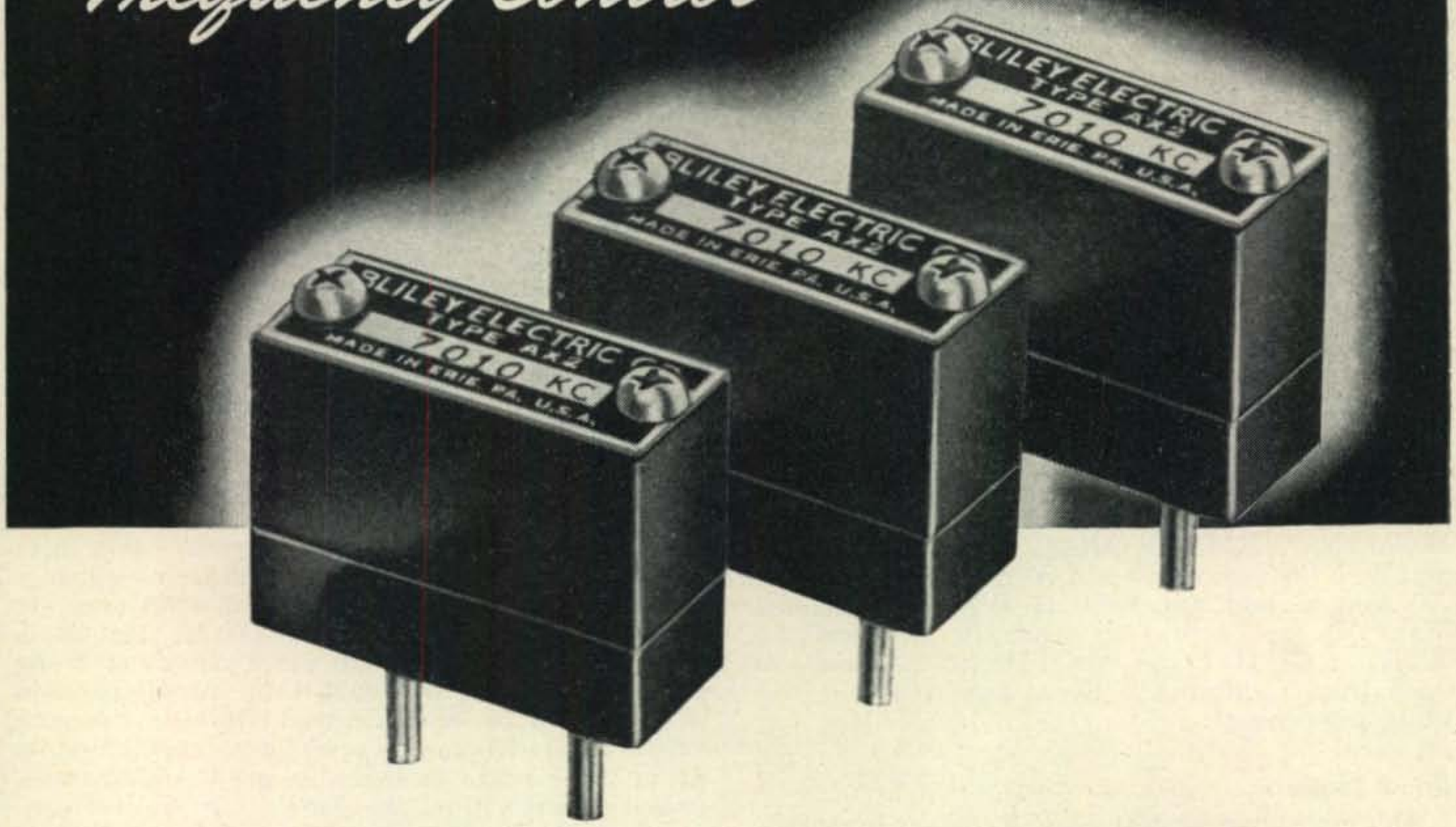

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(JCQ?). He heard W8CYA. Now, fellows, this is a nice list of contacts for anyone, and was done with a lone 807 in the final with 30 watts and a simple dipole antenna. Leroy just happened to listen for the first time in months, and off he went! Signals were mostly of good strength and it was as fine as opening during the summer. Although he was not active on the band in the late summer, he did find openings on May 16; June 5, 11, 12, 14, 20, 23, 24, 29, 30; July 1, 3, 5, 7, 14; August 9, 12, 18; September, none; October 16 (or 17?). This is a fair picture of the summer seasonal pattern of 50 mc sporadic-E layer DX.

October 17. This is the date that the above work of W5AJG *may* have been done—but it is subject to recheck. Anyhow, Charles Faulkner, W6FPV, worked W9ZHB, WØYUQ, WØNFM and WØDZM (Minnesota) around 7 p. m. Pacific time. He also called WØZJB, W9PK, WØIFB and WØJCQ. From this list, it seems that Faulkner has to thank the mid-west net for most of his contacts because it was primarily their activity that made the opening possible for him. W6FPV was using 100 watts on a VT-127A on 51,672 kc with a 4-element horizontal beam and a home-made superhet. He noted that the signals this time seemed to favor horizontal polarization, not being heard on a vertical. Another report comes from Bud Keller, W7QPA. He found that the band opened twice! The first time, at 1110 Mountain time, he worked W7JAP. Then at 1957 the second opening brought contacts with WØMZJ, WØMFN, WØZJB, WØJCQ, WØYUQ, W6YBP, and W6KIW. Also, he heard WØIFB, and WØCHI. No double hop appeared at W7QAP, although WØYUQ was very loud while he was working W2BYM, W8DAL and W8QYD. So the band was open from California to New Jersey, and it was quite an opening!

British Notes

Our monthly copy of the *RSGB Bulletin* brings the column entitled, "The Month on Five," by W.A. Scarr, G2WS. The G stations really work a lot of interesting DX when the band opens on 58 mc for them. Some of the calls getting on the summer DX are HB9G, G5BY, I1AY, SU1KE, GI6TK, G6CW, G2XC, F3JB, G5MQ, I1IRA, I1FA, G6VX, G5BD, G5LL, G6DH, G4CI, G5TX, I1DA, I1AV, F3VV, I1SS, G5LJ, HB9RLA, HB9RQB, HB9RSM, G2MV, G5BJ, G6JB, G8II, SM5SI, SM5II, G6UH, G8RK, G2ZV, OK1AW, G5IG, G6SL, G2AK, G6YU, G2BMZ, G2YL, G5LL. Some of the dates for Sporadic-E layer DX were May 19; June 4, 24, 30; July 21; and August 22. Perhaps the greatly smaller number of open dates is a direct result of the smaller widespread activity on the band than there is here in the U. S. A.

The 50-Megacycle Gang

W3OMY in Pittsburgh joins W3RUE in wanting to know why they never hear ground-wave DX from the east. They feel that if the Washington, D. C., gang would turn their beams northwest at night, a contact could be made over the several low mountain ranges that intervene. John, you should get W4EDD/3 busy on that one, he may run some tests with you. W3OMY's skip DX days were July 21, 26, 27, 28; August 9, 19, 24; and October 9.

WØJCQ is leaving for Germany soon, and hopes to get there in time to set up on 50-60 mc by February for some F-layer transatlantic work which may occur this winter and next.

WØZJB wants volunteers to help repair the damage left by W1HDQ, W4EDD and W9ZHB when they tried to put up a new beam at "Megacycle Farms."

We have found out why Keller, W7QAP, goes by the name of "Bud." His first name is Winchell. He has started extended-ground-wave tests on six meters with Wayne Hester, W7KAD and formerly W5JGV/7 at Hurley, New Mexico. Straight c.w. was necessary much of the time at first without any sign of temperature inversions. When W6OVK and W6QLZ used to put through S9 signals, it was when the temperature would drop from about 80 to 30 degrees in the evening and night. The Tucson-Douglas terrain is rugged, starting at 2,400 feet and rising to over 6,000 feet then down to 4,000. QAP uses 52 watts into an 829B and Wayne has 450 watts into HK-54's. Each have horizontal beams. When Bud fired up his new 6AK5-6AK5-6C4 converter, he found that Wayne became readable on phone usually whereas c.w. was necessary on the old receiver with its hiss and highly regenerative r-f stage. The new converter has no more over-all gain, but it is obtained through straight non-regenerative gain which does not amplify the noise as much.

In Zearing, Illinois about 80 miles southwest of Chicago, Ed. Grabill of W9ZHB works to W9HAQ in Davenport, Iowa, and to the Chicago area. At times, his ground-wave signals get as far as Kansas City. He has two nice windmill towers, holding up his 10-6-2 meter beams, all horizontal. On six, he uses a three-element job 80 feet high, fed with Q-bars and a transposed 450-ohm line.

W7HEA in Toppenish, Washington, has a nice rig for both six and two meters. The exciter ends up in an 832 which drives a pair of 4-125A's on six meters with 500 watts on the plates. He has a triple-deck antenna on 10, 6 and 2 meters, all being plumber's delights, with folded dipole radiators fed with 300 and 75-ohm twin lead. By adjusting the length of the 75-ohm section, he obtains a match. All of these rotate on the same mast, and are controlled remotely from the shack. His receiver converter uses an acorn r-f stage with coaxial lines as tuned circuits.

W9ZUL in Wilmette, Illinois, has modified his DM36 for 50 mc and has joined the six-meter gang around Chicago. W7OWX on 51.4 has been added to the Tucson, Arizona, stations. W9UNS in Marshall, Indiana, is now on the band.

Two-Meter Comments

In Dallas, W5AJG is working on his 144 mc gear. Fort Worth stations are now active, 40 miles away. Leroy used to do this hop very well on 112 mc and believes that more interest will be evident on 144.

According to Lloyd Broderson, W6CLV, the Sacramento gang is still active, including W6KME, BVK and MGC. A few weeks ago, Lloyd went to Salinas and installed a folded dipole for VQK who is the lone two-meter representative there. VQK has a plane rigged out for two-meter work, with an off-center single wire fed antenna, and a test hop was planned for October 19. W6BLP is a new station in Sacramento, who lays down a good signal with a flea-power portable. Lloyd is a firm believer of c.w. and i.c.w. as a good means of stretching the DX on the v-h-f bands.

Of scientific interest and some amazement it is, noted that October 9 which brought the meteor display also stirred up some two-meter DX, according to W9IOD. The horizontally-polarized gang started the evening out early about 6:30 CST with S8 and S9 signals. Active stations included W9BHJ,

[*Continued on page 51*]

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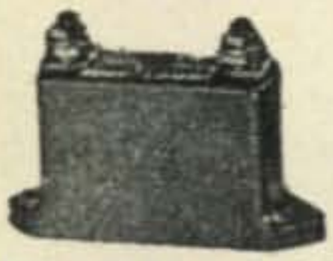

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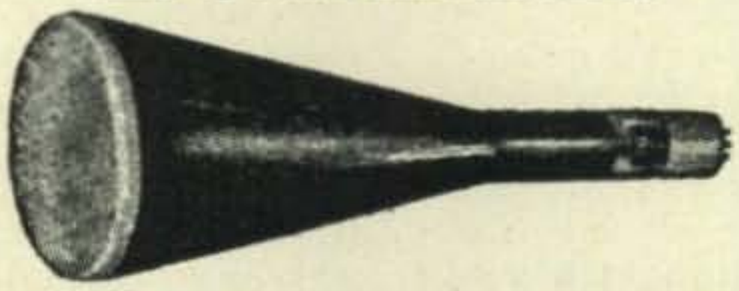

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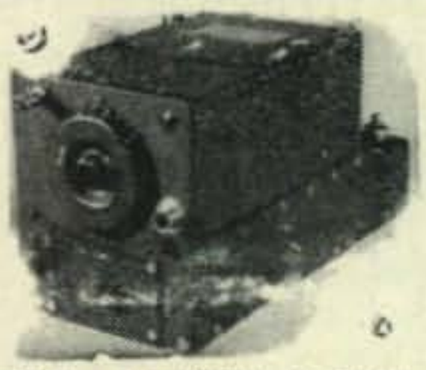
Sockets for 5CPI; 3BP1, and similar types of tubes..... $ .95

New ARC-5 Superhet Receivers Transmitters

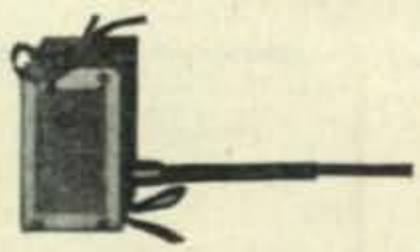


Tubes 3-12SK7; 1-12K8; 1-12SR7; 1-12A6. Range: (Specify freq. desired) 190-550 KC; 3-6 Mc; 6-9.1 Mc. Power; 24-28 VDC. with remote control, rack, plugs, and tubes only..... **$25.50**

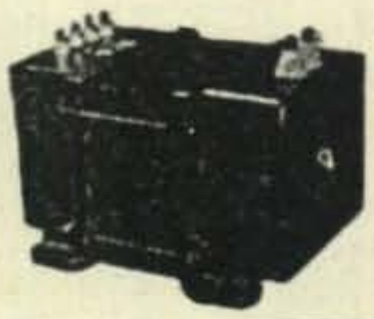
ARC-5 Transmitters; (25 watts CW; 15 watts phone. Tubes: 2-1625; 1-1629; 1-1626; 1 crystal. Range (Specify frequency desired): .5-.8 Mc; .8-1.3 Mc; 1.3-2.1 Mc; 4-5.3 Mc; 5.3-7 Mc; 7-9.1 Mc Power; 24-28 VDC. Remote control. Rack and plugs. Less dynamotor.... **$25.50**

Modulator unit; (with tubes) 1-1625; 1-VR150; 1-12J5 ..... **$12.00**

Transmitter-Dynamotor extra, new....$16.00
Receiver-Dynamotor extra, new .....$ 8.00



1-F Crystal filter for BC-312. BC-342. Resonant at 470 kc. Crystal included... **$6.95**



AMERTRAN PLATE TRANSFORMER. 115 v—60-cycle primary. 6200 volt-ct-700 mil secondary. Size 11"x14"x10" . **$39.95**

6 HENRY 700 M.A. CHOKES can be used with Amertran Transformers. **$7.95**

RELAYS

DPDT 10a contacts, 115 v/60 cps coil Allied **$1.79**

SPST 5a, ac; 115v cont. 115v/60 cps..... **$1.49**

SPDT contacts; 5a coil rated 115v/60c..... **$1.39**

DPDT 115v/60c. cont. rating 5a @ 50v..... **$1.69**

DPST Telephone type; 2p. 1 cl; 1 open; cont. rating, .5a @ 50v, coil rating 3.5 ma (@ 12 K ohms) 1000 vac..... **$1.05**

DPDT Leach relay, steatite insulated with, 10A silvered contact. Operates on 110 AC.. **$1.95**

SPDT Struthers-Dunn sensitive keying relay, 5 ma-dc Coil. 110v/60 cycles—2 amp contacts..... **$1.49**

SPDT mercury contact switch W.E. rated No. D-168479 @ 125 V 1 amp. 28VDC. 2 operating coils: 1-200 ohms 2, 3300 ohms mounted in standard metal octal tube, 6F6 size..... **$1.00**

OHMITE WIRE WOUND RHEOSTATS

Model H 250 ohms 25 watt.	$ .98
Model H 125 ohms 25 watt..	.98
Model J 1800 ohms 50 watt..	1.25
Model K 3000 ohms 100 watt	1.98
Model L 250 ohms 150 watt.	2.25
Model L 100 ohms 150 watt.	2.25
Model N 22 ohms 300 watts.	3.00
Model P 1200 ohms 225 watt	2.75

Audio Transformer, Modulators

Mod. for 211's cl. A 50 W	$1.35
Mod. 807 to pr 807's	1.65
Mod. pr 811's to 813....	5.00
Chi. transformer: P.P. Mod. & Driver 6L6's per pr...	3.30

Audio output transformer Split pri. 1500 Ohms each side. Secondary impedance 85 ohms center-tapped—6:1 ratio. 100 Watts output..... **$5.50**

NEW POWER SUPPLY for LM-18 freq. meter. Output: 290v. @ 20 ma; 13 v @ 600 ma. Input: 105-125 v. @ 60 cps; 260 ma; 27.6 W. type 84 rectifier tube; shock mounted. Complete with input and output cables, tube included..... **$14.75**

SILVER BUTTON MICA CONDENSERS

stud. mtg. (Erie/Centralab.) 175-180 - 185 - 245 - 335 - 360 mmfd 400 vdc each..... $ .05
lots of 100..... 4.50

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The YL's Frequency

by Amelia Black, W2OLB

MAYBE A C-W GAL should stick to code but we can't help thinking back to the recent Manchester, N. H. convention, which yours truly left as a neophyte public speaker. It was a wonderful ham-fest, more informal than usual, with all the trimmings that left with us warm and happy memories. And meeting eight licensed YLs whom we'd QSO'd but never seen, would alone have made the trip worthwhile.

Our hostess, Dot Evans, 1FTJ, made out very well in the code contest, copping second prize. She has a 35 wpm code certificate and a neat fist. Despite the romantic #88 ticket Dot held, she won nothing in the prize drawings.

Among the licensed hams we easily recognized tall, attractive Eunice Randall, W1MPP, of Watertown, Mass. Besides being an active ham since 1921, Eunice is a power company draftsman, holder of a commercial license and member of the I.R.E. Now on 80 and 2 meters, she hopes to get on 6 soon.

Also spotted Leora Howe, 1KKQ of Nashua, with no trouble. She's been a radio operator in the WAC, and is now taking G.I. training in photography. We had a very enjoyable lunch with Leora, Dot and Eleanor Blake, W1MWI. Eleanor is married to W1JDP, and lives in Wayland, Mass.

Met an old neighbor from Waltham—Louise Bruya, 1MDV. Though Class A since 1939, she works c.w. only, on 80. Most of her time is divided between traffic and DXing. During the war, Louise was an electrical inspector at Raytheon. OM is W1KKJ.

We were also pleased to meet W1MUY, Norma Moskey, of Manchester. She schedules husband 1JMY nightly on 80—Joe's doing a temporary bachelor act in Connecticut while waiting to move into their new home in Hartford.

It was nice meeting a lively rag-chewer, Alice, W1MJE, who is married to 1KON. Alice is a great favorite with the 80 meter gang.

For a long time, we've been anxious to know one of the most popular old-time YLs, May Smith, W1BDN, of Manchester. She has a wonderful collection of memories of ham activities that date back to really early days. May is the sister of W1HPM.

Lou Littlefield, 1MCW (One More Cross Woman, she says—very pleasant, we say) boasts 60 countries post-war on 10 phone, including a QSO with India. With her at the convention was OM W1CRU; their home is in Cape Elizabeth, Maine.

We were most impressed with the eloquence of a very "irate" wife who grabbed the mike when asked for comments following our talk. This well-stacked and luscious female (clad in falsetto voice, evening gown, wig and men's shoes) was indeed a boon to the womanhood of hamming. She delivered a magnificent address, gave typical ham conversations and left us with a rare gem of a definition—XYL means "X-terminate Your Love." This lady we're speaking of is the inimitable and reverend M. B. Strickland, W1GJG, and he's no lady!

At the Evans shack, Dot Wickenheser, W3JSH, better known as 2MIY (then Dot Knapp), met Dot Evans. After 7 years on the air together, the two Dots finally came face to face. (No puns now, about the Dots dashing together.)

Recently lunched with Kitty LePine, W2FKA, of River Edge, N. J. Looked forward to the meeting ever since seeing a pix of her holding a handsome fish (the edible variety—pickerel, I think). We talked out this mutual fishing hobby, then got down to hamming. Strictly a c-w operator from way back, and well known on 20 and 40, Kitty's converting to phone. For years she's been trying to get the OM ham-wise, but pounding brass just hasn't clicked with him. The idea of *talking* over the air finally intrigued him into studying for his ticket, and Kitty's being compromised into phone. Though Kit's doing all she can to help Bert with information and manuals she stops there—no prodding.

Another girl trying to stimulate her OM's interest is Lillian, W2PMA. Lil's applying real strategy. She simply moved her rig right up to Abbey's service station in Mamaroneck, N. Y. Between servicing cars, this particular Mr. and Mrs. can now be heard on 10 phone.

Brand new YL call, W2TBU belongs to Kit Zionson. A former WAC, Kit is now a schoolteacher studying engineering on the side . . . W2PBI, an old timer of several months, reports a new four element beam on 10 phone . . . another short-time veteran is W2QWL. Mignon is in the same a-c apartment hunting chase as yours truly.

The New York City YLRL is now holding round-tables on the first of each month at 8 p.m. on 29,000 kc phone and at 10 p.m. on 7220 kc for c.w.

Local YLs are anticipating the expected visit of ZS6GH, Miss Diana Tuck of Johannesburg, South Africa.

YL of the Month

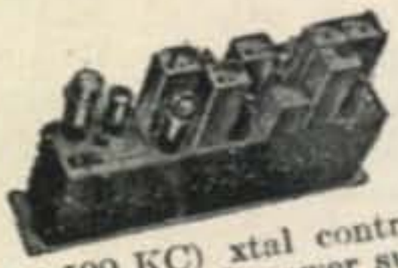
Also present at the previously mentioned luncheon with Kitty was Liz Zandonini, W3CDQ, of Washington, D. C. One of the best known hams in the

[*Continued on page 60*]

From left to right—Kitty Le Pine, W2FKA, Liz Zandonini, W3CDQ and Liz's sister Marie Zandonini.

Ham's Paradise!

EVERYTHING IN RADIO, ELECTRONIC, AND COMMUNICATIONS SUPPLIES



CW3 RECEIVER
Wilcox CW3 Receiver (used for aircraft monitoring) a fixed freq. receiver (1100 KC to 16,500 KC) xtal controlled superhet with BFO and AC power supply; 110 V, 60 cy; makes a beautiful ham receiver with a converter. Coils can be furnished in any of the following groups: 1100-2100 KC; 3500-6100 KC; 5600-10,000 KC; 9400-16,500 KC; complete with add. set of tubes and one set of coils Less xtal. **$32.50**

PLATE TRANSFORMER
6200 Volt CT-700 mils, 110 V, 60 Cy. Tapped primary 2KVA Amertran. Freight charges prepaid any part of Continental U.S.A. Special..... **$39.95**

MODULATION TRANSFORMER
Modulation transformer, perfect for input up to 300 Watts —150 Watts of audio with screen winding. Class C loads on Primary No. 1, 1400 ohms—Primary No. 2 is designed for screen of Tetrode or Pentode-Primary will match 811, 809, TZ20 or TZ40 Tubes. Complete factory specifications and circuit diagram included..... **$4.95**

W. E. Driver Transformer Class B will match any Class B grids from 6L6's **$3.95**
Perfect match for above transformer

VT 127A/100 TS TUBE
This Triode is capable of full output up to 600 MC; a pair will take a kilowatt input with exceptionally high efficiency. Plate dissipation is 100 watts; Rating—Class C Telegraphy; Plate Voltage—2500 V; Plate current 200 ma; Grid Voltage 150V; Grid Current 25 ma; Filament Current 10a; Filament Voltage 5v; Amp. Factor—15. For further description see Article Nov. QST. Spl. **$3.25**
Special **Mykroy socket** for above tube **$1.25**
Heat Radiating Caps for VT 127 2 for .25

FULL WAVE SELENIUM RECTIFIER
Perfect for bias application—Use your DC relays from an AC source. Unit is very small and compact. Only requires 3"x ½" mounting space. Rectifier for input up to 300 Volts @ 40 ma. output. Made by G.E.
$.89 or 5 for $4.00

Johnson type 803 ceramic socket suitable for both 803 & RK 28 etc., tubes—comes complete with rubber and aluminum 5" diameter shock mount. Very special..... **$1.99**

Socket for 204A, 849..... **$1.95**

EBY 7 prong ceramic miniature with shield. Special..... **$0.39**

Gon-set 6 or 10-11 meter converter **$39.95**

Cramer hour counter, 110 VAC... **$ 4.95**

I. R. C. bleeder resistor 50,000 ohms 100 watt. Very special..... **$ 0.89**

9 conductor cable shielded with rubber outside covering. Per foot..... **$ 0.12**

Antenna change over relay. Leach type 1357 DG-13F-DPDT—plenty of spacing. Mounted on low loss bakelite..... **$ 2.50**

In stock **GA75 Temco Transmitter.** First come, first served..... **$495.00**

Coax cable RG8U/RG11U. 100 ft. **$7.50**

Coax couplings for standard. 405 cable silver plated. Male..... **$ 0.40**

Coax right angle connectors, silver plated..... **$ 0.90**

Chassis feed-thru, female on both sides..... **$ 0.79**

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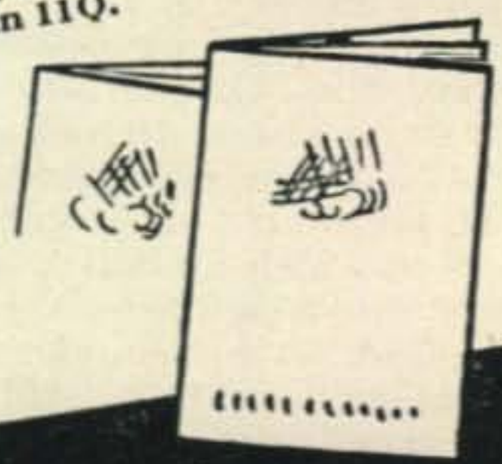
We carry a complete line of B&W, Westline and Cardwell equipment in stock. Send us your request or ask for catalog.



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parts & products

QSO Index Book

A spiral bound loose leaf QSO index book is now being manufactured by Charles B. Ware, W3GQS. An interesting approach to the problem of keeping a record of QSOs with pertinent information, the QSO index provides space for about a 1000 calls under each alphabetical heading. Full details may be obtained by writing Charles B. Ware, W3GQS, Feasterville, Pa.

Communications Receiver

Collins Radio Co., Cedar Rapids, Iowa has announced a new communications receiver engineered specifically for amateurs. Containing many desirable features, the 75A is the first amateur radio communications receiver made by Collins, who are outstanding manufacturers of all kinds of communications equipment.

The double conversion circuit of the 75A employs fourteen tubes, including a rectifier. The use of double conversion avoids the compromise between a high i.f. desirable for image rejection and a low i.f. for optimum selectivity.

Features of the Collins receiver include an entirely new system of permeability tuning providing linear

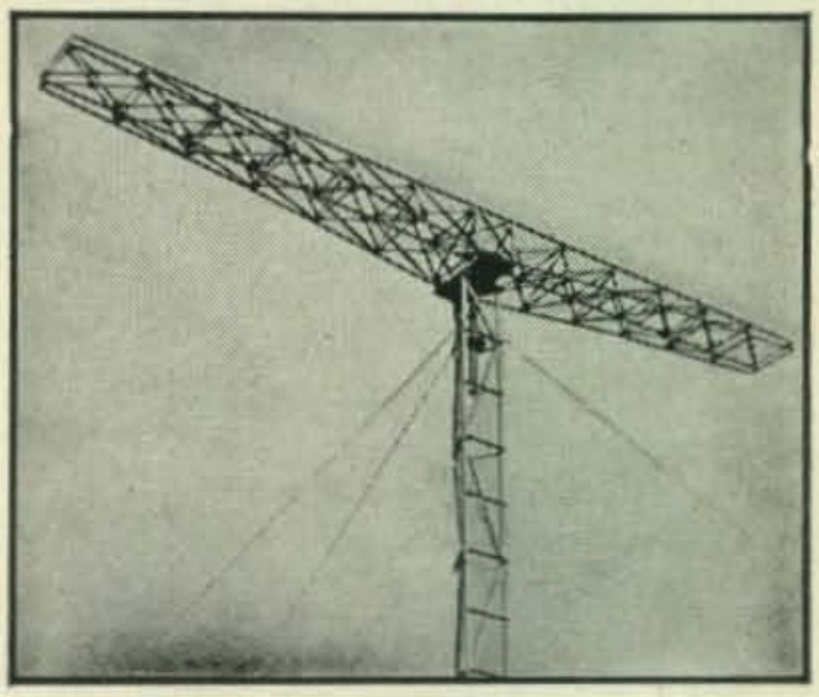
calibration on all bands. Ten turns of the vernier tuning dial cover 80, 40, 20, 15, 11, and 10 meters. Each division of the vernier dial (which has 100 divisions) represents 1 kc on 80, 40, 20, and 15 meters, and 2 kc on 11 and 10 meter bands.

Dial calibration is directly in frequency; variable selectivity crystal filter; automatic noise limiter; calibrated S-meter; high stability; separate oscillators for mixers; and amplified a.v.c. are additional features of the 75A. A 1 microvolt r-f input signal provides normal audio output with approximately 10 db signal-to-noise ratio.

Rotary Beam Antenna Support

The new Trylon Rotary Beam Antenna Support made by the Wind Turbine Company, West Chester, Penna., offers amateurs an easily installed fully dependable unit for 4-element, 20-meter array. Of lightweight, stainless steel, spot-welded construction the support has an overall length of 19'2" yet weighs only 31 pounds exclusive of the mounting assembly. Ball bearing design provides full and easy 360° traverse and the unit is adaptable either to manual or motor drive. The beam attaches easily to any supporting tower. It can be tilted in either direction and thus brought flat against its tower for easy accessibility to permit turning or adjustment of the array without removing the support from the tower.

The Trylon rotary beam antenna support incorporates the same design features that are used in the high commercial broadcasting sticks. It supports a 4-element array with a sufficient margin of safety to withstand wind and icing conditions that so



often wreak havoc with home-made supports and sometimes even cause property damages.

The support can easily be moved from one location to another and can be erected with no tool other than a screwdriver. It is shipped in convenient knockdown sections with complete instructions for quick, easy erection.

A folder picturing and describing the new development in detail will gladly be sent on request to the Wind Turbine Company, Tower and Antenna Division, West Chester, Pa. Other available literature describes Trylon Antenna Towers for all amateur and commercial stations applications including ideal towers for use with the rotary beam antenna support.

V-H-F Tetrode

United Electronics Co., Newark 2, N. J., has announced their new type 5562 v-h-f tetrode. A graphite type anode with a new isolated getter-trap gives the United 5562 the lowest operating temperature of any tube of this kind.

General characteristics of the 5562 are: filament, 6.3 volts at 3.0 a.; amplification factor 60; transconductance 2500 micromhos; interelectrode capacitances; input to plate, .2 $\mu\mu$f, input 6.5 $\mu\mu$f, output 1.8 $\mu\mu$f. Maximum Class C telegraphy ratings up to 120 mc are: d-c plate voltage, 2000; d-c grid voltage (grid 1), 350; d-c grid voltage (grid 2), 400; d-c plate current, 125 ma; d-c grid current, 20 ma; plate input 175 watts; screen input 8 watts; plate dissipation, 45 watts.

Feed-Thru Capacitors

New hermetically-sealed, metal-cased, feed through capacitors are now in production at the Cornell-Dubilier Electric Corporation.

The hermetically sealed, metal cylindrical containers are equipped with universal side mounting brackets with foil ends fully swaged by a new

HIGHLIGHTS at SRI

SECONDARY FREQUENCY STANDARD

Model 18A

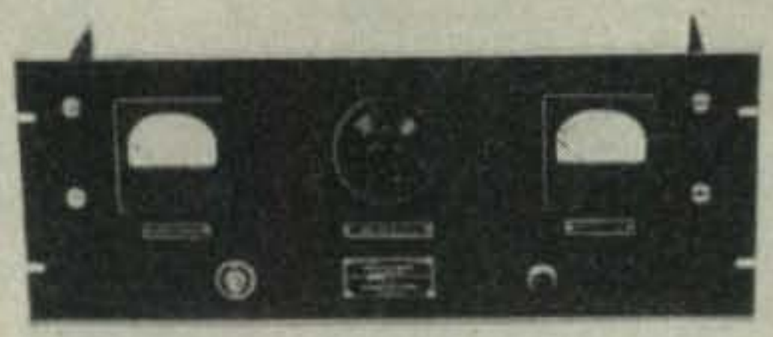
Measures transmitted and received signals with high accuracy. Multivibrator and tuned output amplifier.

- 100 KC to 45,000 KC
- 1000-100-10 KC Check Points
- 100 to 250 V., 25-60 Cycle

Power Supply self contained with dual crystal, spare tubes and instruction book.

A Buy At

29.50



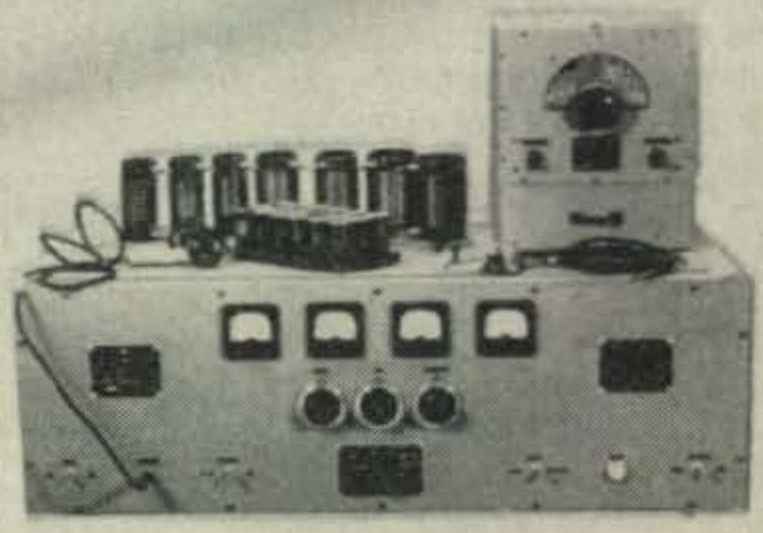
COMPRESSOR AMPLIFIER

A precision unit, extremely useful for PA systems and transmitting applications. Maintains 100% modulation percentages. Doubles the output of the transmitter by raising the average modulation level. Frequency response (30 to 10,000 CPS).

- 38 db. Amplifier Gain
- 600 OHM Input and Output
- Relay Rack Mounting
- Power Supply: 100-220 Volts, 50/60 CPS, self-contained.

Your Cost Only

59.50



Less tubes **325.00**

Model 150B

250 *Watts* TRANSMITTER

Conservatively rated phone and CW. Fully automatic—push to talk, etc. Variable frequency oscillator (ECO) included. Unit comes complete with self contained 110 volts 60 cps power supplies, mike, key and spare parts—just connect to power source and you are on the air.

Frequency range: 1500 to 12,500 KC (continuous coverage). Short required turns on two coils for 20 meters. Convertible to 10 meters. Pi network matches directly to antenna on 72, 150 or 300 ohm line.

TUBE COMPLEMENT (tubes not furnished): Modulator: 1–6J5, 2–6V6GT's, 2–811's, 2–866A's, 1–5U4G. Shifter: 1–6F6G, 1–6L6G, 1–VR150, 1–VR105, 1–5U4G. RF Final: 1–813, 2–866A's.

All transmitters brand new and packed in original manufacturer's export crate. Two instruction books supplied. Built by Meissner to U. S. Signal Corps specifications.

With Tubes–Ready To Go On The Air

349.50

Terms: 25% deposit. Balance C.O.D.

Special At

13.75

For the portable rig

INVERTER

Input 6 or 12 VDC, Output 110 V. AC, 60 CPS. Designed for continuous operation delivering 15 Watts (low power) or 50 Watts as desired. Shipped complete with spare vibrator. Entire unit self contained in steel cabinet. Size 7½ x 8 x 8½.

A Buy At

13.95

DYNAMOTOR

Designed for 6 or 12 Volts DC Input. Delivers 500 VDC @ 160 MA continuous service. With intermittent operation the unit will deliver 224 MA. Furnished complete with integral filter circuit, relay, fuses, etc. Type P103A.

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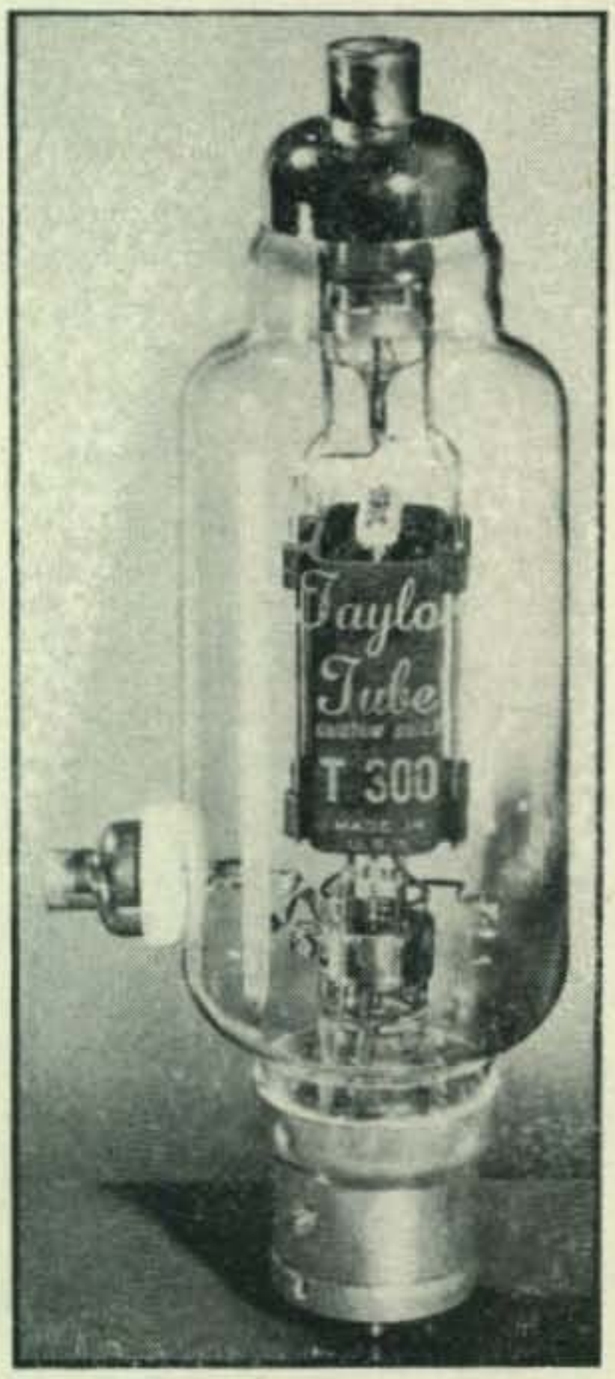
process. The d-c rated voltage is 600 volts, the a-c rated voltage 330; both at 15 amps. Capacities range from .01 μf to .5 μf. Further details of these new capacitors will be furnished upon request to Cornell-Dubilier Electric Corp., South Plainfield, New Jersey.

Medium Power Triode

A new triode transmitting tube in the medium power field, the T-300, has been released by Taylor Tubes, Inc., 2312 Wabansia Avenue, Chicago. With an increased filament wattage and carbon plate the tube is similar in some respects to the old 204-A, and is a similar to the HF-300, KU-23 and the DR-300 except as indicated.

Physical characteristics: Overall size—12" $\pm$ 1/8"; overall diameter of bulb—3½"; overall diameter over grid pin (brought out at side) 4¾"; base—Jumbo 4-pin; diameter of plate connector—13/16" diameter of grid connector—½"; filament—theoriated tungsten; plate—carbon.

General electrical characteristics: filament voltage—11 volts, d.c. or a.c.; filament current—6 a.; amplification factor—23; interelectrode capacitances: G-P 7.0 $\mu\mu$f, G-F 6.0 $\mu\mu$f, P-F 1.4 $\mu\mu$f; maximum rating for one tube: plate volts—3,000; plate current—300 ma; driving power—20 watts (approx).

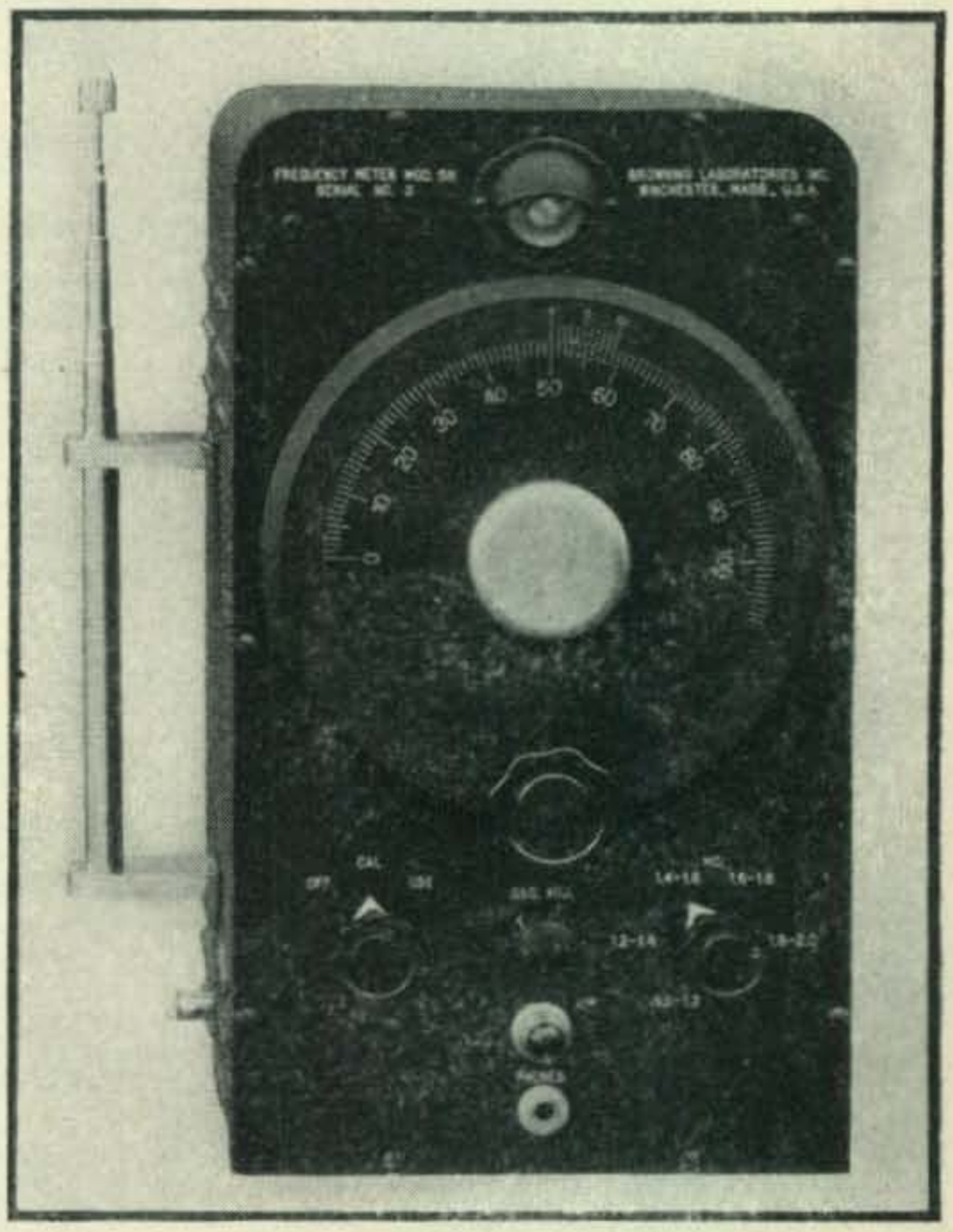


Frequency Computer

Problems involving frequency, inductance and capacity are quickly solved with the "Calculaide" frequency computer devised by American Hydro-math Company, 145 West 57th Street, New York 19, N. Y. This new frequency computer correlates, in one setting, the natural frequency and wave length of a circuit comprising a coil and condenser with the physical dimensions of the coil and the capacity of the condenser.

Since all answers are given at only a single setting, the computer greatly simplifies resonant circuit calculations. Inductance values can be determined for widely varying physical dimensions of coils, such as high-power transmitting coils or the smallest single-layer receiver coils.

The computer's range covers frequencies from 400 kc to 150 mc and wave lengths from 2 to 600 meters. It handles condensers of capacity between 3 and 1000 $\mu\mu$f. Inductance values which can be



determined extend from .1 to 1500 μh. The device performs calculations with coils of ¼" to 5½" diameter, ¼" to 10" length, 2 to 150 turns per inch, of 10 to 35 gage wire, whether enameled, single or double silk covered, or single or double cotton covered.

The Calculaide frequency computer is produced from three sheets of tough, non-warping vinylite plastic. All markings are indelibly heat-sealed into the body of the plastic itself. Only 6¼" in diameter, and semi-flexible, it can be conveniently carried in the pocket. All scales appear on one side of the computer. An attractive leather vase is available.

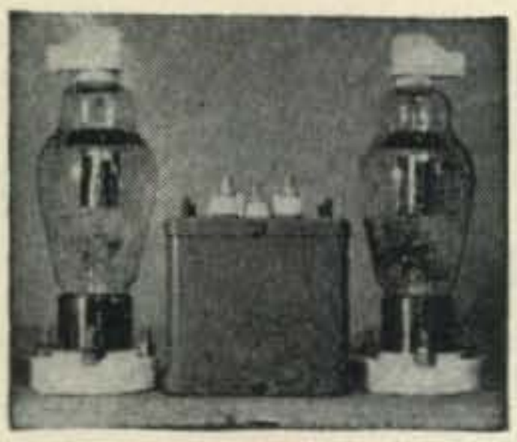
Crystal Controlled Test Oscillator

Bliley Electric Company, Erie, Pennsylvania, announces a test instrument, completely crystal controlled, engineered for greater proficiency and accuracy in radio alignment. This crystal controlled oscillator, known as the CCO, employs Bliley low temperature coefficient quartz crystals, stable to

[*Continued on page 52*]

"TAB"

That's A Buy



Raytheon 866A filament transformer 115V 60c pri, 2.5Vct 11A Sec and Two new RCA 866A tubes..... $5.90
With Millen caps and sockets.....$7.00
Raytheon Transformer only.....$3.25

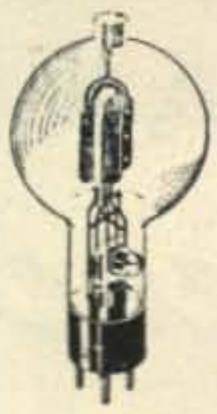
Combination Two 872A's KENYON TNSF, SOCKETS New gtd..... $12.00

Collins transformer mfgd. Chicago Transf Co. Pri 50/60 cy 105, 110, 115, 120, 125V inpt; Sec. 1100VCT/212ma cased and two 10hy/250ma/100 ohm GE chokes and two 3mfd/330VAC 1000WVDC pyranol condsrs Gt'd new worth $40..... **$ 9.50**
Same but primary 115V & 230V50/60cy..... **10.50**
115V/60 cy pri; 2.5V/1.75A, 6.5V/8a, 5V/3A, 6.5V/.6A & rectifier tube 1641/RK60 ..... **$ 4.50**

RAYTHEON cased 840VCT/110ma, 530VCT/21ma, 5V 3A, 5V/3A, 6.3V/1A, 6.3V/6A, 115V/60c pri & Two 10hy/110ma hermetlly cased chokes & oil condsr. 2/2.5mfd & 5mfd..... **$ 5.95**

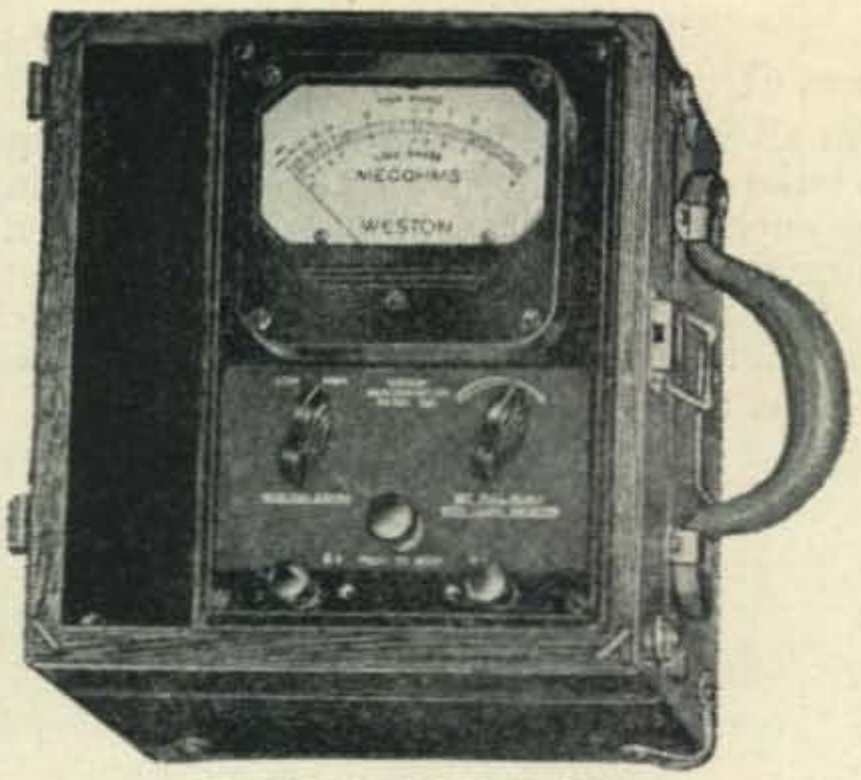
Cased hermetlly sealed transformer pri 50/800cys-105/125 &80V Sec. 1000VCT & 300v110 ma, 6.3V/4.5A, 5V/3A, 6.3V/.65A, 6.3V/.65A, 6.3V/1.25A & two cased H' sealed 10hy/110 ma Chokes & two condsr. 3mfd/330VAC/1000 VDC pyranol..... **$ 9.95**

Thermador cased SC. Rated cont. 3800VCT/6KW/2.7 amps. Primary 200, 210, 220, 230, 240, 440, 50/60cys ($365)..... **$45.00**
GE line trans. 220V/50/60 cys, sec 117/112/103/93V-7 Amp..... **$20.00**



6AK5 JAN new (LP$4), $1.25 @ 2 for..... **$2.00**
RCA&NU 829B/3E29 JAN boxed gtd, with socket..... **$4.50**
RCA 808 JAN-CRC, new, gt'd fil 7.5V/4 amp., plate 1500V/200 watts, rated 140 watts output each, "UHF" (list $7.75) "TAB" price $2.70 @ 2 for..... **$5.00**
GE&WST 807 JAN (LP$2.75) 1.35 @ 2 for..... **2.50**
GE&RAY 955 JAN (LP$2.85) .65 @ 2 for..... **1.25**
VT127A/100TS UHF 100 watts 2 for..... **7.50**
956, 957, 958A, new & socket, ea. **1.25**
872A, new & socket, 2 for..... **5.75**
RCA 6AC7 JAN boxed new, 4 for **3.00**

SC. A27 Phantom Antenna new with manual, contains Millen 12515 Variable condsr. 150MMF/3000V & 2W. L. plaque 12ohm/40W resistors, metal box, cables, clamps, spares..... **$ 1.95**
WSTGHSE dual AN Ind. two 200 micro amp. mvts..... **4.50**
Weston GE-10, plus 6DB 500/600 ohm ($14)..... **3.95**
Weston 476 Sq. 3" B' Case 15VAC ($10)..... **4.25**
GE RF 0-100, 3½" B' case micro amp mtr..... **8.98**
Simpson one ma 3½" Rd. B' case..... **3.95**
GE. Weston, or eq., 1 ma 2½" Rd case..... **2.50**
Wstghse running time indicator, six digits..... **5.95**
WE 200 3½ rd B' case micro amps..... **4.95**
Dynamic mike & transformer, complete, new..... **1.95**
16' Ext. cord, hvy duty, SJ. Male & Fem. plugs. **1.00**
IRC WW 100000 ohm/40 watt .65 ea., 2 for..... **1.00**
WE crystals IN22, 23, 26, 4 for..... **1.50**
Collins-Choke, cased, 6HY/1.2 amp/12500V wkg ($70)..... **16.00**
Socket CINCH DIHEPTAL ($5.90)..... **.49**
Socket, Amphenol, S8TN octal, HF, 25 for..... **1.50**
Socket, Amphenol, 49S8 octal, ceramic, 10 for.... **1.00**
Socket, acorn, Ham'lund, UHS900: 4 for..... **1.00**
National XC-5 Ceramic 5P socket: 4 for..... **1.00**



WESTON MODEL 796

Portable insulation tester and megger NEW NAVY termination. Tests insulation and resistance up to 200 megohms, test potential 350 to 500 vdc. Resistance 0-20-200 megohms .5 and 5 megohms center scale. 4" sq. 50 microamp mtr. less batteries, test leads and carrying case (LP $100)..... **$16.95**
with carrying case $24.75: Parts for 500V-AC supply $9.

NEW NAVY VIBRAPACK & STG' BATY TBY-Type CLG-20144 & CLG-19029 mfg'd by Electronic laboratories and WILLARD non-spill Battery-rated 4.2V/40AH, 16 hour discharge rate, complete with acid. Vibratorpack delivers plate voltage 156V/35 ma, C'bias-7.5V30 ma fil 3V/375ma, fil 1.5V/200 ma V'Pack & battery separately cased in steel box, units hinges & plug into each other, overall size 2 units H4⅜" x 9⅛" WxD 6⅛" wgt. 19 lbs. Pack contains vibrator & CK 1005, battery charges 6V stg' bat or chger. Ideal rcvr, xmtter, amplifier pwr source; with manual..... **$ 9.95**
Additonal spares 5 fuses, CK1005 ($3.80) & vibrator **2.75**

SOLA constant-V Transf 95 to 125V/250Watt/60 cy (LP$52) new overseas packed **$19.00**
WE 16 MFD/400V oil condensers ($9), 2 for..... **2.35**
Condsr 0.5 mfd/600WVDC Bathtub, 5 for..... **1.00**
Condsr. 10 mfd/600WVDC (2/2.5 & 5mfd) 2 for. **2.50**
Condsr. 20mfd/600WVDC (1-2-3-4-5-8mfd), 2 for **5.00**
Condsr 3mfd/330VAC/1000WVDC, 2 for..... **2.50**
Condsr 2mfd/2000wvdc W & CD, 2 for..... **4.25**
Condsr 3mfd/2000WVDC, 2 for..... **5.00**
Condsr 15 mfd/330VAC/1000WVDC GE/PYR ($18) with standoff insulators..... **2.95**
Condsr 30mfd/660VAC (2 or 3 units)..... **8.10**
Condsr 2mfd 5500WVDC WSTGHSE oil..... **10.00**
Thordarson & Wheeler WE transf. 115V50/60cy Primary; Sec. 1540V no CT & 670VCT at 300 ma $4.95 ea., 2 for..... **7.00**
Buss & Littelfuses 3AG/250ma (25c), 48 for..... **1.00**
Resistor Kit 100 BT½ & 1W; 50 to 2 meg **2.50**
Condsr kit QTY silver mica; 50 for..... **2.00**
Control kit type ABJ; 50 to 1 meg, 10 for..... **2.50**
Write for information on other parts including tubes, transformers, condensers, sockets, chokes, rcvrs & Xmtters.

CRYSTALS MTD QUART'D 6250 to 6750 (6 MTR), 6797 to 6863 (11 MTR), 7000 to 7425 (40, 20, 10 MTR), 8335 to 9000 (6 MTR) Low T'drift, active osc's each 85c, 4 for..... **$3.00**

Other frequencies available on request

Dual socket xtal, 2 for..... **$ .25**
DC-9 Xtal Std ±10 cys **5.95**
100 KC Crystal std's..... **7.20**
200 KC Xtal Std ± 10 cys..... **5.95**

$2 Min. orders FOB N.Y.C. Add Postage all orders and 25% deposit. WHitehall 3-3557. Send for catalog 300.
Specialists in International Export, School, College & Industrial trade. Special prices in quantity. Moneyback "TAB" Guarantee

"TAB," Dept. Q12, Six Church Street, New York 6, N.Y., U.S.A.

Letters

C. W. —Phone Subdivisions

512 Parkside Dr., Peoria 5, Ill.

Editor, *CQ*:

I'm all for your plan of a "division of frequencies on a basis determined by the percentage of amateurs using each type of transmission." Your idea of including foreign stations in this division is just right, too, I think. The 20-meter band is practically ruined right now by foreign phone and I believe it's high time for something to be done about it.

L. A. Morrow, WØVKF

Chester House, Chine Crescent,
Bournemouth West, England

Editor, *CQ*:

. . . . commend me to your editorial of the August issue . . . . beginning Foreign Governments. Is the British ham included in this heading? And has the F. C. C. the deciding vote internationally as to what comprises the c.w.-phone bands as regards British amateurs? You state that you realize that for stations outside USA, to work in the American phone band would probably mean they would be "smeared." Might I be so bold as to ask if you have listened on 14000-14200 kc to QRM caused by your GI stations operating in Europe and Italy with power far in excess of any lawfully used by the English amateurs. If so, have you ever considered that these stations are a great deal more offensive outside the band?

. . . . the old line "they are working traffic" is in your own language "baloney." If you are so keen on fair play, wipe your own slate clean first and insist on American phones in Europe working inside the American phone bands where 500 watts can compete with 500 watts and kw against kw—not 500 watts and kw against 150 watt phone and 25 watt c-w stations.

I agree that international agreement is necessary re band sub-division, but let it be *international* and not so selfishly American as your article indicates.

Fred C. White, G3XP

1834 N. E. 50 Ave., Portland 13, Ore.

Editor, *CQ*:

What has been gained by the proposed frequency changes on 14 mc? It is commonly felt amongst people with whom I have talked that the old 14 mc frequency allocations were excellent. Something like them should prevail throughout the amateur spectrum in order to divide QRM and especially band edge QRM.

Putting the phone band in the middle of 20, splits phone and c-w QRM. It also leave two edges for the phone DX man and gives the c-w operators two edges instead of one as now proposed. No change should be made without mature deliberation among the amateur actively operating on the bands under discussion.

Wally Hagestad, W7ENW

QSLs

4030 N. Leclaire Ave., Chicago 41, Ill.

Editor, *CQ*:

It is true that we could still enjoy our amateur radio even if no QSL cards were ever printed, but it is certainly just as true that our hobby is a lot richer and fuller because some of us do send cards. It will be twenty years this December since I received my

HARRISON HAS IT! HARRISON HAS IT!

GOOD-BYE TO BATTERY EXPENSE!

for

- Portable Receivers
- Transmitters
- Walkie Talkies
- Remote Controls
- Test Equipment

This efficient pack works on any 6 Volt DC source, and has such desirable design features as neon voltage regulator, complete filtering, remote load start relay, etc. Brand new in sealed Navy inspected cartons, fully guaranteed. *One of the most sensational HSS values ever offered*

COMPLETE VIBRATOR PACK

less only battery (use it on four flashlight cells or your car battery, etc.)... **$3.95**

COMPACT POWER PACK

For little more than the cost of one set of regular dry batteries, you can obtain a new, modern, vibrator pack that will save you space, weight, and money! Ruggedly made for Navy radio equipment, this pack gives excellent service under the roughest field conditions.

- *Only* 1¾" x 3⅝" x 4" high (6½" high with battery)!
- *Weighs* 3 lb. 10 oz. complete!
- *Delivers* 135 volts at 20 ma in continuous Military duty or 30 ma, or more, in intermittent Amateur service; 1.5 filament or 6.3 heater, bias, and microphone voltages.

Complete Power Pack including clip-in Willard storage battery. Unbreakable plastic NON-SPILL CASE (even if turned upside-down!) Shipped bone-dry, fully charged, ready to put into immediate service, or to store for years. Can give several hours of *continuous* operation at full rated load and then be RECHARGED for only a few pennies by any ½ ampere charger or our special trickle charger.. **$5.50**

(Spare Storage Battery—$2.75)

BATTERY CHARGER. Noiseless. Selenium rectifier type, to trickle charge these or any other small batteries at .2 Ampere. 110 Volt AC..... **$2.97**

If recharging facilities are unavailable we can supply these packs with clip-in Willard 6 volt lead-zinc Primary batteries. 25 watt hour capacity. *Unlimited* shelf life (Can store for years!. Excellent for export.) 1¾" x3½" x 2½", only 21 ounces! Complete pack with TWO Primary batteries..... **$5.75**

Replacement Primary Batteries

These batteries are also a fine source of 6 Volts DC for many other applications. **95c**

Export packed case of 20 **$14.75**

● KW MODULATION TRANSFORMER

Here's an FB HSS value in a hard-to-get item! RCA commercial quality construction. Conservatively rated at 550 Watts of audio, will modulate up to a kilowatt final.

Primary matches any Class B modulators up to 10,000 ohm plate to plate. Impedance ratio 1:1. Secondary carries 450 ma. Tertiary winding to modulate screens or suppressors carries 80 ma.

Mycalex terminal board with three adjustable protective flash-over gaps insures against breakdowns. Open frame mounting. Actual weight 38¼" lbs. **$29.75**
9½"x7½"x7¼" high.....

● ANTENNA TUNING UNIT

Signal Corps BC-939-A (Hallicrafters AT-3)
Will efficiently couple up to KW transmitter to any short or long wire antenna working against ground. Full range of 1.5 to 18 Mc.

You've seen these sold *as surplus* at $79.50. Harrison sells them NOW, brand new, complete with RF meter, cabinet, and *both* plug-in vacuum condensers, for only.. **$29.95**

24G Tubes (3C24/VT204) An FB triode for VHF. 90 Watt rated Class C output.
6.3 V 3 amp. filament. Small bulb. Gov't insp., fully gtd.)
Regular amateur net price was $9.00, reduced to $6.00. Harrison sells them for only..... **$1.49**

● COAXIAL CABLE

Save money! See our previous ads for all types!

RG-58/U. 55 ohms. An efficient, light-weight transmission line (.195 OD) for Amateur, FM, and Television antennae. Also use as high quality, inexpensive crystal mike or pick-up cable. List price.....$18.50

HSS SPECIAL
100 feet for..... $3.95

● BC-406 15 TUBE UHF RECEIVER

(BC-406-A 16 Tubes, with motor—$29.75) **$19.95**

These are the good ones! Complete with tubes and conversion instructions. Ask the ham who got one from *us!* See our previous ads.

● TRANSMITTERS

Still the best buy in a modern, post-war rig! *Conservative* output rating of 75 Watts Phone, 100 Watts CW. The price of $495 brings you an FB *stable* VFO, full coverage of 10, 15, 20, 40, and 80 bands, one dial tuning, bandswitching, and everything to go on the air but key, microphone, and antenna. Add it up yourself and you'll see why the Temco 74-GA is gaining such popularity!

And to step up your power later, just slip it into the 500 GA Amplifier and you will have a complete, well engineered 500 Watt *output* transmitter. Order your 75-GA from Harrison, today!

● 20, 10, or 6 METER RECEPTION WITH YOUR BCL, AUTO, or SIGNAL CORPS RECEIVER! **$39.95**
We have the new GON-SET Converters in stock

Ask for Literature.

● OIL FILLED CONDENSERS

Standard makes, new, guaranteed, all at prices that will save you money. HSS
2Mfd, 1000 Volt. Round, upright case mounts in ¾" hole
FOUR for $2.34
Rectangular, upright cases, with ceramic terminal insulators:

4 Mfd, 600 Volt	THREE for $1.98
10 Mfd, 600 Volt.	TWO for $2.47
8 Mfd, 1000 Volt.	TWO for $3.88
4 Mfd, 1500 Volt.	TWO for $3.98
1 Mfd, 5000 Volt	$2.45

● XTALS

Good oscillators, mounted, sealed, *guaranteed*. 40-80 meters. (Three or more postpaid) **90c** each

MAIL ORDERS? Certainly! Just list everything you want (items in this ad, or any ad, magazine or catalog) and include remittance.

Vy 73 de

Bill Harrison, W2AVA

HAM HEADQUARTERS *Since... 1925!*

HARRISON RADIO CORPORATION

11 WEST BROADWAY • NEW YORK CITY 7

PHONE—BArclay 7-9854 • EXPORT DEPT.—CABLE—"HARRISORAD"

[JAMAICA BRANCH—172-31 Hillside Ave.—REpublic 9-4102]

W9KA and I still send a card to every station I work. Of course I only send a card the first time I work a station. I might add that I always get a kick out of receiving a card even though it be from a station in my own city.

Roy W. McCarthy, W9KA

Hats off to old-timer W9KA who would serve as an example to the 65% of the boys who haven't answered our postwar cards.—Ed.

How Much?

1440 Floribunda, Burlingame, Calif.

Editor, *CQ*:

. . . . I am a potential purchaser of many articles advertised having been off the air many years and anxious to resume operation. I am enthusiastically fired up over reading descriptive articles (of equipment) and your ads, but what do they cost?

I am fully cognizant of present-day cost conditions. However manufacturers who do not quote prices may very well lose sales, as we are likely to buy some other brand priced right. Actually the article we really want may also be within our purchasing power.

A. R. Kanaga, W6BAA

The "Best" Antenna

Elmhurst College, Elmhurst, Ill.

Editor, *CQ*:

We have found at W9SCH that a horizontal may be even more of a "cloud warmer" unless it is at some multiple of a half-wave above the reflecting surface—tending otherwise to squirt most of the energy straight up at the clouds where it can never do any good, except to an itinerant bird.

In looking over the average suburban location, one notices that there are many more horizontal conductors in the field of the antenna than vertical ones. According to simple reasoning a vertical should suffer far less absorption than a horizontally polarized wave.

It is possible to make a vertical antenna perform satisfactorily at any height above ground provided that one places a set of radials—or a ground plane, immediately beneath it. At W9SCH a ten meter vertical with its lower end about 25 feet above ground performed in a rather mediocre fashion until a counterpoise of four twelve foot rods was placed beneath it. A 14 mc half-wave vertical now in use here also responded favorably to the same treatment. The radial system in use beneath the 14 mc antenna consists of six wires stretched over a composition paper roof, connected together at the common center, but insulated from the rest of the system. For best results, the radials should approach a quarter wave in length, but this is not critical.

It is believed here that, aside from a directive system, the vertical half-wave antenna with a radial system is the most effective DX radiating system for the average ham.

C. F. Rockey, Jr., W9SCH

Electric Co. Special

P. O. Box 311, Sanford, Florida

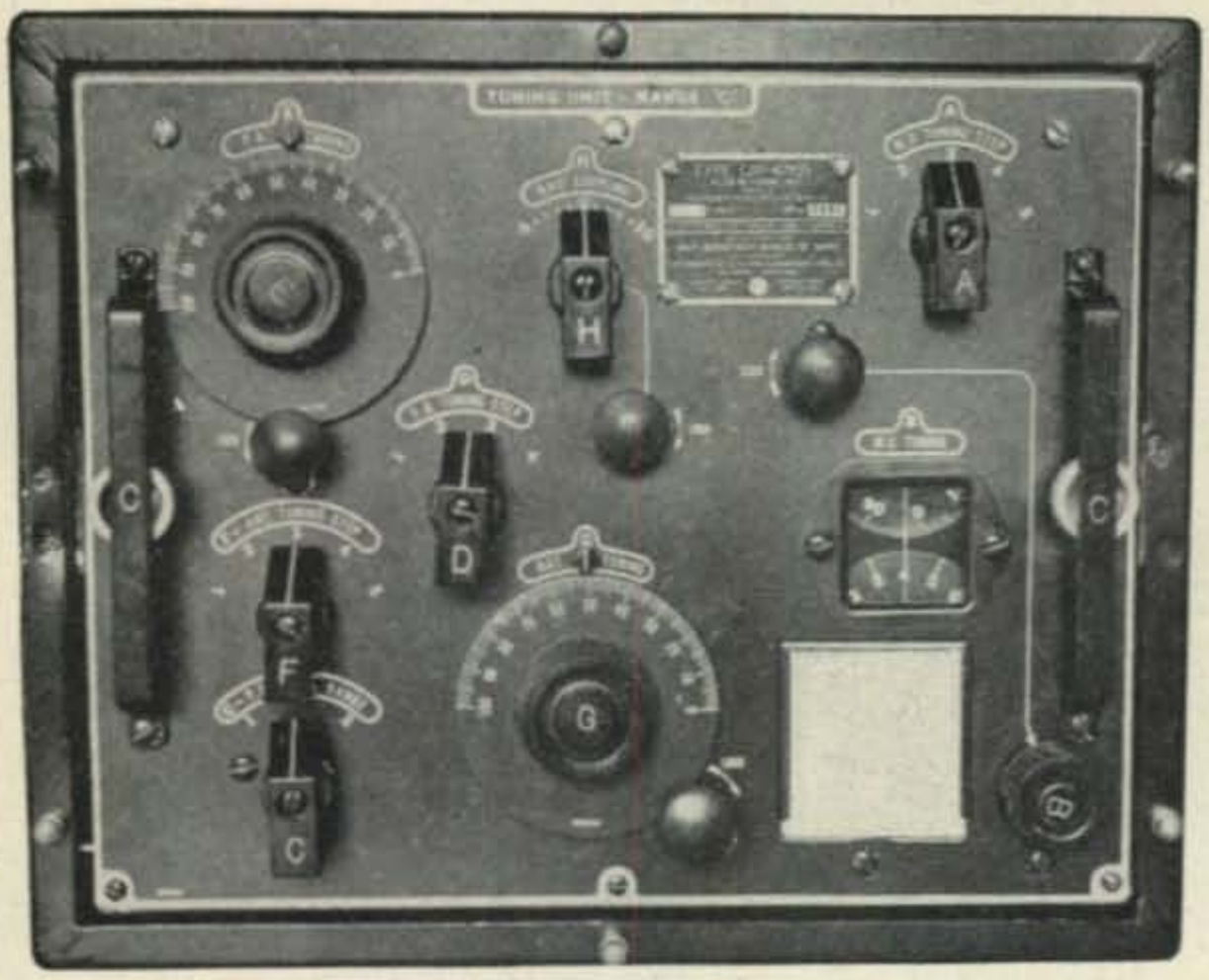
Editor, *CQ*:

Re: page 27, Sept. 46 CQ. How do you turn the d—n thing off?

Paul E. Trued, W4HXM

The draftsman owns stock in the light company. A switch in the center tap lead of the supply would do the job.—Ed.

Here's the Basic Unit for Your New Transmitter



Precision Tuning Assembly Built by Westinghouse --only $12.50

The addition of 2 tubes makes this compact tuner the best little C.W. transmitter you ever saw. It will handle any power up to 250 watts as a transmitter or may be used as an E.C.O. to drive anything you've got. Locking type precision controls provide calibrated tuning for M.O., P.A. and antenna circuits. The tuner was built for the Navy and is obviously a remarkable value at **$12.50**

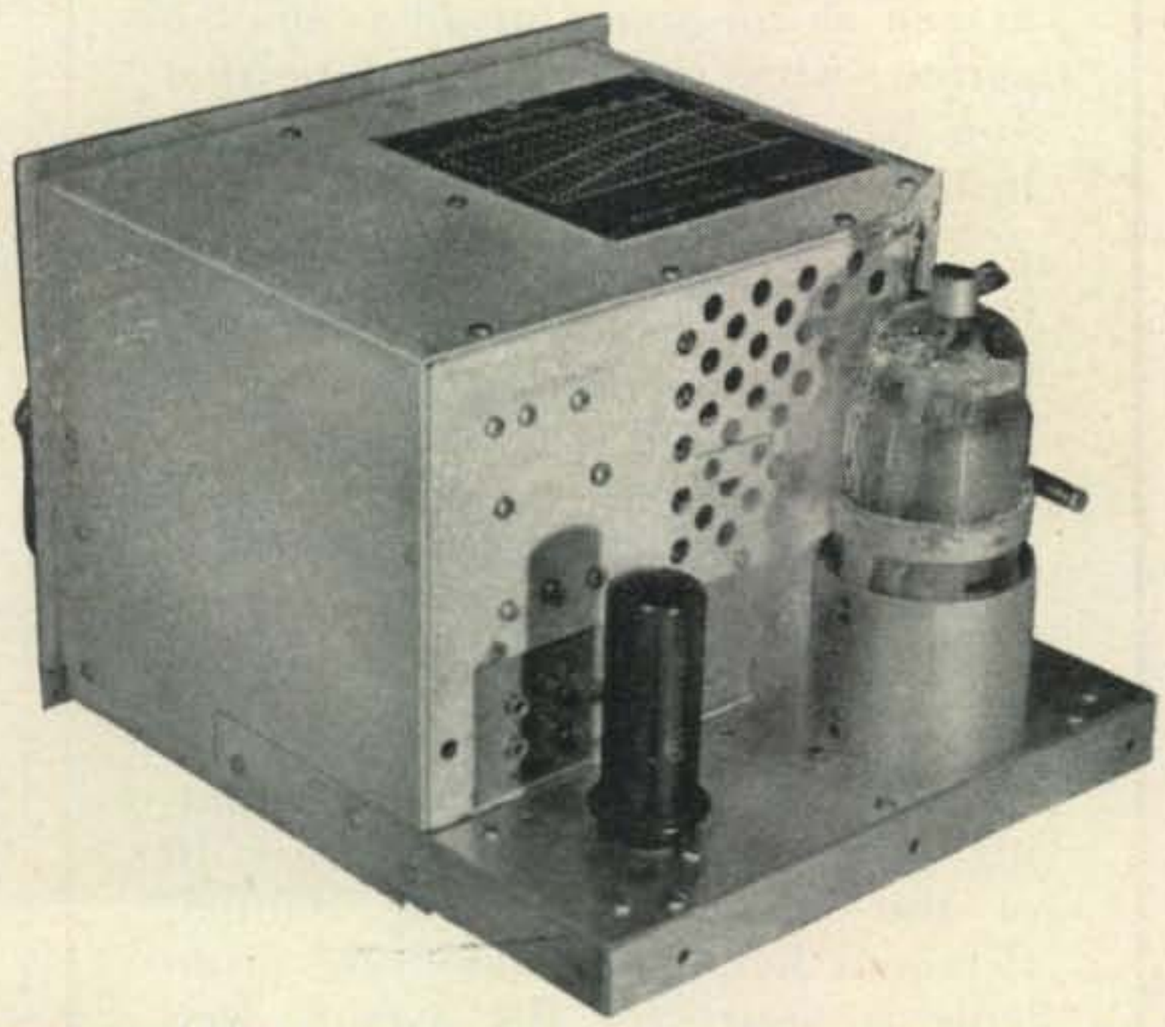
The Tuner is available in the following ranges:

Range A— 350 to 800 KC
B— 800 to 1500 KC
C—1500 to 3000 KC
D—3000 to 4525 KC
E—4525 to 6500 KC
F—6200 to 9050 KC

Higher frequencies are obtained by reducing coil turns or by use of frequency multipliers.

Dimensions 8½ x 8½ x 11. Shipping Wt. 23 lbs. New and fully guaranteed.
Shipped complete with dust-proof steel carrying case. Only..... **$12.50** F.O.B. Chicago

Tom Kosti (W9OPU), head of our Amateur Division, modified the unit illustrated to accommodate the 2 tubes. It's easy. Connect a power supply, key and antenna and you're ready to go! Incidentally, this unit also makes an ideal portable rig.



Write for Amateur Radio Catalog H-200

Our stock of transmitter components is one of the world's largest. Everything is new and has been carefully selected from Government Contract termination sources. A wide range of transmitting tubes and parts is immediately available at a fraction of their original cost.

WELLS SALES, INC.

4717-V W. Madison St., Chicago 44, Illinois

Wells Sales, Inc., 4717-V West Madison St., Chicago 44, Ill.

Please ship via express collect.....Westinghouse Tuning Units at $12.50 each for which my check (or M.O.) for $..... is enclosed. Range.....

☐ Please send catalog H200

☐ Please send information on the following items:

.....

Name.....

Address.....

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

Washington Radio Club

The Washington Radio Club is carrying on a membership drive to last until December 15. All amateurs and other radio-hobbyists are invited to attend the regular meetings and get in on the fun and benefits of Club participation. Meetings are held on the second and fourth Saturday at 8:00 p. m. in the Columbia Bowling Alleys building on 14th Street above Park Road, N. W.

War Assets Administration Surplus

Special procedures which reduce to a few simple actions the steps a veteran will need to take in order to obtain surplus electronics material are being prepared by WAA as a major part of its reorganization of electronics disposal.

Under the new system, a veteran will go to his nearest WAA veterans' certification office, and when he obtains his certificate he will be given the name and address of the WAA agent handling the material he wants. He may then, if he wishes, inspect the material and purchase it on the spot.

If the equipment the veteran needs is not stocked by WAA agents, he then will send his order directly to the Washington office of WAA to be filled from supplies in stock at a central storage point.

WAA pointed out that if the veteran prefers he may purchase directly from Washington.

As a temporary expedient until the new plans can be placed in effect, time saving devices have been adopted to speed up the filling of orders already received from veterans. A veteran now may send his certificate for electronics equipment directly to the Washington office of War Assets. When his order is received, the material is located, and the veteran is notified where to buy. This temporarily by-passes the WAA regional offices. Under this short-cut procedure the time elapsing from the date the veteran's order is received until it has been shipped has been reduced to as little as 15 days. This will be reduced even further when the new system becomes effective.

UHF

(*from page 38*)

W9UDO (Union), W9ERU (Rockford), W9DLI, W9RHL (Hobart, Indiana), W9BOR (Hammond, Indiana), W9GGH (Kenosha, Wisconsin), W9ONX (Berwyn, Illlnois), and W9IOD. Also, there was a contact between IOD and W9JPK in Milwukee who was using a vertical antenna. BHJ and UDO are using BC625A transmitters with about 25 watts in the 832A final; these sets are the SCR-522 aircraft jobs, and should be available by the thousand as soon as the Army starts to let them go.

W3KMM/9 is on in Joliet and works into the Chicago area. W9HMM reports that Chicago stations are heard in Racine, Wisconsin. Active stations include HMM, CAR, RIW, WWH, PFH, KBH, SOW.

W9IOD has been making consistent contacts with the Rockford gang including ERU, UDO, BHJ, RHL, DLI at a distance of over 80 miles, when the band seems closed tighter than a drum to others. IOD attributes this to the use horizontal antennas.

W9FFG reports Chicago area two-meter activity to include W9BIS ex W8NUI/9, TKA, BBK, ULP, MIK, SPQ, FFG, IPO, and W2FZA/9. The latter, FZA, had trouble with his signals breaking up the "taxi" band above 152 mc. NFK points out that this may not be due to any fault of the two-meter transmitter, but of a receiver image in a commercial mobile set with the oscillator on the low side of the signal about 9-12 mc.

W9RHL has been stirring up activity in Indianapolis, helped by W9DLI. They use horizontals.

W9VEZ and W9FFG report on the "ten and two" hidden transmitter race held on October 6 by the Mid-West VHF club. None of the ten-meter boys did any good, but the two-meter gang did. VEZ, ZDG, NJJ and RKA took turns operating the transmitter. The first car to locate the set were SWL's Hitz, King and Hunt using an S-37 with 4-element rotary beam. It took 53 minutes, with low mileage of 12.5. W9SXE was second using a superregen and 4-element beam, time 105 minutes and mileage 25. W9YTM was third with 106 minutes and mileage 26. W9NLZ and W9BON also came through later.

Above 400 MC

Bernard Bates, W1BBM, says that the 425-mc band was open to the New York area on September 1, 7, 15, 16, 17, 20, 21, 26, 27, 28 and 29. This is a result of listening to the RCA 438-mc transmitter. One sure-fire condition is cold nights after hot days; another good time is when light fog starts dropping down after sunset. In August, conditions peaked up around 9:30 in the evening, but in September the best time was midnight. Bernard gets general coverage from his heam by pointing at water tanks four and five miles away, bringing in signals one or two points lower. His antenna is only 28-feet high, just clearing tree tops, but it seems to work on ground-based ducts very nicely. Bernard is convinced that cooperation with simple equipment and antennas—in the clear—will bring communication up to two hundred miles down the coast or up towards Maine.

Well, gang, it is 73 now. Please help Vince to put out an interesting column and get the word around so that the gang can enjoy the v-h-f bands more and more. We'll miss not reporting the first F-layer transocean QSO, but we may still have time to get out and take part in it.

PARTS AND PRODUCTS

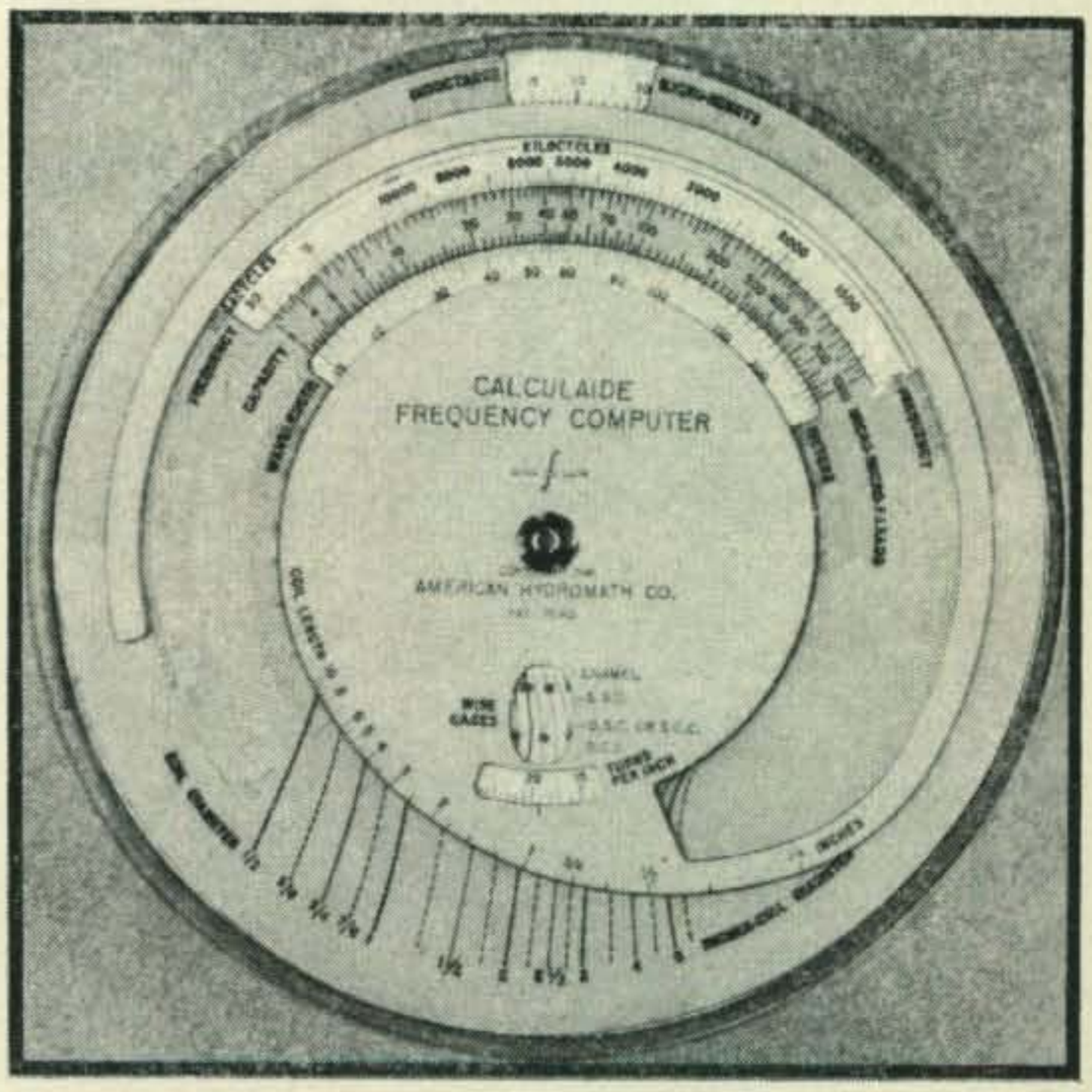
[*from page 44*]

within plus or minus 0.1% to provide direct crystal control, with instant selection, of the five most commonly used intermediate frequencies—175 kc, 262 kc, 370 kc, 455 kc and 465 kc. Direct crystal control is also provided at 200 kc for r-f alignment and at 1000 kc for short wave alignment.

An external socket is provided to accommodate special frequencies that may be required. A three position modulation selector and a five step attenuator with vernier output control from 0 to 15 volts provide finger-tip operation. Power consumption is 17 watts at 110 volts a.c. or d.c. No warm-up period is necessary since the crystals are on frequency as soon as the oscillator is energized. Complete description of the unit and its use is contained in Bliley Bulletin 32, now available on request from authorized Bliley distributors.

Frequency Meter

A moderately priced, general-coverage frequency meter has been announced by the Browning Laboratories, Inc., 742-750 Main Street, Winchester, Mass. Useful over a continuous frequency range of 100 kc to 50 mc, the instrument features ±.025% accuracy, an instrument dial 6″ in diameter readable to one



part in 1000, transformer-type power supply, and rugged construction. The oscillator range is 1.0 to 2.0 mc in five bands, each tuning 200 kc. A built-in crystal calibrator provides convenient means of assuring long time accuracy. External signals are coupled to the meter through a telescoping antenna which also serves as a carrying handle. Dimensions 13½″ x 7⅝″ x 6⅞″. Weight: 15 lbs.

New B Battery

A new 45 volt B battery having an increased life but only half the weight and size of pre-war models has been developed by "Eveready" batteries as power for battery operated equipment including standby power for amateur radio transmitters, and for emergeny mobile radio power supply.

The new battery utilizes the famous "Mini-Max" battery principle originally developed to power the tiny radio sets in the proximity fuses of anti-aircraft and artillery shells, and is the most efficient storage

UNCLE

AUNT

GRANDMA

GRANDPA

FATHER

MOTHER

BROTHER

SISTER

NEPHEW

NIECE

SON

DAUGHTER

What <u>one</u> gift would please them all?

No matter what their tastes . . . their hobbies . . . their likes or dislikes . . . there's *one* gift that will please them, each and every one.

That gift is a United States Savings Bond.

This Christmas, put at least one Savings Bond under the tree for someone you love.

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.

power source ever evolved, according to battery engineers, since it employs a higher usage of space by active materials than any previous type. Round batteries have a carbon center post set in a zinc can with activating chemicals packed between. Old-style layer-built B batteries have piles of alternate zinc and carbon plates separated by layers of the chemical mix. The Mini-Max battery has the carbon electrode printed ink-thick, in effect, on the zinc plate—which greatly condenses the size and increases the efficiency of the battery.

With outside dimensions of 5⅛" x 2⅛" x 7¼", the new 45 volt B battery displaces only 76.6 cubic inches as compared to the 179 cubic inches necessary to produce the same power and life in the old-style layer-built battery, and weighs only 4 pounds 4 ounces compared to 8 pounds 6 ounces.

Wire Stripper Kit

The insulation of any wire from size 8 to 30 can be quickly stripped with the new Speedex 733-K Stripper Kit. The Speedex and seven interchangeable blades are packed in a permanent steel case small enough to be conveniently carried in a tool box. Speedex Wire Stripper kits are manufactured by the General Cement Manufacturing Co., 919 Taylor Ave., Rockford, Ill.

Microphone Stands

First of a new line of Snyder Manufacturing Co., Philadelphia, Pa., is a floor stand featuring a heavy cast-iron base with non-skid rubber pads, a newly designed quick-grip locking nut, and triple-plated with copper, nickel and chrome. This rust proof stand lowers to 30 inches and extends 60 inches.

Catalogs

A complete bulletin on the new Cardyne Cardioid Dynamic Microphone has been issued by Electro-Voice, Inc. Bulletin No. 131 illustrates the design of the Cardyne, points out its performance features, and gives complete specifications. The bulletin shows the cardioid unidirectional polar pattern and also explains how the new Electro-Voice principle of unidirectivity works.

Electronic tubes for amateur radio applications have been listed in a new price and data sheet announced by the Tube Division of General Electric's Electronic Department at Schenectady. This new sheet, called ETX-19, has been introduced to facilitate selection of tubes and provide a hand reference chart for all amateur applications. Copies of the ETX-19 may be obtained on request to the G-E Tube Division, Schenectady, N. Y.

A new binder for filing copies of the G-E Ham News has been made available through distributors by the Tube Division of the company's Electronic Department. Featuring slide-pocket design which will accommodate at least twelve copies of the radio amateur publication, the new unpunched folder is suitable for filing in a loose leaf or similar type binder.

CQ DX

[from page 33]

Shuler, W7GEW. He is one of the old time operators of W6BC. Both of the above are Colonels, one in the Medical corps, and the other in the Engineers. Incidentally, Bill's QTH is Ft. Lewis, Washington.

Received a note the other day from W7CX in Reno, Nevada. You can't say he is ex-W6CW, because he still holds this call at another QTH in California, so its W7CX in Reno and W6CW at

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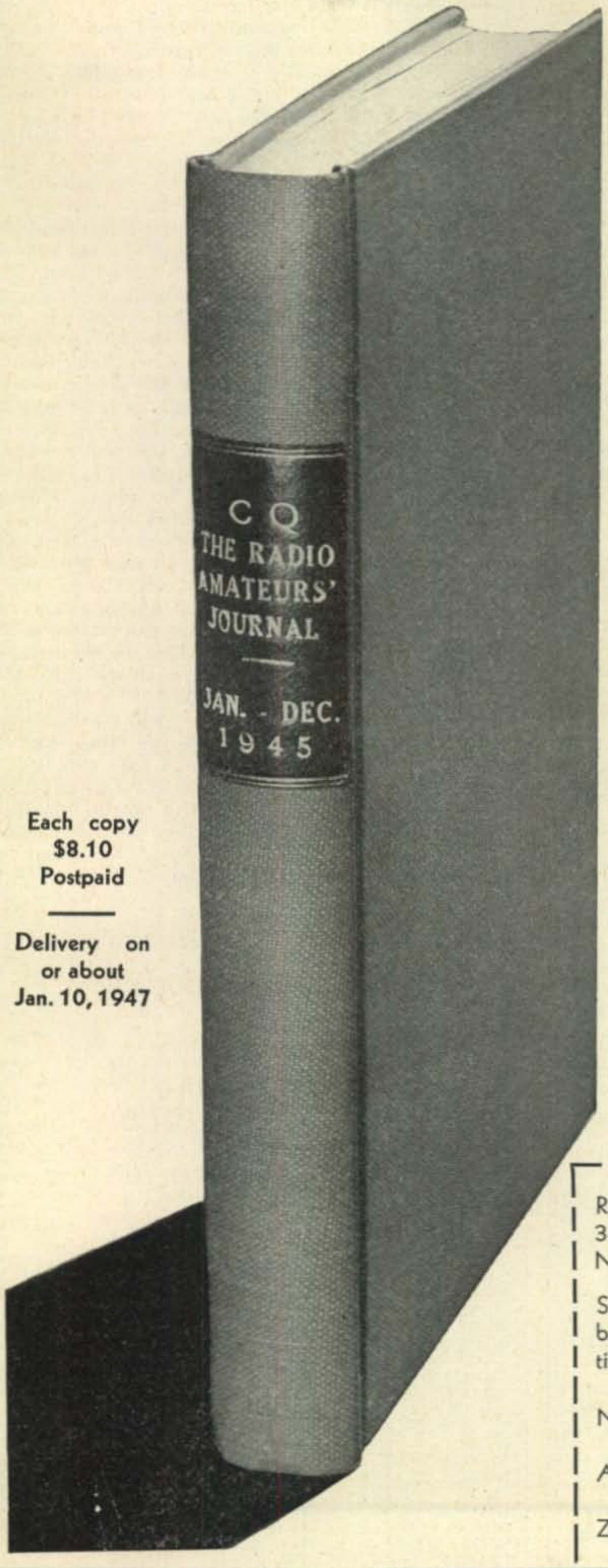

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Lake Tahoe. Incidentally, Art is bemoaning the fact that he never received a card from PK6XX confirming their QSO of August 25, 1938. Art understood that VK4HN was handling the QSL situation for PK6XX. Maybe some of you guys can help W7CX in this thing, and in return, maybe he can help you, because if you knew Reno like I know Reno! Art has been doing his share of DX on 10 and 20 meter phone, although, he says he wants it understood that he does know the code and actually works a little stuff via this medium. We can thank him for some frequencies which will be found in the list below.

W8PQQ blew himself to a new HRO, and as a consequence, sends in a whole page of good DX stations, and their frequencies which he has logged. As mentioned previously in this column, we are going to pool all the stations and their frequencies into one combined list, and I think the DX gang as a whole appreciates seeing this list even though maybe only one or two stations out of the whole list will prove of benefit to them. I think as time goes on, there will be no use in publishing the frequencies of the more common DX stations, but will confine it more to, shall we say, the rare stuff.

Ah, here's one from WØGKS, Dr. Gross. Haven't heard from Doc for years, and of course, he used to be a W9. Doc sends in a nice typewritten list of 34 zones and 65 countries with an all time total of 37 and 109. I do hope that when you fellows send in your list, you'll do your darndest to make it a typewritten one, listing the countries, call letters of stations worked, and followed by the date worked. On the zones, list the zone number with the call letters of the station in the zone worked, followed by the date. If we can get a standard form established, it will make it much easier for yours truly, and believe me, the tabulating of these lists can become quite a problem. WØGKS went so far as to put the exact time of the QSO, which will not be necessary, except that it would help probably to cross check at a later date. All of Doc's post-war work has been done since the latter part of August, 1946 on 14 mc c.w.

Hear ye, hear ye, hear ye, etc., etc., What do you think By Goodman has been up to? Well, it will be

CHOICE DX FREQUENCIES

Phone		C.W.	
EA1D	14300	SV1EC	14080
EL5B	14190	W9JSH/OX	14150
EI3J	14060	OH3OE	14040
F7AE	14325	UA9DP	14055
GW5VX	14205	YR5C	14090
J9LG	14290	PK1RI	14075
J9AAB	14300	ZE1JU	28150
OZ7HL	14300	ZD4AB	28015
OX1BC	14350	VQ2FR	28060
PZ1G	14330	OK1AW	28080
SU1CX	14325	SM7TJ	14040
TI2HB	14160	VS1BX	14070
TI3FM	14140	J2UVW	14290
VO2D	14300	OK1WF	14040
VO6K	14315	SM5KC	14060
VE8MF	14325	HB5AB	14060
KH6CT	14200	UA3KBC	14040
KH6AW	14285	SM3ZF	14070
W8QEN/CT2	14300	SM5XB	14065
W1LTQ/TF	14335	UA3HI	14085
W9BNB/KL7	14300	UB5AB	14060
YN1LB	14335	VO5Z	14090
XZ2AA	14310	UA3KAH	14090
ZB1AB	14305	OX2K	14100
XU1YY	14300	OK2DD	14055
C8YR	14310	FA8SB	14090
J9LG	29200	I7AA	14085
EI9J	28010	UA9CF	14090
I1AW	27310	OK1AW	14050
HR1MB	18435	FG3FP	14360
OQ5BL	28415	I1PL	14060
OX1Z	28450	HB9FE	14060
PZ1RM	28150	CR4BØ	14180
VO6F	14240	OX1C	14100

a little old by the time you read this, but the guy goes out and gets himself a nice brand new call, and of all things, it's W1DX. Can't blame him for trading in W1JPE, and I'll bet they didn't give him much of an allowance when he turned it in. For those that don't remember, By Goodman used to be W6CAL and W6QV. A number of years back, things got a little out of phase, and he found himself on the East coast with the call W1JPE. Anyway, having known By for a period of years, and knowing the way he can accomplish things when he sets out to do them, I can understand how he grabbed W1DX. Now he has to undo everything he did with W1JPE, but I guess that won't be too hard.

A recent visitor to L. A. was W9KYM, Al Kahn. Al is an old timer from South Bend, and was mentioning conditions on the twenty meter band, especially one evening when EL4A was putting out a CQ on 14230, and almost before the guy could sign, twenty stations called him right smack on 14230. Quoting Al, "So why bother!" This was on phone, which brings up an interesting point, at least to me. 9KYM has been a brass pounder for years, and although there is nothing unusual about this, it does get a little unusual when you know Al is the owner and Prexy of Electro-Voice Microphone. As we have always told Al, since he is the big shot of the company, the least he could do would be to use one of his own mikes. I guess he was converted during the war period. because he is now on phone, but hastens to add, he will be pounding brass also.

Another visitor out here last month was W2BJ, Ray Farwell. He and his family were driving around the country and had very little time to chew the rag about DX. I am sure we will be hearing more from W2BJ on this little subject, however.

W1GKK is wondering if some of these high power stations, when they get on and CQ DX for ten minutes at a crack, expect to have AC4YN answer them. He also echos the feeling of many other DX men when he wonders why the dickens do some fellows slide their v.f.o.'s on a W's frequency while he is working a DX station, and then call the DX station hoping to grab him. It is the same old story. It causes more QRM resulting many times in the DX station getting so hot under the collar, that he just quits and doesn't work anyone. George has been on twenty meter phone for about a month, and has worked 23 countries. He is running a kw into a pair of 100-THs and uses an NC-200 for his receiver.

Here's another W9 . . . this time W9NRB . . . Haven't heard from Smitty for years. He is still pounding brass as are some of the other pre-war gang in Chicago including W9PK, W9GY, and W9YFV. Smitty is getting the old Austin radio club going again, and we hope that with all those old timers, they will be taking a peek at CQ every month. W7FNK chips in his bit on behalf of the W7's, and at present is confining his DX to 20 c.w. Some of the better ones worked include OQ5CE, VQ3HJP, VQ3TOM, YR5V, VO2G, OK1WX, ZE1JI, VQ2GW, XZ2KM, UA9CF, and UA1KBA, who happens to be a YL named Soya. If it didn't sound so corny, I would say, "Where has Soya been?" W7FNK runs 800 watts into a pair of 4-250As. So far, his post-war total is 34 zones, 55 countries.

It is good to hear from W6AYZ, Bill Mayes. He and his brother used to operate W6BYB, whom a lot of old timers will remember. Bill said he worked a station signing RAEM and wants to know who the dickens that is. We can thank G2MI for supplying the answer as we are lifting it out of his column.

Now it seems that RAEM is the chairman of the Moscow radio club, and was the operator on the famous "Cheliuskin." In recognition of his services, for which he was made a hero of the Soviet Union, he was allowed to use the call RAEM which was originally the ship's call.

While we are snatching news from G2MI's column, we might as well keep it up. The QTH of HR1BD is Box 101, Washingtonville, Honduras. XSM6US is a Swedish station in the Baltic. G6ZO thinks ZK1AA is genuine; and VP4TR and VP2AT are brothers. G6RH has worked 100 countries post-war. Then G2MI says a lot of so called pirates on the air say to QSL via RSGB just to give themselves an air of authenticity. Young Peter Clarricoats is the Jr OP at G6CL, and had an interesting contact with a station signing LWFZ on 14 mc who stated he was in an RAF Wellington flying over central Europe. Of course, the OM at G6CL is still doing his share of brass pounding and works VE8MJ up in Baffin Island on regular Skeds. Those who have worked OX2MJ can QSL to 293 Grand Street, Brooklyn, New York. His position is 65° 56′ N., 36° 41′ W. The QTH of ZC6FP is F. R. Pope, RAF station AQIR, Palestine M. E. F.

W6JFJ is with the telephone company in this part of the country, and is now located in a little town of Yermo, which as Bruce puts it, is one hundred miles from nowhere. He has visions of plenty of rhombics, but he will have to wait for the lumber shortage to ease up a bit. Apparently it is a good location, and with 50 or 60 miles of open space for his backyard, it looks as though he should have some good antennae—At present, W6JFJ is running 175 watts.

W3MSK has been using 10 watts on ten meter c.w. and on three week ends worked 16 countries. Total countries post-war is 42. Antenna is only 4 feet above the roof, and is a bi-directional, two element beam.

From W5ZG we learn that he is on phone for the first time in twenty-five years. He is using a pair of 35Ts in the final with 400 watts input, and a pair of the same as class B modulators. Harry still has his old rig consisting of a pair of 204-As, and he says it still works. W5ZG chiseled a couple of telephone poles which now support a four section 8JK ten meter beam.

W8PQQ received a letter from TF3C, bits of which will be of interest to you. TF3C says he is hoping that more of the Iceland hams will be able to return to the air soon. He is using a receiver covering 16 to 2200 meters and expects to build a converter pretty soon in order to hit the ten meter band. The antenna at TF3C is a long wire of about 250 feet. Now then the QTH: TF3C, Thorhallur Palsson, 39 Hafnar Street, Akureyri, Iceland. W2OLU says he heard OX2MJ on 14110, and this may be a good chance to grab that zone. As mentioned before, he is located on the east coast of Greenland. W9IIU is still doing allright with his 807 and 40 Watts. His post-war total is 36 countries. Dave has been off the air lately due to two months sojourn in the hospital. He is going to have to go back, after which, we hope he will be able to stay out of the place, get back on the air, and do some fancy brass pounding. W6EAK works only twenty meter c.w. and has 57 countries post-war. Some of his latest include UA3DA, VR2AA, CR9AG, CR9AN, and for those who have worked a station signing K9P, it seems that he is an undercover station (it doesn't take a mind reader to figure this out), and when he operates, he is aboard an airplane near Iceland. If any of you work him and want to send a card, send it through W6EAK,

1813 N. Naomi Street, Burbank, California. Here are a few QTH's:

J2ABC	Hank McTighe, SCAP, CCS, APO 500, % P. M., San Francisco, California.
W5KGI-C7	Lt. G. W. Simpson, APO 912, Signal Section, Peiping, China, % P. M. San Francisco, California.
C3YW	S. H. Chen, % China National Aviation, Foochow, China
VR2AA	% P. M. Suva, Fiji Islands

W8BKP says he has now worked 109 countries; 31 on twenty, and 78 on ten. Forty-eight of the countries were on phone, and the other 61 on c.w. George also says that just getting on the air, is the real ZD4AB who remarks that to date, he has received thousands of QSL cards which means someone else was signing his call. ZD4AB also says there are several bootleg stations on the air; another one being ZD4ABE. There are supposed to be only two genuine, and they are ZD4AB, Tom Hall who operates on 28 and 14 mc, and ZD4AE who is on 14,160 phone. Does anyone have any dope on the F9's.? For example F9AH? W8BKP wants to know, and so do I. ZS6DW says there are a couple of ZS3's in Southwest Africa, and a ZS4 in Swaziland, and then too, there is a ZM on the air in Bechuanaland Protectorate. W1DYV is back on the air and has worked OY3G. He gives his QTH as Thorshavn, Largani, Faeroes Island. OY3G says he will QSL direct.

G6QX needs New Mexico for his WAS. Bob says he will gladly exchange a W9 QSL card for one from New Mexico. Hey, you better hang on to those W9 cards, my friend. Bob relates his son is a golf and YL addict, and only seems to be interested in Ham radio when he is broke?????

W6ANN, Bill Adams has worked 68 post-war countries. Some of his latest include W9JSH/OX, OH3OE, UA9DP, SV1EC, and ZE1JU.

W2IOP (he used to be a DX man too) says OX1C is Dick Eidel W2MHW. His QTH is as follows: R. Eidel, AOA/ATC, BWI, APO 858, c/o P. M. New York. Larry has over 70 post-war now. Latest include, ZB2B c/o Rock Radio Station, Gibraltar; CN8MI, LZ1XX, and W2OUB/C7.

Haven't heard one single piece of DX news from an XE station. Some of them must be doing a little DX. Also, how about the VE's? Speaking of Mexico, and getting back to W9KYM, Al Kahn, when he was out here, he brought up an interesting item one evening while we were having chow with W6UF and W6HB. It seems that a few of the boys in the middle west are getting a little enthused about having an International Convention. This all started when WØUI asked W9KYM what he thought of it. As a consequence, a few others got enthused and now Al wants to know what we think of it. They all seem to think Mexico City would be a good spot for it in 1947. I understand a few of the XE's have been asked for their reaction. If any of you fellows think the idea has any merit, I will be glad to do any plugging and publicizing I can in this column.

During the past couple of months, I have received a lot of inquiries as to whether CQ is going to sponsor anything in the way of DX contests, DX marathons, and even the WAAP which just got going before the war. If you will remember, in the magazine "Radio", we sponsored these things, the WAAP being "Worked All American Possessions." For your information, here is what we plan to do. First, re-establish the zone and country list: second, have a World Wide DX Contest next year, probably in October: third: DX Marathon such as we had in

1939. After things get a little more stabilized throughout the world, such as knowing what our possessions are and are not, we will have the WAAP. We plan to issue certificates for WAZ and WAAP.

The only reason I am bringing these things to your attention is just to give you an idea of what we have in mind. As you know, CQ is a relatively new magazine but is growing like the dickens. We do not have the staff to prepare all of the details necessary to sponsor various events, and at this time, no more details can be given. However, with the same old cooperation I have always gotten from you fellows, I feel sure next year will see the gang at CQ sponsoring these events. The one and only World Wide DX contest which Radio sponsored before the war was considered by most hams to be a pretty good thing. Since the ARRL sponsored a DX contest in March, lasting nine days, we thought we would have a contest on the other half of the year and holding it over two successive week-ends; each week-end to consist of three days. This feature most of the fellows seem to like very much, and we have plans on making it an annual affair. When the war came along, that ended that. Now, however, I believe we can pick up where we left off with this World Wide DX contest.

On the DX marathon, many of you will remember it ran a period of one year. I will be interested in getting your reaction on whether or not we should get going with this little contest again.

The list of frequencies on page 56 are picked from the various contributors and it is hoped some of these will be of help. Naturally some of these DX stations will be found on frequencies other than those shown due to using v.f.o.'s In other words I cannot guarantee when you tune your receiver to any of these frequencies the guy will be there waiting for you. But heck, things are tough everywhere!

Well, that's all this poor mill will handle this month, so I'll see you on the low end.

Here's hoping all of you get some nice, shiny brand new zones and countries for Christmas. Merry Christmas and a Happy New Year to all of you.

YL'S FREQUENCY

[*from page 40*]

country, Liz turned out to be as charming and interesting as her letters. She shares our philosophy that as a hobby radio can add a great deal to one's life, but it must under no circumstances become an all-consuming obsession. 3CDQ have been her call letters right from the beginning in '22, at which time there were then less than a dozen YLs in the country. Although we've been unable to tabulate the exact number, careful estimate indicates there are over 500 YLs now active.

Liz' interest in radio actually dates back to 1917 when she obtained a commercial ticket while still in high school. She later taught radio in army hospitals at Camp Meade and Fort McHenry for rehabilitation work, as a member of the Woman's Radio Corps. In 1921 she came to the Bureau of Standards, in the capacity of radio aide, and has been there ever since. While talking with Liz we learned that she's an accomplished linguist, and part of her work at the Bureau has included translating technical articles from German, French, Spanish and Italian.

Liz' duties at the Bureau have included work with the primary standard of radio frequency, which later became WWV; she also formed reference lists for the Proceedings of the Institute of Radio Engineers, of which she is a member.

During the war Liz was Assistant Radio Aide of the WERS in charge of nine control stations and about forty WERS operators, as well as a dozen AWVS ops.

Active in YL affairs, Liz is a past president of the YLRL. She can be heard on 40 meters on 7220 kc. Her rig consists of a 6L6 xtal oscillator, an 807 doubler, 100TH final with 1800 volts on the plate and 200 watts output. Her receiver is an HRO. From what Liz says about the number of hams in Washington, added to a group of high-powered ones right in her own neighborhood, guess she needs every watt she can squeeze out!

BEAM ON THE TARGET

[*from page 23*]

crosses the new equator—swing your beam, and fire when ready!

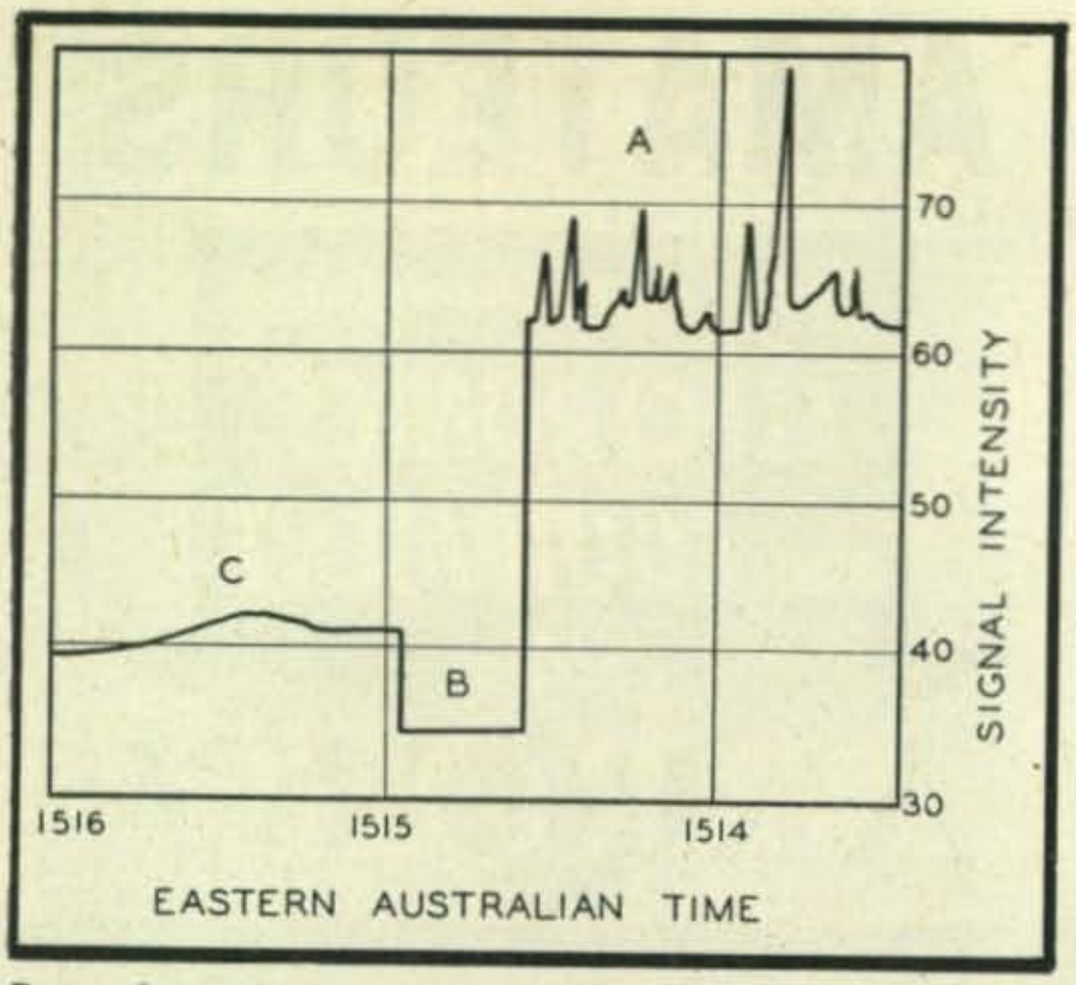
Parenthetically, assuming the arc on your globe is marked in degrees of latitude, you can obtain a reasonably accurate figure for the great circle distance of your contact by noting the number of degree divisions along the arc from you to the other end of the QSO. Multiply this number by 60 and the answer will be the distance in nautical miles. Remember to count the degrees along the arc *toward* the DX; you will notice that these degrees are numbered in the opposite direction, i.e., from zero on the established equator to ninety over your shack. If the other station is located more than ninety degrees away, of course you add the additional degrees and multiply the total by 60.

It would be easy to elaborate this type of bearing indicator. The modification described is the simplest. At the other extreme is the "California" model. An "ADF" loop holds on the DX and a selsyn/servo system applies this intelligence to the beam which immediately tracks the receiver loop. At the same time a selsyn transmitter on the beam drives a repeater coupled to our globe, and the world revolves while an internally mounted bulb projects through perforations on the globe's surface and onto damasked walls "W6——." Floodlights on the beams, of course, old boy. Colossal!!!

SOLAR POLARIZATION

[*from page 13*]

antenna was pointed away from the sun at *B* the only background noise was that of the receiver itself. In *C* the Yagi antenna was phased to receive principally radio waves having a near circular left-handed polarization. Although there is some increase in the background hiss it is only one-quarter the intensity when the antenna was rephased to receive only right-handed polarized radio waves. Curiously, it was observed that the



Recording of the intensity of solar static on July 26, 1946 showing at *A* the strength of right-handed polarization, at *B* the antenna directed away from the sun and at *C* the intensity of left-handed polarized waves.

polarization changed when the sunspot crossed the central solar meridian facing the earth and three days later the signal intensity was about five to one in favor of the left-handed circular polarization. Apparently this phenomena is a distant relative of the extraordinary wave observed in earthly ionosphere transmissions.

R-C SUPERHET

[from page 16]

ers and resistors in the r-c circuits are within 5 or 10% of the correct values. The plate voltage of the first detector and degree of antenna coupling can be adjusted so the 9002 tube oscillates smoothly and weakly. Ignition noise or signals will not be heard unless this tube is oscillating. Tube hiss noise will be present when the i-f sensitivity control is advanced whether the 9002 tube is oscillating or not. Nearly all 2-meter signals can be received in the FM switch position because nearly all modulated oscillators or MOPA transmitters have enough frequency or phase modulation to produce a good FM signal even though only amplitude modulation was intended.

The receiver shown produces good audio output for inputs of less than one microvolt though values of about 5 microvolts are necessary to override entirely the tube hiss noise. The "R-C" super is better in nearly all respects than a super-regenerative receiver, but is not as good as a well-designed standard superheterodyne. The ease of construction, alignment, and tuning and its low cost are factors in its favor as compared with a standard form of superheterodyne receiver.

C-W KILOWATT

[*from page 20*]

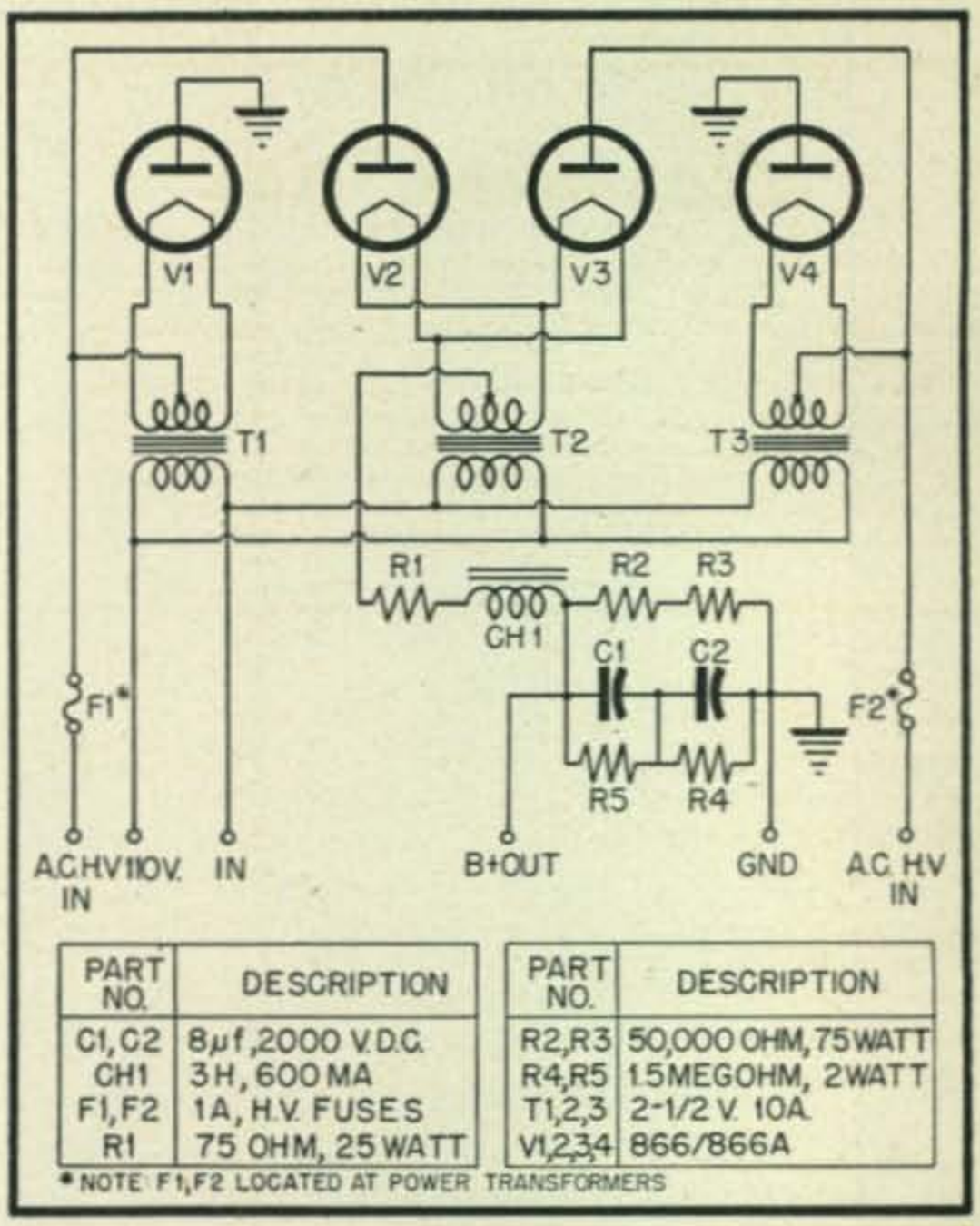
circuit using four 866/866As handles this load nicely. The topside layout appears in *Fig. 8*. As usual a 17" x 14" x 3" chassis was used with the three filament transformers in the center, the bleeder resistors in the rear and the tubes in line along the front. The bleeder mounting is very important as these resistors must dissipate considerable heat. The resistors are heavy duty units supported by the porcelain pillar insulators mounted on metal brackets. The heavy sockets of the rectifier tubes are mounted well above the chassis to increase the voltage breakdown safety factor. The filament transformers are war-surplus purchased at $2.50 each and have a good 10,000 volt insulation.

The under chassis view in *Fig. 9* shows the mounting of the two oil-filled 8 μf filter condensers. The small 3 henry choke admittedly has little filtering effect, but takes much of the grind off the rectifier tubes that would occur in a straight condenser input filter. The 75 ohm resistor in the h-v lead provides a measure of protection in case of filter condenser failure. With an input of 220 volts a.c., the power supply delivers 2950 volts at no load. The plate transformer which is not mounted on this chassis, is an over-size affair weighing close to 150 pounds. It is mounted under the shack floor out of sight and out of mind since it will deliver 2200 volts at practically any load without the least grumble. It is another bargain article costing only $1.50, believe it or not! Look for them in your local power company salvage yard.

The addition of wire screening to observe the plates of the tubes in the various stages adds much to its professional appearance. A system of Jones plugs and cabling from stage to stage has proved a great convenience whenever necessary to move the transmitter. The small box at the extreme right of the Comet Pro receiver controls the high voltage and filament circuits in the driver and final amplifier stages. The exciter is seen between the receiver and the rack-and-panel final amplifier.

Good a-c regulation is obtained by biasing the driver and final amplifier till they draw 100 milliamps *key-up*. Under this condition the plate voltage varies from 2600 volts *key-up* to 2150 volts *key-down*. The homemade exciter delivers about 12 watts. The driver grid current varies from 25 to 30 ma, while the driver plate current is about 80 ma. The final amplifier grid current is 150 ma and the final plate current 425 ma. Keying is accomplished in the exciter.

At the time this was written the antenna was a ground-plane vertical and operation was only



PART NO.	DESCRIPTION
C1, C2	8μf, 2000 V.D.C.
CH1	3H, 600 MA
F1, F2	1A, H.V. FUSES
R1	75 OHM, 25 WATT

PART NO.	DESCRIPTION
R2, R3	50,000 OHM, 75 WATT
R4, R5	1.5 MEGOHM, 2 WATT
T1,2,3	2-1/2 V. 10A.
V1,2,3,4	866/866A

*NOTE: F1, F2 LOCATED AT POWER TRANSFORMERS

Fig. 7. Wiring schematic of the bridge type rectifier. Operation is at 2200 volts at approximately 500 milliamps. The plate transformer is not shown.

on 10 meters. During the first eight weeks of operation 16 countries were contacted on 10 meters c.w. with R8 to R9 reports straight through. All components operate nicely without any indication of ever overheating. The unit should be readily adaptable for phone operation with the addition of a suitable modulator.

(Note: If drive for the final is on the "slim" side a 25,000 ohm 50 watt bleeder should be placed in parallel with the existing bias pack bleeder. The bias for the driver should be obtained from the new resistor. A somewhat larger choke in the high voltage plate supply might give better regulation.)

DX PREDICTIONS

[*from page 31*]

1030 hours PST. Conditions from these points to eastern United States indicate that 10 meters will be active from 1300 hours EST with best conditions around 1800 hours EST and closing at 1900 hours. Early morning 20 meter opening will peak at 0815 hours EST. South American transmitting conditions remain very good all month with 20 meters staying open till 0300 hours EST. 10 meters will open around 0730 hours EST and close at 1630 hours EST for the eastern stations and 1800 hours EST for the western stations. Transcontinental conditions will be well up and 10 meters will probably open around 0815 hours EST and close at 1915 hours EST. MUF probably won't exceed 40 mc.

Amateur band predictions are based upon research work now in progress at the Central Radio Propagation Laboratory of the National Bureau of Standards, Washington, D. C. Comments and inquiries from users of the predictions are invited, and may be addressed to CQ Magazine, 342 Madison Ave., New York 17, N. Y.

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SPORADIC E

[from page 22]

The Drifting 6 Meter Skip

V-H-F amateurs have often observed how the E_s-created short-skip apparently drifts from one call-letter district to another. W4s generally work first the W1s and W2s with strong signals. Then progressively hear and work W8s, W9s, W5s and WØs. Sometimes it is the other way around, but always the E_s short-skip seems to be changing in length and direction. Possibly a minor portion of this variation may be due to the inevitable decrease in the density of the E_s cloud. Although this would make it appear as though the inner edge of the skip zone were expanding, it will be found upon examination of *Fig. 1* that much of the drifting of the skip zone must be due to the motion of the reflecting E_s cloud.

The drifting of the 5-and 6-meter skip is the basis of a scientific paper now in preparation by the author. Upon reducing certain observations it has been found that the drifting of the E_s cloud may be interpreted as a function of the winds in the ionosphere through the variations in the length and direction of the short-skip. This work is based solely upon the systematic reporting and recording of amateur stations.

Although in the preparation of this paper some ten to twelve outstanding dates in the history of the old 5-meter band could have possibly supplied the necessary data, it was decided that more stations were active (*due to the lack of crystal control regulations, Ed.*) and more reports passed on June 5th, 1938.

Fig. 2 illustrates the midpoints or points of incidence in the ionosphere for 30 selected contacts between 1730 and 1800 EST on June 5. All of these contacts were noted for their very strong signals both ways, and for the minimum effect of fading. Basically, one may consider this area of the midpoints to be the heart of the E_s cloud. This group of contacts also represents the area within which 80% of the total number of short-skip contacts were made. Some DX contacts are made through the scattering of the signal from the sides or edges of the maximum density of the E_s cloud. A certain number of contacts falling outside this general midpoint area also suggests the presence of a minor E_s cloud to the south of the one illustrated in *Fig. 2*. These smaller clouds of E_s ionization are for the most part short-lived, but momentarily capable of erratic signal scattering outside and inside the major skip zone.

In *Fig. 3* the midpoints of 50 contacts in the half-hour period between 1815 and 1845 EST are plotted. Again these contacts were noted for their

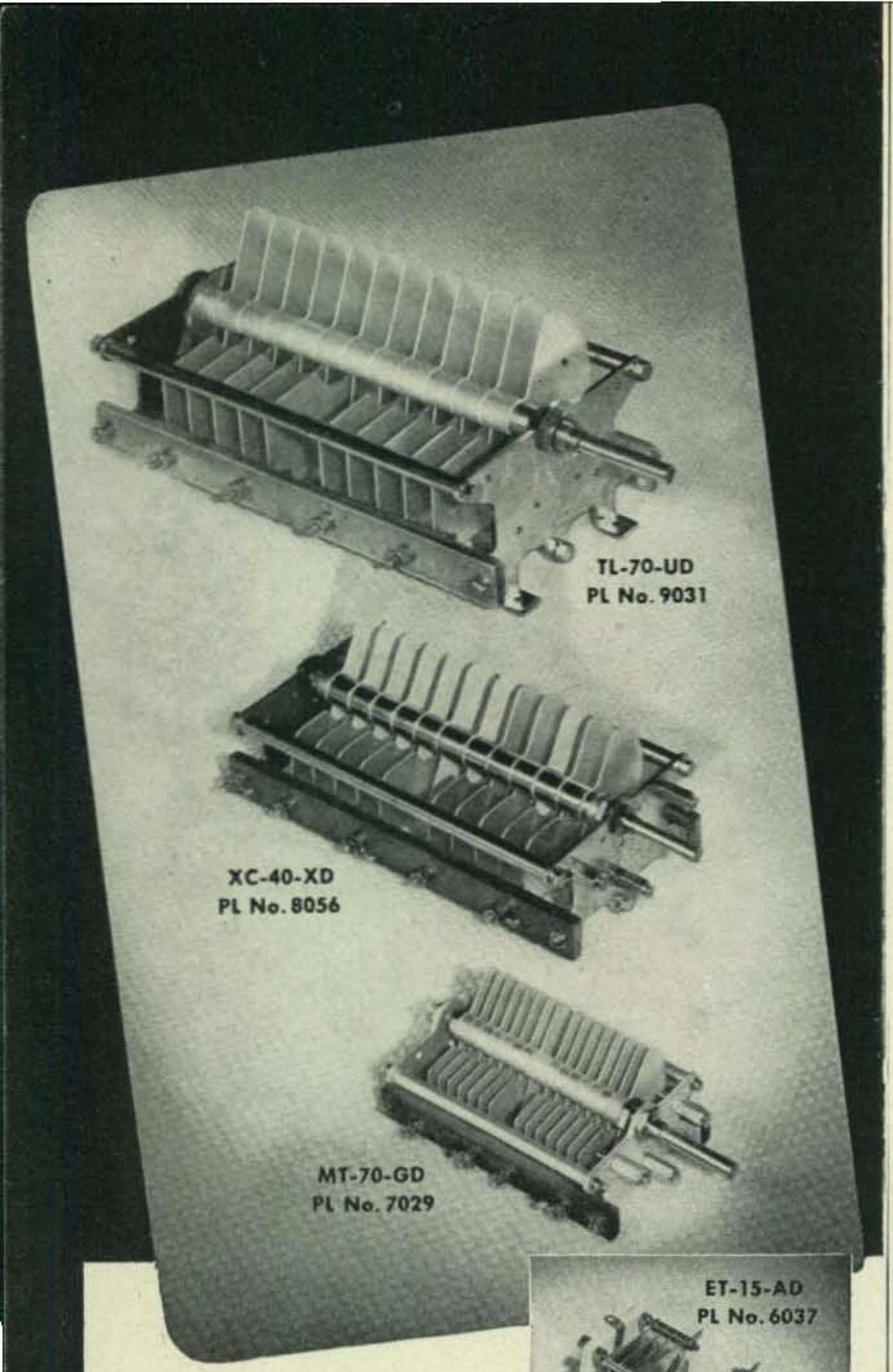
very strong signals. It is now possible to see that the E_s cloud is apparently diffusing by spreading out both in the north and south directions as it is blown along by an easterly wind. A rough estimation of the velocity of drift can now be made and it is found to be approximately 320 km/hr. This agrees excellently with the observations of Eyfrig in Germany who found in 1940 the velocity of drift to be as high as 380 km/hr.

Fig. 4 represents the third time interval, or 1930-2000 EST. During this period it was only possible to find 15 contacts to meet the established requirements of excellent signal strength and little fading. This is due primarily to the very few stations on 5 meters operating from west of the Mississippi River and to the further diffusion and recombination of the free electrons in the E_s cloud.

What We Can Learn From Es

In this examination we have translated the observed evidence of the drifting of the E_s short-skip into its true cause—a circulatory wind in the ionosphere. The value of obtaining further data by this method should not be underestimated. At this time a knowledge of the circulation and velocity of air currents in the upper atmosphere can be of particular value. Today in New Mexico the Rocket Sonde Section of the Naval Research Laboratory is attempting, through the use of V-2 rockets, to learn more about the temperature and constituents of the E region of the ionosphere. This research is bound to have far reaching consequences for the present conception of the working of the ionosphere necessitates extremely high temperatures at these levels. Meteorological sciences are of the opinion that an iso-baric surface exists at the 116 km height of the E layer. Previously, most of the data on the circulation of the upper atmosphere has been based upon the observation of long-enduring meteor trains. This type of information is generally difficult to interpret while requiring extended mathematical analysis.

Some thought can be given the possibility of tracking the E_s type cloud by use of radar. But this could only be accomplished on frequencies around 25 mc, with the resulting complications of interference to the other radio services and signal scattering from other types of ionospheric clouds. It would appear that a systematic accounting of the radio amateur contacts in the 6-meter band should provide a complete picture of air mass velocity and drift through the skip distance variations of the limited area E_s cloud. The results of this project will not only aid in establishing the cause of E_s, but will provide further data necessary in long-range weather forecasting.



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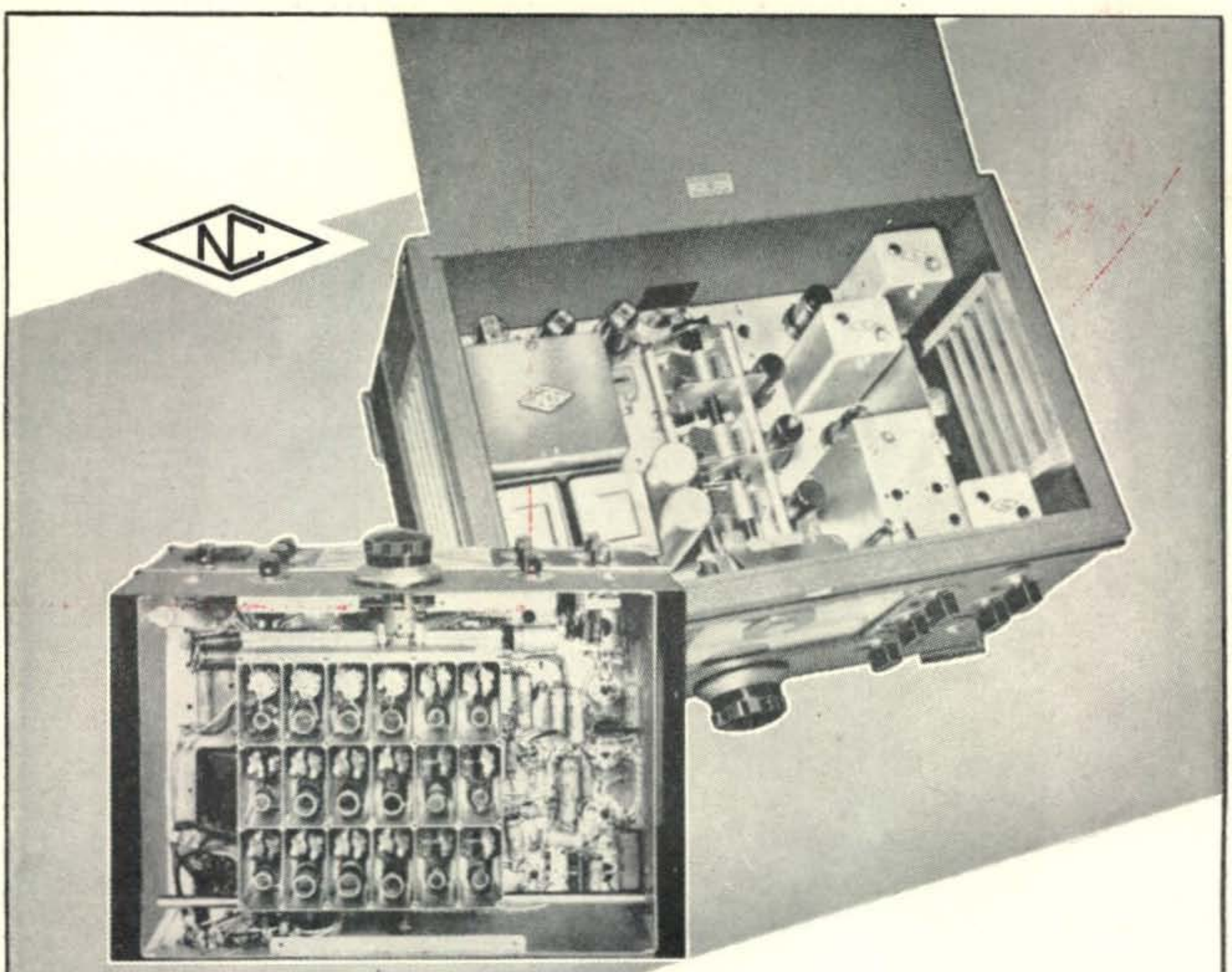

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