

All-Wave Radio

MARCH

1938

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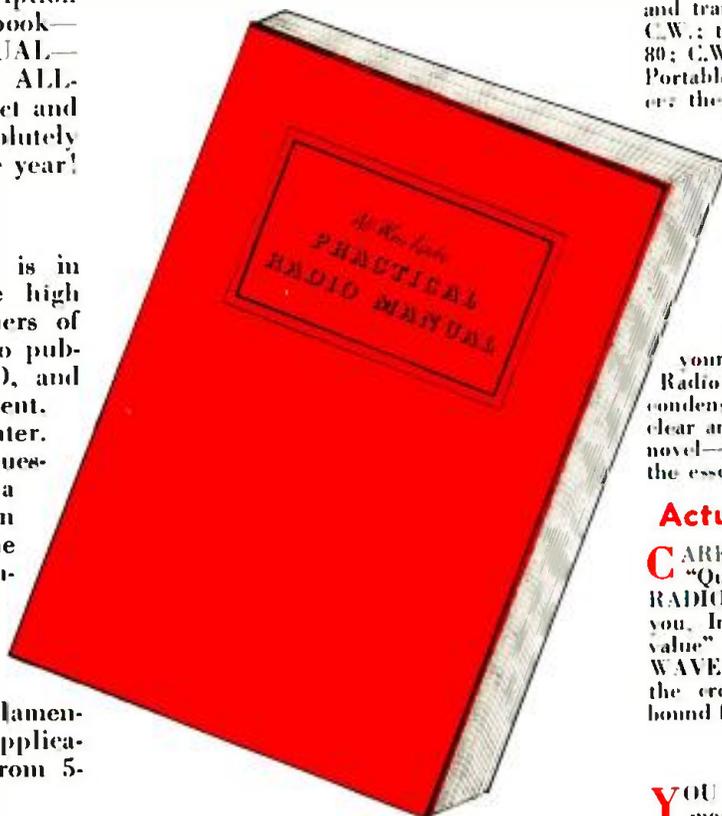
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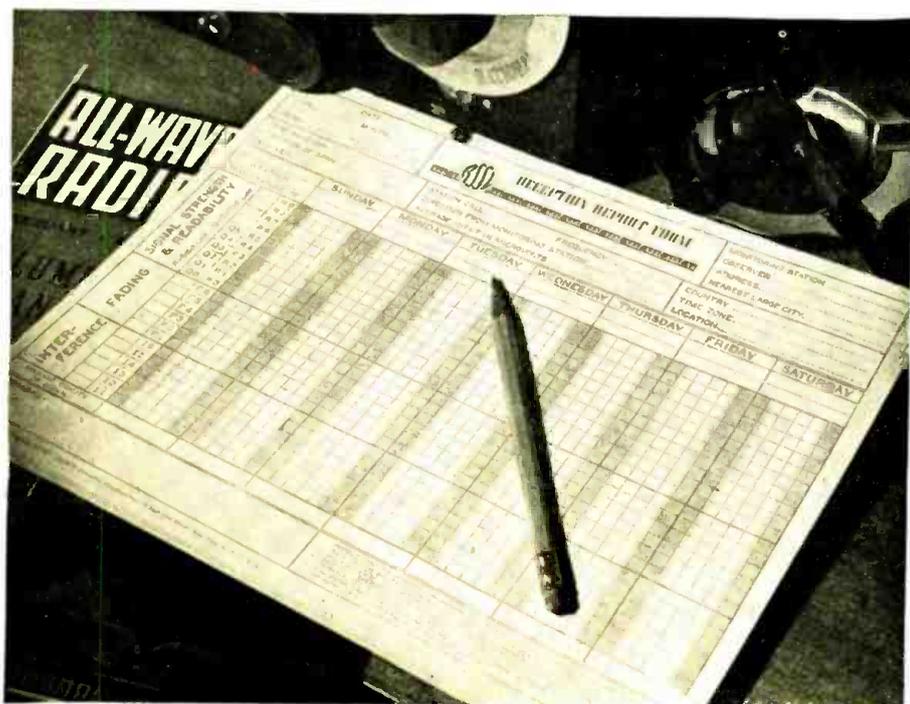
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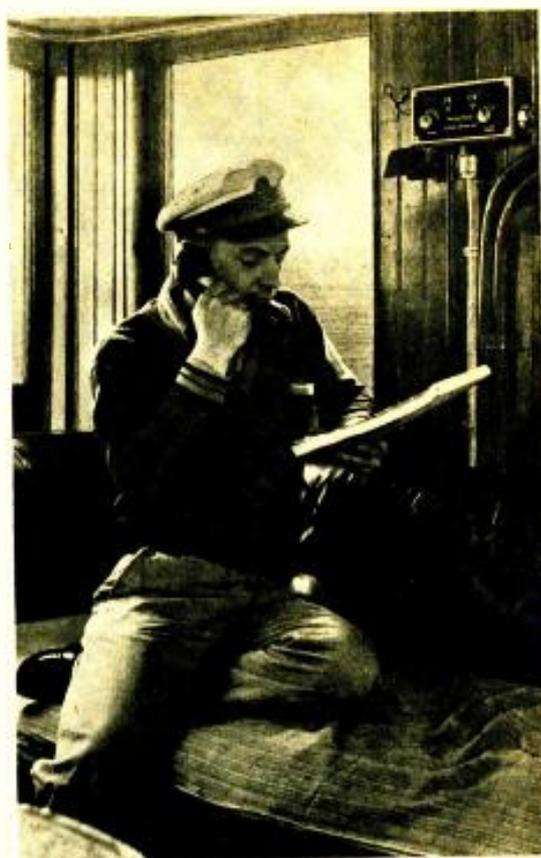
EDITED BY M. L. MUHLEMAN

VOL. 4, NO. 3

MARCH, 1938

COVER ILLUSTRATION

AN INTERESTING AND HIGHLY ARTISTIC PHOTOGRAPH OF THE THREE LATTICE-WORK STEEL TOWERS SUPPORTING THE ANTENNA SYSTEM EMPLOYED AT STATION ZRO, ROME, ITALY.



Capt. Woelfffing of the pilot steamer "Sandy Hook" can keep in touch with shore or other ships by means of the new marine radio telephone equipment. The shore operator can ring the bell in the wheelhouse. (Photo courtesy Western Electric Co.)

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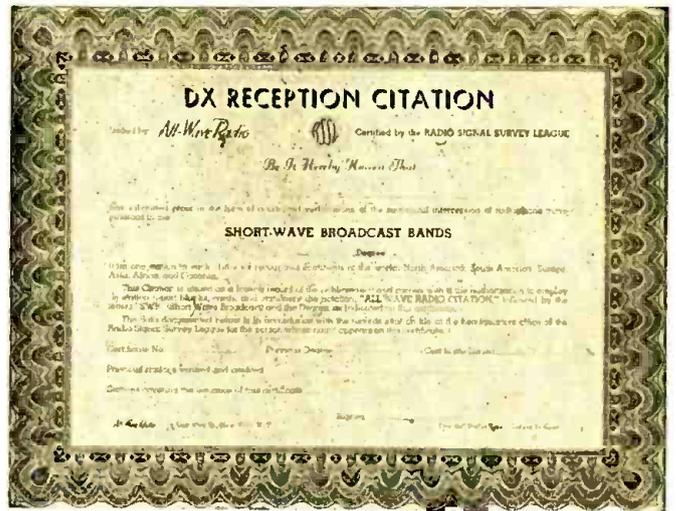
- Short Wave Broadcast
- Standard Broadcast
- Amateur Phone

Listeners, the world over, are now eligible to apply for individual citations, stating definitely their own DEGREE of DXing ability in each specific Band. Based on an entirely new and sound merit rating system, these DX CITATION CERTIFICATES are issued by ALL-WAVE RADIO only after qualifying verifications have been carefully checked and certified to by a judging body, composed of members of the staff of ALL-WAVE RADIO and the directors of the RADIO SIGNAL SURVEY LEAGUE, in accordance with the regulations. CITATIONS start with "FIRST DEGREE" based on the minimum requirements, and advance in ascending order (SECOND DEGREE, etc.) according to the applicant's record of accomplishments! Every DX CITATION CERTIFICATE of ascending degree carries a complete list of previous qualifying verifications in addition to those warranting its own issuance. An individual, duplicate record of verifications is kept on file, at RSSL Headquarters!

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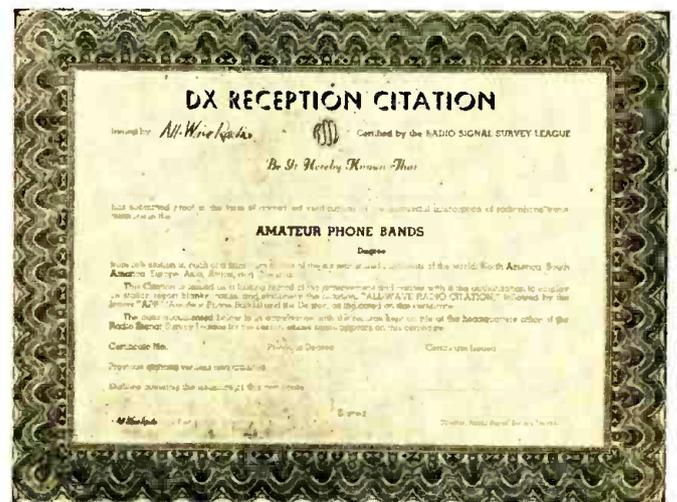
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RADIO SIGNAL SURVEY LEAGUE, 16 EAST 43 ST., NEW YORK, N. Y.

THE "ONE STOP"

ALL-WAVE SUPER

ADVANCED DESIGN FOR HAM AND LISTENER

By MICHAEL G. RELSUM



Front view of the completed "One Stop" receiver in new, modern cabinet, and its companion loudspeaker, also housed in metal. Controls are explained in text.

THE designing of a superheterodyne receiver that will meet all reasonable listener and amateur requirements, and still have a high degree of over-all efficiency, is not the easiest job in the world by a long shot, but is nevertheless both possible and practical. The receiver to be described was designed with the foregoing view in mind.

Up to a certain point, listener and amateur receiver requirements are identical. In some instances they are identical in all respects. For instance, the crystal filter, long assumed as a feature of value to the amateur only, is fast taking a place in the listener field where it plays an important part in separating DX stations in the short-wave broadcast

bands where QRM has become exceptionally heavy. As another instance, the beat-frequency oscillator, originally employed almost exclusively by the amateur for c.w. reception, is now used by the listener as a weak-station finder. Sensitivity, good a.v.c. action, noise silencer circuits, and so on, are, of course, features highly desirable to both groups. Adequate bandspread, ample audio output, and all-wave coverage are also points of value to the listener and amateur alike.

It was our opinion, therefore, that a receiver adaptable to both classes of reception would necessarily have to contain the combined features of the communications-type superheterodyne and the bet-

ter class all-wave broadcast set. Let us see how close our design comes to fulfilling this ideal.

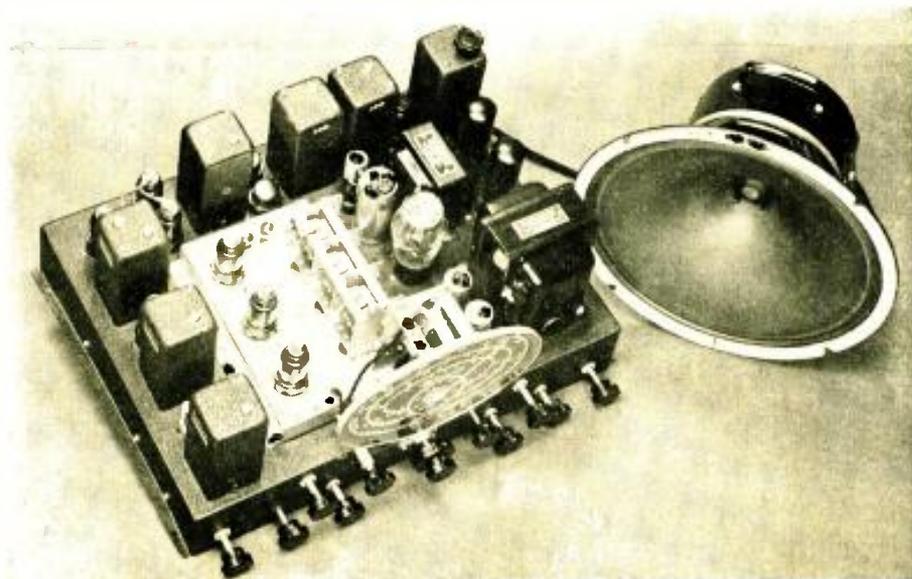
Receiver Characteristics

The set is an all-band job, covering everything from 540 kilocycles to 60 megacycles, or 550 to 5 meters. Thus it takes in all services of interest to the listener and amateur. Band switching is employed, and the five positions of the switch cover the following ranges:

Band	Range
1	550-1560 kc.
2	1560-4400 kc.
3	4.3-12.0 mc.
4	11.3-32.0 mc.
5	32.0-60.0 mc.

Bandspread is mechanical, but highly effective, and ample for all purposes. For instance, the 5-meter band is covered by 26.7 inches of travel of the bandspread dial pointer, the 10-meter band by 9 inches of travel, the 20-meter band by 3.34 inches, and the 40-meter band by 3.6 inches. The 80- and 160-meter bands are covered by 13 and 22 inches of pointer travel, respectively.

Wide-range selectivity—from the extreme of the crystal filter to over-coupled i.f. transformer—was incorporated for a number of reasons, namely; crystal for single-signal reception and excessive phone and broadcast QRM; varying degrees of intermediate selectivity to meet normal reception requirements, and broad-band selectivity for local high-fidelity program reproduction and reception of 5-meter phone stations. Any degree of selectivity can be obtained by the mere turn of a switch on the front panel.



Chassis view of the receiver and the unmounted Jensen dynamic speaker. The beat oscillator pitch control is on top of the transformer seen in the right rear corner of the chassis.

In order to lick the fading problem—a pain to listener and amateur alike—amplified automatic volume control was included. The circuit also includes a noise silencer which is particularly effective in keeping auto-ignition and similar man-made interference well below signal level when working in the higher frequency ranges. Obviously there is an r.f. stage for increased sensitivity, and in order to abolish drift, variable air trimmer condensers are used throughout the r.f. and i.f. circuits.

The Circuit

A better understanding of the characteristics of the receiver can be had from the schematic diagram, shown in Fig. 1. The complete r.f. section is composed of a Meissner 7512-A Tuning Unit with Align-Aire trimmers. In this unit are included the 6K7 r.f. tube used on all bands except No. 5, the 6L7 mixer or first detector, and the 6J7 oscillator. This unit comes completely wired and aligned and saves a lot of headaches and possible errors. It is easily wired into the receiver proper.

The crystal filter and its attendant i.f. transformers, T1 and T2, are connected between the output of the mixer tube and the input or grid circuit of the 6K7 first i.f. tube. A two-gang, four-point switch common to the crystal filter and iron-core i.f. transformer, T3, provides wide selectivity control. The second gang of this switch controls the degree of coupling between primary and secondary of the i.f. transformer, the over-coupling being provided by a third winding, a part or all of which can be cut in or out of circuit.

The second i.f. tube is a 6L7 which is controlled, when noise impulses appear, by the Lamb noise silencer directly below. This circuit employs a 6J7 noise amplifier and a 6H6 noise rectifier. Proper noise bias level developed in the output circuit of the 6H6 is controlled by the potentiometer, R25.

The 6L7 second i.f. tube is coupled to the 6R7 by means of the iron-core i.f. transformer, T4. This latter tube is a diode-triode. The diode functions as second detector while the triode section of the tube serves as the first a.f. amplifier which drives the 6L6 beam-power output tubes operated in push-pull.

Separate tubes are employed to provide amplified a.v.c. There is a 6K7 a.v.c. voltage amplifier, the control grid of which is in parallel with the control grids of the 6L7 second i.f. tube and 6J7 noise amplifier. The a.v.c. amplifier is actually a separate i.f. channel and includes the i.f. transformer, T7, the secondary of which feeds the 6H6 a.v.c. rectifier in full-wave connection. The amplified and rectified signal voltage ap-

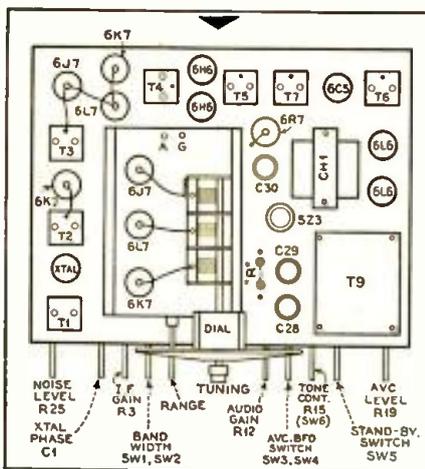


Fig. 2.—Chassis layout for the "One Stop" super.

pearing across the load resistor, R18, is used to bias the r.f. and mixer tubes in the tuning unit proper, and the 6K7 first i.f. tube.

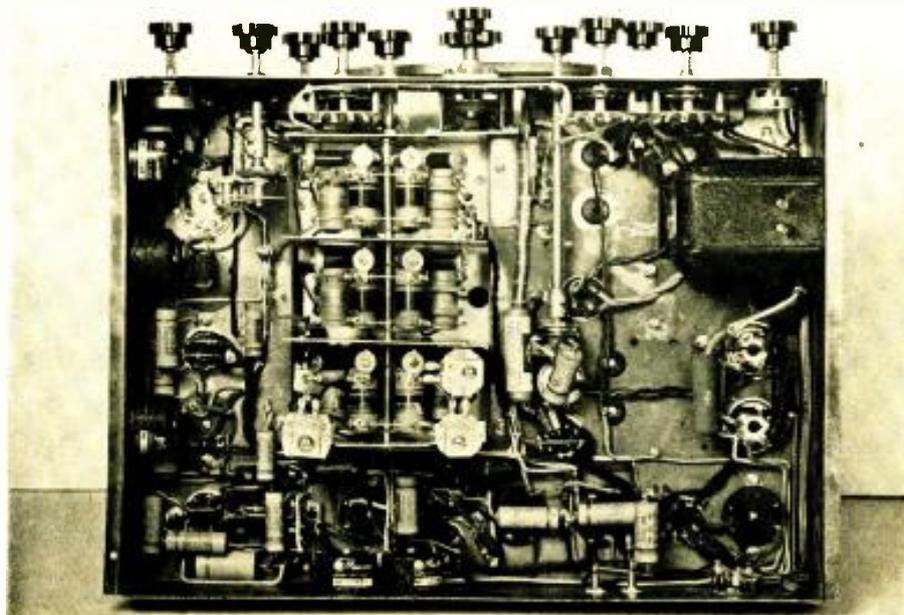
Of particular interest here is the fact that the degree of automatic volume control as governed by signal level can be altered to meet reception conditions. This is accomplished by the potentiometer, R20, which controls the steady bias on the paralleled cathodes of the 6H6 a.v.c. tube. By means of this control, located on the front panel of the receiver, the signal level at which the a.v.c. becomes active can be adjusted so that, for instance, no a.v.c. bias is placed on the controlled tubes under weak-signal conditions. In this instance the receiver is operating at maximum sensitivity during the reception of weak signals—a decided advantage—and the sensitivity is reduced by a.v.c. action only for signals above a satisfactory level. This flexibility in a.v.c. control is of particular value in DX reception.

This flexibility is further increased by the inclusion of the i.f. gain control, R3, and the noise cut-off control, R25.

Posts are provided in the plate circuit of the 6K7 first i.f. tube for the inclusion of an "R" meter to assist in proper tuning and as a means of determining relative signal levels. This may be a 5-milliamper meter of the usual type which can be calibrated in arbitrary units. If a meter is not employed the two posts should be connected together by a jumper, as indicated in the diagram.

There is nothing unusual about the circuit of the beat-frequency oscillator. This employs a 6C5 triode in conjunction with the b.f.o. coil, T6, which has a knob on the condenser for pitch control. This is mounted directly on top of the b.f.o. coil shield which may be seen in the right rear corner of the chassis in the accompanying photo. Note from the schematic diagram that the b.f.o. voltage is impressed on the cathode of the 6L7 second i.f. tube. This provides better beat reception. By means of the four-position switching arrangement, including the ganged sections SW3 and SW4, the receiver may be operated with a.v.c. on and b.f.o. off, with both off, with a.v.c. off and b.f.o. on, or with both on.

The "phones-speaker-standby" switch, SW5, is also of considerable convenience. In the first position the output of the 6R7 triode is fed through the push-pull input transformer, T8, for loudspeaker operation. In the second position the headphones are connected in the output of the triode which is, in this case, disconnected from the primary of the transformer. In the third or "standby" position, plate voltage is removed from the 6R7 triode so that the receiver is to all intents and purposes dead during transmission periods. This method permits



Under-chassis view of the "One Stop" receiver, showing layout and wiring. The a.f. transformer, T8, can be seen mounted on the right side of the chassis apron.

instantaneous resumption of reception by snapping the switch to either phone or speaker position.

Under Control

At first glance, the multitude of "front of panel" controls might give the impression that the receiver is difficult to handle. This is far from being the case.

Signals are tuned in with the same ease as they are on a stock model receiver with no controls other than tuning, volume and band changing.

Referring to the front view of the receiver, the controls, from left to right are: Noise Level Control, Crystal Phasing Control, R.F. Gain Control, Selec-

tivity Switch, Band Selector Switch, Main and Bandsread Tuning Control, Audio Gain Control, A.V.C.-B.F.O. Switch, Tone Control (with a.c. switch), Phone-Speaker-Standby Switch, and finally the A.V.C. Level Control. A lot of controls, but with everything under control.

(Continued on page 166)

ALPHA WIRE

- 1—No. 2101 8-foot power cord
- 1—No. 1431 black hook-up wire
- 1—No. 1431 red hook-up wire
- 1—No. 1431 green hook-up wire
- 1—No. 1431 yellow hook-up wire
- 1—No. 1431 blue hook-up wire
- 1—No. 1431 brown hook-up wire
- 1—No. 1431 white hook-up wire
- 1—No. 1641 filament wire
- 12 feet No. 1641 5-wire cable
- 2 feet shielded grid wire

AMERICAN PHENOLIC

- 7—No. S8 octal tube sockets
- 2—No. RSS8 octal ceramic tube sockets (for 6L6 tubes)
- 1—No. RSS5 octal ceramic tube socket (for crystal)
- 1—No. S4 4-prong tube socket
- 1—No. S5 5-prong tube socket (for speaker outlet)
- 1—No. PM5 5-prong speaker plug

AMERICAN RADIO HARDWARE

- 1—No. 92 shielded grid cap
- 1— $\frac{1}{2}$ inch rubber grommet
- 2— $\frac{3}{4}$ inch rubber grommets
- 1—No. 12250 12" brass $\frac{1}{4}$ " shafting
- 2—No. 250 $\frac{1}{4}$ inch shaft couplings
- 2 pr.—No. 138 insulated phone tip jacks
- 5—No. 202 metal tube grid clips
- 2—No. 801 insulated shaft bearings
- 9—No. 5210 3-terminal tie-lugs
- 6—No. 5101 2-terminal tie-lugs
- 1—No. 5320 4-terminal tie-lugs
- Assorted 6/32 and 8/32 machine screws, nuts, lock washers and soldering lugs.

BLILEY

- 1—No. CF-1 mounted crystal filter (456 kc.) tube socket prongs

CORNELL DUBILIER

- 2—DT-4S1 .01 mfd. (C11, C27)
- 1—DT-4S5 .05 mfd. (C15)
- 7—DT-4P1 0.1 mfd. (C4, C5, C19, C21, C22, C24, C25)
- 1—DT-6P1 .01 mfd. (C9)
- 2—DT-6P5 .05 mfd. (C17, C18)
- 6—DT-6P1 0.1 mfd. (C3, C6, C8, C10, C12, C23)
- 1—ED-2100 10 mfd. (C14)
- 2—KR-508 8 mfd. (C28, C29)
- 1—KR-588 8-8 mfd. (C30)
- 1—5W-5Q5 .00005 mfd. mica (C2)
- 2—5W-5T1 .0001 mfd. mica (C7, C20)
- 2—5W-5T25 .00025 mfd. mica (C13, C16)
- 1—5W-5T5 .0005 mfd. mica (C26)

I.R.C.

- 2—type BT- $\frac{1}{2}$ 500 ohms (R16, R22)
- 2—type BT- $\frac{1}{2}$ 1000 ohms (R4, R6)
- 1—type BT- $\frac{1}{2}$ 1500 ohms (R9)
- 1—type BT- $\frac{1}{2}$ 5000 ohms (R14)
- 1—type BT- $\frac{1}{2}$ 30,000 ohms (R24)
- 2—type BT-1 30,000 ohms (R13, R20)
- 1—type BT- $\frac{1}{2}$ 40,000 ohms (R1)
- 4—type BT- $\frac{1}{2}$ 50,000 ohms (R2, R5, R7, R26)
- 3—type BT- $\frac{1}{2}$ 100,000 ohms (R10, R21, R23)
- 3—type BT- $\frac{1}{2}$ 250,000 ohms (R8, R17, R18)
- 1—type DHA 150 ohms (R11) (adjust to 125 ohms)
- 2—type 11-114 5000-ohm potentiometers (R19, R25)
- 2—type 14-120 25,000-ohm potentiometers (R3, R15)
- 1—type 13-133 500,000-ohm potentiometer (R12)
- 1 a.c. power switch type No. 21

JENSEN

- 1—Model A-12 high-fidelity dynamic speaker (1250-ohm field with 6L6 p.p. output transformer. Specification number B-5469.)

KURZ-KASCH

- 9—No. S-308-3 instrument knobs

MEISSNER

- 1—Model 7512 Tuning Unit
- 1—No. 18282-A punched metal chassis
- 3—No. 18254 rotary tap switches
- 5—No. 5590 r.f. chokes (RFC1 to 5)
- 1—No. 7446 i.f. transformer (T1)
- 1—No. 7447 i.f. transformer (T2)
- 1—No. 7416 i.f. transformer (T3)
- 1—No. 6645 i.f. transformer (T4)
- 2—No. 6869 i.f. transformers (T5, T7)
- 1—No. 6779 b.f.o. transformer (T6)

PAR-METAL

- 1—No. DL-1210 receiver cabinet
- 1—No. 3605 10 $\frac{1}{2}$ -inch relay panel
- 1—No. SC-1580 speaker cabinet

RCA RADIOTRON

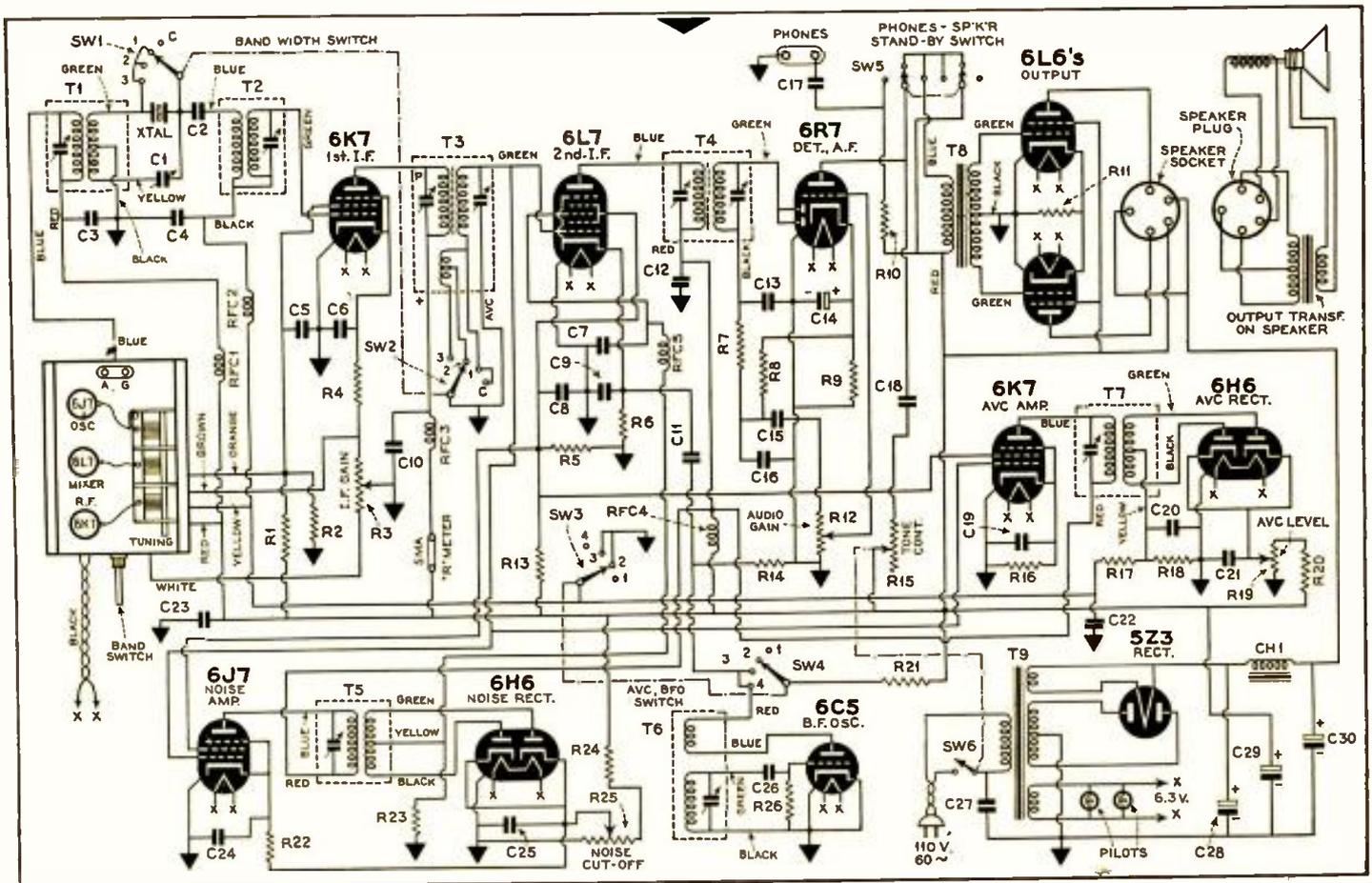
- 3—6K7
- 2—6J7
- 2—6L7
- 2—6L6
- 2—6H6
- 1—6R7
- 1—6C5
- 1—5Z3

THORDARSON

- 1—No. T-92R-21 power transformer (T9)
- 1—No. T-15A-74 pp. audio transformer (T8)
- 1—No. 67-C-49 filter choke (CH1)

Miscellaneous

- 3—6.3 volt .15 amp. dial lights



Complete schematic diagram of the "One Stop" receiver. Parts list above.

A TICKET AT FIFTY—OR BUST!

YOU young fellows who glibly pound out, "Tnx fer ur call OM — . . . — o.k. OM abt fb rig — . . . — sa OM hw abt—" probably don't realize that now and then you *may* hook up with an honest-to-goodness OM.

This little rag-chew has to do with the problem of getting a license at 50. Please don't jump to conclusions and say, "Hi-hi-imagine a Ham with a long white beard!" *Your* dad wouldn't see it that way. He probably feels just as young at 50 as I do.

So here's the lay-out.

"Bill" Gets Bitten

Five or six years ago my son, Bill, started messing around with radio and the first thing I knew he flashed a government license under my nose with the remark, "What do you know about that, Pop!" Well, I'll admit I got a kick out of it myself and the upshot was I coughed up about 50 bucks for equipment for the kid. Inside of 24 hours he became an OM in his own right and has remained one ever since. That was about four years ago.

During the first three years Bill had his ticket, I found I could take my amateur radio or leave it alone. I mean I'd go up to the shack (in the attic) and listen in now and then when Bill was on phone; whenever he was working c.w. I'd just wonder how the devil any one could possibly dope out what all the crazy clicks meant. After the QSO was finished, Bill would sort of insinuate that "matched impedance was the cats if you could handle the gain without too much feedback to the bias and didn't I think *we* ought to have a crystal-controlled filter in the oscillator output to the tuned antenna feed - - -". Well, that's what it sounded like to me, anyway, and I usually cut through the smoke and said "How much?" As soon as the financial details were settled I'd go down and turn on my broadcast receiver and decide that maybe golf was a comparatively simple game after all.

Then "Pop" Gets the Bug

Then Bill went and got him a mild case of scarlet fever and had to be confined to his room for about three weeks, though he really wasn't sick.

That's when the trouble started!

You see I'd go sit in the doorway to keep him company and chat about things in general. Of course "general" had a way of getting around to radio and plans for the future. And one day Bill said.

By **W. P. WHITLOCK, Jr.**

"Say, Pop, why don't you learn the code?" You know, offhand like, and then he added, "We could have a swell time together."

And I fell for it!

Bill got a buzzer rigged up and started sending single letters to me—and then a word or sentence now and then. Before he got out of quarantine, he even had the nurse working at it. Then Bill decided I'd better have a code machine, because he'd be away at college and I could work on it in spare time all by myself.

I pretty near got the jitters with that code machine, but it undoubtedly gave me a good foundation. After I'd reached 9 or 10 words per minute, I decided I ought to listen to actual sending, and that meant a receiver, because I didn't want to spend all my evenings up in the shack and leave the XYL downstairs with the knitting.

So I got me a National SW3 battery set, a pair of ear phones, and a load of concentration. It was pretty bad at first—particularly the abbreviations and the spotty fists—but I began to make headway. Then I decided that commercials were what I should spend most of my time on, even if they were too fast for me, because the sending was so perfect I'd get the proper rhythm of it.

Code Becomes Duck Soup

I'll admit I put a good many hours on it and at times thought I'd never make the grade—but suddenly it began to "come through" and I found I was taking

20 words per minute fairly well and even getting some of the 25-word press reports. My favorite practice station was NAA which came on every evening except Sunday with political and economic news that was fine material for practice.

So far I had been taking everything down (even if I couldn't read my 25-word stuff afterwards, because it's pretty hard to write that fast) and then came another change! I suddenly found I could dispense with the pencil and absorb it pretty well just as it came. I found I got an extra kick out of being able to stick the ear phones on and just listen.

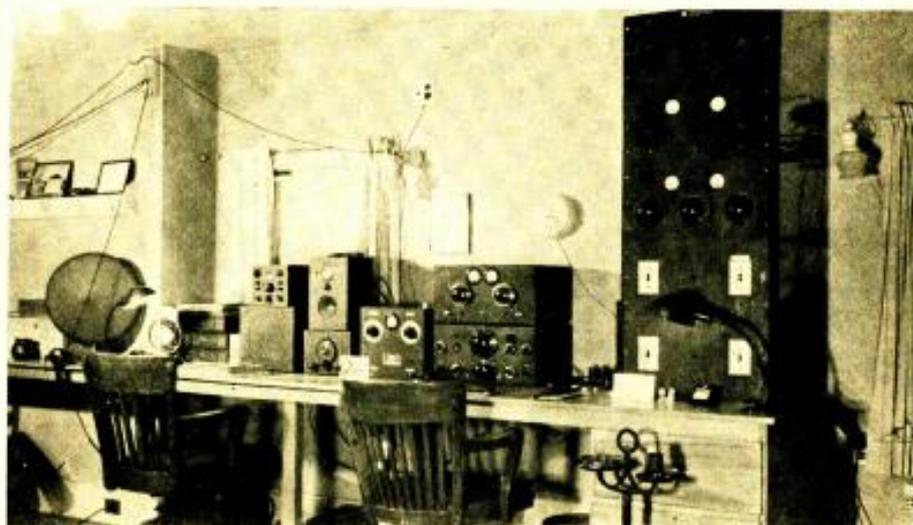
About that time, some confounded little bird came along and whispered in my ear, "Why don't you get a license? Then you and Bill could *really* work together; besides, how would you like to pound out a few CQs on the brass all by yourself, and maybe hook a foreign, or somethin'?"

Of course I replied, "Oh don't be stupid!" But I didn't mean it, and what's more I knew I didn't mean it.

A Zedder Settles It

A week or so later, I arrived home one night about midnight. Bill was home from college on his Christmas vacation and the light was on in the shack. As soon as I stepped into the room I got the high sign and knew there was something doing. Sure enough, Bill had hooked New Zealand, clear around the world. I got my pencil out quick and took down both sides of the QSO. A cold winter

(Continued on page 163)



The equipment at W2GUO, William Whitlock III. A chair each for father and son. From left to right: Oscillograph and speaker, SW3 Monitor, 35-watt xmtr, NC-101X receiver, and 150-watt xmtr.

A DE LUXE HIGH-FIDELITY RECEIVER INSTALLATION

PART I

By JAMES MILLEN

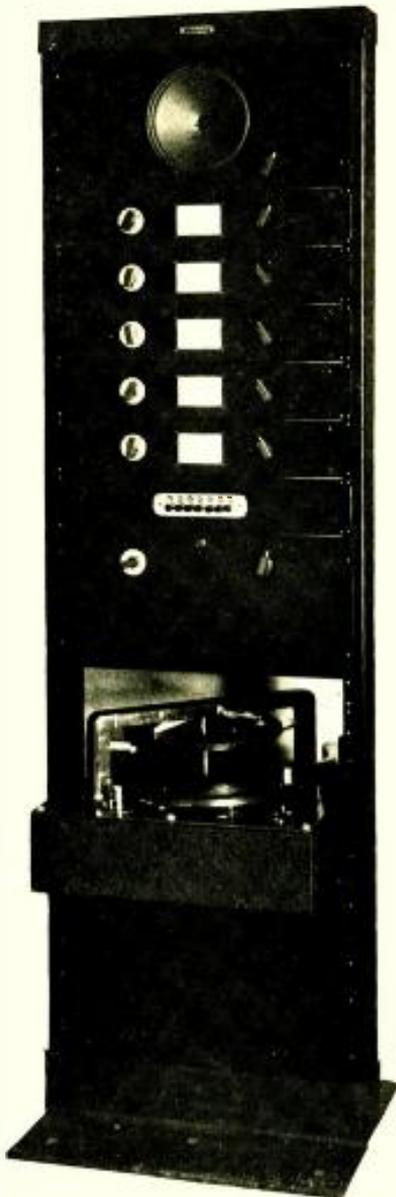


Fig. 3. Front view of the multi-unit band-pass type of "fixed-tuned r.f." receiver, a.f. amplifier, and automatic record changer. The small speaker at top is merely for use when tuning and adjusting the individual channels.

THE old proverb about the shoe-maker's children going barefoot seems to be as universally applicable today as ever. Certainly, there are very few of us in the radio industry who can boast of a particularly good installation of broadcast program reception equipment in our own homes.

With a view toward at least partially remedying the situation in our own case, we have just completed the design and construction of the equipment illustrated herewith.

High-Fidelity Requirements

The term "high-fidelity broadcast reception" in itself requires some explanation. The studios of the various networks transfer to their networks, programs of remarkably fine fidelity. Even when these programs have traversed

many miles of land wire to reach some of the distant stations of the network, the quality is generally still quite good—indefinitely superior to anything emanating from the loudspeaker of the average radio set. To receive these programs with the same order of fidelity in your own home, with which they may be heard by means of a good speaker connected to the audio line in the broadcast studio or even the control room of the distant transmitter, involves more than just a band selector type tuner and good audio channel in the home receiver.

Most important among these other requirements is, perhaps, the field strength of the particular transmitter being listened to at the point of reception. When this field strength is abnormally strong, one secures, in the first place, a tremendous signal-to-noise ratio which completely eliminates any question of disturbing background. Also it permits the operation of the detector circuit in a manner which assures a minimum of distortion at that point.

In studying the requirements of a high-fidelity reception system, it is rather interesting to note that the tuners of the style manufactured back in 1929 and 1930 are capable of better performance than anything being offered on the market today. One such commercial tuner, illustrated in Fig. 1, employed a t.r.f. circuit of the Vreeland band selector type. A later commercial tuner, using essentially this same circuit, is the well-known Western Electric 10A tuner, illustrated in Fig. 2.

In building t.r.f. band-selector tuners of this type, the major difficulty encountered by the average constructor is the mechanical problem of proper ganging and shielding. If some simple and relatively inexpensive method of overcoming these difficulties could be developed, the problem would be greatly simplified. Our solution to this problem is the con-

struction of a number of separate pre-tuned channels made, as illustrated in Fig. 3, from standard i.f. transformer units. Shielding is no problem in constructing an amplifier along this line. The difficulty of properly ganging a multiple unit variable condenser is exchanged for the relatively simple task of switching the outputs of the several different channels.

The system is extremely flexible in that any number of channels may be used and that additional channels may be added at any time. In this connection the normal frequency range may be considerably ex-

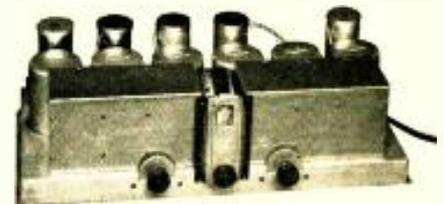


Fig. 1. A band-selector tuner manufactured in 1929, for high-fidelity broadcast reception. It was known as the "MB-30."

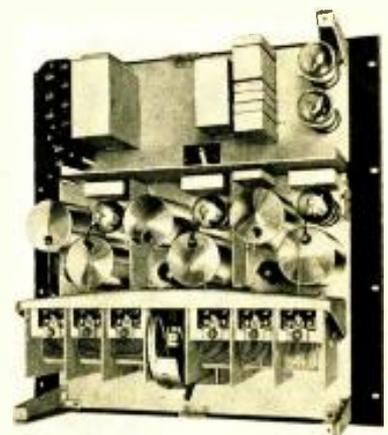


Fig. 2. The famous Western Electric "10-A" tuner which is similar in circuit details and performance to the "MB-30" unit shown in Fig. 1.

tended by the addition of low- or high-frequency channels providing for the reception of stations lying outside of the normal broadcast band. For instance, the weather broadcasts on the low frequency Department of Commerce "X band," the Arlington time signals, and the news flashes from some of the powerful European high-frequency broadcast transmitters are all services that it is nice to be able to have at the mere touch of a button at any time. Then, again, a multiple-channel type of receiver lends itself readily to remote control by the modern push-button method.

Remote Push-Button Control

In our case, the channels are built on standard relay rack panels, and mounted on a standard relay rack along with the automatic phonograph record changer, audio amplifier, relay panels, and monitor speaker. The rack is located in the basement of our home. The Jensen 15-inch Peri-Dynamic speakers and master control boxes are remotely located in such places as the living room, dining room, etc., where, in most cases, it has been possible to build them into cupboards and other out-of-the-way places.

Thus, during dinner, it requires the mere pushing of a button to secure 35 minutes of recorded music which can be interrupted by the mere pressing of a button at any time to cut in the news broadcasts or any other special features.

In this connection, it would not be at all difficult to go one step further and add an electric clock control that would automatically interrupt whatever program might be on at any time to automatically insert the news broadcast and then revert back to the former program whether its origin be radio or phonograph record.

R.F. Unit Details

The actual construction of the individual r.f. channel units is extremely simple, but before going into details it might be well to examine the fundamental requirements for high-fidelity reception. The first, of course, is a signal of adequate field strength. Experience has shown that consistently satisfactory entertainment cannot be obtained from distant broadcast stations, due to static and selective fading. No a.v.c. system has yet been devised which will overcome fading which results from phase differences between sky wave and ground wave and it follows that the only really satisfactory program material will be obtained from local stations within a maximum radius of about 25 miles.

A non-regenerative t.r.f. circuit will, therefore, have ample sensitivity and its construction need not be complicated by automatic volume control circuits, local-distance switches, etcetera. These simplifications tie in very well with the high-fidelity requirement for, in spite of what



Fig. 7. Close-up of one of the "fixed-tuned circuits" removed from its shield can. Note variable air trimmers and mechanism for altering coupling between the coils. This is a standard commercial type i.f. transformer.

may have been said to the contrary, we have always felt that any such additions were bound to have a deleterious effect on tone quality. The various r.f. units were therefore designed along the simplest possible lines, consistent with the needs of channel width and flexibility,

the circuit for each unit being identical with the diagram of Fig. 4.

Figs. 5 and 6 show the construction details clearly, and only a few of the special features will be pointed out. The chassis itself is a stock National item, which is furnished complete with the new type "CIR" ceramic sockets, terminal panels, etc. The dimensions of the chassis are $1\frac{1}{2}$ " x 3" x 17", and it may, of course, be readily constructed from sheet steel by the experimenter who has adequate shop facilities. The chassis is mounted on the back of a standard $3\frac{1}{2}$ " x 19" relay rack panel, which at the same time serves as the chassis bottom. The horizontal position of the tubes and r.f. transformers is very convenient when making tests and adjustments.

It may be seen that there are two sets of terminals near the 6C5 detector; one on each side. Both sets are connected to the heater buss arrangement so that short jumpers may be used for inter-connecting separate r.f. units. B plus and output leads are brought out in a cable.

All the tubes in the various r.f. channels are lighted, even though only one channel is used at any one time. Aside

(Continued on page 162)

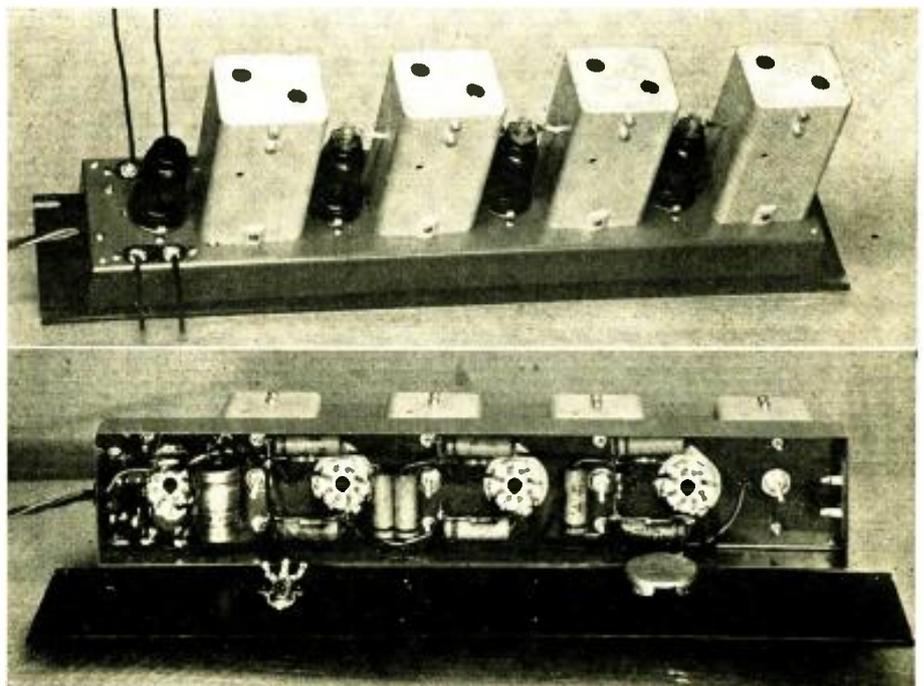
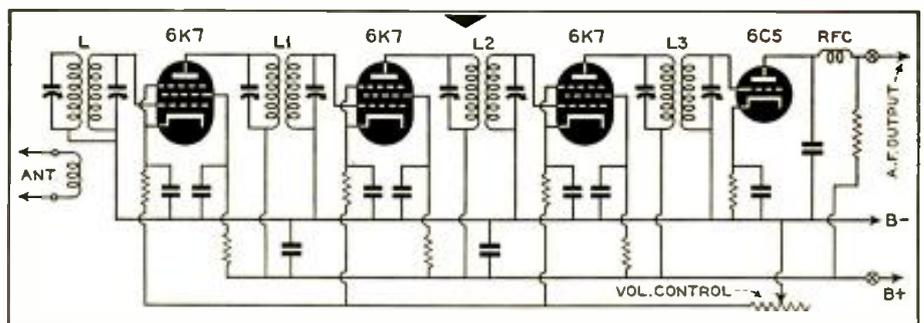


Fig. 4, above, is the schematic diagram of a single pre-tuned r.f. channel. Fig. 5, center, is one of the bandpass r.f. channels using standard i.f. transformers. Fig. 6, below, is an r.f. chassis removed from its panel to show wiring, fixed condensers, etc.



NEWCOMER'S TRANSMITTER WITH ITS PRE-AMPLIFIER AND AUXILIARY POWER UNIT, AT RIGHT, AND ANTENNA TUNING UNIT.

AUXILIARY EQUIPMENT FOR THE NEWCOMER'S C.W.-PHONE TRANSMITTER

THE basic Newcomer's Transmitter, as described in the January issue of *ALL WAVE RADIO* was kept to a reasonable minimum in regards to number of components and their cost. This month we will describe three accessory units which will render the transmitter more versatile in both use and operation.

The Pre-Amplifier

As shown previously, the transmitter was designed for use with an inexpensive carbon microphone. This not only saved approximately ten dollars over the cost of the more expensive crystal or velocity mikes but effected an additional saving by the elimination of the extra audio stages necessary for use with the low-gain types of microphones. This month we are describing a two stage pre-amplifier which will permit the use of either crystal or velocity microphones for those who prefer their use. The diagram, Fig. 1, and the photos show the proper connections for use with a Velotron microphone. For use with crystal types of microphones it is necessary to change the input circuit of the pre-amplifier to that shown in Fig. 1-B. The high voltage supplied to the Velotron input jack is injurious to a crystal microphone, so do not

By *C. WATZEL, W2AIF, and W. BOHLEN, W2CPA*

plug a crystal mike in this jack by mistake.

A plate-to-line output transformer, T, matches the pre-amplifier to the transmitter input through a 200-ohm line. Note that a three-wire cable is necessary. It is preferable to use a two-wire shielded cable, employing the outside shield as the common ground connection, together with a pair of type 76A shielded plugs. No changes are necessary in the input connections to the transmitter as previously shown. Either the carbon microphone or the output cable from the pre-amplifier may be plugged into the microphone jack on the transmitter. With the three-wire connection system between the pre-amplifier and transmitter the microphone voltage generated in the transmitter does not appear across the low-impedance audio windings regardless of the setting of the microphone voltage control on the back edge of the transmitter chassis.

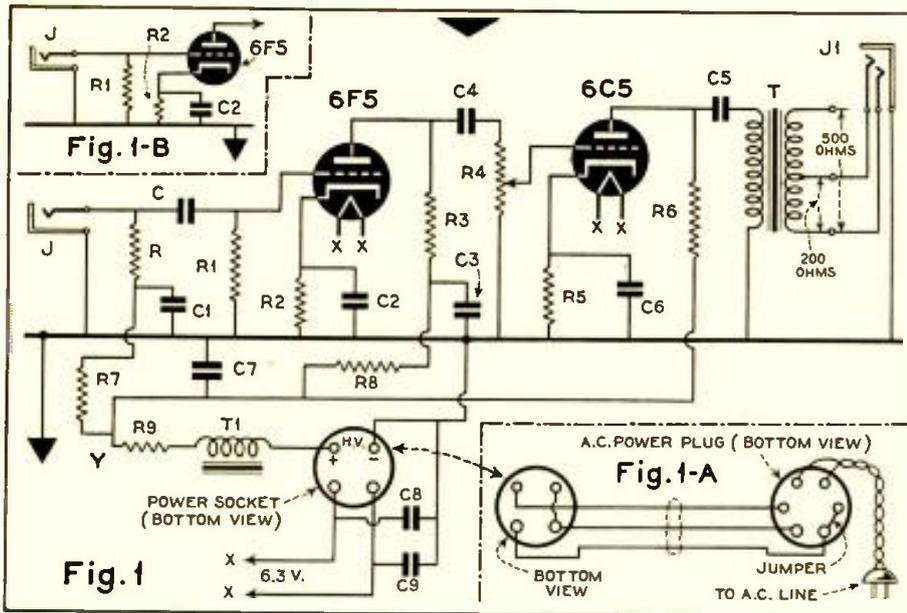
Power for the pre-amplifier is taken directly from the transmitter. In the transmitter diagram, power section, is shown an a.c. line cable connected to a plug marked "A.C. Power Plug." The heater and plate voltages for the pre-

amplifier are taken from this same plug. The insert, Fig. 1-A, at the lower right of the pre-amplifier diagram shows the additional connections to the a.c. power plug. The power socket on the pre-amplifier (which is mounted on the back edge of the chassis) is connected "standard." This makes it possible to run the pre-amplifier from any standard power supply giving 6.3 volts for the heaters and not more than 400 volts for the plates. The value of R9 is such as to drop the voltage at the point marked "Y" to 250 volts when the supply voltage is 400 volts.

This pre-amplifier is not limited to use with the Newcomer's Transmitter. It will permit the use of either a Velotron or crystal microphone on any transmitter which previously employed a carbon microphone. The gain is more than ample for any setup used. The hum level is so low as to be almost inaudible. One reason for this low hum level is the fact that no power supply has been included in the pre-amplifier itself.

Universal Antenna Tuning Unit

Because of the many different bands the amateur works on and the varied



Schematic diagram of the pre-amplifier and plug connection for tie-in with transmitter.

AMERICAN RADIO HARDWARE

- 2—octal wafer sockets
- 1—4-prong wafer socket

CORNELL-DUBILIER

- 1—type 1W-5D6 mica, .006 mfd. (C)
- 2—type DT-4P5 paper, 0.5 mfd. (C1, C3)
- 2—type ED-3050 electrolytic, 5 mfd. (C2, C6)
- 2—type DT-4P1 dual paper, 0.1 mfd. (C4, C5, C8, C9)
- 1—type KR-508 electrolytic, 8 mfd. (C7)

I.R.C.

- 3—5 megs., ½ watt (R, R1, R7)
- 1—3500 ohms, ½ watt (R2)
- 1—250,000 ohms, ½ watt (R3)
- 1—2500 ohms, ½ watt (R5)
- 1—100,000 ohms, ½ watt (R6)

- 1—25,000 ohms, ½ watt (R8)
- 1—10,000 ohms, 10 watts (R9)

KENYON

- 1—type T-101 plate-to-line transformer (T)
- 1—type T-156 filter choke (T1)

PAR-METAL

- 1—type HC-788 cabinet
- 1—type C-4510 chassis

YAXLEY

- 1—type A-1 jack (J)
- 1—type N, 500,000-ohm pot. (R4)
- 1—type 390 indicator plate
- 2—type 76A 3-way shielded mike plug (for output cable)
- 1—type 702A jack (J1)

which would be "floppy" when air wound may be wound on the type XR13 forms indicated in the parts list. These are the same as employed for the plate tank coils in the 807 stage of the transmitter. Each pair of insulators should be spaced 3 1/8 inches to accommodate these forms. Banana plugs can be screwed directly into the end holes of these forms.

"A" to "F" of Fig. 2 indicate several possible connections for the antenna unit. "A" shows a balanced coupling to a two-wire feeder line with series tuning. "B" shows balanced feed to a two-wire line with parallel tuning. Notice that the inside link is "split." The turns of this link coil should be evenly divided in the center and the turns pushed close to the ends of the antenna coils for closer coupling with few link turns. In some cases this division of the link turns is not necessary, the link directly in the center being satisfactory. Experience will dictate the proper degree of coupling between the link and antenna coils.

"C" indicates balanced parallel tuning with a single antenna coil. In this case the link is wound around the center of the single antenna coil. "D" shows series tuning on a "Marconi type" of antenna worked against ground, while "E" shows the same Marconi type with parallel tuning. The proper size, and position on the antenna coil, of the link will, again, be determined by the "cut and try" method.

"F" shows how the antenna unit may be "bypassed" when it is desired to couple an untuned two-wire feed line directly to the transmitter without removing the antenna and link connections from the antenna unit.

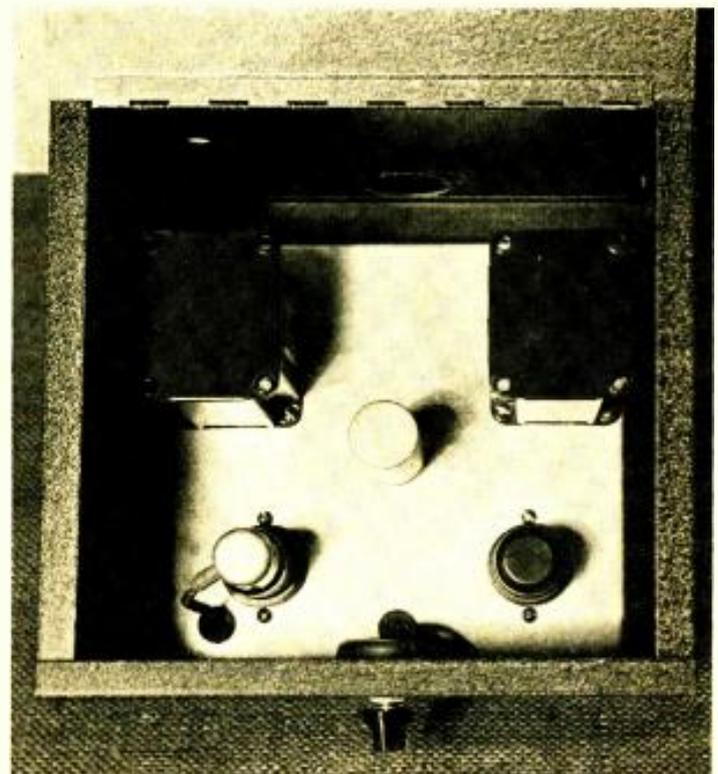
Because of the relatively low power of

number of antennas in use, it is difficult to match the transmitter to these antennas with a single unit without changing connections for each antenna. The unit described here permits these changes in connection by means of "patch cords." Fig. 2 and the accompanying photo of the antenna unit show clearly the construction and simple connections for this unit. The two pieces of hard rubber are fastened at right angles to each other by means of a pair of small brackets and the parts mounted and wired in the positions shown. Five plug-in cords are made up from standard rubber-covered wire and the No. 131 insulated banana plugs. By plugging these cords into the various jacks on the upper panel any desired connections may be quickly made.

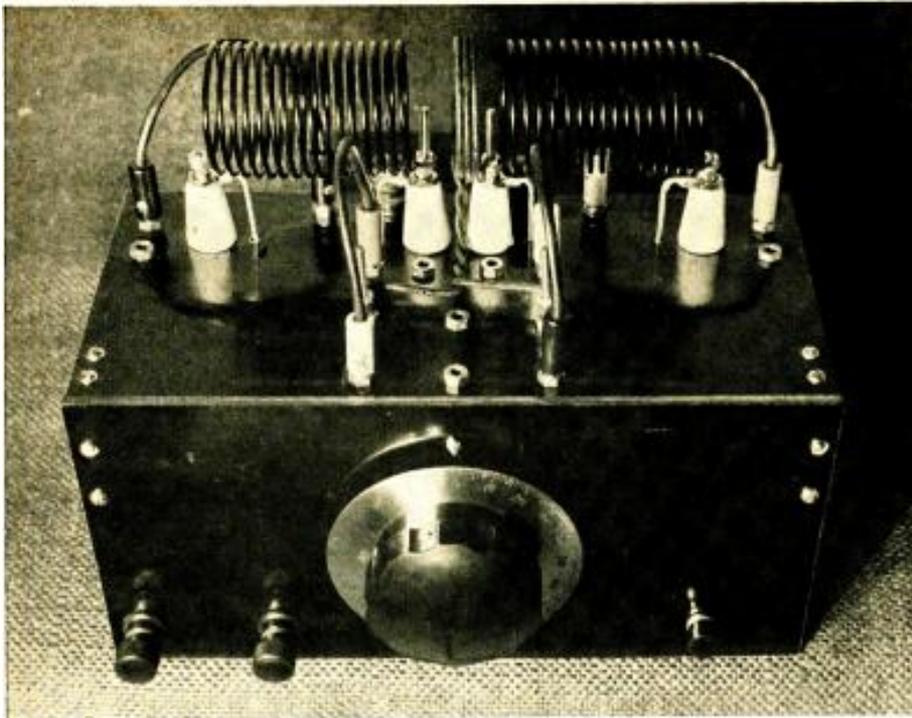
Two sets of feed through insulators place the coils above the top panel so that the interconnecting cords may run beneath them when desired. Fig. 2 indicates shorting wires on each coil which do not show in the photograph. These are composed of flexible wire with Cardwell inductance clips to make contact to the various turns. The other ends of the wires may be soldered either to the outer ends of the coils or to the outer coil mounting insulators.

No data is given on coil sizes, as this will depend on the antenna used. Make

coils of whatever size indicated in the instructions for the antenna. Coils of a few turns may be "air wound" to save the expense of coil forms. Larger coils,



Interior view of the resistance-coupled pre-amplifier which permits use of crystal or velocity microphones.



View of the completed antenna tuning unit for the Newcomer's Transmitter.

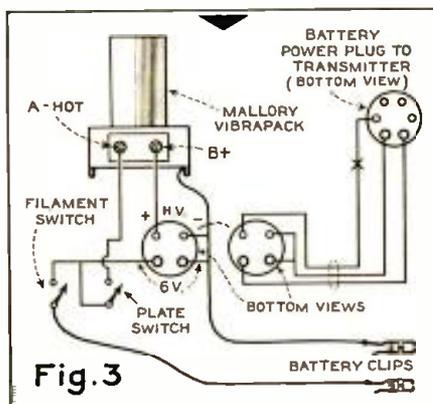
the Newcomer's Transmitter, the link coils for the antenna panel may be made of well-insulated pushback wire. This will permit of best flexibility of this link as to size and position.

The antenna unit should be mounted close to the point at which the antenna feeders enter the house. The link from the unit to the transmitter may be of any desired length. Low impedance cable, such as EO1 or the Bassett type is best for this link. Twisted rubber-covered wire is also satisfactory. A line of about 400 or 500 ohms impedance may be made up by spacing ordinary bell wire an inch.

Battery Operation

In the previous article on the Newcomer's Transmitter it was stated that it was felt desirable that the transmitter be adaptable to operation from a storage battery for portable or emergency work. All necessary connections in the transmitter itself are shown in this previous article. No changes whatsoever are therefore necessary in the transmitter to change it from a.c. to battery operation. It is only necessary to remove the "A.C. Power Plug" from its socket on the back edge of the transmitter chassis and insert in its place the "Battery Power Plug" shown in Fig. 3 of the present article.

The above feature makes the Newcomer's Transmitter suitable for operation both in the home and abroad. The car battery, for instance, will provide power for operation at remote locations. This instant adaptability of the transmitter makes it especially valuable for emergency work. Any available 6-volt storage battery will run the transmitter, while a.c. operation may be instantly reverted to when and as external power is



The Vibrapack connections and the connecting plug and cable. Separate plate and filament switches are provided.

restored. If, for instance, the transmitter is in use in the amateur's home as a "driver" for a high power final stage, it becomes an emergency low-power transmitter merely by moving it to any desired location, or it may be operated in the home shack as an emergency low-power transmitter merely by "swiping" the battery from a nearby car. It would be a good idea if more amateurs would build up their exciter units in their high-power transmitters so that they could be quickly adapted to low-power operation from a storage battery. This would greatly aid in emergency work.

A Mallory type VP-552 Vibrapack converts the 6 volts d.c. from the storage battery to high voltage d.c. for the plates of the various tubes. Fig. 3 illustrates the connections necessary to adapt the Vibrapack to the Newcomer's Transmitter. All that is needed is a 4-prong wafer socket, two 15-ampere toggle switches, a scrap piece of metal or other material to fasten these parts to the Vibrapack, and a pair of large battery clips. The composite photo of the transmitter setup shows a small aluminum "panel" fastened by a pair of brackets to the bottom mounting screws of the Vibrapack.

The leads from the battery to the
(Continued on Page 160)

AMERICAN RADIO HARDWARE

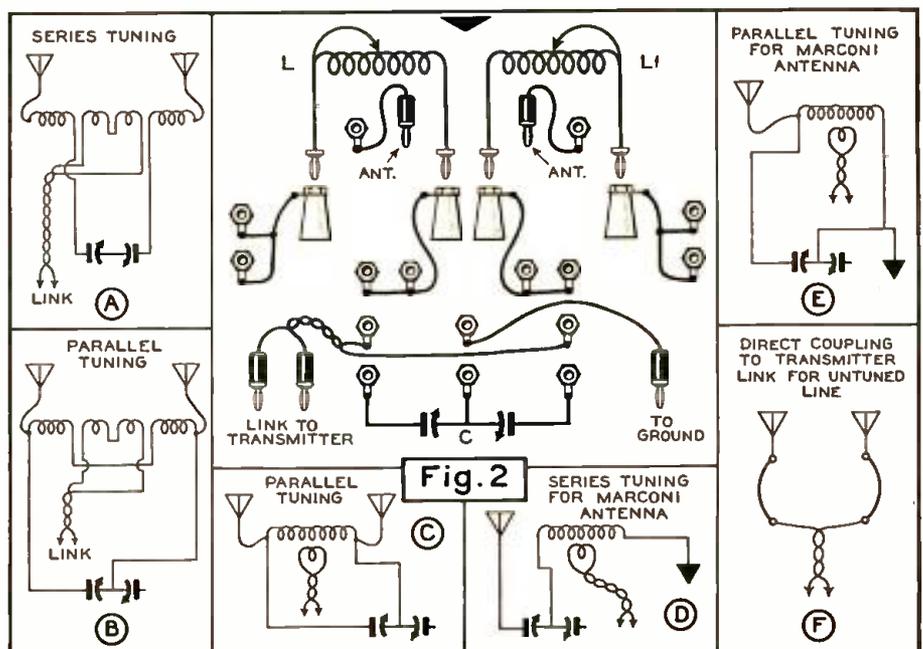
- 16—No. 125 banana plug jacks
- 4—No. 1764 banana plugs (2 for each coil)
- 10—No. 131 insulated banana plugs
- 4—No. 74 feedthru insulators
- 5—No. 154 binding posts

NATIONAL

- 1—type TMS-100D dual tuning condenser (C)
- 1—type O dial
- 2—type XR13 coil forms (L, L1) (see text)

Miscellaneous

- 2—pieces hard rubber, 5"x10"
- assorted brackets



Circuit of the antenna tuning unit and the various combinations it provides for use with different antenna systems. Parts list above.

Hamfest

By W8QMR (W4FCP) ex-2PI • LU4S

TAKING a busman's holiday from the air pending the reincarnation of W8QMR as W4FCP, we have been pounding brass, in five-hour tricks, at the booth of the Tampa Radio Club during the Florida State Fair. This booth is among the most popular at this stupendous exposition, and an enterprise of this nature does much to rehabilitate amateur radio in the eyes of the layman who often considers its representatives as a bunch of kids existing for no other reason than to spoil Amos 'n Andy with their didadits and "hi hi's." Any well-organized club can put on a similar show. But it's quite a job, and for the sake of those who would like to duplicate it, we'll outline the essential mechanical considerations.

First, it is desirable that the booth be divided into two sections—the counter, where the messages are written and collected, and the operating room. The two sections should be separated with a glass partition, so that the mob can google the operator when he snitches a drink between nr1250 and nr1251. The messages are passed from the counter to the operating booth by a letter box arrangement which can be designed either to catch the messages or scatter them on the floor.

A recommended message form is shown in Fig. 1. These can be printed at a very reasonable cost, on inexpensive paper (in lots of 5000). This form is standard, except that the filing time is omitted—which simplifies filing and transmission. The station of origin is not set in type, as it is impossible to clear all traffic from the booth, and a thousand or more messages must be transmitted from the personal stations of individual club members. "Write Plainly" can be omitted if desired—it doesn't mean anything!

A crew of *no less than five persons* is required to run the show—two at the counter and three in the operating section. The two lads at the counter, first of all, answer foolish questions, damn foolish questions, G - - - D - - - foolish questions, and those that come after that. In self-defense, the counter should not be open continuously. A sign, prominently displayed, should state that messages can be filed only between the hours of two and five in the afternoon, and from seven to nine in the evening. They give essen-

HEIGHTOMETER . . . HAMFAIRS . . . QSL-EGANT . . . HAM MAPS . . . CQ DAMNEA

tial directions, check the messages, enter the check, see that it is fairly readable, enter the date and pass the message in to the operating section. Here a third member of the crew picks it up from the floor (or out of the box) and puts it on a hook labeled in the general direction of its destination—New England, Middle West, Northern Fla., etc. While all members of the crew should be operators, the remaining two are designated as first and second operators. The first operator does nothing but pound brass and tune the receiver. The second operator notes the schedules, and selects messages from the hooks which the station contacted should logically QSP. He fills in the number (with an automatic number changing stamp) "sent to," "date" and "op," and passes the message to the first operator. Immediately upon transmission, he enters the "time" and *returns* the message to the operator. During transmission he has prepared the next message. The messages remain with the operator until the sequence, usually three, has been transmitted. This is to avoid confusion in case fills are requested. When the messages have been okayed, the second operator puts them in the "sent" pile. The second operator also takes care of the log and keeps the monitor from boiling over. With a good first operator,

and an expert on the receiving end, operator number two is as busy as a one-armed paper hanger with fleas.

All stations are worked on carefully pre-arranged skeds. The schedules are posted, with notes on the operator, characteristics, speed, etc. Most operators prefer to accept the first message with full preamble, and all subsequent messages with just the number, check and date.

It is essential, of course, that skeds be obtained only with operators who are first-rate traffic men, know procedure, and are reliable. When you get a string like W4DNA, W5GHF, W4EBP, W4DWI (who copies on a Braille machine) W9ZCH, W4PL, W4CZA and W9RWS, you can really go places in five hours of operating.

And with good men at the other end, *it is only fair* that the first operator at the booth be of similar caliber. Keep the lids at the counter. And it is only fair also that the club provide A-No-1 ops with adequate, reliable equipment and facilities.

HEARD AT THE radio club booth at the fair:

Woman No. 1: Oh look—let's send a radio message home free!

(Continued on page 167)

Amateur Radio STATION W4 DUG		AMATEUR RADIOGRAM		Amateur Radio STATION W4 DUG	
NUMBER	STATION OF ORIGIN	CHECK	TAMPA, FLORIDA	DATE	
TO _____					
Address _____					
City _____ State _____					
(NOT OVER 15 WORDS — WRITE PLAINLY)					
Signature _____					
Sent To	Date	Time	Op.		

Fig. 1. Suggested form for radio club message blank at State Fairs, etc.

A REVERSE-FEEDBACK DRIVER

By R. B. SHIMER

Engineering Dept.
Kenyon Transformer Corp.



View of the complete driver amplifier, with inverse feedback, which employs type 1608 tubes in the output.

FOR a long time there has been much discussion among less technically minded amateurs and sound men as to why pentodes and beam power tetrodes with their high output characteristics would not make good drivers for Class AB and Class B stages requiring considerable amounts of power and drawing considerable grid current. Here presented is an amplifier which does use a beam driver stage—among other features.

Driver Considerations

But first let us consider why pentodes normally do not make good drivers. Consider the circuit of the amplifier described in this article, but minus the feedback circuit from plate to grid on the 6V6 tubes. The constants important to us are these:—

- (1) Plate resistance of 6V6 = 52,000 ohms
- (2) Peak grid-voltage swing of 1608 = 65 volts for 50 watts output
- (3) Peak grid current at 50 volts grid = 85 ma.
- (4) Turns ratio of driver transformer = 5:1 Pri. to 1/2 Sec. (T-3)

Under these conditions, the grid resistance of the 1608 may be assumed to be a minimum value of 580 ohms. This reflected to the primary of the driver transformer T-3 (since this is a Class A stage) is $(5)^2 \times 580 = 14,600$ ohms. Now we may proceed to the equivalent circuit of the driver stage, as shown in Fig. 1.

It can now be seen that as the load resistance of the stage is decreased as the 1608 tubes draw grid current, regulation

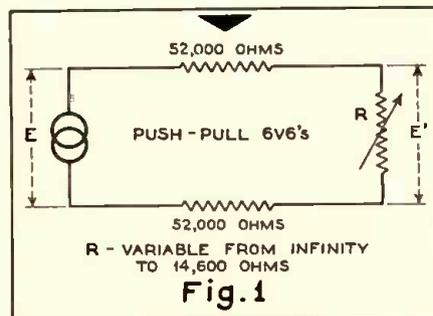
of the load voltage E' becomes worse and worse because of the high series resistance between it and the generator voltage E . This results in amplitude distortion in the stage, one of the commonest and worst sounding kinds of distortion known.

The Amplifier

With this in mind we may proceed to the discussion of the amplifier. The gain of this amplifier is approximately 105 db., and the output conservatively rated at 50 watts. It will deliver this output from any of the modern microphones with a level of -60 to -70 db. Its quality is excellent, and the response is satisfactorily constant over the audio range. The driver is capable of delivering much more power than that required by the 1608's so that these may be seriously overdriven without any driver distortion.

The Circuit

On looking over the circuit of Fig. 2, two radical departures from practice



Explanatory diagram which is the equivalent circuit of the driver stage.

will be noted. First, we have triodes as the output tubes instead of 6L6's, for about the same power output. The major reason for this is that, as is well known, 6L6's require power supplies for plate, screen and grid, with small degrees of regulation. This is not quite so strictly true of triodes and is their major advantage. More than that, the 1608 is a high-power, high-mu cousin of the 2A3—that old standby of power tubes—and should thus show less tendency to be critical than has been sometimes shown by the 6L6's.

The other new point is the beam-power driver, capable of some eight or ten watts of clean drive—more than ever will be needed by the 1608 output tubes. How this is achieved without regulation causing distortion will soon be discussed. The other new type of driver which has been used to drive medium-power tubes is the cathode driver, but a push-pull driver always has certain favorable balancing characteristics found in no single-tube driver. For this reason the push-pull tubes were chosen.

Legend

- T1—Kenyon Type T-2 transformer
- T2—Kenyon Type T-58 transformer
- T3—Kenyon Type T-257 transformer
- T4—Kenyon Type T-305 transformer
- T5—Kenyon Type T-216 transformer
- T6—Kenyon Type K-6 transformer
- L1—Kenyon Type T-507 Choke
- L2—Kenyon Type T-154 Choke
- L3—Kenyon Type T-153 Choke
- R—50,000 ohms, 1/2 watt
- R1—1 meg., 1/2 watt
- R2—2500 ohms, 1 watt
- R3—2 megs., 1 watt
- R4—500,000 ohms, 1 watt
- R5—500,000-ohm volume control
- R6—100,000 ohms, 1 watt
- R7—1000 ohms, 1 watt
- R8—5000 ohms, 1 watt
- R9—5000 ohms, 1/2 watt
- R10—5000 ohms, 1/2 watt
- R11—150 ohms, 10 watts
- R12—25,000 ohms, 1/2 watt
- R13—25,000 ohms, 1/2 watt
- R14—1,000 ohms, 25 watts
- R15—150 ohms, 25 watts
- C—25 mfd., 25 v. electrolytic
- C1—0.1 mfd., 200 v. paper
- C2—0.1 mfd., 200 v. paper
- C3—1.0 mfd., 400 v. paper
- C4—0.1 mfd., 400 v. paper
- C5—10 mfd., 25 v. electrolytic
- C6—4 mfd., 450 v. electrolytic
- C7—4 mfd., 450 v. electrolytic
- C8—10 mfd., 25 v. electrolytic
- C9—4 mfd., 600 v. electrolytic
- C10—4 mfd., 600 v. electrolytic
- C11—4 mfd., 450 v. electrolytic
- C12—16 mfd., 200 v. electrolytic
- C13—16 mfd., 200 v. electrolytic
- S1—S.P.D.T. toggle switch

Reverse Feedback

For some months now the benefits of reverse feedback have been widely proclaimed, so the author need not elaborate on the conventional system as applied to output tubes and voltage amplifiers; usually in these cases the aim is to improve fidelity and distortion characteristics. As applied to the driver stage, it assumes a new use. As derived in Eastman's book, "Fundamentals of Vacuum Tubes," the plate resistance of a tube in a circuit employing reverse feedback is as follows:

$$R'p = \frac{R_p}{1 - \mu \beta}$$

where

$R'p$ = Plate resistance with feedback

R_p = Standard plate resistance

μ = Amplification factor of tubes

β = Ratio of voltage appearing across feedback resistor in grid circuit to that appearing across the plate load. In our case the approximate values are as below:

$$R_p = 52,000$$

$$\mu = 218$$

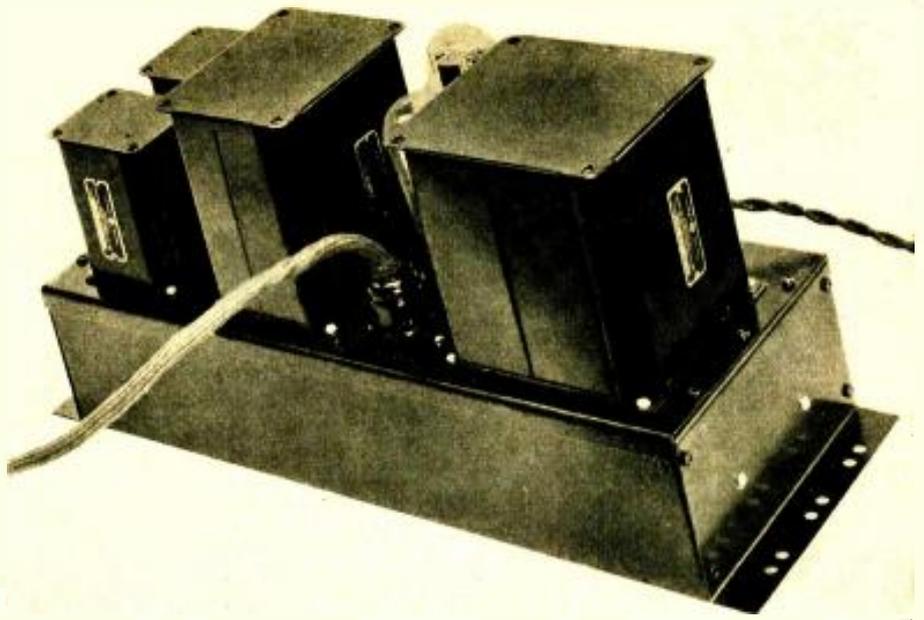
$$\beta = -.3^*$$

* Negative since the feedback voltage is out of phase with the input to the grid circuit.

Thus the effective plate resistance of the tube— $R'p$ —becomes

$$R'p = \frac{52000}{1 - 218(-.3)} = 780 \text{ ohms}$$

which compares exactly with the plate resistance of that ideal driver, the 2A3, which is 800 ohms.



View of the power-supply chassis for the inverse feedback driver amplifier.

The feedback thus reduces to a practically negligible amount the regulation in the driver stage as discussed before. It has the further advantage of reduction of any distortion appearing in the driver stage.

Advantages of System

This driver system has several advantages over push-pull 2A3's in a conventional circuit. First, more power is available. Second, the current drain from the power supply is less, both as applied to plate supply and filament. Thus are the features of the reverse feedback driver shown. Actually, a much higher power final stage could be driven with these tubes. For instance, a pair of 809's

for 100 watts or a pair of 805's, 203A's, or 838's for 250 watts.

The general circuit of the amplifier is, aside from the driver, conventional. The initial stage is a 6J7 pentode, with a high or low impedance input provided. This stage is resistance-coupled to a 6C5 triode, which is transformer-coupled to the 6V6's, which drive the final stage. Transformer coupling to the driver was chosen rather than a phase-inversion circuit because feedback application is so much simpler in the former case. The output transformer provides for either transmission line or voice coil connection, in a variety of impedances. A variety of low-impedance connections for input are also provided.

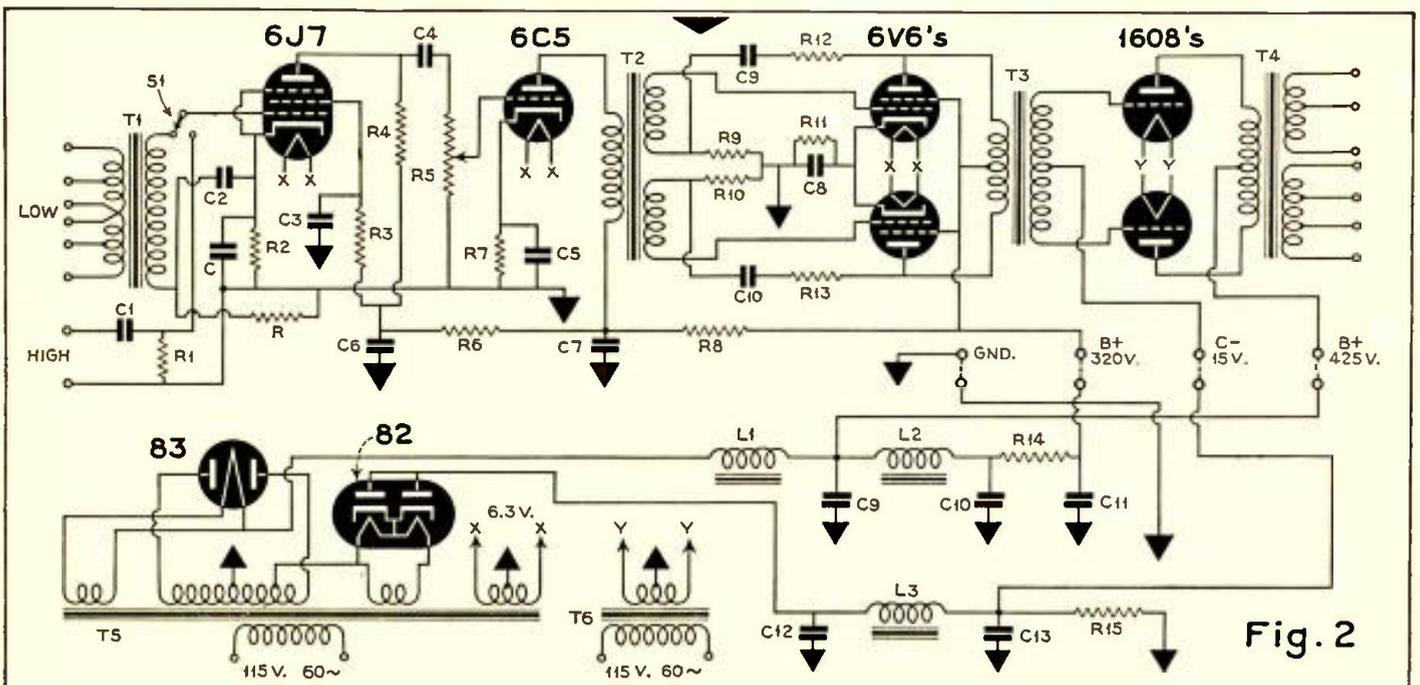


Diagram of the inverse feedback driver and its power supply. Parts list on opposite page.

Globe Girddling

By J. B. L. HINDS

THERE are many points to be given consideration in compiling and maintaining an authentic and reliable short-wave station list, with attendant data, which will meet all listener requirements. It is our sincere desire to paint the short-wave picture from facts rather than rumors, and this, we are sure, is the wish of the listener.

This can be accomplished so long as our usual sources of information are continually supported by active data received from listeners. But without listener reports, the situation is almost hopeless, as there is no official list that remains accurate for much more than a week or so at the most. We must rely on the listener to inform us of changes in calls, frequencies, schedules, etc., that occur regularly.

But right here we wish to state that there are many listeners who minimize the importance of advising us of station changes, new stations on the air, etc. There is a tendency to assume that such data will be provided by some other listener, and therefore why bother with the matter when the report will be of no real value.

Nothing could be further from the truth. *Every single listener report* sent to this department is valuable if for no other reason than the fact that it serves

VALUE OF LISTENER REPORTS . . . NEW ZEDDERS . . . NANKING SILENT . . . ROME "RADIO CAIRO" . . . FINLAND ASSIGNMENTS . . . W4XB TO RELAY WIOD SIGNALS

as both a check and a substantiation of other similar reports. As an example, if we receive but a single report on, say, a change in operating frequency of some station, there is always the possibility that the reporter might have been in error, either because of a poorly calibrated receiver or due to a misunderstanding of the station announcement. On the other hand, if we receive a batch of reports dealing with the same subject, and these reports are identical, then the chances are very good that the new operating frequency is correct. Under such circumstances we can safely make the change in the station list, whereas in the other instance we would hesitate to make such a change purely on the word of one listener, unless we knew by past experience that all his reports were beyond question. Even so, we would "rather be right than president," and much prefer to check and double check all data when this is possible. You can make it possible by sending in reports.

In any event, do not under-estimate either the value or the accuracy of any reports you may have to make. The chances are you're right, and you can rely on us to do the checking.

We should also like to amplify our paragraph on International Reply Coupons which appeared in the February issue, by stating that coupons should be enclosed with reports to stations where it is not specifically covered in the station list as to the procedure to follow.

It is reported that Guatemala, Nicaragua, Argentina, Chile and Ecuador (except Quito) do not accept coupons, but this statement has not been confirmed in all cases. It might also be said that in the case of Canadian stations, Canadian stamps could be secured and forwarded.

Radiophone and Experimental Stations

WEL, 8950 kc., WCG, 10380 kc. and WQV, 14800 kc., Rocky Point, New York, heard in Toronto, Ontario, testing with DJA and DJB in Berlin, about 4 p.m.

YNA2, 9940 kc., Managua, Nicaragua, heard at 8 p.m. at Ithaca, New York,

New Stations			
Kc	Meters	Call	Location
6465	46.40	YV3RD	Barquisimeto, Venez.
6383	47.00	VP2LO	Basse Terre, St. Kitts, B.W.I.
6150	48.78	ZRD	Durban, South Africa
6000	50.00	HJ1ABC	Quibdo, Colombia

Station Changes			
New Frequency	New Call	Old Call	Old Frequency
41000	—	W8XWJ	31600
9700	—	Radio Martinique	9685
6013	—	HJ3ABX	6122
4880	—	HJ4ABP	6028
4860	—	HJ1ABE	9495

Stations Deleted			
Kc	Meters	Call	Reason
15183	19.76	RV96	Not in service
13600	22.06	ZMBJ	Not in service
9505	31.56	HID	Not in service
8840	33.94	ZMBJ	Not in service
8110	37.00	ZP10	Not in service
7203	41.64	EAJ8	Not in service
6820	43.99	XGOX	Not in service
6138	48.88	HJ4ABD	Not in service
5900	50.85	HJ4ABD	Not in service
5900	50.84	ZNB	Not in B.C. service
5780	51.90	HJ4ABD	Not in service
4420	67.87	ZMBJ	Not in service

Non-Authenticated Stations		
Frequency	Call	Location
17760	PZF	Dutch Guiana (Jan.)
15170	—	Peru (Feb.)
14010	VK5DI	Australia (Oct.)
9950	COCU	Cuba (Jan.)
9565	HP5S	Panama (May)
9300	HIG	Dom. Rep. (Mar.)
9180	TGQA	Guatemala (Jan.)
7100	—	Mexico (Jan.)
6600	HI6H	Dom. Rep. (May)
6388	HI8J	Dom. Rep. (Mar.)
6120	HP5Z	Panama (June)
5835	YV5RR	Venezuela (Nov.)

calling WNK, 9355 kc., Hialeah, Florida.

SUX, 7860 kc., Cairo, Egypt, heard in Indianapolis, Indiana, contacting London, England, at 5:32 p.m.

GAB, 18040 kc., Rugby, England, heard at 8 a.m. and 3 p.m. by Long Island listener, calling and testing with Canada.

KAY, 14980 kc., Manila, P. I., heard in Jeanette, Pennsylvania, phoning DFB, 17520 kc., Nauen, Germany.

RIZ, 14790 kc., Irkutsk, U.S.S.R., heard on Long Island contacting Moscow at 9:30 a.m.

KKQ, 11950 kc. and KKZ, 13960 kc., Bolinas, California, heard in Bernet, Texas, at 11 p.m. testing with VK2ME, 10520 kc., Sydney, Australia.

WQD, 18960 kc. and WET, 9470 kc., Rocky Point, New York, heard in Texas at 6:20 p.m. contacting PPU, 10310 kc.



A nifty from SPD, Poland, in black and brown.

and PPQ, 11670 kc., Rio de Janerio, Brazil.

HPH, 10670 kc., Panama City, Panama, heard in Ohio at 6:50 p.m. calling WNK, 9355 kc., Hialeah, Florida.

YVQ, 13345 kc., Maracay, Venezuela, heard in West Point, New York, at 4 p.m. phoning WNC, 15055 kc., Hialeah, Florida.

GCS, 9020 kc., Rugby, England, heard in West Point, New York, at 3:55 p.m. testing with New York.

HC1JB 14420 kc., Quito, Ecuador, 200 watts power and operated by broadcast station HCJB, Quito, occasionally re-broadcasts programs of the latter station and contacts amateur stations.

Down-Under Broadcasters

VLR, Melbourne, Australia, on 9580 kc., advises that it was decided to withdraw the call sign VK3LR to give effect to the desire that the station should use a call by which it might more readily be identified by overseas listeners as an Australian station.

FO8AA, 7100 kc., Papeete, Tahiti, reported by several listeners as heard Tuesday and Friday nights from 11 p.m. to 12:30 a.m.

ZMBJ, 13600 kc., 8840 kc. and 4420 kc., Wellington, New Zealand, have been removed from station lists.

These stations were operated by the Union Steam Ship Company of New Zealand, Ltd., and were aboard the TSS "Awatea." The operators advise that they are not broadcasting as no broadcast license has been granted as yet and they can give no information as to the future possibilities.

XGOX, 6820 kc., Nanking, China, has been removed from station list as it is not being heard.

JZJ, 11800 kc. and JZI, 9535 kc., are still transmitting the Overseas programs as listed. English news on JZJ, 11800 kc., from 6 to 6:30 p.m. There are many complaints on the method of verification by form and no card veri. A questionnaire is sent with each form with the request that the listener fill out and return. Under the circumstances it would seem that value received should be offset by a suitable card.

JDY, 9925 kc., Dairen, is received with good signal and requests reports on its reception. Broadcasts from 7 to 8 a.m. with English period from 7:40 to 8 a.m. Power of transmitter is 10 kw. Complete address is now shown in station list.

KZRM, 9570 kc., Manila, P. I., is reported as meeting interference in its broadcasts after 6 a.m. when WIXK, Boston, comes on the air.

ZL6, 25800 kc., ZL5, 17770 kc., ZL4, 15280 kc. and ZL3, 11780 kc., are new assignments to New Zealand, apparently for short-wave broadcast service.

TAP, 9485 kc., is another call assigned to Turkey, the station to be located at



Habana veri in red, blue and black.

Ankara. This is in addition to TAQ, 15195 kc., mentioned in February.

ZRH, 9523 kc. and ZRK, 9606 kc., South Africa, are being heard regularly with good signal strength between 11:45 p.m. and 12:45 a.m. although the 9523 kc. output has been missing on one or two occasions. Reports are that both stations are also received between 4 and 4:30 a.m.

ZNB, 5900 kc., Mafeking, South Africa, advises that the broadcasting of musical programs has, for the time being, been discontinued. At present this station is being used solely for the transmission of government traffic. ZNB has,

therefore, been removed from the broadcast list. If, at a later date, they again decide to broadcast program material advice will be given for the benefit of the readers.

Egypt will be on the air, according to the 1939 program, with several transmitters to be known as "Radio Cairo."

Europeans

2RO4, 11810 kc. and 2RO3, 9635 kc. are carrying the Rome programs daily, but using either IRF, 9830 kc., IQA, 14730 kc., or other stations, simultaneously, but inasmuch as no definite advice has been received from Rome as to the final set-up to be in effect when changes to the facilities are completed, these frequencies will not be shown in station lists. As a matter of information it might be said that the following frequencies are assigned to I2RO, Rome, up to November 30, 1937: 25650, 21510, 17770, 15300, 15290, 15230, 15170, 15150, 11810, 9635, 9600, 6980, 6160, 6085, 6065, 5660 and 5555 kc.

It is assumed that when the changes shall have been completed that new assignments of frequencies for service will be made. In other words, it is also assumed that IRF and IQA and other frequencies now being used is a temporary arrangement. The latter two stations are operated by Italo Radio, via Calabria N. 46/48, Rome, but, of course, controlled by the government.

EAR, 9480 kc., Madrid, Spain, advises they broadcast English programs daily at 7:30 p.m. and Mondays, Tuesdays and Thursdays at 9:30 p.m. Special German broadcasts on Saturday nights. Duration of time of programs not given. English question and answer period at 9:30 p.m. on Tuesdays. Letter received gives address as: Emisores al Ex Tranjero, Calle Medinaceli, 6, Madrid, Spain. Senor Felix Albin, Director. EAQ, 9860 kc., may be used at irregular times.

LAST-MINUTE FLASHES

TGWA, 9685 kc., Guatemala City, is again being heard evenings.

In March, HBO, 11402 kc., Geneva, will broadcast Mondays 2:30 to 2:45 a.m. and HBJ, 14535 kc., on Mondays from 3 to 3:15 a.m.

YVIRB, 5850 kc., Maracaibo, Venezuela, now on weekdays 5:30-8:30 a.m.; 10:30 a.m.-1:30 p.m. and 3:30 to 10:30 p.m. except Tuesday, Thursday and Saturdays to 9:30 a.m. Sundays 7:30 a.m.-2 p.m.; 3:30-4:30 p.m.; 5:30-9:30 p.m.

YNI.G, Managua, Nicaragua, advise they are now on 6610 kc. with 1 kw. power. Weekdays 8-9 a.m.; 1-3 p.m.; 6-10 p.m. Sundays 10 a.m.-1 p.m.; 8:30-11 p.m.

CJCN, 6010 kc., Sydney, N. S., not on regularly on account of fire. Hope to resume schedule before end of March.

PRA8, 6010 kc., Pernambuco, Brazil, daily 9 a.m.-12 noon; 1-3 p.m.; 4-9 p.m. Power 5 kw.

T18WS, 7750 kc., Puntarenas, Costa Rica, reported heard on 6370 kc.

"Radio Nacional," Salamanca, said to be on long waves, 1258 kc.

Delhi, India, being heard between 9 and 11 p.m. on 9590 kc. English announcements at 10:40 p.m.

HIG, Ciudad Trujillo, Dom. Rep., heard on 9290 kc. but no on 6280 kc.

HC1RB, new station at Quito, Ecuador, on 7870 kc.

HC1CQ, 9180 kc., Ecuador, said to be on air Mondays, Wednesdays and Saturdays 8-10:30 p.m.

TGQA, Quezaltenango, Guatemala, reported heard on 6435 kc.

IQY, 11870 kc., Rome, Italy, heard simultaneously with 2RO, Rome, on American Hour.

Vera Cruz, Mexico, station reported testing near 6530 kc.

Radio Fort de France, 9450 kc., Martinique, back on air 9350 to 9400 kc.

CSW2, 11040 kc., and CSW3, 9940 kc., Lisbon, Portugal, are being heard with excellent signals and programs. CSW4, 11840 kc., has not been reported heard on its scheduled time between 1 and 2:10 p.m.

RV59, 6000 kc., Moscow, is now broadcasting from 4 to 5 p.m. on Sundays, Mondays and Fridays.

Radio Vaticano, 15121 and 5969 kc., is now testing out on other frequencies and it is understood that extensive improvements are being made with a view to bettering the service. The following frequencies have been assigned: 21480, 17480, 11740, 9550 and 6030 kc. Tests have been made on 11740, 9550 and 6030 kc., and several reports received in connection therewith. The call HVJ is used for each of the new frequencies mentioned.

Finland is evidently progressing with their new broadcasting facilities as the following frequencies have been assigned: 21550, 17800, 15190, 9500 and 6120 kc. No call letters yet made known. This is a 1938 program and the transmitters are 25 kw. power. What a merry time you boys are going to have in separating these stations and identifying them as they come on the air. But the separation may be worked out in the assignment of hours in service.

Radio Coloniale, Paris, France, in addition to the frequencies now used regularly, has been assigned the following frequencies: 21490, 17785, 17765, 15295, 11845, 9585 and 6145 kc. In the transmission of programs they are apparently testing out their new facilities under construction by using some of these new frequencies as they have been reported as heard on 11845 kc., 17785 kc. and one or two others which would indicate they are proceeding nicely along the lines

heretofore mentioned in this section. This information is given so that the readers will understand the present situation. No calls have been assigned as yet to the new frequencies.

Radio Milano, which has been broadcasting between 10600 and 10880 kc. from 5 to 6 p.m. and occasionally between 9 and 10 p.m., seems to have settled near 10700 kc. at this writing. Transmissions consist mostly of talks in Italian with a band selection thrown in for good measure from time to time. No one has yet reported the address of the station.

SPW, 13635 kc., and SPD, 11535 kc., Warsaw, Poland, have increased the duration of time schedules as shown in list. As conditions of reception for 22 meters are particularly unfavorable from October to February in the early evening for East European stations being heard in North America in the early evening, the station does not look for better reception. In other seasons, however, it is expected that SPW will be received regularly in the United States. Station requests that all reports be addressed to "Radio Polskie," and not to individuals.

OLR2A, 6010 kc., OLR2B, 6030 kc., OLR3A, 9550 kc., OLR5A, 15230 kc. and OLR5B, 15320 kc., are being used in the transmission of Czechoslovakian programs as listed, provided no changes have been made in January schedules, which was used as a base in compiling the time on the air as shown. An endeavor will be made to secure more advance information so time will be reflected correctly.

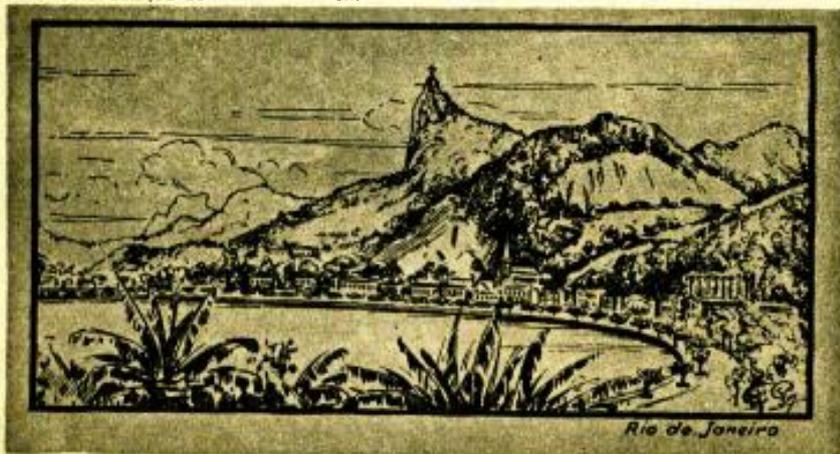
HBL, 9345 kc., and HBP, 7797 kc., Geneva, Switzerland, are now transmitting the Swiss broadcasts to North and South America on Monday evenings from 6:45 to 8 p.m. instead of Saturday evenings as heretofore. The usual

MARCH ACE REPORTERS

Mrs. F. W. Alfred, VE8G3, London, Ont., Can.
 Willis E. Blanchard, W3E1, Bangor, Me.
 William Bell, Monroe, La.
 Joe Brown, W7J17, McKeesport, Pa.
 H. D. Burrall, Albuquerque, N. M.
 David Block, Jamaica, N. Y.
 Robert Behm, Philadelphia, Pa.
 G. T. Beyer, W911H55, Chicago, Ill.
 H. C. Chesnut, Plattsburg, N. Y.
 Edward H. Davis, W4H151, Brooklyn, N. Y.
 William Doniger, W4H116, Cedarhurst, N. Y.
 Cecil K. Drinker, Jr., Brookline, Mass.
 Norman Ebling, Portland, Ore.
 T. H. Elder, W19R1, San Angelo, Texas
 J. O. Faris, W11J1, Danville, Ill.
 William Fearnley, Palm Beach, Fla.
 H. L. Ford, Parkersburg, W. Va.
 Walter E. Gibson, Kingston, New H.
 Hughes Gemmill, Glen Ellyn, Ill.
 E. C. Games, Trenton, N. J.
 E. G. Granger, W5F2, Syracuse, N. Y.
 Clarence Hartzel, W7J7, Jeannette, Pa.
 Jack Holterman, W4H148, Flushing, N. Y.
 G. L. Harris, North Adams, Mass.
 A. Jansen, Boskoop, Netherlands
 Robert Jones, W8J1, Coshocton, O.
 Stanley Koenig, W4H188, New York, N. Y.
 Harry E. Kentzel, W4F5, Averill Park, N. Y.
 C. F. Keirstead, W3F5, Framingham, Mass.
 Bill King, W30D3, Silverton, Ore.
 M. E. Leshner, W3F32, Lawrence, Mass.
 Harold J. Miller, W16J6, Omaha, Neb.
 Bob Morrison, Vancouver, B. C., Canada
 A. W. Mann, Middlebrough, England
 R. B. Oxrieder, W6H5, State College, Pa.
 H. Orlaw, VE5-29A7, Vancouver, B. C., Can.
 Ronald D. O'Leary, Garwood, N. J.
 A. L. Okolish, Barberton, Ohio
 Albert Pickering, W3F74, West Medway, Mass.
 F. M. Pow, VE24A1, South Edmonton, Alta., Can.
 J. F. Pichler, W22N4, Santa Fe, N. M.
 Donald Rimmer, VE2-5DE, Ville St. Pierre, Que., Can.
 Earl R. Roberts, Indianapolis, Ind.
 George T. Robinson, Bronx, N. Y.
 Homer E. Sink, Dayton, Ohio
 Theodore C. Smith, W5F8, Ogdensburg, N. Y.
 T. D. Smith, W17R1, Burnet, Texas
 Charles F. Stephens, W3F37, Randolph, Mass.
 George C. Starry, W7J12, Derry, Pa.
 Ed Stubblefield, W12J1, Stanford, Ill.
 Frank W. Stockbridge, Westboro, Mass.
 J. A. Slezak, W11H26, Chicago, Ill.
 J. V. Saxton, W4H48, Bronx, N. Y.
 Harold I. Tucker, W4G20, West Point, N. Y.
 Mrs. H. I. Trammell, Redmond, Wash.
 John M. Unkefer, W8H14, Minerva, O.
 Alfonso Velasco, Mexico City, Mexico
 Howard Wilson, Jr., Ithaca, N. Y.
 LeRoy Waite, W4F11, Ballston Spa, N. Y.
 Mr. & Mrs. Ralph E. Weikal, W17L1, Pratt, Kans.
 Elliott Wolheim, Bronx, N. Y.
 Laurance A. Weber, W4H195, East Orange, N. J.
 Ashley V. R. Walcott, San Francisco, Calif.
 Douglas Worcester, Honolulu, Hawaii

This card certifies that *Mr. B. L. Hinds*
 heard our short wave station on *10220 kc* on *11/24/37*
 Este cartão certifica que
 ouviu nossa estação de ondas curtas em

PSH



From PSH. Rio. Call in red. Design in black with yellow background.

League of Nations broadcasts will continue until otherwise changed as scheduled in station lists over HBJ, 14535 kc., HBO, 11402 kc. and HBL, 9345 kc.

OZH, 15165 kc. and OZI, 17750 kc., are additional frequencies and calls assigned to Denmark for broadcast purposes and which may be heard at any time.

LYZ4, 15300 kc., LYZ3, 11900 kc., LYZ2, 9523 kc. and LYZ, 6125 kc., have been assigned to Lithuania, in the short-wave bands and to be located at Kaunas.

YUA, 6100 kc., Belgrade, Yugoslavia, will before long transmit on other fre-

quencies, as it is noted they have been assigned channels at 15240, 11735 and 9505 kc.

South Americans

YV3RD, 6465 kc., Barquisimeto, Venezuela, the new station reported in February issue, is called "Radio Barquisimeto" and operates daily from 11:30 a.m. to 1:30 p.m. and from 5:50 to 9:30 p.m. Address: Avda. Bella Vista No. 335. Senor Amilcar Segura is the proprietor and owner.

OAX1A, 6150 kc., Chiclayo, Peru, as stated in "Last Minute Flashes" in February issue, was changed from 6335 kc. to the above frequency as station insists it is operating on 6150 kc., notwithstanding reports to the contrary. Station operates daily from 8 to 11 p.m. and opens transmission with the March, "Anclas Arriba" and closes with "Good-Night Melody." Collins transmitter with 250 watts power in antenna. Station known as Radio "Delcar." Verification cards furnished with all correct reports.

VP3MR, 6130 kc., Georgetown, British Guiana, appears to be getting out better since the improvement in its facilities. New schedule is shown in this issue. The closing song "Good-Night" is sung by Charles Kullman. Station wishes readers to know that they answer all reports on their broadcasts, but those desiring verification card must enclose International Reply Coupon along with report.

HC2RL, 6668 kc., Guayaquil, Ecuador, has made a slight change in schedule.

CXA4, 6125 kc., Montevideo, Uruguay, reported heard close to 6127 kc. Station known as "Difusion Radio Electrica." Relays CX6 on 650 kc. Power 1 kw. New schedule shown in list.

"Radio Nacional," 15170 kc., Lima, Peru, has not as yet furnished call of station heard by many on that frequency.

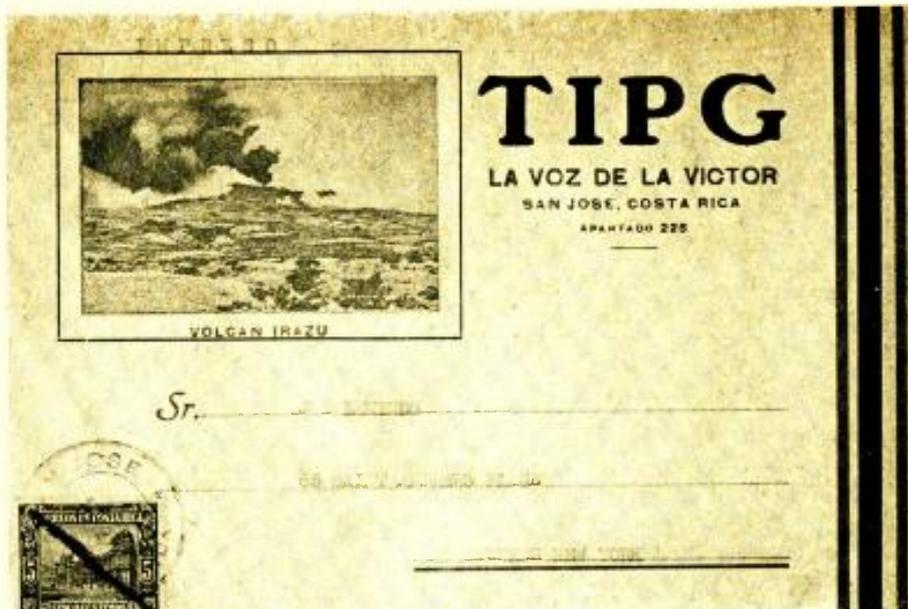
HJ3ABX, 6122 kc., Bogota, Colombia, has been changed to 6013 kc. where it is now working.

CXA8, 9640 kc., Colonia, Uruguay, does not seem to be very prompt in sending cards or replies to reports. One or two replies have been received from Primera Cadena Argentina de Broadcastings, Radio Belgrano, Belgrano 1841, Buenos Aires, but none from the station at Colonia.

ZP10, 8110 kc., Radio Prieto, Asuncion, Paraguay, has been deleted from lists as no reports have been received for months of its having been heard and no advice can be had from the station.

HJ1ABE, 9495 kc., Cartagena, Colombia has again shifted to 4860 kc. and change has been accordingly made in this issue. Station now on the air week days 7 a.m. to 1:45 p.m. and 4 to 11:30 p.m. Sundays 9 a.m. to 3 p.m.

HJ4ABP, 6028 kc., Medellin, Colombia, preferring the company of HJ1ABE



Red and blue veri from TIPG. Card approximately 5 by 7 inches.

also changed back to 4880 kc. and this move has again been recorded.

PPU, 19260 kc., PPQ, 11670 kc., and PPM, 10310 kc., Rio de Janerio, Brazil, are assigned to public radiotelegraph and radiotelephone service, but by special arrangement with the Brazilian government, are used for broadcasting purposes when occasion demands.

CB960, Radio Difusora Pilot, 9600 kc., Santiago, Chile, states they are on the air daily with 500 watts power from 10:30 a.m. to 1 p.m. and 8:30 to 11 p.m. However, reports of their being heard are few.

PSH, 10220 kc., Rio de Janerio, Brazil, is still being heard at other hours in addition to those shown in schedule. It is possible that the broadcasts between 7 and 9 p.m. as listed may be considered English broadcasts and that other transmissions are made in other languages. Veri cards received give no time schedules.

PZF, 17760 kc., Paramaribo, Dutch Guiana, seems to have dropped out of the picture for the past few weeks as no reports of its being heard have been received.

HKV, 8795 kc., Bogota, Colombia, shown in our lists, broadcasts two hours each week on Mondays and Thursdays from 7 to 7:30 p.m. on which transmissions the government bulletin to the Consulates is read. This service is also relayed by HJ1ABE, 4860 kc., at Cartagena, Colombia.

HJ4ABD, 6138 kc., 5900 kc., and 5780 kc., Medellin, Colombia, have left the air and the stations have been removed from the lists.

HJ1ABC, 6000 kc., Quibdo, Colombia, has been overhauled and put back into service. This station was deleted from our lists in January. It was badly damaged by storm which swept the area

and it was thought impossible to rebuild, but apparently this was not the case.

HJ2ABJ, Santa Marta, Colombia, assigned to 4660 kc., reported heard on this band, but some reports indicate it as high as 4772 kc.

HJ7ABB, 4820 kc., Santander Broadcasting, Bucaramanga, Colombia, reported heard on this frequency by one listener and reported in February "Globe Girdling," is said not to have gone on the air according to advice from Colombia on January 11th.

OAX4Z, 6082 kc., Lima, Peru, is best heard from 11:15 p.m. to 12:30 a.m. OAX4P, 5970 kc., Huancayo, Peru, reported heard between 10 and 11:15 p.m. Slogan, Radio Huancayo, address understood to be Apartado 187.

OAX5C, 9580 kc., Ica, Peru, reported heard near 9610 kc. No further advice has as yet been received in regard to OAX5A on 11796 kc.

HJ6ABC, 4740 kc., Ibague, Colombia, is now being heard on this frequency.

HJ1ABG, Barranquilla, Colombia, advises station frequency is 6042.3 kc. as listed and as reported by Minister of Communications of Colombia.

HCETC, 6975 kc., Quito, Ecuador, is being heard near 9355 kc. with much better signal than formerly. We changed frequency in July 1937 and commented in this section in same issue. At that time station informed the writer that they transmitted on Mondays and Saturdays from 7:45 to 9 p.m. That the broadcasts were carried on 6975 until 8 p.m. and from 8 to 9 p.m. on 43.02 meters or 9350 kc. but not heard there. At present they are not heard on 6975 kc. but on 9355 kc. where they are announcing in Spanish and English and giving address as Theatre Bolivar, Quito, and requesting reports from listeners. Call is given as HC1ETC. It is hoped



NATIONAL BROADCASTING COMPANY, Inc.
A RADIO CORPORATION OF AMERICA SERVICE
CHICAGO, ILLINOIS, U. S. A.



Date Jan. 14, 1938

This will acknowledge your report of reception of our international broadcast station W9XF operating on 6100 KC., or 49.18 M., with a power of 10 KW.

W N 9 B x C F

Schedule (Subject to change)

MONDAY - FRIDAY Inclusive 1:05 A.M. to 2:00 P.M. EST and 4:00 P.M. to 6:50 P.M. EST.
SATURDAY 1:00 P.M. to 6:30 P.M. EST.

Remarks

This will verify your report of Jan. 7, 1938

From W9XF, Chicago. The letters "NBC" in red.

that information from the station will be received soon so that a proper listing can be made.

TG2, 6180 kc., Guatemala City, Guatemala, is being heard quite regularly but some report a higher frequency. No advice has since been received from station TGQA, at Quezaltenango, Guatemala, has not as yet been added to our lists.

HC2CW, 8494 kc., Guayaquil, Ecuador, has not yet given advice as to the frequency being used and no change has been made. This station reported as heard between 9290 and 9330 kc.

HCODA, 9440 kc., Guayaquil, Ecuador, is being heard with better signal. Announcements would indicate that address is Apartado 704. Bad code station QRM.

YV5RR, 5835 kc., mentioned in this section in November last. Senor Mario Garcia Arocha advises that he will be very glad to inform us when the station starts on tests. Owing to changed Governmental regulations they are awaiting assignment of a determined frequency. There is a possibility, therefore, that YV5RR may not broadcast on 5835 kc. Their address is Apartado 185, Caracas, Venezuela.

Central Americans

TI4NRH, 9670 kc., Heredia, Costa Rica, is broadcasting with 500 watts and improved transmitter. While working somewhat higher than the assigned frequency, station is getting out with fairly good signal. Frequent announcements in English and requests made for reports with the promise of verification certificate in return. Sr. Amando Cespedes Marin is unquestionably an untiring radio enthusiast and we extend our congratulations and best wishes.

TIX, 5830 kc., San Jose, Costa Rica, mentioned in "Last Minute Flashes" in January, is the long-wave call of TIGPH and heard in connection with the broadcast of the latter station.

TGWA, 15170 and 11760 kc., are transmitting the programs from Guatemala City as outlined in station lists. TGWA, 17800 kc. and 9685 kc., while not in use at present may be used as the occasion demands.

HP5H, 6122 kc., Panama City, Panama, advises that since recent changes in facilities they are receiving more frequent reports. New time schedule is shown in station list. An English hour is broadcast daily from 10 to 11 p.m. HP5H up to this time has not been regularly issuing veri cards or letter verifications but state that from now on they will verify all exact reports. Their new address is Apartado 1045. Station known as "La Voz del Pueblo."

HP5A, 11700 kc., Panama City, requests reports on any fading noticed on their carrier. The writer has noticed no serious fading on this station.

YNLG, 6325 kc., Managua, Nicaragua, is still carried in list on this frequency as it appears to be as good as any until the correct one is learned. Since the transfer to 6325 it has been reported heard at 6600, 6620, 6650, 6700, 8505 and 8580 kc. The quality is poor and the information imparted is meager when heard and no advice has been secured from the station.

West Indies

Radio Martinique, has been changed in frequency from 9685 kc. to 9700 kc., as owners state they are on the latter frequency daily from 7:45 to 8:45 p.m. local time, or 6:45 to 7:45 p.m., Eastern Standard Time. Station built by owners and transmits with 200 watts power, doublet antenna, 30 meters high. They give address as Radio Martinique, Poste Seri, Route de la Dillon, Fort de France, French West Indies, Boite Postale 136. Station advises veri cards being printed and they wish to assure listeners that cards would be forwarded upon receipt.

VP2LO, 6383 kc. or 47 meters, is a

new station coming on the air at Basse Terre, St. Kitts, British West Indies. Station has been testing preparatory to going on the air with regular transmissions and seems to have a consistent carrier. Tests have been made with 500 watts power but usually with considerably less power. It is understood that station is intended for benefit of English residents in West Indies, Barbados and other islands. The exact frequency to be used is not known at this writing although announcements inform us it is on 47 meters.

HH3NW, Port-au-Prince, which was deleted from 6325 kc. in December was changed to long waves and this transmitter is now operating with the call letters HHW on 1230 kc.

H18J, La Vega, Dominican Republic, is a new station reported heard near 6388 kc. between 5:30 and 6:30 p.m., announcing as "La Voz de la Provincia." It will be shown in the non-authenticated block until details have been secured.

HID, 9505 kc., Ciudad Trujillo, Dom. Rep., has been dropped from the list as it develops that the station heard first on 9505 kc. and afterwards near 9290 kc. was HIG, Ciudad Trujillo, which has been carried in station lists for some time on 6280 kc. Verification for report made for HID has been received by a listener which shows station as HIG on 6280 and 9300 kc. Reports received indicated that two stations were working in parallel on 6290 and 9290 kc. and it is assumed that they were HIG. Station slogan is given as "Radio La Opinion" and the new schedule is shown under HIG, 6280 kc. We have not as yet listed the 9300 frequency, but prefer to wait until the facts are known.

Cubans

COCX, 11435 kc., Havana, Cuba, is not being heard or reported. It is noted that 11650 kc. has been assigned to them and it is possible that a change will be made. The code interference on the first mentioned frequency was really troublesome.

COKG, Santiago, Cuba, gives advice that station is on the air daily from 7:55 a.m. to 12 midnight on 8935 kc. Station is shown in list on 8920 kc. which is the frequency assigned by the authorities. No change will be made at present. Station opens with the musical selection "La Conga."

COCA, Havana, Cuba, is still transmitting near 9100 kc. and quite badly interfered with by code. No advice has yet been received from station. This station was originally assigned to 9700 kc. and is so shown by Berne Bureau.

COCM, 9833 kc., Havana, Cuba, is sending out some very pretty veri cards. Station is known as "Transradio Columbia." Address is Calle 23 No. 482,

(Continued on page 161)

Channel Echoes

By ZEH BOUCK

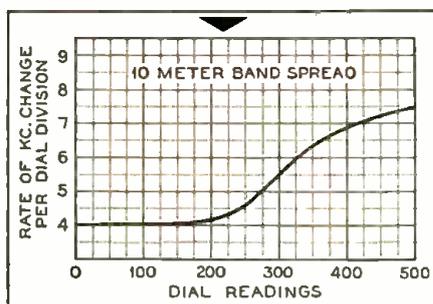
WE mentioned last month a "rate-of-frequency-variation curve" as an aid to accurate short-wave logging. Precision logging is obviously desirable—for station identification in many instances, and for reporting to Brother Hinds. It is rarely practical to calibrate a receiver directly over the entire short-wave spectrum so that readings to within a kilocycle can be made. A rate-of-frequency-variation curve licks the problem. Fig. 1 shows such a curve on our own receiver, plotted for the 10-meter band-spread coils. This is used in conjunction with a table of spot frequencies within the band. These spot frequencies are exact, and were obtained from a crystal calibrator, and, over a period of time, from station announcements of frequency.

For instance, let us assume that an unknown station is heard at 310.6 on the dial. The nearest spot frequency on our table is at 305.5, and is 29,100 kilocycles. The difference in dial readings is 5.1 divisions. The mean dial reading (half-way between the spot frequency and the unknown station) is approximately 308. The rate of frequency change per dial division at 308 is obtained from the curve—5.6 kc. Multiplying the number of divisions by the rate— 5.1×5.6 —we obtain the frequency difference between the spot frequency and the station—28.56 kilocycles. Adding this figure to the spot frequency (frequency increases with the dial reading on our receiver) gives us 29,128.56 kilocycles as the frequency of the station.

The above example will provide an idea of the accuracy with which frequency can be measured using this system. It is an actual instance, and the amateur shortly afterwards announced that he had ground his own 20-meter crystal which he was doubling into the 10-meter band—which accounts for the somewhat "screwy" frequency. To obtain a similar measurement directly from a dial calibration curve would require a chart twenty-five times the size of an ordinary sheet of graph paper!

The rate-of-frequency-variation curve is very easily prepared, and in many cases can be made from the tuning curve supplied by the manufacturer, and the method is the same on single dial receivers, and the bandsread dial designs such as Hallicrafters, Hammarlund,

RATE-OF-FREQUENCY CURVE . . . CAME THE DAWN . . . LAUGH, CLOWNS, LAUGH



A rate-of-frequency-variation curve is more useful in accurate logging than direct calibration of the receiver.

RME, etc. In any event, frequencies at various dial positions must be known to within a fair approximation. These positions should not be more than one-tenth of the entire dial distance apart. (This will, of course, vary with different receivers.) The frequency difference in kilocycles is divided by the number of dial divisions which will give the kilocycle change per dial division. In plotting the curve, *this number is taken as the variation at the mean dial reading.* For instance, if from zero to twenty on the dial the frequency changes from 14,000 to 14,200 kilocycles, the change in frequency is 200 kc., and the rate is 10 kilocycles per division. This is plotted as the rate of change at 10 on the dial—not at zero or 20.

ANSWERS ARE STILL coming in with the solution of the Colliers Hour problem

(?). They are all correct, but it is a rather tardy hour in which to publish the names of runners-up who have written in subsequently to those who were mentioned last month.

On the present page we have a real sticker for you. Obviously, it is an old timers' contest—and the only hint we offer is that the photo is of the most historic event in the entire history of radio broadcasting. A free subscription, of course, for the *best* correct identification of the picture.

WHICH REMINDS US of Clem McCarthy at the Tommy Farr-Braddock tussle. McCarthy was in rare form that night, and the best part of the fight came when "Tommy landed a vicious right uppercut on Farr's jaw!"

DURING THE SUMMER we had little opportunity to tune in the Mexican stations broadcasting from their sanctuary across the Rio Grande. However, down here at our winter headquarters on the Gulf of Mexico, they roll in nightly, and there is nothing we can do about it. Rose Dawn, over XERA, is still with us, but she has presumably forsaken astrology for the perfumery business. Apparently the dollars didn't roll in fast enough for her super-giant readings of a year ago. Now she employs astrology, mostly to help the listener determine which of her four perfumes is best suited to the individual's

(Continued on page 162)



Radio broadcasting's most historic moment. How good is your memory—or your guess? A free subscription waiting for someone!

Ultra-High

By PERRY FERRELL, Jr.

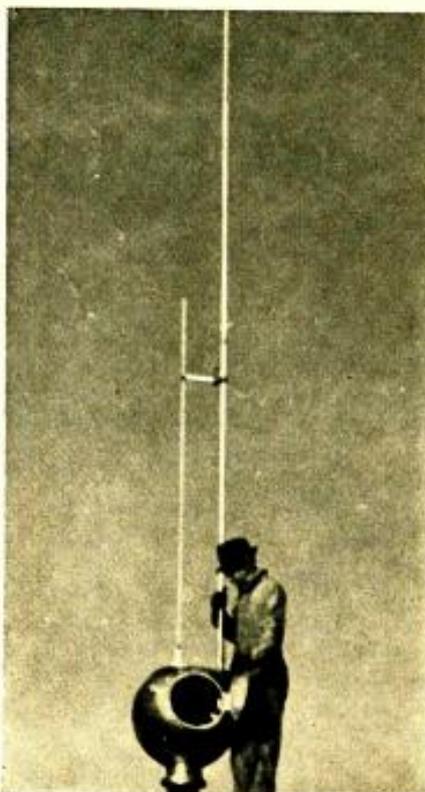
SEVERAL years ago we formed a definite opinion of the u.h.f. At that time we thought it was the miracle band where anything and everything was sure to happen at the most unexpected time. We can truly state that we have never been disappointed or have had any reason to alter our view. It certainly has its faults and necessitates a lot of experience and patience in the old art of DX-ing, but as we have said before, we like it and here's hoping you do too.

Broadcast Stations

W9XJL, 26.1 mc., Superior, Wis., still remains the foremost performer. In fact, many u.h.f. listeners, especially in the west, depend upon this station for program service. (We wonder if the west coast will ever wake up to the fact that there are several hundred listeners waiting for a few stations to be put into operation.) The schedule at present is 7:30 a.m. to 8 p.m. weekdays and 9 a.m. to 8 p.m. on Sundays. Occasionally W9XJL carries a special program, such as the reading of the mail on Sundays, Wednesdays and Fridays at 11 a.m. and 7 p.m. The power is only 80 watts, but don't let that worry you—reports have been received from 11 countries. At this writing 20% of the received mail has come from England!

Several months ago W9XJL was

SPECIAL W9XJL PROGRAM . . . W8XNT ARRIVES . . . W2XOY TEMPORARILY OFF AIR



The W8XNT "J" type antenna, 758 feet above ground, atop the Terminal Tower building in Cleveland.

broadcasting the meeting of the Superior City Council, which was of special interest to the local listeners, because the city fathers, contrary to the wishes of a goodly portion of the citizens, were considering buying a \$6,000,000 utility. In the middle of the spirited session, one of the councilmen leaped to his feet and demanded that broadcasting over W9XJL be discontinued immediately. A quick vote followed and as a result W9XJL abruptly left the air!

W1XEH, 63.5 mc., Hartford, Conn., as mentioned in last month's department is operating on the following schedule: 6 to 1 a.m. on weekdays, 9 to 1 a.m. on Sundays. The power is 150 watts. The antenna is a directional array, bi-pole type, maximum directivity northeast and southwest. Although it is only 70 feet above ground, it is located on the summit of Talcott Mountain, between Hartford and Avon, making a total of over 700 feet above sea level. Dx-ers on five, please take notice of schedule.

W3XEY, 31.6 mc., Baltimore, Md., notifies us that they have changed the schedule to 12 to 8 p.m. daily.

W8XKA, 31.6 mc., Pittsburgh, Pa., broadcasts daily 9 to 1 a.m. The 50 watts power is fed into a J type antenna at ground potential and is 500 feet above ground. Reports have been received from 3 countries and all correct ones are verified by card. W8XKA will change to the 40-mc. band with 500 watts sometime this year. Address: Westinghouse Electric & Manufacturing Co., Grant Building.

W8XAI, 31.6 mc., Rochester, N. Y., daily 6:30 a.m. to 12 midnight. Their 100 watts is fed into a vertical half wave. Also verifies by card and plans to change to 40-mc. band. Address: Stromberg-Carlson Co.

W1XKB, 31.6 mc., Springfield, Mass., one of the Westinghouse twins, broadcasts daily 6:30-1 a.m. and 8-1 a.m. on Sundays. The power is as usual 50 watts. The antenna is a quarter-wave vertical 220 feet above ground. All correct reports verified by letter. Address: Westinghouse Electric & Manufacturing Co.

W6XKG, 25.95 mc., Los Angeles, Calif., still operates 24 hours a day. The antenna has been changed to a vertical



NEW YORK FIRE DEPT. W2XNH
VERIFIES RECEPTION
ON 1-6-38 AT 9:30A M.S.

WNYF

FIRE CHIEF & COMMISSIONER

Veri from the New York City Fire Department, received by Clyde Criswell, Mission Ranch, Phoenix, Ariz. This verifies reception of W2XNH on 35.6 megacycles.

half-wave 165 feet up. Reports have been received from all over the world. Short-wave talks every Monday, Wednesday and Friday afternoons. Address: 1417 South Figueroa Street.

W8XNT, 38.6 mc., Cleveland, Ohio, will probably be in operation by the time this article is in print. The 50 watts will be fed into a "J" type antenna, atop the Terminal Tower, 758 feet above ground. They expect to operate the station daily from 7 a.m. to 12 midnight. All correct reception reports will be verified. Address: Radio Air Service Corp., 1311 Terminal Tower.

W2XOY, Albany, N. Y., is being installed by the General Electric engineers atop the State Capitol Building. It came on the air Nov. 1st., but left 10 days later and started to rebuild. Definite word from the Technical Director stated that they have not decided what fre-

LAST-MINUTE FLASHES

The F.C.C. has recently allotted eleven clear channels to newspapers and press associations. The frequencies are to be used by "relay press stations" for work where other types of communication is impossible. They will be divided into two groups; the first for low power portable mobile units, such as might be used by reporters, in airplanes, etc.; the second for higher power units to be set up at points where better land line communications exist.

The stations in the first group operate on the following frequencies: 30.85, 33.26, 33.98, 35.18 and 37.42 mc. Those in the latter group on 31.98, 33.02, 33.58, 35.98, 39.02 and 39.98 mc. The range of such units is accordingly small but we believe that those stations operating on the lower frequencies will have a good chance of being heard "skip distance" away.

The New York Marine Department conducts a routine test at 8 a.m., 4 p.m. and 12 midnight. Listeners west of the Mississippi should watch for the 4 p.m. test on 35.6 mc. All reports verified by the same card used by WNYF. Address: City of New York Fire Department, Bureau of Fire Alarm Telegraph, Room 1111, Municipal Building.

quency will be used when operations are resumed. They may not be on the air till late spring as many of their men are working on the new Belmont, Calif., station. Address: 1 River Road, Schenectady.

W1XER, 41.0 mc., Mt. Washington, N. H., is reported, by Clyde Criswell, to be calling Boston around 11 a.m. to give them the weather report.

We have received several reports that W1XXM is musing up 41.0 mc. with a buzzer-modulated signal. Does anyone know the purpose of this station?

Television Stations

March is generally the last month in which the foreign television stations come through with "readable" volume. Any good receiver and an antenna cut for 40 mc. is suitable. Of course, these sta-

(Continued on page 157)

ULTRA-HIGH-FREQUENCY STATION LIST

ROMAN NUMERALS—MEGACYCLES. ITALIC NUMERALS—METERS. ALL TIMES E.S.T. NUMERALS IN PARENTHESES DENOTE APPROXIMATE RANGE OF GROUND WAVE IN MILES.

25.700 ——— <i>11.65</i>	Experimental — Portable mobile units.	31.600 W8XAI <i>9.40</i>	Rochester, N. Y., Stromberg Carlson Co. 6:30-12 a.m. daily (8)	39.800 ——— <i>7.53</i>	Aeronautical Radio, Inc. — Portable mobile units.
25.950 W4XH <i>11.56</i>	Spartanburg, S. C. No information available.	31.600 W8XKA <i>9.40</i>	Pittsburgh, Pa., Grant Building. 9-1 a.m. daily (30)	39.900 ——— <i>7.51</i>	Aeronautical Radio, Inc. — Portable mobile units.
25.950 W6XKG <i>11.56</i>	Los Angeles, Calif., 1417 S. Figueroa St. 24 hours a day, seven days a week.	31.600 W9XER <i>9.40</i>	Kansas City, Mo., Midland Broadcasting Co. Irregular. (15)	40.100 ——— <i>7.46</i>	Mainly police stations—Other portable units.
25.950 W8XNU <i>11.56</i>	Cincinnati, Ohio, Crosley Radio Corp. No information available at present.	31.600 W9XHWH <i>9.40</i>	Minneapolis, Minn., C.B.S., Nicolet Hotel, 9-12:30 a.m. (18)	40.600 ——— <i>7.38</i>	Broadcast pickup stations — Other experimental stations.
25.950 W9XUP <i>11.56</i>	St. Paul, Minn. No information available.	31.600 W9XPD <i>9.40</i>	St. Louis, Mo., Pulitzer Publishing Co. Daily 9-1 a.m. (21)	40.800 ——— <i>7.35</i>	Forest fire service—Portable mobile units.
26.000 ——— <i>11.53</i>	Experimental — Portable mobile units.	31.600 ——— <i>9.40</i>	Special experimental stations — Portable mobile or portable marine equipment — Forest fire service.	41.000 W1XER <i>7.32</i>	Transmitter at the summit of Mt. Washington, N. H. Address: The Yankee Network, 21 Brookline Ave., Boston, Mass. No definite schedule as yet. (over 100; will vary)
26.050 W3XEX <i>11.50</i>	Norfolk, Va., c/o WTAR.	33.100 ——— <i>9.05</i>	Mainly police stations—other experimental units.	41.000 W2XHG <i>7.32</i>	New York, N. Y., N.B.C., (see W2XDG 38.6) Daily 9-12 a.m. (39)
26.100 W9XJL <i>11.49</i>	Superior, Wis., Head of the Lakes Broadcasting Co. Weekdays 7:30 a.m.-8 p.m., Sundays 9 a.m.-8 p.m.	34.100 K6XCG <i>8.96</i>	Manawahua, T.H., Mutual Telephone Co. Point-to-point communications.	41.000 W8XH <i>7.32</i>	Buffalo, N. Y., WBEN, Inc. Daily 1-5 p.m., 5:45-9 p.m. (25)
26.400 W9XAZ <i>11.35</i>	Milwaukee, Wis., The Journal Co., 1 p.m.-12 a.m. daily.	34.600 ——— <i>8.93</i>	Broadcast pickup stations — Other experimental installations.	41.000 W8XWJ <i>7.32</i>	Detroit, Mich., 4465 Penobscot Bldg. Weekdays 9 a.m.-11 p.m., Sundays 10 a.m.-5 p.m. (34)
26.550 W2XQO <i>11.29</i>	Flushing, N. Y., Knickerbocker Broadcasting Co., 1697 Broadway, New York City, N. Y.	35.400 W2XCU <i>8.48</i>	Lakehurst, N. J., Forest fire service.	41.000 W9XRS <i>7.32</i>	Chicago, Ill., N.B.C. Merchandise Mart. Variable schedule (33)
27.100 ——— <i>11.08</i>	Experimental — Portable mobile units.	35.600 W3XES <i>8.42</i>	Baltimore, Md., Monumental Radio Co. 6 p.m.-12 a.m. daily (17)	41.000 ——— <i>7.32</i>	Various types of experimental stations.
30.100 ——— <i>9.95</i>	Mainly police stations—Other experimental stations.	35.600 W9XOK <i>8.42</i>	St. Louis, Mo., St. Louis Star Times. Special experimental (20)	41.800 K6XCA <i>7.20</i>	Ulupalukua, T.H., Mutual Telephone Co. Point-to-point communications.
31.100 ——— <i>9.65</i>	Broadcast pickup stations — Other experimental installations.	35.600 ——— <i>8.42</i>	Special experimental stations. Especially marine fire in New York City.	42.000 ——— <i>7.14</i>	Blue Hill Observatory, N. H. Free balloons—Other portable mobile units.
31.600 W1XKA <i>9.40</i>	Boston, Mass., Westinghouse Electric & Mfg. Co. Weekdays 6:30-1 a.m., Sundays 8-1 a.m. (23)	36.000 W3XBX <i>8.34</i>	Blue Anchor, N. J., Forest Fire Station. Daily 9 a.m. to 5 p.m. Other fire stations.	45.000 ——— <i>6.66</i>	Aeronautical Radio Co. Portables in W6.
31.600 W1XKB <i>9.40</i>	Springfield, Mass., Westinghouse Electric & Mfg. Co. Weekdays 6:30-1 a.m. Sundays 8-1 a.m. (20)	37.100 ——— <i>8.08</i>	Mainly police stations—Other experimental units.	51.000 ——— <i>5.88</i>	Aeronautical Radio Co. Portables in W6.
31.600 W1XEQ <i>9.40</i>	New Bedford, Mass., E. Anthony & Sons. Daily 2-6 p.m. (12)	37.600 ——— <i>7.98</i>	Broadcast pickup stations — Other experimental units	52.000 ——— <i>5.77</i>	Various types of portable-mobile units.
31.600 W2XDV <i>9.40</i>	C.R.S., 485 Madison Ave., New York. Weekdays 6-11 p.m., Saturday and Sunday 7-10 p.m. (30)	37.800 ——— <i>7.94</i>	Other experimental units	53.000 W1XR <i>5.65</i>	Mt. Washington Observatory, N. H.
31.600 W3XEY <i>9.40</i>	Baltimore, Md., The Baltimore Radio Show, Inc. 12-8 p.m. (21)	38.000 ——— <i>7.90</i>	Forest fire portable mobile.	55.000 ——— <i>5.45</i>	Aeronautical Radio Co. Portables in W6.
31.600 W3XKA <i>9.40</i>	Philadelphia, Pa., Westinghouse Electric & Mfg. Co., 1622 Chestnut Street. Daily 10 a.m.-11 p.m. (25)	38.500 K6XCB <i>7.80</i>	Aeronautical service A2 emission.	60.500 W1WR <i>4.95</i>	Mt. Washington Observatory, N. H.
31.600 W4XBW <i>9.40</i>	Chattanooga, Tenn., Hotel Patten. No information available at present.	38.600 W2XDG <i>7.76</i>	Manawahua, T.H., Mutual Telephone Co. Point-to-point communication.	60.600 W1XW <i>4.94</i>	Milton, Mass. Operations with Blue Hill Observatory.
31.600 W4XCA <i>9.40</i>	Memphis, Tenn., Memphis Commercial Appeal. Daily 10 a.m.-10 p.m. (21)	38.600 ——— <i>7.76</i>	New York, N. Y., N.B.C., 30 Rockefeller Plaza. Daily 9-12 a.m. (39)	61.000 ——— <i>4.84</i>	Aeronautical Radio Co. Portable-mobile.
31.600 W5XAU <i>9.40</i>	Oklahoma City, Okla., WKY Radiophone Co. Daily 12-2 p.m., 6-7 p.m., 11:30-12:30 p.m. (17)	38.600 W3XAY <i>7.76</i>	Experimental units—Portable mobile units.	63.000 W1XAF <i>4.80</i>	King's Highway, Princetown, Mass., New England Tel. & Tel.
		39.000 ——— <i>7.70</i>	Philadelphia, Pa., Atlantic Communications, Inc., coastal harbor telephone service.	63.000 W1XAF <i>4.80</i>	Careswell Ave., Marshfield, Mass., N.E. Tel. & Tel.
		39.700 ——— <i>7.56</i>	Forest fire service.	63.500 W1XEII <i>4.72</i>	Hartford, Conn., The Travelers Broadcasting Service. 6-1 a.m. weekdays, 9-1 a.m. Sundays. (directional southwest and northeast)
		39.800 ——— <i>7.53</i>	Aeronautical Radio, Inc. — Portable mobile units.		
			Forest fire service—Portable mobile units.		

Night-Owl Hoots

By RAY LA ROCQUE

DURING the season which is fast drawing to a close DXer's have spent many sleepless nights in search of DX from stations across the Atlantic or from those "down under" in the Australian Commonwealth and in New Zealand. In most cases disappointment was uppermost in their minds as they retired with the rising sun, for the winter months of 1937-38 did not prove very fruitful in yielding new stations from the aforementioned localities. However, those Night Owls who passed up the opportunity of DXing in the early evening hours may have much cause to regret—for the season in question produced many fine catches in the form of Latin Americans, not a few of which were from countries heretofore missing from most logs.

The South Americans

Reception from Latin America usually suffers no let-down with the coming of Spring, however, and March and April usually are the best months for reception from our Southern neighbors, so it is the Chief's suggestion that you go after the stations now and get in on the best SA season in our DX experience and, perhaps, the best season in many years to come. Look at the special Latin American section of the forecast and by use of the following suggestions or tips,

SOUTH AMERICAN DX . . . CONTEST NEWS . . . WNEL DX PROGRAM . . . MONITORED VERIES . . . SPECIAL CMHJ VERI . . . HAVANA CONFERENCE . . . EASY IDENTIFICATIONS

STATION CHANGES

There are no changes to be made this month in the United States station list. Below are the foreign station list changes preceded by a Brazilian station list. We give the complete list of Brazilian stations as practically every station in that country has shifted frequency.

BROADCAST STATIONS OF BRAZIL

Call	Location	Kc.	Power
PRA-2	Rio de Janeiro	780	1500
PRA-3	Rio de Janeiro	860	10000
PRA-4	San Salvador	740	10000
PRA-5	Sao Paulo	1260	5000
PRA-6	Sao Paulo	800	10000
PRA-7	Ribeirao Preto	670	1000
PRA-8	Recife	720	25500
PRA-9	Rio de Janeiro	1220	20000
PRB-2	Curitylia	1480	5000
PRB-3	Juiz de Fora	620	500
PRB-4	Santos	1450	1000
PRB-5	Franca	1410	500
PRB-6	Sao Paulo	1200	10000
PRB-7	Rio de Janeiro	900	5000
PRB-8	Rio Preto	690	1000
PRB-9	Sao Paulo	1000	20000
PRC-2	Porto Alegre	1170	5000
PRC-3	Pelotas	580	250
PRC-4	Blumenau	1370	1500
PRC-5	Belem	670	2000
PRC-7	Bello Horizonte	690	250
PRC-8	Rio de Janeiro	1360	5000
PRC-9	Campinas	1170	500
PRD-2	Rio de Janeiro	1240	5000
PRD-3	Petropolis	1480	1000
PRD-4	Araraquara	1090	500
PRD-5	Rio de Janeiro	1470	1000
PRD-6	Piracicaba	630	250
PRD-7	Sorocaba	1320	600
PRD-8	Nichteroy	1320	1000
PRD-9	Sorocaba	690	1000
PRE-2	Rio de Janeiro	1430	5000
PRE-3	Rio de Janeiro	1180	10000
PRE-4	Sao Paulo	1340	250

PRE-5	Uberaba	1170	250
PRE-6	Nichteroy	1170	2000
PRE-7	Sao Paulo	1410	1000
PRE-8	Rio de Janeiro	980	22000
PRE-9	Fortaleza	1420	2000
PRF-2	Rio Claro	1460	500
PRF-3	Sao Paulo	960	7500
PRF-4	Rio de Janeiro	940	13000
PRF-6	Sao Salvador	630	—
PRF-7	Campos	1450	2000
PRF-8	Sao Salvador	580	250
PRF-9	Porto Alegre	1440	5000
PRG-2	Sao Paulo	1040	25000
PRG-3	Rio de Janeiro	1280	10000
PRG-4	Jaboticabal	1470	250
PRG-5	Santos	720	750
PRG-6	Cruzeiro	1500	1000
PRG-7	Jahu	1340	300
PRG-8	Bauru	1250	250
PRG-9	Sao Paulo	1100	20000
PRH-2	Porto Alegre	600	20000
PRH-3	Sao Paulo	1120	10000
PRH-4	Pelotas	1320	250
PRH-5	Pocos de Caldas	1330	500
PRH-6	Bello Horizonte	1300	3000
PRH-7	Ribeirao Preto	—	5000
PRH-8	Rio de Janeiro	1080	5000
PRH-9	Sao Paulo	840	5000
PRI-2	Sao Paulo	—	—
PRI-3	Bello Horizonte	880	22800
PRI-4	Joao Pessoa	1080	10000

NEW STATIONS, FOREIGN

—	Kenora, Ont., Can.	1420	100
CMBF	Havana, Cuba	770	1000
CMCV	Havana, Cuba	1420	—
CMIW	Camaguey, Cuba	1340	—
HJ3ABG	Bogota, Colombia	1410	250
NEFQ	Cananea, Sonora, Mex.	1010	50
ZBK	Hongkong, China	640	250

FREQUENCY CHANGES

CMBG 1140-1440 kc.

K I D O



Meet KIDO Our Cat



Studio of KIDO

Our versatile mascot, as a kitten was rescued from the street on a dark and dismal winter night. He has thrived with KIDO, whose name he bears. KIDO'S fan mail is increasing since his first broadcast. Besides the quality of his voice our listeners declare his touch on the piano to be masterful. * *

Our new and commodious studios on Mezzanine floor of the Hotel Boise provide modern facilities to more fully serve the Intermountain Region in connection with our new N. B. C. hookup.

Compliments of

KIDO BROADCASTING STATION

PHONE 222 BOISE IDAHO

acquire for yourself a few additional SA's.

The first and foremost requirement for good SA reception is a selective receiver. In the case of receivers which are not selective, a directional antenna (Inverted "L") pointed to the South is most useful. If you are fortunate enough to own a communications type receiver equipped with a crystal filter, then you are "all set" so to speak. In tuning the Latins, one should start about one-half hour previous to sun-down for it is then that the opportunity to log the Eastern South American countries, such as Brazil, Uruguay, and Argentina, presents itself. Of course, many times these countries can also be logged later in the evening, but QRM is negligible before the Western U. S. stations begin to break through. The best way to search for SA's is to wander up and down the dial in search of heterodynes. When a heterodyne

Photo veri sent to the "Chief" by "Bake" Young. Meet "KIDO" the cat.

(squealing sound similar to peanut whistle) is located, it becomes the task of the DXer to separate the two or more stations whose combined signals are causing the heterodynes. If you have a crystal filter this is easy, and if you have a directional antenna the Latin is usually the loudest station, but if you have neither, just sit back and listen for the announcement and hope that the strongest station is on SA. If not, then just pass on to another heterodyne.

The matter of identification is also a problem to the DXer not acquainted with Spanish or Portuguese. However, this is not so hard as it seems. Just refer to your log to see what Latin stations are listed on the channel to which your receiver is tuned. Then make a mental note of them and listen for catch words that may connect the station with any of those in the log. All Latin Americans use identification signals (usually chimes) before announcing so that the DXer can be prepared to listen closely after hearing chimes, for the announcement that follows is usually a station identification. We have included in the forecast various notes on each SA in order to assist you in identifying them.

Contest News

Boosting his average 18 points while Tony Tarr and H. Orlaw were loosing a few, Bob Wilson assumed the lead in the ALL-WAVE RADIO Championship DX Contest for 1937-38. Here are the standings after two months of competition:

Robert C. Wilson (2), Portland, Me.	78.6
H. Orlaw (1), Vancouver, British Columbia	71.4
Anthony C. Tarr (1) Seattle, Washington ..	68.6
Carroll Weyrich (4), Baltimore, Md.	60.3
Joseph T. Lippincott (2), Tufts College, Mass.	57.8
Richard Holland (2), Gonic, N. H.	56.1
Albert Bartholomew (6), Bradford, N. Y. ...	53.8
Bob Rice (x), Muskogee, Okla.	47.1
Ralph G. Hughes (3), Ireland Island, Bermuda	46.7
Harry Honda (1), Los Angeles	43.2
William Vornkahl, Jr. (6), Westport, Conn.	41.7

LAST-MINUTE FLASHES

SPECIAL DEDICATORY PROGRAM FOR R.S.S.L. Baker Young, W27F1, Parma, Idaho, has arranged for a special program from station KIDO on March 13 from 2-3 a.m. to be dedicated to officers and members of the R.S.S.L. "Bake" promises a good program and that every report which is correct and accompanied by return postage will be verified with KIDO's attractive photographic card!

FQN special program for NNRC and NRC on March 6 from 4-5 a.m. on 609 kc. FQN located on St. Pierre & Miquelon Island and requires 10c in coin for verification.

A new station in Guatemala City is being heard on 1480 kc. Call is TG-1X and though no schedule is known it can be heard after midnight conversing with TG-1 or TGW occasionally.

New U.S.A. Stations:

WGUA	Athens, Georgia	1310 kc.
		100 w. unlt'd
KWEW	Hobbs, New Mexico	1500 kc.
		100 w. daytime
	Galesburg, Illinois	1500 kc.
		250 w. daytime
KPOF	Increases power to 1000 watts, from 500 w.—880 kc.	

Charles Hesterman (3), Saskatoon, Sask. ...	37.7
Richard Wright (7), Chicago, Ill.	37.5
Vincent Stasen (5), Philadelphia, Penna. ...	37.1
Stanley Brus (5), No. Braddock, Penna. ...	36.6
Robert Skyten (8), East Brookfield, Mass. ...	35.5
Raymond Sahlbach (7), St. Louis, Mo.	34.8
Bill Stone (6), Toronto, Ontario	32.9
Edward H. Urban (6), Cleveland, Ohio ...	29.0
Curtiss Keirstead (8), Framingham, Mass. ...	26.2
Earl Lever (8), Worcester, Mass.	25.6
Kendall Walker (3), Yamhill, Ore.	19.4
Mike Gajdos (9), East Chicago, Ind.	11.2
Joseph Piechuta (9), Meriden, Conn.	9.4
Walter J. Gyngell (10), Saratoga, N. Y.	8.0
Jack McKelvey, Los Angeles, Calif.	7.7
Harry Snyder (10), Trenton, N. J.	7.0
Chester Wheeler (2), Milford, N. H.	6.9

Most noticeable were the steady gains made by Weyrich, Lippincott, Holland, and Bartholomew, the latter making an especially good showing in the last two weeks of the month. So watch for these four—and for last year's champion—Hesterman, who has been slow starting because of illness. But remember last season—Hesterman never once held first place until the last month of competition—and that's the one that counts!

Records: Bob Wilson equalled his record of 1000 points not once but five times in the second month of scoring—which explains why he is on top. Tony Tarr joined him as co-record holder by also scoring 1000 points in the period from Dec. 15-18. Al Bartholomew just missed this honor in the Dec. 29-Jan. 1 period when Dick Wright caused him to split 100 with him on XERB. Al's score was 950!

Best catch of the month: We should say "best catches" for take a glance at the following which are only a few of the TA's reported by Bob Wilson: Vienna (592), Eiffel Tower (1456), Helsinki (895), Brno (922), and many others reported not once, but over and over again! Let's move to Portland!

Team Scores: If you harbored any thought last month that the Phantoms would walk away with this contest, take a look at the standings now. The New Englanders who now lead, the Boosters and the Can-Ams, all took turns at knocking off the former leaders so that the race for top honors is now wide-open. The standings:

	Won	Lost
(2) R.S.S.L. New Englanders	12	2
(1) R.S.S.L. Pacific Phantoms	12	3
(4) Baltimore N.N.R.C. Boosters	12	3
(6) N.N.R.C. Canadian-Americans.	10	5
(5) R.S.S.L. Keystone Owls	8	6
(3) R.S.S.L. Internationals	7	8
(7) R.S.S.L. Midwesterners	4	10
(8) R.S.S.L. Bay Staters	4	10
(9) R.S.S.L. Independents	3	11
(10) R.S.S.L. Northeasterners	0	14

Records: The record score for a team in one competition is now held by the New Englanders. They scored a record-breaking total of 3491 points in the Dec. 8-11 competition against the Phantom's for the first loss that the Pacific team suffered in the contest. The Boosters and Can-Ams then proceeded to imitate the New England team! Numbers at the beginning of each listing show the team with which the individual contestants are associated. For more detailed information send your questions with a stamp to the Chief.

With the Night Owls

Harry Honda, Los Angeles, Calif.: "XEAA is definitely on 755 kc., as I can hear WJR 5 kc. away. May be crystal drift!"

M. W. Oliver, Houston, Texas: "For your information, our local station KXYZ, 1440 kc., will now broadcast 24 hours daily!" (*Grrr!—Chief*)

Elvyn L. Barker—W3E4, Portland, Me.: "George H. Calre, announcer at WNEL, informs me that the station conducts a DX program on the second Saturday of each month. They start with their frequency check at 3 a.m. and continue until 5 a.m. Reports from all listeners will be appreciated. Station WPRA in

ALL-WAVE RADIO'S Time Table of DX Programs

(All schedules in E. S. T.)

Specials

TUESDAY MORNING, MARCH 1

WRR	Dallas, Tex.	1280 kc., 1:00-1:30
KLAH	Carlsbad, N. M.	1210 kc., 5:00-5:30
KBIX	Muskogee, Okla.	1500 kc., 5:30-6:00
WPAY	Portsmouth, Ohio	1370 kc., 4:00-4:30
WTOC	Savannah, Ga.	1260 kc., 3:00-4:00

WEDNESDAY MORNING, MARCH 2

KWBG	Hutchinson, Kans.	1420 kc., 6:30-7:00
KWOS	Jefferson City, Mo.	1310 kc., 2:00-2:30
WSUI	Sioux City, Iowa	880 kc., 1:30-2:30

FRIDAY MORNING, MARCH 4

KNOW	Austin, Texas	1500 kc., 1:45-2:15
WACO	Waco, Texas	1420 kc., 1:45-2:15

SATURDAY MORNING, MARCH 5

KSAL	Salinas, Kans.	1500 kc., 2:30-3:00
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SUNDAY MORNING, MARCH 6

CHLN	Trois Rivieres, P.Q.	(IDA) 1420 kc., 3:00-4:00
CHWK	Chilliwick, B. C.	780 kc., 3:00-4:00 (NRC)

WGRC	New Albany, Ind.	1370 kc., 3:30-4:00
WJBO	Baton Rouge, La.	1120 kc., 2:00-4:00

MONDAY MORNING, MARCH 7

KTSA	San Antonio, Texas	550 kc., 1:00-1:15
KVGB	Great Bend, Kans.	1370 kc., 3:00-3:30
WPAD	Paducah, Ky.	1420 kc., 3:00-3:30

THURSDAY MORNING, MARCH 10

CMHJ	Cienfuegos, Cuba	1160 kc., 2:00-6:00
WHIS	Bluefield, W. Va.	1410 kc., 2:30-3:30
WLLH	Lowell, Mass.	1370 kc., 1:45-2:00

FRIDAY MORNING, MARCH 11

KPOF	Denver, Colo.	880 kc., 2:15-2:45
WJAG	Norfolk, Nebr.	1060 kc., 1:30-2:00

SATURDAY MORNING, MARCH 12

WNEL	San Juan, P. R.	1290 kc., 3:00-5:00
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SUNDAY MORNING, MARCH 13

WCKY	Covington, Ky.	1490 kc., 3:00-4:00 (IDA)
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TUESDAY MORNING, MARCH 15

KBIX	Muskogee, Okla.	1500 kc., 5:30-6:00
KGFW	Kearney, Nebr.	1310 kc., 6:00-6:30
WDAY	Fargo, N. D.	940 kc., 1:00-?
WRR	Dallas, Texas	1280 kc., 1:00-1:30

WEDNESDAY MORNING, MARCH 16

KWBG	Hutchinson, Kans.	1420 kc., 6:30-7:00
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TUESDAY MORNING, MARCH 22

KBIX	Muskogee, Okla.	1500 kc., 5:30-6:00
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FRIDAY MORNING, MARCH 25

KADA	Ada, Okla.	1200 kc., 2:45-3:15
WLLH	Lowell, Mass.	1370 kc., 1:00-1:15

SUNDAY MORNING, MARCH 27

KFOR	Lincoln, Nebr.	1210 kc., 3:00-4:00 (IDA)
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WJBO	Baton Rouge, La.	1120 kc., 2:00-4:00
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TUESDAY MORNING, MARCH 29

KGFW	Kearney, Nebr.	1310 kc., 6:00-6:30
WBRZ	Ponca City, Okla.	1200 kc., 6:00-6:30

Regulars

EVERY SUNDAY MORNING

KMPC	Beverly Hills, Calif.	710 kc., 3:00-4:00
KMTR	Los Angeles, Calif.	570 kc., 3:00-3:30
KVOO	Tulsa, Okla.	1140 kc., 12:00-6:00
LR3	Buenos Aires, Arg.	950 kc., 12:30-1:30
WDAF	Tampa, Florida	1220 kc., 12:00-3:00
WTMJ	Milwaukee, Wis.	620 kc., 12:00-4:00

Mayaguez, Puerto Rico conducts its frequency test programs from 4:30-4:50 a.m. on the second Thursday of each month. They verify with a card showing a native scene.

Anthony C. Tarr, Seattle, Wash.: "We had a sudden thunderstorm here the other night. I was listening to KRSC and they remarked, 'From the sound of the lightning outside there seems to be a storm brewing.' Aside from the fact that one cannot hear lightning, no sooner had he said that when 'Blam! Crash! Zzzst! Boom!' and he went out like a light. They were off the air for an hour, resuming with the announcement that the station had been directly hit by lightning—probably the antenna tower."

Albert Bartholomew, Bradford, N. Y.: "In the NNRC convention picture in the January issue of AWR you have the name of the last person in the second row as L. Collins. He was at the convention, but the picture is none other than yours truly!" (Sorry Al—someone slipped up on this, but we hereby officially correct the mistake—Chief).

Enrique Hidalgo, Cienfuegos, Cuba: "On Thursday morning, March 10, I will be back in Cienfuegos at the mike of CMHJ conducting a DX program from 2 to 6 a.m. A beautiful and special verification card is being planned for this program and will be issued for every correct report."

Robert Wilson, Portland, Me.: "I am hearing what I think is Danzig on 1303 kc., but do not dare report it as it's listed as only 500 watts and I cannot really identify it." (Coming from a location where one hears TA's till July and at practically all hours of the day as Bob does, we shouldn't be a bit surprised if it were Danzig—Chief).

Bill Stone, Toronto, Ontario: "I have arranged for a special broadcast for the National Radio Club from CHWK, Chilliwack, B. C., on March 6 from 3 to 4 a.m. Ten cents in coin must be sent for a verification. No verification will be issued unless that amount is enclosed!"

Richard Holland, Gonic, N. H., and Robert Skyten, East Brookfield, Mass.: "TGW has just moved to 1520 kc. and is in the clear every night."

Joseph T. Lippincott, Medford, Mass.: "Please note that the Cuban on 770 is now CMBF and not CMBS. The two sound so much alike it is very difficult to tell the difference."

Bernard L. Ahman, 3313 Westerwald Ave., Baltimore, Md.: "As I haven't verifications from the following Cubans I'd like the names of the signers of the veries received by other Night Owls in order to assist me in writing: CMBC, CMBD, CMBG, CMBL, CMBS, CMC, CMCA, CMCF, CMCG, CMCU, CMCW, CMW." (Will anyone who is able to supply the missing name please write to Barney—Chief).

Carroll Weyrich, Parkville, Md.: "XEJP is the Mexican heard almost every morning on 1125 kc."

Kilocycling Around

Things are still pretty much topsyturvy in our Cuban list. We did find that CMCW was on 1140 and CMCX on 1380 in time to include those changes last month. CMKG has moved down a few kilocycles to 1135. CMBF is replacing CMBS on 770 and CMBS is—well

your guess is as good as ours. CMCL is another new Havana station on 730 kc., and CMBQ also will soon take the air in the same city on 680 kc. What's to happen to CMCG? Guess again!

Soon there will be a complete change of frequencies of all North American broadcasting stations. At the Havana Conference, which concluded its discussions in December, arrangements were made to distribute the channels from 550 kc.

(Continued on page 164)

ALL-WAVE RADIO'S DX FORECAST FOR MARCH 1938

LATIN-AMERICAN RECEPTION

General Forecast: As Latin-American reception is more or less the same in all parts of the country we are consolidating it in one section this month in order to save repetition and to give you more details on identifying each station. March, always a good month for the Latin-American stations, should be exceptionally good this season judging from the way the signals from these countries have been coming through all winter!

Specific Forecast

- LR1 1070 kc. Known as "Radio El Mundo de Buenos Aires". Station announcement every fifteen minutes preceded by chimes similar to NBC, but with a more musical ring. Should not be confused with CMBX who also is occasionally heard on this channel. Till 11 p.m. daily.
- LR5 836 kc. When KOA is weak in the evening—why LR5 rides through R9! "Radio Excelsior" is the station slogan. No identification signal known. Till 11 p.m.
- LR6 870 kc. Sometimes gives WENR a battle on this channel. This station features descriptions of sports events, operas, and dramatic sketches. Popular music is seldom heard.
- LR3 950 kc. This station is on the air till 1:30 a.m. Sunday mornings with American dance program. "Radio Belgrano" is the slogan—and announcements are very frequent with no identification signal.
- LS2 1190 kc. Heard through WOAI occasionally. "Radio Prieto" is the slogan.
- YV1RF 1120 kc. Often has late programs continuing till early morning hours. Also sometimes breaks through in evening. Announcements are as follows: "Ondas del Lago" followed by the rippling strains of a harp and then the call and location Maracaibo, Venezuela.
- YV5RC 960 kc. "Radio Caracas" is the slogan and announcements are preceded by chimes. Best between 6-8 p.m.
- YV5RG 1005 kc. Announces "Emisoras Ondas Populares, YV5RG y YV5RH en Caracas." Till 10 p.m.
- YV5RQ 882 kc. Many call this the best of the Venezuelans. Heard from 6-7 p.m. Announces "Radio Philco YV5RP y YV5RY." Do not confuse with another Radio Philco—CMW on 880 kc.
- 625 kc. "La Voz de la Victor" is the slogan. Heard from 9-11:30 p.m.
- OAX4A 854 kc. Announces as "Radio Nacional del Peru OAX4A y OAX4Z." On the air till 11:30 p.m. Signs with Ted Lewis *Good Night Melody*.
- HJ3ABB 1105 kc. This one seems to be best around 8 p.m. and relays short waver HJ3ABD "Emisora Nueva Grenada."
- PR.. On the east coast Brazilians are heard from 6-7 p.m. or earlier. Try for all of the stronger ones listed in the "Changes" this month.
- TG-1 1510 kc. This one is not too difficult to hear. On till 10 p.m. and sometimes later it usually is stronger than the Canadians on its channel.
- TGW 1520 On this channel, TGW featuring its famous marimba orchestras is now very easily heard with no interference.

Cuba & Mexico With conditions as they are, any station in these countries is apt to be heard and it would be too difficult to list all of them. Cubans are all on the air until midnight or 12:30 a.m. and Mexicans till 1 or 2 a.m. or later.

EASTERN NORTH AMERICA

General Forecast: If you get a TA in March, well all we can say is that you're in the same class as Bob Wilson in Maine! However, do not be surprised, if after spending many mornings at the dial from 4-6 a.m. in March, you find a few TP's making themselves audible. March is TP month for eastern listeners.

Specific Forecast

- T.A. The average DXer will find that no TA's can be heard this month unless by some freak of reception. If heard they'll be audible for only a few minutes before fading completely.
- KGU 750 kc. 1st-31st, 3-4 a.m., R7. KGZ should be almost a daily visitor during March.
- KHBC 1400 kc. 1st-31st, 3-4:30 a.m., R9! Yes this 100 watter does occasionally reach R9 signal. How they get out with such low power is unexplainable.
- KGMB 1320 kc. 1st-31st, 4:5-30 a.m., R7. As this is the only Hawaiian to stay on as late as 5:30, the early risers ought to find this one easy pickings in March.
- 4YA 790 kc. 1st-31st, 4:60 a.m., R3. Stronger at the latter part of the transmission. Other N.Z. stations which may be heard are 1YA (650), 3YA (720), 2YC (840), and 2YA (570).
- 4QN 600 kc. 1st-31st, 5-6:30 a.m., R2. The other Aussies which you may hear are: 5CL (730), 4QG (800), and 2BL (740).

WESTERN NORTH AMERICA

General Forecast: A great increase in strength from down under signals should be noted this month, while Japs fade out of the picture almost completely.

Specific Forecast

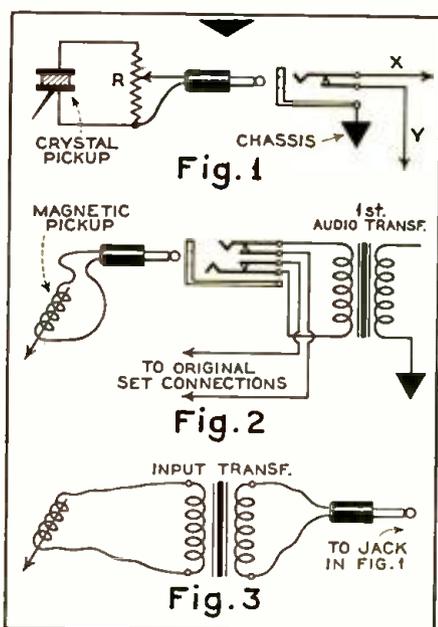
- 4YA 790 kc. 1st-31st, 4-6:30 a.m., R5-8. Others heard in order in which they are listed: 1YA (650), 3YA (720), 2YC (840), 2YA (570).
- 4QN 600 kc. 1st-31st, 5:00-6:30 a.m. unless otherwise stated. The following along with 4QN are R6: 2CO (670), 2NR (770), 2BL (740), 4QG (800), 3GI (830), 2GZ (990) till 6, 2KY (1040), 4AK (1220), 4BH (1380—R7), 2CR (550), 3KZ (1180), 2CH (1190). The following at R5 or less as stated: 4BU (1480), 3BA (1320) on at 5:30, 3DB (1030), 2GB (870), 5CL (730), 7NT (710) on at 6, 2WL (1430) on at 5:30, 3LK (1090), 3LO (770), 5CK (640). Many more may be picked with a good receiver and a good location.
- KGU 750 kc. 1st-31st, 3-5 a.m., R6. Other Hawaiians: KHBC (1400) 3-4:30 a.m., R7-9; KGMB (1320), 4-5:30, R7-8.
- JOAK-2 870 kc. 1st-31st, 6-7 a.m., R4. Others which may be heard occasionally: JOIK (810), JOHK (770), JOAK-1 (590), JOBK-2 (940), JOHG (1050).

Queries

QUERY NO. 56: I have a small radio and a portable phonograph. I wish to make wire connections to the sound box on the phonograph so that the sound will be amplified and reproduced in the radio.—C. M., New York City.

Answer: It would appear that C. M. has a portable phonograph with an acoustic reproducer. This should first be eliminated and an electrical pickup substituted. A large stock of these is carried by the various radio stores and mail order houses, and sell from about \$4.50 up. It is a simple mechanical job to remove the old acoustic reproducer and to install the new and modern electrical pickup in its place.

The pickup can of course be connected directly to the amplifier of the radio. However, a simpler method of record reproduction, considering the technical limitations of the layman, is to purchase an RCA Model RK-24 Phono Oscillator. This costs about six dollars at most stores. This oscillator is connected to the pickup which modulates it. In effect, it is a miniature broadcasting station, and the radio is tuned to it exactly as to any other station. No changes whatsoever need be made in the receiver. The frequency of the oscillator can be varied, so as to select a channel that is clear of broadcasting.



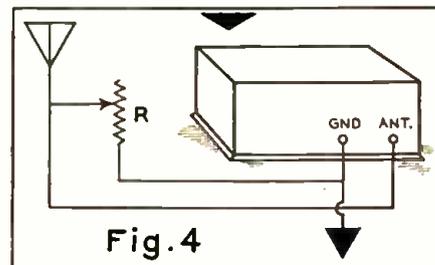
Various plug-in arrangements for connecting a crystal or magnetic pickup to a radio receiver for electric phonograph reproduction.

PHONO ATTACHMENTS . . . AUXILIARY VOLUME CONTROL . . . REVAMPING FOR TEN

THE primary purpose of the Queries Department is to solve the technical and semi-technical problems of our readers who feel they require such assistance. However, questions, so long as they are related to radio, need not be of a technical nature. Every question will be answered personally, by mail. A self-addressed and stamped envelope should be included. In questions concerning specific apparatus, it will be of considerable assistance to our technicians if the inquiry is accompanied with a wiring diagram, original operating instructions, and all relevant literature. While it is the desire of this department to be of assistance in all possible instances, it should be borne in mind that the manufacturer will occasionally be in a position to give better advice concerning his own product, and usually maintains a technical department at the service of those who purchase his equipment.

The pickup is most easily connected directly to the audio system of the radio by means of an adapter. These cost about \$.65 and are accompanied with full directions. The connection can of course be made without the use of an adapter by anyone fairly familiar with radio circuits. If a crystal pickup is used, about the best arrangement is that shown in Fig. 1. Resistor R is a 500,000-ohm potentiometer used as an auxiliary volume control and to provide a grid return circuit for the first audio tube. Lead X is connected to the control grid of the first audio tube, and lead Y to whatever that grid was connected to for radio reproduction. In place of the plug and jack, a simple single-pole, double-throw toggle switch can be used—the switch arm being wired to the grid and the two switch contacts to the potentiometer and receiver.

Where the first audio stage is transformer coupled to the detector, a high-impedance magnetic pickup should be connected to the primary of the transformer. A double-circuit jack is best used here, as suggested in Fig. 2, as one side of the



A simple auxiliary volume control which is very effective with t.r.f. receivers.

transformer primary will probably be "hot." When the pickup is plugged in, the primary is completely disconnected from the receiver.

If a high-impedance magnetic pickup is employed, but the first audio stage is not transformer-coupled to the detector, the arrangement shown in Fig. 1 can be used successfully in some instances. However, as a rule, better results will be secured if a transformer is used. This circuit is shown in Fig. 3—and the plug goes into the jack in the circuit of Fig. 1.

♦

Query No. 57: I recently built a short-wave receiver using a 6C6 detector with a 76 and a 41 in the audio. This arrangement works very nicely, except that on some signals the volume is excessive and the volume control does not seem to be adequate. Kindly tell me how I can correct this trouble.—K. K., Peterboro, Ont., Canada.

Answer: Unfortunately K. K. does not furnish us with sufficient information concerning his circuit so that we can give him perhaps the most intelligent answer. However, in cases such as he describes, it is always a safe bet to install an auxiliary volume control working on the antenna input. The circuit is shown in Fig. 4. The value of R depends somewhat on the input impedance of the receiver, but will usually run between 200 and 1000 ohms maximum. Five hundred ohms is a good average value, and the rheostat should "open" on the high resistance end.

This is always an excellent auxiliary way to control volume, as the input to all circuits is reduced, with a corresponding reduction in overloading—excepting, of course, in receivers with good a.v.c. action.

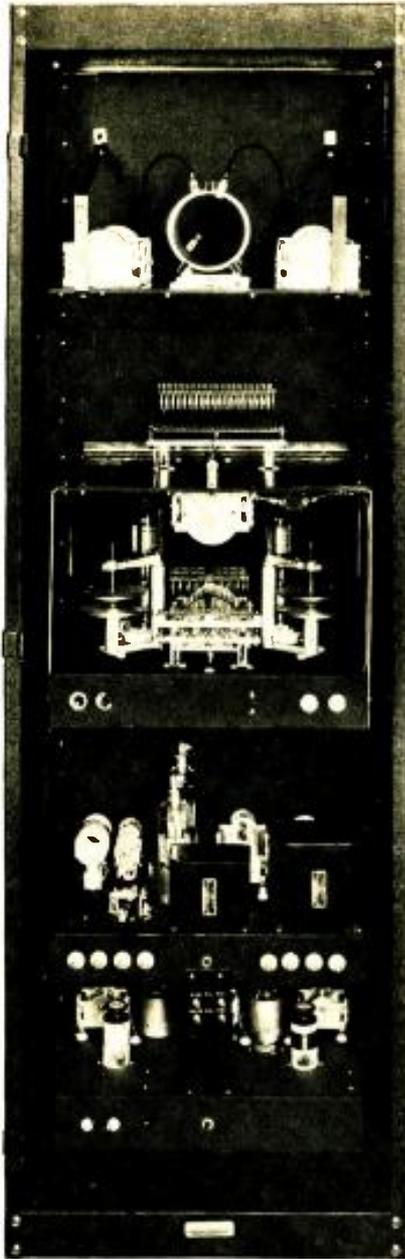
(Continued on page 152)

The MacGregor Expedition

Radio Equipment-Part 2

BASED ON AN INTERVIEW WITH
MRS. C. J. MACGREGOR

By FRANK P. KENYON
PRES., KENYON TRANSFORMER CORP.



Rear view of the rack containing the r.f. equipment. From bottom to top are: exciter, driver, Class C stage, and antenna tuning unit.

IN the first installment of the article on the MacGregor Arctic Expedition Radio Equipment, appearing in the February issue of ALL-WAVE RADIO a detailed description was provided of the speech amplifier, the modulator and the power supplies which are mounted in a single relay rack. The remainder of the equipment making up the main transmitter is the subject of the present article.

A rear view of the rack containing the r.f. units of the transmitter is shown on this page. The chassis carrying the exciter and buffer units is at the bottom of the rack. Immediately above it is the driver stage which is link coupled to the Class C final amplifier occupying the central position in the rack assembly. The antenna tuning unit is located at the top of the rack.

The Exciter and Buffer

The schematic diagram of the exciter and buffer unit is shown in Fig. 8. This consists of an RK-25 crystal oscillator capacity-coupled to an RK-39 buffer-doubler. Plate power is obtained from the power-supply unit in the first relay rack, but the transformer for supplying filament voltage to the RK-25 and RK-39 is contained in the exciter-buffer chassis, as indicated. Plug-in coils are used so that the various bands can be covered with the least amount of difficulty. The circuit is conventional in all respects and requires no additional explanation.

The Driver Stage

The RK-39 buffer-doubler is link coupled to the driver stage which employs a pair of RK-20's in push-pull.

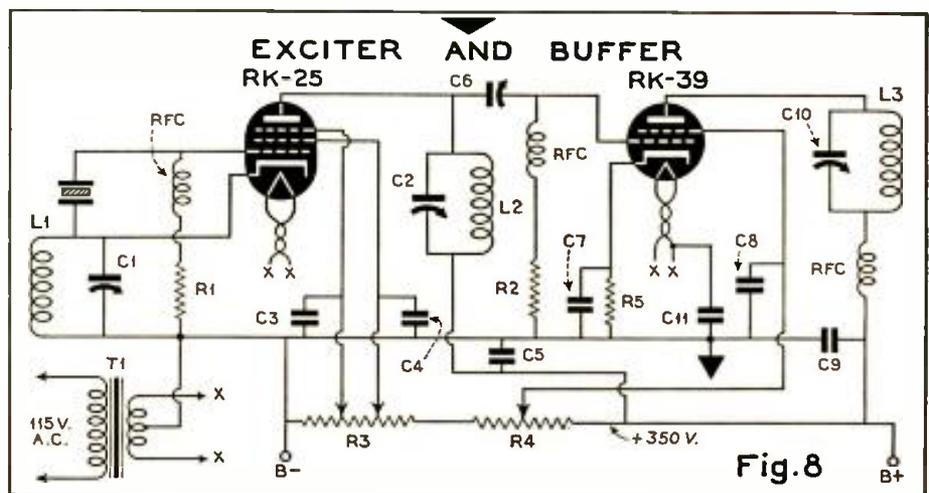
The diagram is shown at the left in Fig. 9. Construction was made so that RK-20's could be used as the final stage in case reduced power operation should become desirable. They furnish ample power to drive the final amplifier tubes operating at 2000 volts with an input of 500 ma.

Here again, high voltage is obtained from a power-supply unit in the first relay rack, but a filament transformer for the RK-20's is contained in the driver chassis. It should be noted from the diagram that keying is done in the driver circuit.

The Class C Stage

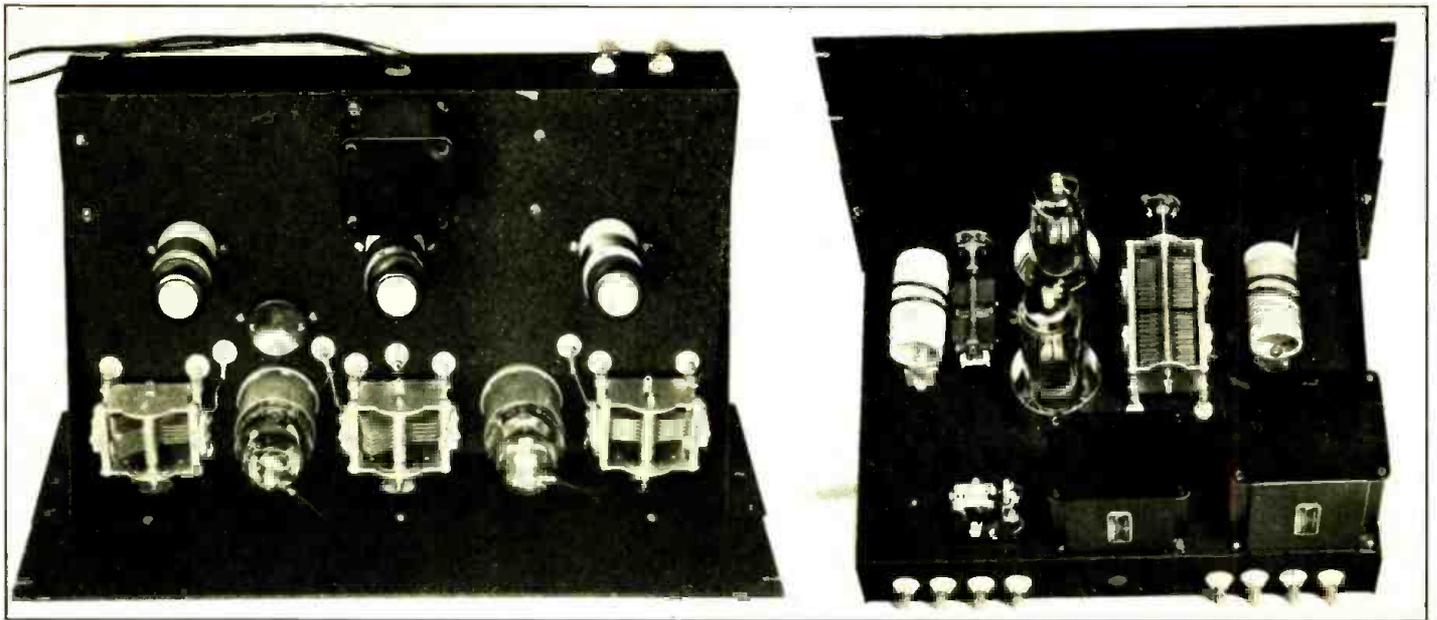
A pair of HK-354's are used in the final Class C stage, as shown at the right in Fig. 9. Link coupling is employed

(Continued on page 153)

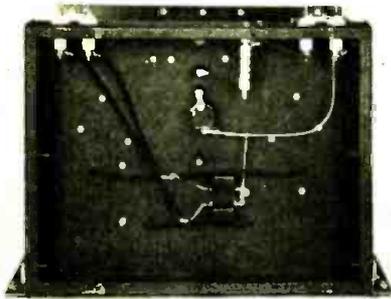


EXCITER AND BUFFER (Fig. 8)

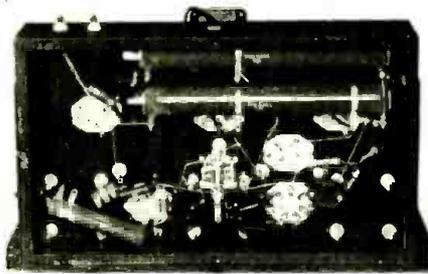
- | | |
|---|--|
| C1—Hammarlund MTC-100 variable, 100 mmfd. | C10—Hammarlund MTC-100 variable, 100 mmfd. |
| C2—Hammarlund MTC-100 variable, 100 mmfd. | RFC—Hammarlund type CHX, 2.1 mh. |
| C3—Cornell-Dubilier type 9 fixed, .002 mfd. | R1—I.R.C. 50,000 ohms, 2 watts |
| C4—Cornell-Dubilier type 9 fixed, .002 mfd. | R2—I.R.C. 50,000 ohms, 2 watts |
| C5—Cornell-Dubilier type 9 fixed, .01 mfd. | R3—I.R.C. type HOA, 15,000 ohms, 200 watts |
| C6—Hammarlund MTC-100 variable, 100 mmfd. | R4—I.R.C. type HOA, 10,000 ohms, 200 watts |
| C7—Cornell-Dubilier type 9 fixed, .01 mfd. | R5—I.R.C. type EPA, 500 ohms, 50 watts |
| C8—Cornell-Dubilier type 9 fixed, .01 mfd. | T1—Kenyon type T-351 fil. transformer |
| C9—Cornell-Dubilier type 9 fixed, .004 mfd. | |



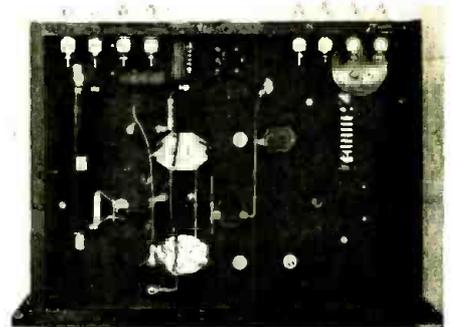
The exciter and buffer-doubler chassis is shown at the left, the RK-20 driver stage chassis at the right.



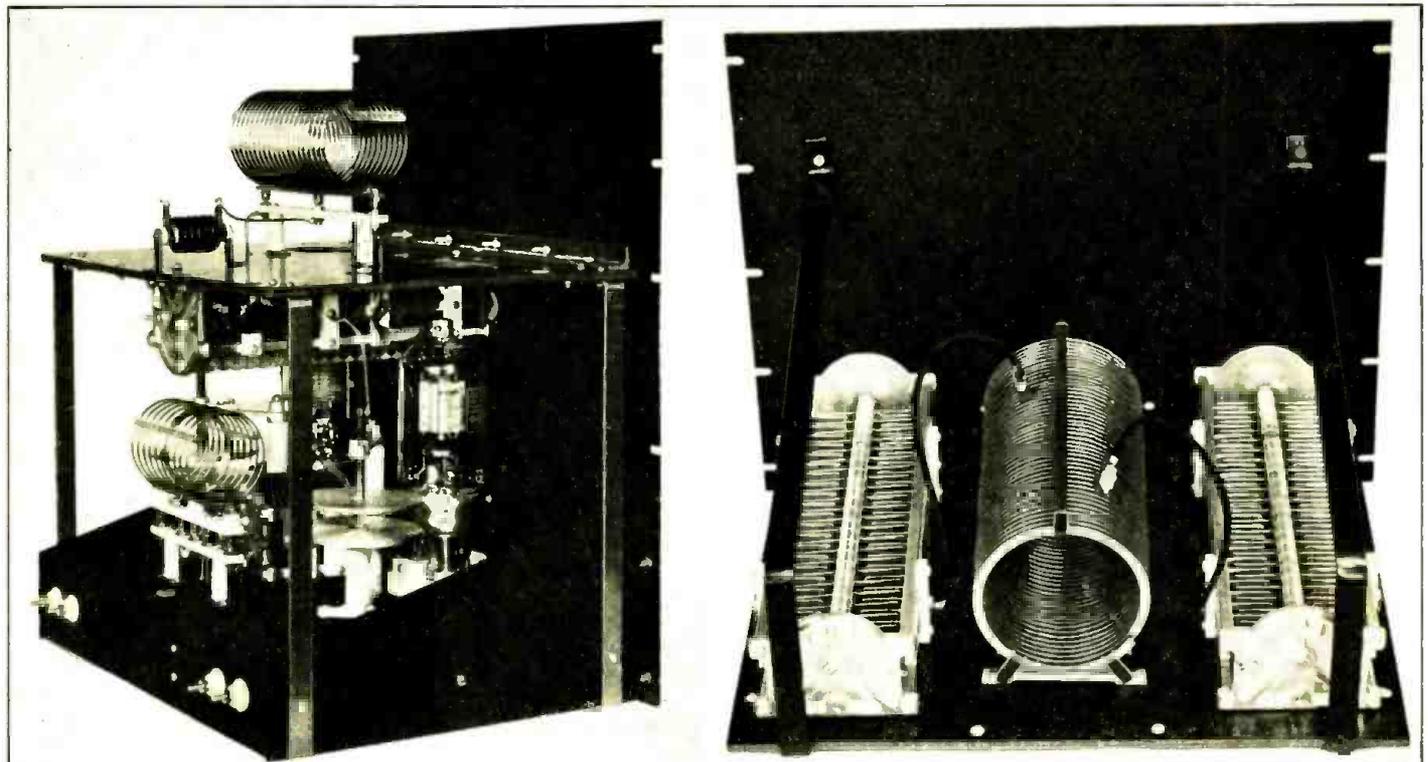
Under-chassis view of the Class C stage, a view of which is shown below. Good design has simplified the wiring.



Under-chassis view of the exciter and buffer-doubler. The small variable is the coupling condenser—C6 in Fig. 8.



Under-chassis view of the RK-20 driver stage, shown above.



At the left is the Class C final amplifier stage. The antenna tuning unit is shown at the right.

THE SILVER

"15-17"

SUPER



A PROVING-POST REVIEW

A GENERAL description of the McMurdo Silver "15-17" superheterodyne receiver appeared on pages 82 and 83 of the February issue of *ALL-WAVE RADIO*. The following review is based on actual tests and observations made at our Proving Post.

Mechanical Features

A front view of the "15-17" is shown at the head of this page. The power-supply components are grouped together at the left end of the chassis. The three-gang tuning condenser occupies the central position and the r.f. tubes, transformers, etc., are at the right end of the chassis. The units associated with the intermediate-frequency amplifier are to the left of the gang condenser and extend toward the rear of the chassis to the second detector, which is followed along the rear edge by the audio amplifier components. All units are adequately shielded and so placed that heat radiation has the least effect on circuits subject to frequency drift.

The large tuning dial occupies the center of the receiver control panel. The 6G5 tuning-indicator tube face fits into a window forming the upper edge of the dial escutcheon. The lower edge of the tuning-eye window carries a small scale which permits the operator to judge comparative signal levels in all bands.

There are five main tuning scales circling out from the dial pointer hub. These are illuminated from the rear by two pilot lights and each individual scale is of a contrasting color. The "A" band scale, nearest the center, is white and covers the standard broadcast band from 540 to 1600 kc. Scale "B," which is orange, extends from 1600 to 4500

kc. Scale "C," again white, ranges from 4500 kc. to 13 mc. The green scale, "D," covers the range from 10 to 32 mc. The fifth scale, at the outer edge, is calibrated in degrees—from 0 to 100—and is handy for logging purposes. Aside from the frequency calibrations on the four active scales, there are the "band spotters," designated in meters, which indicate the location and extent of each of the various short-wave broadcast, commercial and amateur phone bands.

The bandsread dial, also actuated by the main tuning knob, is below the main tuning scale. There are 200 divisions on this scale and it permits direct and accurate logging since the scale is directly geared to the main dial pointer at all times.

The tuning knob operates a traveling gear drive which provides a pointer travel ratio of 12 to 1 for rapid tuning, and a ratio of 80 to 1 for precise tuning. This "slow motion" ratio is made available at all points on each scale by merely reversing the direction in which the tuning knob is turned. It is possible, for instance, to move the pointer rapidly over to the edge of any desired short-wave broadcast band and thereafter cover the width of this band with the slow-motion drive by turning the tuning knob in the opposite direction.

In either case, the subsidiary scale provides adequate bandsread readings at all frequencies. The 20-meter amateur band, as an instance, covers 40 divisions on the bandsread scale.

The controls along the lower edge of the front panel are: Volume and Power Switch; Selectivity and Phono.; Band Selector, and finally the Bass Control and Beat Oscillator. The beat oscil-

lator pitch control, phonograph tip jacks, the headphone jack, and the three posts for doublet or Marconi antenna are ranged along the rear chassis apron.

The tuning control is exceptionally smooth in operation, has a "feather touch" and is free from backlash. The four subsidiary controls are also smooth and sure-fire.

Electrical Characteristics

The volume control is compensated and therefore provides good bass response at low volume levels—a highly important feature in any receiver. The selectivity control offers three i.f. bandwidths, namely: 3 kc. for severe interference, 8 kc. for normal DX reception, and 16 kc. for local, high-fidelity program reception. The tone control, which permits varying degrees of bass response, operates over a very wide range. When set to the left the bass response is highly attenuated. As the control is turned toward the right, bass response is built up gradually, and with the control all the way up the lower tones are boosted considerably. Setting this control full to the left turns on the beat oscillator.

The Jensen 15-inch dynamic speaker has a wide frequency range and is particularly effective in reproducing the lower tones. The bass response of this speaker is good even without the usual baffle with which it should be used.

The audio power output of the receiver is far in excess of what can be enjoyably used in the average home. Such power capabilities, however, are an effective insurance against distortion due to overloading.

The Circuit

Though the tube line-up and stage functions were covered in the previous article, there are a number of interesting points to be found in the circuit, shown herewith.

It should be noted, for instance, that

provisions are made in the band-switching system common to the r.f., mixer and oscillator circuits, for shorting out all coils but the ones in use. This prevents dead spots due to absorption and also a possible loss of efficiency and oscillation due to stray coupling. The switches forming the gang are lined up at (6) in the accompanying diagram. The lower section, at (6-O), alters sensitivity in the various bands by changing the bias on the r.f. and second i.f. tubes.

It should also be noted that all three of the i.f. transformers, at (D-11, D-14 and D-18) are of the variable bandwidth type. Taps on a third winding in each transformer are selected by a switch which provides the 3-kc., 8-kc. and 16-kc. response curves. There are four sections to this gang switch, the last section, at (E-21), merely serving to connect the input circuit of the first audio amplifier to the phonograph pickup terminals. The i.f. transformers are inductively tuned by means of adjustable iron cores.

The second detector is of the "infinite impedance" type, which has a gain a bit less than unity but a lower distortion value than the usual diode detector. This

circuit is located at (C-20), the tube used being a 6J5. The audio voltage is developed across the series resistors in the cathode circuit and a percentage of this is fed to the control grid of the 6J5 first a.f. tube, located at (J-22). The compensated volume control is located in this circuit, while the bass response control, at (M-19) is in the audio plate circuit of the same tube, the control itself being in series with the lower end of the primary of the input push-pull transformer.

It should also be noted that inverse feedback is applied to the 6L6 power tubes, located at (L-22) and (N-22) respectively. A percentage of the audio voltage developed in the plate circuit of these tubes is fed back to the grids of the same tubes through a series connection of resistors and condensers. Thus, the feedback in the upper tube circuit is through the 100,000-ohm resistor and 0.1-mfd. condenser. The inverse feedback is of value in appreciably reducing harmonic distortion, speaker "hangover," hum and tube plate impedance.

Amplified a.v.c. is placed on the r.f. tube and the two i.f. tubes. The 6K7 a.v.c. amplifier is located at (I-16) and

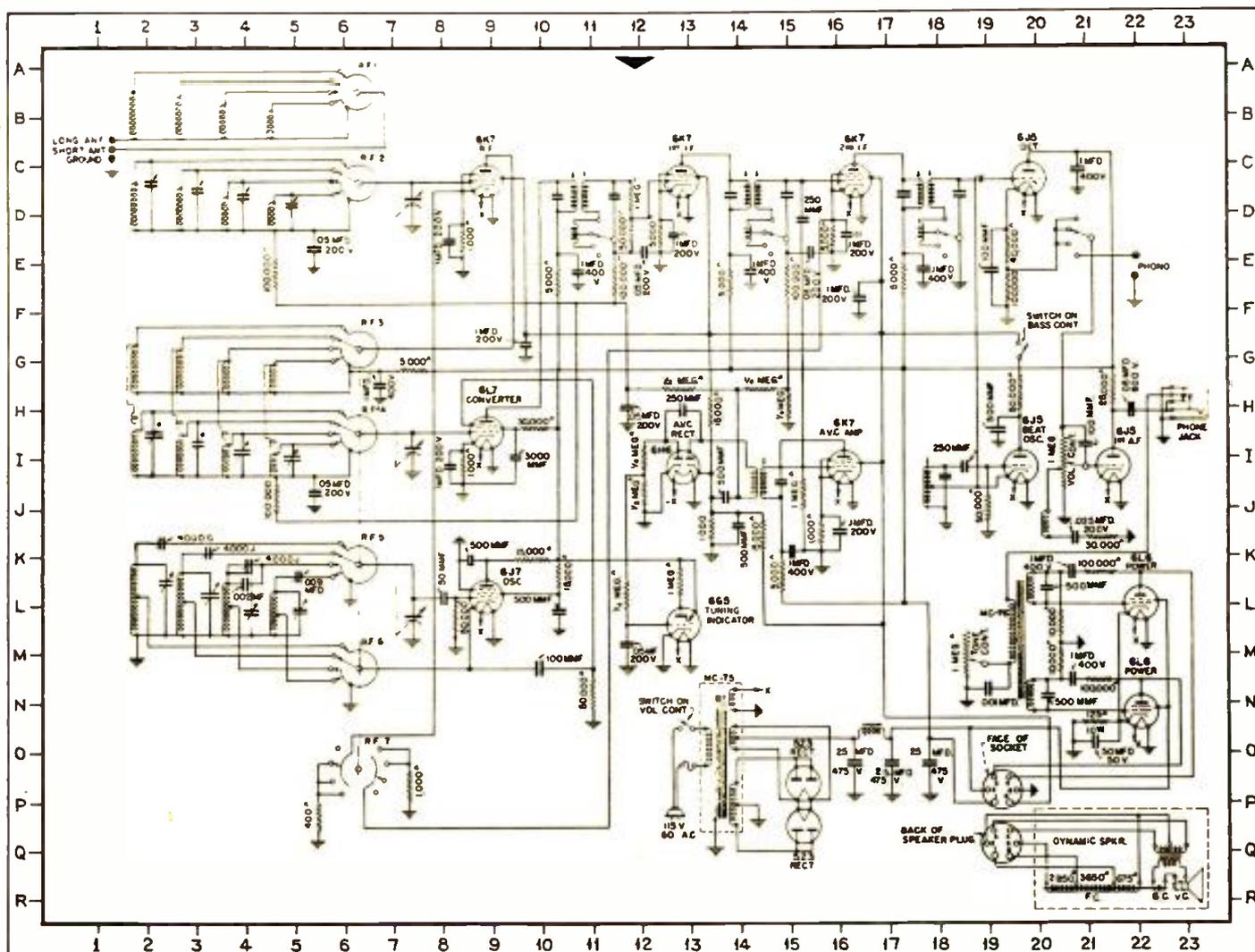
the 6H6 a.v.c. rectifier at (I-13). The system operates from the second i.f. stage where signal voltage is fed through a 250-mmfd. coupling condenser to the control grid of the 6K7 a.v.c. amplifier tube. This tube is coupled to the 6H6 rectifier by means of an i.f. transformer. The voltage developed across one section of this duo-diode is applied to the 6G5 tuning-indicator tube. The voltage developed in the load circuit of the other diode section is fed to the grids of the controlled tubes. The a.v.c. action is delayed by means of cathode bias so that the sensitivity of the receiver to weak signals does not suffer.

The 6J5 beat oscillator, located at (I-20), is electron coupled, and is also inductively tuned by means of a movable iron core. Both the electron coupling and the inductive variation contribute to the stability of this oscillator.

Aural Tests

In our Proving-Post tests, the "15-17" was stacked up against two "laboratory" receivers specifically designed for local high-fidelity program reception. All we need say as to the outcome is that the

(Continued on page 159)



The schematic diagram of the McMurdo Silver "15-17" superheterodyne, drawn road-map fashion for easy reference.

RADIO SIGNAL SURVEY LEAGUE NEWS

IN the accompanying box are listed the first group of CLASS A MONITORING STATIONS of the R.S.S.L.—those ardent listeners who have helped so much in the development of the League by acting as Section Managers in the past and who thus have achieved the distinction of being the first to be awarded CLASS A MONITORING STATION cards.

Relieved of the burden of correspondence and organization activities, these members will now be able to devote the major portion of their radio listening to monitoring the official and special surveys of the League. They are always eager to be of aid to R.S.S.L. members in their immediate vicinity and will doubtless be instrumental in developing local chapters in their respective cities and communities.

Outstanding "Class A" Member

The first member of the R.S.S.L. to earn the CLASS "A" distinction on the basis of receiving 100 merit points is R. B. Oxrieder, W6H5, of 122 E. Hamilton Avenue, State College, Penna. Mr. Oxrieder's reports have long been outstanding for their accuracy, completeness and reliability. Since the first of the year, he has furnished not only a series of most valuable reports on harmonic interference, but also a complete outline of interference problems in connection with the reception of YUA, Belgrade; interference with reception of FO8AA, of Radio Centre, Moscow, and of HP5J.

Complete and accurate reports of this type are of real value. On the basis of

FIRST CLASS "A" MEMBERS . . . NEW SURVEYS . . . PITCAIRN SURVEY ON WAY
NEW R.S.S.L. CHAPTERS . . . MEMBERSHIP NEWS . . . ROUND ROBIN LETTERS



Lew Bellem, WIBES, snapped by our staff photographer, on the deck of the S.S. "Haiti" just before sailing for far-off Pitcairn Island. He is taking copies of ALL-WAVE RADIO to Andrew Young—and an Honorary Membership in the R.S.S.L.

them, R.S.S.L. headquarters contacts the stations involved, calling all facts to the attention of those in charge.

Other members who are already well on the way toward CLASS "A" ratings are: Bill King, W30D3; P. Miles, W4H69; W. Burton, W8H11; Newby Whyvel, G68; W. M. Hummel, W9-11H59; John Zieger, W4H107; G. R. Beyer, W9-11H55; David Hutchinson, W3G23; W. C. Noltemeyer, W8-9H8; C. F. Keirstead, W3F5; A. Bettinger, W16J3; R. E. Dement, W19P2; Maurice Dubreuil, VE4D2; Kenneth White, W5H17; Harold Kaplan, Jr., W4H191; James C. Kneeland, W3F42; M. R. Burtman, W4H85; C. M. Whelan, W16S4; E. Habe, W4H64; R. E. Pichette, W1-4F15; H. Giese, W12G4; A. M. Rheiner, W1H11; G. H. Peacock, Jr., W12P1; D. R. Jack, VE6F2; M. E. Leshner, W3F32. With the monitoring reports on the MacGregor Expedition which are now being received daily, many R.S.S.L. members will make their first long strides toward winning this coveted distinction.

Obtaining Class "A" Ratings

Turn to the R.S.S.L. News in February AWR for full details governing the award of a CLASS "A" designation. The following supplementary rulings were made by the Board of Directors at their recent meeting:

1. Only reports sent in during 1938 will receive credit.
2. All R.S.S.L. members who wish credit should send all reports (official or voluntary) *direct* to Radio Signal

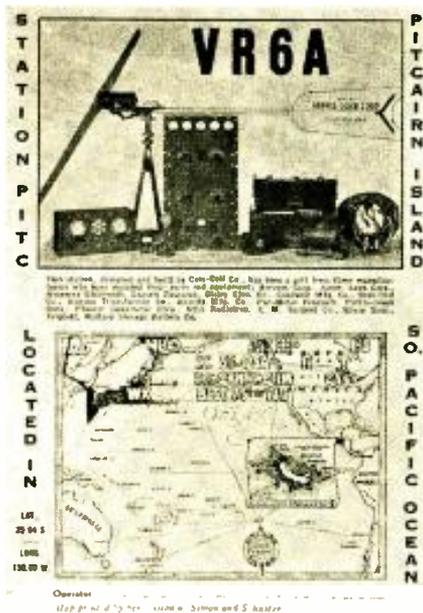
Survey League, 16 East 43rd Street, New York. Credit cannot be given for reports sent to radio stations.

Official Surveys

Bernabe de la Torre, Manager of stations CMGF-COGF, at Matanzas, Cuba, has called upon the R.S.S.L. for signal surveys. Here is another chance to add points toward that CLASS "A" rating. A credit of 10 points will be given all those submitting reports. CMGF can readily be heard throughout a major portion of the United States and on its short-wave signal (COGF) over a much larger radius. See box for complete data on frequencies, schedule, etc. Why not make this a 100% job with *every* member sending in his report on the R.S.S.L. report form (or similar forms)? We cannot overemphasize the fact that when no signals are received, reports to this effect should be sent in—with the understanding, of course, that a conscientious effort has been made. A series of negative reports show interesting phases of skip effects when plotted on the master chart. A postal stating that you heard this station and giving the time, frequency and program heard is welcome, *but* a full report on a standard R.S.S.L. (or similar) form giving complete data for several days presents a much more complete and valuable picture. Incidentally, this survey was arranged through the efforts of James Kneeland, W3F42, of the Mohawk (Mass.) R.S.S.L. Chapter.

R.S.S.L. at Pitcairn Island

An honorary membership card in the



Reproduction of one of the QSL cards for VR6A, Andrew Young, Pitcairn Island, South Pacific.

R.S.S.L. has been sent to Andrew Young, operator at VR6A, Pitcairn Island, South Pacific Ocean, through the courtesy of Mr. Lew Bellem, who is now en route to install the modern short-wave transmitter described in February AWR. In a short time R.S.S.L. members will be called on to monitor the signals from VR6A, located in this far-off corner of the world.

Existing Clubs as R.S.S.L. Chapters

Radio clubs everywhere may feel free to affiliate themselves with the R.S.S.L., as local chapters, without fear of losing their own identity. In many instances, the opportunity of assisting the League in its constructive work has given new vitality and purpose to established groups of short-wave enthusiasts. Furthermore, many clubs are drawing new members from

R.S.S.L. OFFICIAL SURVEYS NOS. 6 AND 7
Stations CMGF and COGF, Matanzas, Cuba

CMGF (1120 kc.) and COGF (11.80 mc.) have requested the R.S.S.L. to conduct a survey on their signals for the purpose of determining coverage, possible interference, etc. Schedule:—March 14th to 20th inclusive, from 8 a.m. to 10 p.m. Monitor at such hours as you can. (See page 76, February ALL-WAVE RADIO for illustration of station veri). Credit will be 10 points on each report. Reports should be on standard R.S.S.L. report forms if possible.

MAC GREGOR EXPEDITION SURVEY CONTINUES

Survey reports on OX2QY, W10XAB or WAWG are desired until further notice. Most transmissions are on 14.368 kc. after 7.30 p.m. E.S.T. (See February AWR for further details) Credit remains 20 points on all reports received at headquarters during March. Use standard R.S.S.L. report forms if possible.

R.S.S.L. members hitherto not affiliated with any local club. If you belong to a club, why not discuss this at your next meeting, or write us direct for complete details.

Local Chapters Formed and Forming

The Fort Wayne Radio Listeners Club, of Ft. Wayne, Ind., has just affiliated itself with the R.S.S.L. as a complete unit. The charter members of this new chapter are: Carl A. Kowalski, W10J3, Survey Supervisor; Paul Maxwell, W10J4; Vieve V. Stout, W10J5; Darwin Stout, W10J6; Carl McKaye, W10J7; and Mrs. Carl A. Kowalski, W10J8. Meetings will be held every Friday evening at 7:00 p.m. and those interested may contact Mr. Kowalski, 1239 Kinsmoor Ave., Ft. Wayne, Ind., for additional information and place of meeting.

Mr. Thomas Matters, Secretary of the Tome Radio Society of Tome School, Port Deposit, Maryland, tells us that his group which includes a licensed amateur, is anxious to become part of the R.S.S.L. We look forward to welcoming this club as a full fledged Chapter in the next issue.

Adelbert Wood, Jr., W3F58, of Concord, N. H., writes of a pleasant evening spent with Chet Wheeler, W3F1, in Milford whom he met through R.S.S.L. correspondence. Mr. Wood is organizing a local Chapter in his community.

Roy E. Chisholm, W10H2, Asst. Survey Supervisor of the Jackson (Mich.) R.S.S.L. Chapter, writes of a novel idea for keeping in touch with scattered members. A circular letter is sent out and each member adds a paragraph of interest

mailing it on to the next on the list until it reaches the last one who starts off a new letter. R.S.S.L. headquarters is always glad to receive copies of such round robin letters upon completing their travels. Our thanks to Mr. Chisholm for the idea and also for the excellent article on the R.S.S.L. survey which he released to the Jackson City Patriot. Here's a tip for other members—let your local newspaper know of your activities and of the R.S.S.L.—they will often be glad to publish this on their radio page, as special short-wave transmissions, such as that of the MacGregor Expedition, are of interest to all S.W.L.'s.

Charles C. Trezise, W9-11H63, Secretary of the Chicago (Ill.) World Wide Dial Chapter of the R.S.S.L. in his report of the last meeting advises us that all members were urged to participate in the monitoring of the MacGregor Expedition signals; that two new members were present and that a picture was taken of those present. This photo will be published in AWR in a future issue. He also extends a cordial invitation to all interested to attend the next meeting on March 9th at the Central Y.M.C.A., 19 So. LaSalle Street, at 8:00 p.m.

Ray La Rocque, Chief Night Owl, writes us that the Mohawk (Worcester, Mass.) Chapter of the R.S.S.L. is planning a special survey of WPGX ultra-high frequency police transmitter. Anyone interested should write him at 28 Aetna St., Worcester, Mass. The Mohawk Chapter visited the local broadcast station at their meeting on Feb. 19th.

(Continued on page 168)

CLASS "A" MEMBERS

- Howard J. duMoulin, W10P1
Birmingham, Alabama
- John Binder, Jr., W26P2
Phoenix, Arizona
- John Hartshorn, W15P1
Texarkana, Arkansas
- Louis B. Booth, W3G1
Middletown, Connecticut
- Karl D. Beckemeyer, W9Q1
Fort Benning, Georgia
- Vick Wilson, W26C1
Coeur d'Alene, Idaho
- J. O. Faris, Jr., W11J1
Danville, Illinois
- Ralph E. Weikal, W17L1
Pratt, Kansas
- Willis E. Blanchard, W3E1
Bangor, Maine
- Carroll H. Weyrich, W5J2
Baltimore, Maryland
- Henry W. Birno, W14E2
Duluth, Minnesota
- Harlan E. Wykoff, W13L2
St. Louis, Missouri
- Chester L. Wheeler, W3F1
Milford, New Hampshire
- Kenneth E. Vroom, W4H26
Morris Plains, New Jersey
- Arthur C. Pforzheimer, W4H23
Woodmere, L. I., New York
- Miles I. Hart, W6M1
Cary, North Carolina
- J. F. Satterthwaite, W9H1
Toledo, Ohio
- Joe E. Hester, W16M1
Tulsa, Oklahoma
- R. B. Oxrieder, W6H5
State College, Pa.
- George Francis Baptiste, W3G8
Howard, Rhode Island
- James M. Alexander, Jr., W10N2
Lookout Mountain, Tennessee
- Boh Beadles, W25H1
Salt Lake City, Utah
- Fred Atherton, W4F1
Rutland, Vermont
- Ronald Ernest Greenwood, W29B1
Seattle, Washington
- Carl Soendlin, W8L1
Logan, West Virginia
- Howard Allen Muir, W12G1
Racine, Wisconsin
- Charles Hesterman, VE21A1
Saskatoon, Sask., Canada
- Charles J. Cowper, VE29A2
Vancouver, B. C., Canada
- F. M. Pow, VE24A1
Edmonton, Alta., Canada
- Richard Chapman, VE6D1
Buckingham, Que., Canada



A specimen of the Class "A" R.S.S.L. Membership Cards now being issued.

SHORT-WAVE BROADCAST STATION LIST

BOLD NUMERALS: MEGACYCLES. LIGHT NUMERALS: METERS. DOT (•): STATION DOES NOT VERIFY. DIAMOND (◆): STATION NOT IN USE.

Abbreviations: O—Opening; C—Closing; I—Interval; S—Signal; I.R.C.—International Reply Coupon. Schedules in E.S.T.

41.000 W2XHG 7.32	National Broadcasting Co., 30 Rockefeller Plaza, New York, N. Y. Daily 9 a.m.-12 midnight.	15.530 HSBP 19.32	Bangkok, Siam. (see 19.020 mc.) Occasional Mondays 8-10 a.m.	15.110 DJL 19.85	Zeesen, Germany (see 17.760 mc.) Daily 12-2 a.m.; 8-9 a.m.; 10:40 a.m.-4:30 p.m.
41.000 W2XDY 7.82	Albany, New York. Address: General Electric Co., 1 River Road, Schenectady, N. Y. Irregular.	15.440 XEBM 19.43	P. O. Box 50, Mazatlan, Mexico. Daily 9-10 a.m.; 1-2 p.m.; 8-10 p.m.	15.040 RKI 19.95	Radio Centre, Soltanka 12, Moscow, USSR. Call: "This is Moscow Calling." O-C: Internationale. Irregular. No I.R.C. required.
41.000 W8XWJ 7.32	4465 Penobscot Bldg., Detroit, Mich. Weekdays 9 a.m.-11 p.m.; Sundays 10 a.m.-5 p.m.	15.370 HAS-3 19.52	Director Radio, Hungarian Post, Gyall St., 22, Budapest, Hungary. I: Musical Box Melody; O: Bells ringing; C: Lord Bless the Hungarian (national anthem). Sunday 9-10 a.m.	14.970 LZA 20.04	Director General, Telegraphs and Telephones, Sofia, Bulgaria. O: Rashtra-tza-(Bulgarian Folk Dance). C: National Anthem and Hymn of His Majesty the King. Weekdays 5-6:30 a.m.; 12-2:45 p.m.; Sundays 12 a.m.-4 p.m.
38.650 W2XDG 7.76	New York, N. Y. (see 41.000 mc.) Daily 9 a.m.-12 midnight.	15.360 DZG 19.58	Zeesen, Germany (see 17.760 mc.) Irregular.	14.935 PSE 20.07	Rio de Janeiro, Brasil. (P) Phons LSL-WLK day irreg.; EDM-EHY 8 a.m. Broadcasts German program 4-4:10 p.m. Wednesdays (see 21.080 mc.)
31.000 W1XKA 9.4	Boston, Mass. (see W1XK 9.570 mc.) Daily 7 a.m.-1 a.m.	15.340 DJR 19.56	Zeesen, Germany (see 17.760 mc.) Daily 8-9 a.m.	14.600 JVH 20.55	Nazaki, Japan (see 21.520 mc.) 7 p.m.-1 a.m. Irregular.
31.000 W1XKB 9.4	Westinghouse Electric & Mfg. Co., Springfield, Mass. Daily 7 a.m.-1 a.m.	15.320 OLR5B 19.58	General Electric Co., 1 River Rd., Schenectady, N. Y.; O: Spark Discharge. C: Star Spangled Banner. Daily 11 a.m.-9 p.m. Specials irregular.	14.535 HBJ 20.64	Radio Suisse, S.A., 12, Quai de la Poste, Geneva, Switzerland. No opening or closing selection (see HBO 11.402 mc.) Mon. 3:15-3:45 a.m. Australia L of N.
31.000 W8XKA 9.4	Pittsburgh, Pa. (see W8XK 21.540 mc.) Daily 10 a.m.-1 a.m.	15.310 GSP 19.60	Prague, Czechoslovakia. (see 21.450 mc.) Daily, ex. Sun. & Holidays, 6:30-7:30 a.m.; 10:05-11 a.m. Sun. and holidays 6-7:30 a.m. (see 15.230 mc.)	14.480 DZH 20.75	Zeesen, Germany (see 17.760 mc.) Irregular.
31.000 W3XKA 9.4	1622 Chestnut St., Philadelphia, Pa. Daily 10 a.m.-11 p.m.	15.300 YDB 19.61	Daventry, England (see 26.100 mc.) Daily 1:45-4 p.m.	13.635 SPW 22.00	Polakie Radio, S. Mazowiecka St., Warsaw, Poland. O: I: Melody/Chimes The Haunted Castle; C: Polish National Anthem. Mon. to Fri. 6-8 p.m.; Sat. and Sun. 6-9 p.m.
31.000 W2XDV 8.4	New York, N. Y. (see 21.520 mc.) Mon. to Fri. 6-11 p.m. Sat-Sun. 1:30-6 p.m.; 7-10 p.m.	15.290 LRU 19.62	Soerabaja, Java. Daily 7:30 p.m.-2 a.m. (see 15.150 mc.)	12.500 HIN 24.00	Radio El Mundo, Malpu, 555, Buenos Aires, Argentina, S.A. O-C: Spanish only. Daily 7-9 a.m.
26.100 GSK 11.49	British Broadcasting Corp., Broadcasting House, London W1, England. Big Ben strikes the hour according to arrangement program. C: God Save The King. 1. Bow Bells.	15.280 HISX 19.63	Radio El Mundo, Malpu, 555, Buenos Aires, Argentina, S.A. O-C: Spanish only. Daily 7-9 a.m.	12.235 TFI 24.53	J. R. Saladin, Director of Radio Communications, Ciudad Trujillo, Dominican Republic. S: Bells. Weekdays 12:10-1:10 p.m.; Sundays 7:40-10:40 a.m.
25.050 W6XKG 11.56	1417 So. Figueroa St., Los Angeles, Calif. Continuously 24 hours each day.	15.280 DJQ 19.63	Zeesen, Germany (see 17.760 mc.) Daily 12:05-5:45 a.m.; 6-8 a.m.; 8:10-10 a.m.; 4:50-10:45 p.m. Sunday 11:10 a.m.-12:25 p.m.	12.130 DZE 24.73	Wayne, N. J. (see 21.520 mc.) Mon. to Fri. 1-2:15 p.m.
21.550 GBT 18.93	Daventry, England. (see 26.100 mc.)	15.270 W2XE 19.64	Daventry, England (see 26.100 mc.)	12.000 RNE 25.00	Boston, Mass. (see 21.400 mc.) Sun. 11 a.m.-12 noon; specials irregular.
21.540 W3XK 18.93	Grant Bldg., Pittsburgh, Pa. O-C: Stars and Stripes Forever. Weekdays 7-9 a.m.	15.260 GSI 19.66	Minister des Postes, Boulevard Hausmann, 98, Bis., Paris, France. I: Three tones F in Morse. O-C: La Marseillaise; S: chimes ¼ hours. Daily 6-11 a.m.	11.960 H12X 25.08	Prague, Czechoslovakia (see 21.450 mc.) Daily ex. Sun. and holidays, 6:30-7:30 a.m.; 10:05-11 a.m.; Sun. and holidays, 6-7:30 a.m. (see 15.230 mc.)
21.530 G8J 18.93	Daventry, England. (see 26.100 mc.) Daily 5:45-8:55 a.m.	15.250 W1XAL 19.67	Phillips Radio, Hilversum, Holland. Tues 3:30-5 a.m. Wed. 9 a.m.-12 noon.	11.900 CD1190 25.21	Pittsburgh, Pa. (see 21.540 mc.) Daily 9 a.m.-7 p.m.
21.520 W2XE 18.94	485 Madison Ave., New York, N. Y. C: Star Spangled Banner. Mon. to Fri. 7:30-10 a.m. Sat.-Sun. 8 a.m.-1 p.m.	15.243 TPA-2 19.68	Zeesen, Germany (see 17.760 mc.) Daily 12:05 a.m.-11 a.m.; 11:10 a.m.-12:25 p.m.; 4:50-10:45 p.m. Sunday 8-9 a.m.	11.900 KEW1 25.21	Hoag Kong, China (see 9.525 mc.)
21.520 JZM 18.94	Overseas Section, The Broadcasting Corp. of Japan, Tokyo, Japan. O-C: Kimigayo National Anthem. Musical chimes follow. (see 11.800-9.535 mc.)	15.230 OLR5A 19.70	Daventry, England (see 26.100 mc.) Daily 5:15-5:25 a.m.; 5:45-8:55 a.m.; 10 a.m.-12 noon, 4:15-6 p.m.	11.895 XEXR 25.22	Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m.; 5:45-8:55 a.m.; 10 a.m.-12 noon, 4:15-6 p.m.
21.470 G8H 18.97	Daventry, England. (see 26.100 mc.) Daily 5:45 a.m.-12 noon.	15.220 PCJ 19.71	Guatemala City, Guatemala (see 17.800-11.760-9.685 mc.) Sun. 10:30 a.m.-3:30 p.m.; Mon. 7:50-9 a.m.; 12:45-5:30 p.m.	11.895 HP51 25.23	Prague, Czechoslovakia (see 21.450 mc.) Irregular.
21.460 W1XAL 18.98	World Wide Broadcasting Corp., University Club, Boston, Mass. O: News, Blaze Away. C: Star Spangled Banner. Irregular.	15.210 W8XK 19.72	Prague, Czechoslovakia (see 21.450 mc.) Irregular.	11.890 TPA3 25.24	Mexico, D. F. (see 9.800 mc.) Daily Irregular.
21.450 OLR6A 18.99	Radiofonos, Praha X11, Fochova Tr. 16, Praha, (Prague) Czechoslovakia. O-C: Melody New World Symphony and Cathedral chimes. I: 9 note trumpet call, repeated. Irregular. (See 6.010-6.030-9.550-15.230-15.320 mc.)	15.200 DJB 19.74	Mexico, D. F. (see 9.800 mc.) Daily Irregular.	11.880 XEXA 25.25	Nazaki, Japan (see 21.520 mc.) Irregular.
18.020 HSBP 15.77	Superintending Engineer, Post and Telegraph Dept., Technical Section, Bangkok, Siam. O: 3 chimes. English Mondays, 8:10 a.m.	15.190 ZBW-4 19.75	Nazaki, Japan (see 21.520 mc.) Irregular.	11.875 OLR4C 25.26	Royal Technical University, Stockholm, Sweden. Weekdays 11 a.m.-5 p.m.; Sunday 9 a.m.-5 p.m.
17.900 TGWA 16.85	Radiodifusora Nacional, TGWA, Guatemala City, Guatemala, C.A. O-C: Simple Melody, Marimba, repeated three times. (see 15.170-11.760-9.685 mc.) Irregular.	15.180 G50 19.76	Stazione Radio HVJ, Citta del Vaticano, Vatican City. I: clock ticks 5 m. S: Bells. C: (spoken) Laudatur Jesus Christus. Weekdays 10:30-10:45 a.m.	11.870 W8XK 25.26	N.I.R.O.M., Koningsplein West 5, Batavia, Java, N.E.I. (Location-Soerabaja), Weekdays 5:30-10 a.m. (Sat. 11:30 a.m.) 6-7:30 p.m. 10:30 p.m.-2 a.m. Sunday 5:30-10 a.m. 7:30 p.m.-2 a.m.
17.790 G8G 16.86	Daventry, England. (see 26.100 mc.) Daily 3:15-5:25 a.m.; 5:45 a.m.-12 noon; 12:20-4 p.m.	15.170 TGWA 19.78	Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m.; 5:45 a.m.-12 noon.	11.860 YDB 25.29	Soerabaja, Java (see 15.150 mc.) Daily 10:30 p.m.-2 a.m.
17.785 JZL 16.87	Nazaki, Japan. (see 21.520 mc.) Irregular.	15.160 OLR8C 19.79	Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m.; 5:45 a.m.-12 noon.	11.855 GSE 25.29	Daventry, England. (See 26.100 mc.)
17.780 W3XAL 16.87	30 Rockefeller Plaza, New York, N. Y. Sun. 9 a.m.-5:35 p.m.; Mon. to Fri. 9 a.m.-4:40 p.m.; 5-6:35 p.m.; Sat. 8 a.m.-5:35 p.m.	15.160 KEWW 19.79	Stazione Radio HVJ, Citta del Vaticano, Vatican City. I: clock ticks 5 m. S: Bells. C: (spoken) Laudatur Jesus Christus. Weekdays 10:30-10:45 a.m.	11.855 DJP 25.31	Zeesen, Germany (see 17.760 mc.) Irregular.
17.780 W9XAA 16.87	686 Lake Shore Drive, Chicago, Ill. S: 3 chimes each 15 minutes. O: Star Spangled Banner.	15.155 SM5SX 19.80			
17.770 PHI 16.88	Phillips Radio, Hilversum, Holland. Call: Seven languages. I: Metronome 80 beats per minute. C: National Anthem—Wihhelmus. Sun. 7:25-10:30 a.m., Mon., Thurs., Fri. 8:25-10:30 a.m. Tues., 8:25-10:10 a.m., Sat. 8:25-11 a.m.	15.150 YDC 19.80			
17.760 DJE 16.89	German Short Wave Station, Broadcasting House, Berlin, Germany. I: 9 musical notes. Folk Song. C: National Horst-Wessel Lied and Deutschlandlied. Daily 12:05 midnight-10 a.m.; Sunday 11:10 a.m.-12:25 p.m.	15.140 GSF 19.82			
17.760 W2XE 16.89	Wayne, N. J. (see 21.520 mc.) Daily Irregular.	15.121 HVJ 19.84			
17.755 ZBW-5 16.90	Hoag Kong, China. (see 9.525 mc.)				

11.840 CSW4 25.34	Emissora Nacional, Rua do Quelhas No. 2, Lisbon, Portugal. (see 11.040-9.940 mc.) O-C: A Portuguese—National Anthem. Daily 1-2:10 p.m.	11.570 HH2T 25.93	Societe Haitienne Radiodiffusion. P.O. Box 103, Port-au-Prince, Haiti, W.I. S: 4 tones song 1-3-3-4. English and French O-C: The Swan. Special Programs, Irregular.	9.645 HH3W 31.10	P. O. Box 1117, Port-au-Prince, Haiti, W.I. S: 4 chime notes and drum each 15 min. before announcements. Daily exc. Sunday 1-2 p.m.; 7-8:30 p.m.
11.840 OLR4A 25.34	Prague, Czechoslovakia (see 21.450 mc.) Irregular.	11.535 SPD 26.01	Warsaw, Poland (see 18.635 kc.) Mon. to Fri. 6-8 p.m.; Sat. and Sun. 6-9 p.m.	9.640 CXAS 31.13	Director, Colonia, Uruguay. S.A. Daily 6 p.m.-11 p.m.
11.840 KZRM 25.34	Erlanger and Galingler, Inc., Insular Life Bldg., Manila, P. I. (see 9.570) Weekdays 5-9 a.m. Sat. to 10 a.m. 4:30-6 p.m., Sun. 4-10 a.m.	11.435 COCX 26.23	P. O. Box 32, Havana, Cuba. S: 5 bells. English each 1/4 hr. O-C: Pajarillo Barranquero. Daily 8 a.m.-1 a.m.	9.635 ZRO-3 31.13	Rome, Italy. Daily 12:20-6 p.m. So. Am. 6-7:30 p.m. No. Am. 7:30-9 p.m. (see 11.810 mc.)
11.830 W2XE 25.36	Wayne, N. J. (see 21.520 mc.) Daily 2:30-6 p.m., 6:30-12 a.m.	11.402 H80 26.31	Geneva, Switzerland (see HBJ. 14.535 mc.) Mondays 3-3:15 a.m. Fridays 2-2:15 p.m.	9.630 HJ7ABD 31.15	Bucaramanga, Colombia, S.A. Daily 12-1 p.m., 6-11 p.m.
11.830 W9XAA 25.36	Chicago, Ill. (see 17.780 mc.) Weekdays 9 a.m.-6 p.m., Sun. 9-11 a.m., 1-5:30 p.m.	11.040 CSW2 27.17	Lisbon, Portugal (see 11.840-9.940 mc.) Daily 2:10-6 p.m.	9.616 HJIABP 31.20	P. O. Box 37, Cartagena, Colombia, S. A. O-C: Under The Double Eagle. Daily 7-9 a.m.; 11 a.m.-1:20 p.m.; 6-11 p.m.
11.820 XEBR 25.38	Apartado 61, Harroville, Con. Mex. O-C: Over The Waves. Daily 1-4 p.m.; 9 p.m.-12 a.m.	11.000 PLP 27.27	J. Sanders, Chief Engr., Java Wireless Station, Bandung, Java; B.E.I. Weekdays 4:30-10 a.m. (Sat. 11:30 a.m.); 6-7:30 p.m. 10:30 p.m.-2 a.m.; Sunday 4:30-10 a.m.; 7:30 p.m.-2 a.m.	9.608 ZRK 31.23	Kilimuevel, South Africa (see 6.097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m.; 3:20-7:20 a.m.; 9-11:45 a.m. Sundays 3:30-4:30 a.m. or 4-5 a.m.; 8-11:40 a.m.
11.820 GSN 25.38	Daventry, England (see 26.100 mc.)	10.980 JZB 27.37	Nasagi, Japan. (see 21.520 mc.) Irregular.	9.600 RAN 31.25	Moscow, U.S.S.R. (see RKI. 15.040 mc.) Daily 7-9:15 p.m.
11.810 ZRO-4 25.40	5 Via Montalle, Rome, Italy. O: Bells of Rome. C: Italian Royal March and Giovezza. I: bird call—black cap bird (see 9.635 mc.) Daily 5-8:45 a.m., 10 a.m.-12:20 p.m.	10.740 JVM 27.33	Nasagi, Japan (see 21.520 mc.) 4:30-7:30 a.m. Irregular.	9.600 KEYU 31.25	Universidad Nacional, Mexico, D.F. Daily 7-10 p.m.
11.805 OZG 25.41	Skamlebaek, Denmark (see 6.060 mc.) Irregular.	10.670 CEC 28.13	Cia Internacional de Radio, Casilla 16-D, Santiago, Chile. Daily exc. Sat. and Sun. 7-7:30 p.m. (see CED. 10.330 mc.)	9.600 CB960 31.25	Casilla 1342, Santiago, Chile, S.A. O: Bases in Toyland. C: Somewhere a Voice is Calling (organ). Daily 10:30 a.m.-1 p.m.; 8:30-11 p.m.
11.801 OER-3 25.42	Osterr. Radioverkehrs A.G., Johannesgasse 4b, Wien 1, Austria. Call: "Hiller Radio Wien." I: Metronome—60 beats per m. Weekdays 9 a.m.-5 p.m. Sat. to 6 p.m.	10.660 JVN 28.14	Nasagi, Japan (see 21.520 mc.) Daily 1:40-2:30 a.m., 3-7:45 p.m.	9.595 HBL 31.27	Geneva, Switzerland (see HBJ. 9.345 mc.) Irregular.
11.800 JZJ 25.42	Nasagi, Japan (see 21.520 mc.) Daily 12:30-1:30 a.m. 8-9 a.m.; 3-4 p.m.; 4:30-5:30 p.m., 6-6:30 p.m.	10.600 ZIK2 28.30	Government Radio Station ZIK2, Wireless Branch, Post Office, Belize, British Honduras, C.A. Tues. Thurs. Sat. 7:30-7:45 p.m.	9.595 YNLF 31.27	Calles 15 de Set No. 206, Managua, Nicaragua, C.A. Daily 8-9 a.m.; 1-3 p.m.; 6:30-10:30 p.m. Veri—Se U. S. postage.
11.800 COGF 25.43	General Betancourt 51, (Playa) Mantanzas, Cuba. O-C: Vale Diana. Weekdays 1-4 p.m., 6-10 p.m. Sun. 9-10 p.m.	10.570 28.33	Radio Nacionales, Salamanca, Spain. Daily 9-9:45 p.m.	9.590 VK6ME 31.28	Amalgamated Wireless Ltd., Perth, West Australia. (Address 47 York St., Sydney, Australia). Daily exc. Sun. 6-8 a.m.
11.790 OAX5A 25.43	Avenida San Luis, Ica, Peru. S.A. O: March. "Reflector." C: "Estrelita." Daily 12-4 p.m. 7-11:30 p.m.	10.370 EAJ43 28.33	Radio Club Tenerife, Apartado 225, Santa Cruz, Tenerife, C.I. Daily 3:15-3:30 p.m.; 6-7 p.m.; 7:10-9:30 p.m.	9.590 W2XE 31.28	Wayne, N. J. (see 21.520 mc.)
11.795 DJO 25.43	Zeesen, Germany (see 17.760 mc.) Irregular.	10.370 28.33	Tablero, Tenerife, C. I. Daily 3-4 p.m.; 6-8:15 p.m.	9.590 W3XAU 31.28	1622 Chestnut St., Philadelphia, Pa. Daily 12 noon-6 p.m.
11.790 WIAXL 25.43	Hoston, Mass. (see 21.460 mc.) Mon. to Fri. 4:45-6:30 p.m., Sat. 4-6:30 p.m., Sun. 1-6:30 p.m. Mon. and Fri. 9-10 p.m. Specials Irregular.	10.350 L8X 28.33	Transradio Internacional, San Martin, 829, Buenos Aires, Argentina, S.A. C: San Lorenzo March. Irregular 5-8 p.m.	9.590 VK2ME 31.28	Amalgamated Wireless, Ltd. 47 York St., Sydney, Australia. Clock strikes at hour, chimes 1/4 hr. I: Kookaburra bird call. C: God Save The King. Sunday 1-3 a.m.; 5-9 a.m.; 9:30-11:30 a.m.
11.770 DJD 25.49	Zeesen, Germany (see 17.760 mc.) Daily 10:40 a.m.-4:30 p.m.; 4:50-10:45 p.m.	10.330 ORK 29.04	Director of Communications, Bruxelles, Belgium. I: Carrillon. O: Towards The Future. C: Brabantonne. Daily 1:30-3 p.m.	9.590 HP5J 31.28	Apartado 867, Panama City, Panama. C. A. News 6:30 p.m. O: Black-horse Troop March. C: Disciplina Honor and Abrogacion. Weekdays 12-2 p.m.; 5-10:30 p.m. Sundays 10:30 a.m.-2 p.m.; 8-10 p.m.
11.760 TGWA 25.50	Guatemala City, Guatemala, C.A. (see 17.800-15.170-9.685 mc.) Mon. to Fri. 7:30 p.m.-12 a.m.; Sat. 7:30 p.m.-1 a.m.; Sun. 7:30 p.m.-12 a.m. No IRC necessary.	10.290 DZC 29.16	Zeesen, Germany (see 17.760 mc.) Irregular.	9.590 PCJ 31.28	Hilversum, Holland. (see 15.230 mc.) Sunday 1:15-1:35 p.m., 2-3 p.m., 7-9 p.m.; Tues. 1:45-3:30 p.m.; Wed. 7-9:30 p.m.
11.760 XETA 25.50	Apartado 203, Monterey, Mexico. Daily 7-11 p.m.	10.260 PMN 29.24	Bandong, Java, D.E.I. (see P.L.P. 11,000 mc.) Weekdays 5:30-11 a.m. (Sat. 11:30 a.m.); 6-7:30 p.m.; 10:30 p.m.-2 a.m.; Sunday 6:30-11 a.m.; 7:30 p.m.-2 a.m.	9.590 GSC 31.28	Daventry, England (see 26.100 mc.) Daily 4:15-6 p.m., 6:20-8:30 p.m., 9:20-11:20 p.m.
11.760 OLR4B 25.50	Prague, Czechoslovakia (see 21.450 mc.) Irregular.	10.220 PSH 29.26	Antofagasta, Chile (see CEC 10.670 mc.) Sat. and Sun. 7-7:30 p.m.	9.580 VLR 31.28	Australian Broadcasting Commission, G.P.O. Box 1686, Melbourne, Australia. O: Recording, song, Australian Lyre Bird. C: God Save The King. 8-3 notes, song; time signals and P.O. chimes. Sun 3-7:30 a.m. Weekdays 9:35 p.m.-2 to 2:30 a.m.; 3:30-8:30 a.m.; Sat. to 9 a.m.
11.750 GSD 25.53	Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m.; 8:55 a.m.-12 noon; 12:20-4 p.m.; 9:20 to 11:20 p.m.	10.185 CQN 29.60	Cia Radio International do Brazil, Caixa Postal 709, Rio de Janeiro, Brazil. Daily 7-9 p.m.	9.580 OAX5C 31.28	Radio Universal, Avenida San Luis, Ica, Peru. S.A. Weekdays 11:00 a.m.-4 p.m.; 7-11:30 p.m.
11.740 HP5L 25.55	Apartado 139, David, Chiriqui, Panama, C. A. Daily 4-7 p.m.	10.042 DZB 29.67	Chief of Radio Station CQN, Post Office Bldg., Macao (Portuguese) China. O: Maria de Fonte. C: National—A Portuguese. Mon. and Fri. 7-8:30 a.m.	9.570 WIXK 31.28	Westinghouse Electric and Mfg. Co., Boston, Mass. O-C: Stars and Stripes Forever. Weekdays 8 a.m.-1 a.m. Sunday 3 a.m.-1 a.m.
11.730 PHI 25.57	Hilversum, Holland (see 17.770 mc.) Irregular.	9.940 CSW3 30.16	P. O. Box 951, Madrid, Spain. O: La Verbena de la Paloma. C: Himno de Riego or Good Night Melody. (see EAR 9.480 mc.) Irregular.	9.570 KZRM 31.28	Manila, P. I. (see 11.840 mc.) Weekdays 5-9 a.m. Sat. to 10 a.m., 4:30-6 p.m. Sun. 4-10 a.m.
11.720 CJRX 25.60	Royal Alexandra Hotel, Winnipeg, Manitoba, Canada. Weekdays 6 p.m.-13 a.m. Sundays 5-10 p.m.	9.930 COBC 30.21	Apartado 33, Havana, Cuba. Daily 3 a.m.-12 midnight.	9.565 YV3RB 31.26	Sr. Arturo Ramos Maggi, Prop., Barquisimeto, Venezuela. Daily 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.
11.718 TPA-4 25.66	Pontaine, France (see 15.243 mc.) Daily 6:15-8:15 p.m.; 10 p.m.-1 a.m.	9.925 JDY 30.23	Calle 25, No. 445, Havana, Cuba. Weekdays 6:55 a.m.-1 a.m.; Sundays 6:55 a.m.-12:01 a.m.	9.562 OAX4T 31.26	Radio Nacional, Peruvian Government, Av. Pettit Thouars 447, Lima, Peru. Daily 11:30 a.m.-1:30 p.m.
11.718 CR7BH 25.66	Lourenco Marques, Portuguese East Africa (see CEYAA. 8.137 mc.) Weekdays 4:30-6:30 a.m.; 9:30-11 a.m.; 12:30-4 p.m. Sundays 5-7 a.m.; 10 a.m.-12:30 p.m.; 2-4 p.m.	9.875 DZA 31.00	Radio Martinique, P.O. Box 136, Port de France, F.W.I. O-C: "La Marseillaise" Daily 6:45-7:45 p.m.	9.560 DJA 31.26	Zeesen, Germany (see 17.760 mc.) Daily 12:05 a.m.-11 a.m.; 4:50-10:45 p.m.
11.710 Y8M 25.66	Director of Communications, San Salvador, El Salvador, C. A. O-C: Bird signals before first and last announcement. Irregular. No IRC required.	9.870 T14NRH 31.02	Guatemala City, Guatemala, C. A. (see 17.800-15.170-11.760 mc.) Irregular. No IRC necessary.	9.550 KEFT 31.41	Av. Independencia 28, Veracruz, Mexico. S: Chimes, bugle call or cuckoo horn. English at closing. O-C: Vale Poetica. Weekdays 10:30 a.m.-4:30 p.m.; 7:30 p.m.-12:30 a.m.; Sunday 9 p.m.-12:30 a.m.
11.710 Philes 25.62	211-213D Rue Catinat, Saigon, Indo-China. Daily 6:30-9:30 a.m. News in French 9-9:10 a.m.	9.866 CR6AA 31.04	Zeesen, Germany (see 17.760 mc.) Irregular.	9.550 YDB 31.41	Soerabaya, Java N.E.I. (see 15.150 mc.) Weekdays 5:30-10 a.m. (Sat. 11:30 a.m.) 6-7:30 p.m., 10:30 p.m.-2 a.m. Sun. 5:30-10 a.m. 7:30 p.m.-2 a.m.
11.710 KEWB 25.62	Juarez 289, Guadalajara, Mexico. Daily 7-11 p.m.	9.860 LRX 31.06	Apartado 40, Heredia, Costa Rica. Tues., Thurs. Sat. 9-10 p.m.; Sundays 7-9 a.m. Irregular 11:30 p.m.-12:30 a.m.	9.550 H15E 31.41	Sr. H. Chavez, Ciudad Trujillo, Dom. Rep. W. I.: Irregular.
11.710 VK9MI 25.62	M.V. Kamibia, McIlwraith and McEcham, Bridge St., Sydney, Australia. 11 p.m.-7:35 a.m.	9.650 CS2WA 31.09	Caixa Postal 108, Lobito, Angola, Portuguese West Africa. I: 3 notes on piano; A-C-B. Portuguese, French and English. Wed. and Sat. 3:45-4:30 p.m.	9.550 OLR3A 31.41	Prague, Czechoslovakia (see 21.450 mc.) Daily 7:15-9:55 p.m. News 5-5:15 p.m. (if no regular program.)
11.705 SBP 25.69	Chief Engineer, Motala, Sweden. Mon. to Fri. 1:20-2 a.m., 6-9 a.m., 11 a.m.-1:30 p.m., Sat. 1:20-2 a.m., 6 a.m.-1:30 p.m. Sun. 3 a.m.-1:30 p.m.	9.650 31.09	Buenos Aires, Argentina, S. A. (see LRU. 15.290 mc.) Daily 9:30 a.m.-11:30 p.m.	9.545 HH2R 31.44	Port-au-Prince, Haiti, W.I. (see HH2T, 11.570 mc.) Special programs Irregular.
11.700 HP5A 25.64	P. O. Box 964, Panama City, Panama, C.A. O-C: "Anvil Chorus". Daily 11:45 a.m.-1 p.m., 6-10 p.m. Sundays—open at 10 a.m. Thurs., Fri., Sat.—open at 5 p.m.		Antonio Augusto de Aguiar, 144 Lisbon, Portugal. I: Cuckoo, 3 times. C:A Portuguese (national anthem). Tues., Thurs., Sat. 4-7 p.m.		
11.700 CB1170 25.64	Radio Otto Becker, Casilla 706, Santiago, Chile, S.A. Daily 10 a.m.-2 p.m.; 4-11 p.m. Anglo American hour 6-6:45 p.m. Tues., Thurs., Sat.—English.				

8.840 VPD-2 31.45	Amalgamated Wireless, Ltd., Suva, Fiji Islands. C: God Save the King. Daily 5:30-7:00 a.m. No signals.	8.920 COKG 33.63	Apartado 137, Santiago, Cuba. O: La Congo. Daily 7:55 a.m.-12 midnight.	6.630 HIT 45.25	Apartado 1105, Ciudad Trujillo, Dom. Rep., W.I. O-C: Anchores Aveigh. English. Daily exc. Sun. 12:10-1:40 p.m.; 6:10-8:40 p.m. DX 1st Sat. 11:10 p.m.-1:10 a.m.
8.540 DJN 31.45	Zeesen, Germany (see 17.760 mc.) Daily 12:05 a.m.-10 a.m.; 4:50-10:45 p.m.	8.831 HCJBI 33.97	Casilla 691, Quito, Ecuador, S.A. O: March Patria 1: 4 blows on song. C: Ecuadorian National Anthem. Daily exc. Mon. 7:30-8:45 a.m. 11:30 a.m.-2:30 p.m. 5-10 p.m. (to 7 p.m. on 4.107 mc.; after 7 p.m. on 4.107 and 8.831 mc.) Veri—Se U. S. Postage.	6.618 El Prado 45.83	Apartado 98, Riobamba, Ecuador, S.A. English ea. 15 mins. O: Bugle call. Thursday 9:15-11:15 p.m. Veri—Se U. S. postage.
8.535 JZI 31.46	Nazaki, Japan (see 21.520 mc.) Daily 3-4 p.m.; 4:30-5:30 p.m.	8.795 HKV 34.13	Ministerio de Guerra, Military Service, Bogota, Colombia, S.A. Men. and Thurs. news 7-7:30 p.m. Finlay No. 8, Altos, Camaguey, Cuba. 8-3 tone song, each 1/2 hr. English Ann. Each 1/2 hr. O: "Allegiance March" C—None. Week days 10:30 a.m.-12:30 p.m. 7-10:30 p.m. Sat. 11 p.m. Sun. 10 a.m.-12:30 p.m.	6.580 "Radio Guardia 45.58	Tetuan, Spanish Morocco. Africa O: March of the Calliph. C: Spanish National Anthem. I and S: chimes. Daily 2-3 p.m.; 7-8 p.m. Ambato, Ecuador, S.A. Mon., Wed., Fri. 8-10:30 p.m. Veri Se U. S. postage.
8.530 WZXAF 31.46	Schenectady, N. Y. (see W2XAD 15.330 mc.) Daily 4 p.m.-12 a.m.; specials irregular.	8.665 COJK 34.63	Cuba. 8-3 tone song, each 1/2 hr. English Ann. Each 1/2 hr. O: "Allegiance March" C—None. Week days 10:30 a.m.-12:30 p.m. 7-10:30 p.m. Sat. 11 p.m. Sun. 10 a.m.-12:30 p.m.	6.575 HCVIY 45.63	Apartado 1064, San Jose, Costa Rica, C. A. B: 4 notes on song O-C: The Lost Chord—Organ. Tues., Thurs., Sat., 6-7 p.m. Religious Sundays 10 a.m.-7 and 8 p.m.; Thurs. 8 p.m.
8.530 LKJ-1 31.46	Ministero du Commerce, Administrato des Telegraphes, Oslo, Norway. I: Piano motif Grieg's Sigurd Jorsalfar. C: National—Yes, We Love This Country. Daily 5-8 a. m.; 11 a.m.-5 p.m.	8.580 YNIPR 34.97	A Melewsky, Gerente, Managua, Nicaragua, C.A. Daily 1-2:30 p.m.; 7:30-10:30 p.m. Veri—Se U. S. postage.	6.550 TIRCC 45.81	Apartado 34, Ciudad Bolivar, Venezuela, S.A. Daily 7:10 p.m.; Sun. 8-6 p.m.
8.525 ZBW-3 31.49	Hong Kong Broadcasting Committee, P.O. Box 200, Hong Kong, China. I-O-C: none. Weekdays 11:30 p.m.-1:15 a.m. Mon.-Thurs. 4-10 a.m., Tues., Wed., Fri., 3-10 a.m., Sat., 3-11 a.m., Sun. 9 p.m.-1:30 a.m., 3-9:30 a.m.	8.404 HC2CW 25.70	Castilla 1166, Guayaquil, Ecuador, S.A. O-C: Sangre Ecuatoriana. Weekdays 11:30 a.m.-12:30 p.m.; 7-11 p.m. Sun. 8-5 p.m. Veri—Se U. S. postage.	6.545 YV6RB 45.84	Managua, Nicaragua, C.A. Daily 6-10 p.m.; Veri—Se U. S. postage.
9.524 FIGA 31.59	Tananarive, Madagascar (see 6.000 mc.) Daily 12:30-12:45 a.m.; 8:30-4:30 a.m.; 10-11 a.m. simultaneously on 6.000 mc.	7.894 YSD 33.99	San Salvador, El Salvador, C. A. (see 11.710 mc.) Daily 9-11 p.m. P.O. Box 805, Guayaquil, Ecuador, S.A. S: Genz. O-C: El Corcovado (Cartoca fox). Daily 11 a.m.-2 p.m.; 4-11 p.m. Veri—Se U. S. postage.	6.520 YV4RB 46.01	Valencia, Venezuela, S.A. C: Bugle call, taps and off. Daily 11 a.m.-1:30 p.m.; 5:30-9:30 p.m.
9.523 ZRH 31.50	Roberts Heights, South Africa (see 6.097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m., 5-7:30 a.m., Sunday 3:30-4:30 a.m. or 4-5 a.m.	7.854 HC2J5B 33.19	San Salvador, El Salvador, C. A. (see 11.710 mc.) Daily 9-11 p.m. P.O. Box 805, Guayaquil, Ecuador, S.A. S: Genz. O-C: El Corcovado (Cartoca fox). Daily 11 a.m.-2 p.m.; 4-11 p.m. Veri—Se U. S. postage.	6.500 HIL 46.18	Apartado 633, Ciudad Trujillo, Dom. Rep., W.I. Daily 12:10-1:40 p.m., 5:40-7:40 p.m.
9.520 OZF 31.51	Copenhagen, Denmark (see OXY 6.060 mc. Daily 2-6 p.m.)	7.797 HBP 33.49	Geneva, Switzerland (see 9.845 mc.) Monday 6:45-8 p.m. Swiss program.	6.500 YVIRM 46.15	Maracaibo, Venezuela, S.A. Daily 6-9:30 p.m.
9.515.6 HJ6ABH 31.52	Armenia, Colombia, S.A. O-C: The Spanish Soldiers. S: Blows on Marimba. News 7-10 p.m. Weekdays 8-11 a.m.; 6-10 p.m. Sundays 7-10 p.m.	7.750 TISWS 30.74	Apartado 75, Puntarenas, Costa Rica, C.A. Weekdays 5-7 p.m.; 8:30-10 p.m. Sun. 4-5 p.m. Moscow, U.S.S.R. Daily 7-9:15 p.m. (see 15.040 mc.)	6.482 H14B 46.23	Ciudad Trujillo, Dom. Rep., W.I. Mon. & Sat. 11:55 a.m.-1:40 p.m.; 4:40-7:40 p.m.
9.520 YSH 31.51	San Salvador, El Salvador, C.A. (see 11.710 mc.) Irregular.	7.520 RKI 39.89	Nasaki, Japan (see 21.520 mc.) 3-7:30 a.m. Irregular.	6.460 EDR-4 46.20	Radio Poste, Palma de Mallorca, Balearic islands. Daily 4:30-5:15 p.m.
9.520 XEDQ 31.51	Apartado 107, Guadaluajara, Jalisco, Mexico. O-C: Mexican Dance—Jarabe Tapatio. Daily 12-4 p.m. 8 p.m.-12 a.m. Occasional OX Sunday 2-4 a.m.	7.510 JVP 39.95	Apartado 485, Quito, Ecuador, S.A. Thursday 9-10 p.m. Veri—Se U. S. postage.	6.480 H11L 46.20	Radioemisora Nacional "El Diario," Apartado 356, Santiago de los Caballeros, Dom. Rep., W. I. 1: Xylophone note O-C: Dominican National Anthem. Weekdays 7:30 a.m., 12-3 p.m., 5:30-9:30 p.m.
9.510 GSB 31.55	Darentry, England (see 26.100 mc.) Daily 3:15-5:25 a.m., 12:20-4 p.m., 4:15-6 p.m.; 6:20-8:30 p.m.; 9:20 to 11:20 p.m.	7.411 HCICE 40.48	Departamento Autonomo de Publicidad, Mexico, D.F. Sun 7-8 p.m. No signals or O-C selection.	6.478 H15A 46.20	Apartado 1812, Ciudad Trujillo, Dom. Rep., W.I. English each 15 mins. O-C: March General Alvarez Obregon. S: 2 strokes of bell. Daily 8:40-10:40 a.m.; 2:40-4:40 p.m.; Sat. 9:10-10:40 p.m.
9.510 HJU 31.55	Buenaventura, Colombia, S.A. O-C: Palmyra, English each 5 mins. Mon., Wed., Fri. 12-3 p.m.; 3-11 p.m.	7.380 XEGR 40.65	Radio Club Tenerife, Apartado 225, Santa Cruz, Tenerife, C.I. O-C: Lady of Spain, English on Saturdays only. Mon., Wed., Fri., Sat. 8:15-4:15 p.m.	6.465 YV3RD 46.40	Radio Barquisimeto, Avda. Bellis Vista No. 335, Barquisimeto, Venezuela, S. A. Daily 11:30 a.m.-1:30 p.m.; 5:30-9:30 p.m.
9.510 H30PJ 31.55	Bangkok, Siam (see 9.350-19.020 mc.) Mon. and Thurs. 8-10 a.m.	7.211 EASAB 41.60	A. Majewsky, Gerente, Managua, Nicaragua, C.A. Daily 7-10 p.m. Veri—Se U. S. postage.	6.480 H14V 46.51	Mella No. 25, San Francisco de Macoris, Dom. Rep. O-C: National Anthem. Daily 2:40-4:40 p.m., 7:10-9:10 p.m.
9.510 VKSME 31.55	Amalgamated Wireless Ltd., 167-9 Queen St., Melbourne, Australia. S: chimes and striking on hour. C: God Save the King. Daily exc. Sun. 4-7 a.m.	7.177 CR9AA 41.90	Lobito, Portuguese West Africa (see 9.660 mc.) Wed. and Sat. 2:45-4:30 p.m.	6.430 H11B 46.66	P.O. Box 112, Santiago de los Caballeros, Dom. Rep., W.I. Daily 11:40 a.m.-1:40 p.m.; 5:40-7:40 p.m.
9.504 OLR3B 31.57	Prague, Czechoslovakia, (see 21.460 mc.) Irregular.	7.100 F08AA 42.25	Radio Club Oceanien, Alfred T. Foris, Pres. Papete, Tahiti, Tues. and Fri. 11 p.m.-1 a.m.	6.420 YV6RC 46.73	Ciudad Bolivar, Venezuela, S.A. Daily 10:30 a.m.-1:30 p.m.; 4:30-9:30 p.m.
9.501 PRFS 31.58	P.O. Box 709, Rio de Janeiro, Brazil, S.A. 1: three-note song. C: Brazilian National Anthem. (see PSE 14.935 mc.)	7.030 EASAH 42.67	El Coronel Jefe de Estado, de las Mayor de las Fuzas, Militares, Apartado 124, Tetuan, Spanish Morocco, Africa. Daily 4-4:25 p.m.; 12-2:30 a.m. Irregular.	6.418 T1PE 46.80	Apartado 225, San Jose, Costa Rica, C.A. O-C: Parade of the Wooden Soldiers. Daily 7-9:30 a.m.; 12-2 p.m.; 4-11:30 p.m.
9.500 H15G 31.58	La Vega, Dominican Republic, W.I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m.; 4:40-8:40 p.m.	7.010 XEME 42.80	Merida, Yucatan, Mexico. Daily 6-11 p.m.	8.400 YV5RH 46.83	Apartado 1921, Caracas, Venezuela, S. A. Weekdays 11 a.m.-1:30 p.m.; 4:30-9:30 p.m.; Sun. 9:30 a.m.-1:30 p.m.; 5-7:30 p.m.
9.500 XEWV 31.58	Apartado 2516, Mexico, D.F. Daily 9 a.m.-12M.	6.975 HCETC 43.01	Apartado 134, Quito, Ecuador, S.A. Sat. and Mon. 7:45-9 p.m. Veri—Se U. S. postage. Veri slow.	6.383 VP2LO 47.00	Basse Terre, St. Kitts, BWI. Irregular bet. 4 p.m.-8:30 p.m.
9.490 EAR 31.66	P. O. Box 951, Madrid, Spain. English daily, 7:30 p.m. Mon., Tues., Thurs., 9:30 p.m. German Sat. 9:30 p.m.	6.900 H12B 43.48	Associated via Dominicana, Ciudad Trujillo, Dom. Rep., W.I. Daily 6:40-8:40 a.m.; 10:40 a.m.-3:40 p.m.; 4:40-8:40 p.m.	6.375 YV5RF 47.10	Apartado 988, Caracas, Venezuela, S.A. C: Organ; Blue Danube. Daily 6:30-7:30 a.m.; 10:30 a.m.-1:30 p.m.; 4:30-10:30 p.m.
9.450 "Radio Fort de France" 31.75	Edouard Boullanger Filis, Fort de France, Martinique. Daily 11:30 a.m.-12:30 p.m.; 6:15-7:15 p.m.; 8-9 p.m.	6.890 T12RS 43.48	Sr. Rogelia Sotela, Prop., San Jose, Costa Rica. Daily ex. Sun. 9:30-11 p.m.	6.360 YVIRM 47.17	P. O. Box 261, Maracaibo, Venezuela, S.A. O: Jeantete. C: Er Welcht der Sonne Nicht—march Weekdays 5:45-6:45 a.m.; 10:30 a.m.-1:30 p.m.; 3:30-10:30 p.m. English 10-10:30 p.m. Sunday 8:30 a.m.-2:30 p.m.
9.440 HCODA 31.78	Apartado 704, Guayaquil Ecuador, S. A. Daily exc. Sunday 8-11 p.m. Veri—Se U. S. postage.	6.850 T10W 43.80	P. O. Box 45, Port Limon, Costa Rica, C.A. Weekdays 10-11:30 p.m.; Sun. 2-3 p.m.	6.360 HRP1 47.24	Sr. Joaquin Mendoza, Director, San Pedro Sula, Honduras, C.A. O: March—Boy Scouts. C: National Anthem Honduras. S: songs. Daily 12-3 p.m.; 8-10 p.m. Veri—Se U. S. postage.
9.428 COCH 31.81	P.O. Box 41, Havana, Cuba. English each 15 mins. S: chimes 15 m. 2 blows song adv. O-C: Organ; Maria My Own. Daily 8 a.m.-12 a.m.	6.800 H17P 44.12	Calle Jose Reyes No. 25, Ciudad Trujillo, Dom. Rep. W. I. Weekdays 12:40-1:40 p.m.; 6:40-8:40 p.m.; Sun. 9:40-10:40 a.m.	6.340 H11X 47.32	Ciudad Trujillo, Dom. Rep., W.I. (see 15.230 mc.) Weekdays 12:10-1:10 p.m.; Tues. and Fri. 8:10-10:10 p.m.; Sun. 7:40-10:40 a.m.
9.380 H30PJ 32.09	Bangkok, Siam (see 19.020 mc.) Thursdays 8-10 a.m.	6.780 PZM 44.30	Paramaribo (Surinam), Dutch Guiana, S.A. Weekdays 2:45-4:45, 8:45-9:45 p.m. Sun. 9:45-11:45 a.m. Veri slow.	6.330 JZG 47.39	Nasaki, Japan (see 21.520 mc.) Irregular.
9.345 HBL 32.10	Information Section, League of Nations, Geneva, Switzerland. Fridays 2:30-2:45 p.m.; 7:30-7:45 p.m.; 8-8:15 p.m. Monday 6:45-8 p.m. Swiss Program.	6.730 H13C 44.58	San Pedro de Macoris, Dom. Rep., W.I. Daily 12:10-1:40 p.m.; 7:40-9 p.m. Sun. 5:10-6:40 p.m. DX 2:40-3:40 a.m.	6.325 YNLG 47.48	Apartado 120, Havana, Cuba. Daily 7 a.m.-12 midnight.
9.340 OAX4J 32.12	Radio Internacional, Casilla 1166 Lima, Peru. C: Organ; Good Night Sweetheart. Daily 12.8 p.m.; 5 p.m.-1 a.m.	6.720 PMM 44.64	Bandoeng, Java D.E.I. (see PLP, 11.600 mc.) Weekdays 5:30-11 or 11:30 a.m., Sundays 5:30-11 or 11:30 a.m., 9:30 p.m.-1:30 a.m.	6.315 H1Z 47.51	Apartado 1092 and 771, Ciudad Trujillo, Dom. Rep., W.I. Weekdays 11:10 a.m.-2:10 p.m.; 4:40-9:40 p.m. Sunday 11:40 a.m.-2:40 p.m.
9.300 YNGU 32.27	Apartado 295, Managua, Nicaragua, C.A. Weekdays 12-2 p.m.; 5-6 p.m. Sun. 11 a.m.-12 noon. Veri—Se U. S. Postage.	6.690 T1EP 44.84	P. O. Box 758, Guayaquil, Ecuador, S.A. O-C: Ecuadorian National Anthem. English each 15 mins. Sunday 5:45-7:45 p.m.; Tues. 9:15-11:15 p.m. Veri Se U. S. postage.	6.300 YV4RD 47.62	Sr. Luis Croquer, Prop., Maracaibo, Venezuela, S.A. Weekdays 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.
9.200 COBX 32.31	San Miguel #194, Havana, Cuba. Daily 11 a.m.-12 midnight.	6.658 HC2RL 44.89			
9.125 HAT-4 32.38	Budapest, Hungary (see HAS-3, 15.370 mc.) Sun. and Wed. 7-8 p.m.; Sat. 6-7 p.m.				
9.080 COBZ 32.32	P.O. Box 866, Havana, Cuba. 5-4 chimes. O-C: Record, "Popular Melodias" 7:45 a.m.-12:30 a.m. Sat. to 2 a.m.				
9.110 COCA 32.33	Ave. de Italia #102, Havana, Cuba. Daily 6 p.m.-12 a.m.				

6.280 COMB 47.77	P. O. Box 85, Sancti-Spiritus, Santa Clara, Cuba. Weekdays 9-10 a.m., 12-10 p.m. Sun. 10 a.m.-10 p.m.	6.130 COCD 48.94	P.O. Box 2294, Havana, Cuba. English each 15 mins. O: In a Clock Store. C: Good Night. Weekdays 9 a.m.-1 a.m. Sundays 10 a.m.-8 p.m. (DX 1-3 a.m.)	6.070.6 HJ3ABF 49.42	Apartado 317, Bogota, Colombia. S.A. C: Good Night Sweetheart. Daily 11 a.m.-2 p.m. 6-11 p.m. Veri Slow.
6.280 HIG 47.77	Av. Jose Trujillo No. 50, Ciudad Trujillo, Dom. Rep., W.I. Daily 7:10-9:10 a.m.; 11:40 a.m.-2:10 p.m.; 3:40-8:40 p.m.	6.130 VE9HX 48.94	P.O. Box 998, Halifax, N.S., Canada. O-C: Oh Canada. Chimes 15 min. periods. Sun. 12 noon-11 p.m. Mon. to Fri. 7 a.m.-11 p.m. Sat. 11 a.m.-11 p.m.	6.070 YVIRD 49.42	P. O. Box 100, Maracaibo, Venezuela, S. A. Daily 8 p.m.-12 a.m.
6.275 OAX4G 47.81	Avda. Abancay, 915-923, Lima, Peru. S.A. C: Good Night Sweetheart. Daily 7-11:30 p.m.	6.125 CX44 48.98	Mercedes 823, Montevideo, Uruguay. S.A. Daily 10:30 a.m.-12:30 p.m.; 3:30-9:30 p.m.	6.070 VP3MR 49.42	18, Robb and Hincks Sts., Georgetown, British Guiana. S.A. 8: Time signals, studio clock. O: The Bond of Friendship. C: Ted Lewis' Goodnight Melody and God Save the King. Veri—L.R.C. or coin. Weekdays 4:15-8:15 p.m. Sundays 7:45-10:45 a.m.
6.270 YV5RP 47.85	P. O. Box 508, Caracas, Venezuela. S.A. Daily 6-11:45 p.m.	6.122 OAX6A 49.00	Munoz Najar 141, Casilla 293, Arquipa, Peru. S. A.	6.070 CFRX 49.42	37 Bloor St., West, Toronto, Ontario, Canada. Week days 7:30 a.m.-12 midnight. Sunday 10:30 a.m.-12 midnight.
6.250 YV5RJ 48.00	Sr. Edmundo Snegart, Prop., P. O. Box 1908, Caracas, Venezuela, S.A. Daily 5:30-9:30 p.m.	6.122 HP5H 49.00	O-La Marcha de los Marino C— Nacional del Peru. Daily 7-11 p.m. Apartado 1045, Panama City, Panama, C. A. Daily 10 a.m.-1 p.m., 5-11 p.m.; English hour 10-11 p.m.; Sundays 8 a.m.-2 p.m.	6.065 XEXR 49.46	Departamento Autonomo de Propaganda y Publicidad, Mexico. D. F. Daily 6-11:30 p.m.
6.243 HIN 48.05	Calle Arzobispo Merino #97, Ciudad Trujillo, Dom. Rep., W.I. English each 15 mins. (see 12,500 mc.) Weekdays 11:40 a.m.-2:40 p.m.; 7:10-9:10 p.m. Sun. 11:10 a.m.-3:40 p.m.	6.120 XEFT 49.02	Veracruz, Mexico (see 9,550 mc.)	6.065 SBO 49.46	Motala, Sweden (see 11,705 mc.) Daily 1:30-5 p.m.
6.235 HRD 48.11	Sr. Tulio Castaneda, Director, La Ceiba, Honduras. C.A. English on the hour. O: Sole Tuyo. C: Intermazzo No. 1. Piano 10:58 p.m. Good Night Melody. No signals. Daily exc. Sun. 8-11 p.m.	6.120 W2XE 49.02	Warne, N. J. (see 21,520 mc.)	6.060 WSXAL 49.50	Crosley Radio Corp., Cincinnati, Ohio. Daily 6 a.m.-8 p.m., 10 p.m.-2 a.m.
6.230—YVIRG 48.15	Radio Valera, Valera, Venezuela, S.A. S: 1 bell O-C: Local March. Daily 11 a.m.-12:30 p.m.; 5:30-9:30 p.m.	6.115 OLR2C 49.06	Prague, Czechoslovakia (see 21,450 mc.) S: Bella. Irregular	6.060 WSXAU 49.50	Philadelphia, Pa. (see 9,590 mc.) Daily 8-11 p.m.
6.210 YVIRI 48.31	Radio Coro, Coro, Venezuela. S.A. S: 4 marimba notes. Spanish Ann. each 15 m. O-C: March — The Three Colors. Daily 7:30-9:30 p.m.	6.110 GSL 49.10	Daventry, England (see 26,100 mc.) Daily 6:20-8:30 p.m.; 9:20-11:20 p.m.	6.060 OXY 49.50	Statensradiofonen, Helbergsgade 7, Copenhagen, Denmark. O: one gong stroke. C: There is a Window Land. Irregular.
6.205 H18Q 48.34	Julio O. Garcia Alardo, Ciudad Trujillo, Dom. Rep., W.I. Sunday only 5:40-9:40 p.m. (Daily later).	6.110 XEGW 49.10	Enrique Arzamendi, Gen'l. Mgr., Mexico, D.F. O-C: Vail a doñid Arleo—march. Daily exc. Mondays 11 a.m.-4 p.m.; 7 p.m.-12 a.m. Mondays 9 a.m.-4 p.m.	6.054.3 HJ6ABR 49.55	Pereira, Caldas, Colombia, S. A. No English. Official March—El Hombre Pajaro. C: Overture — Chorus Voices. No signals. Daily 9:30 a.m.-12 noon; 6:15-10 p.m.
6.200 XEXS 48.39	Secretaria de la Economia Nacional, Mexico, D.F. Daily 7-11 p.m.	6.109 VUC 49.10	1 Garstin Place, Calcutta, India. S: none. C: God Save The King. Daily 8 a.m.-12:30 p.m. 11 p.m.-12:30 a.m.	6.050 GSA 49.59	Daventry, England (see 26,100 mc.) Daily 12:20-4 p.m.
6.190 H11A 48.47	P. O. Box 423, Santiago de los Caballeros, Dom. Rep. W.I. I: Gong C: Anchors Aweigh. Daily 6:40 a.m.-4:40 p.m.; Thurs. and Sundays, 7:40-9:40 p.m. Band concert.	6.105.1 HJ6ABB 49.14	Apartado 175, Manizales, Colombia. S.A. Daily 11 a.m.-1 p.m.; 5-8 p.m. Veri slow.	6.050 XEXF 49.59	Secretaria de la Economia Nacional, Mexico, D. F. Daily 8 p.m.-12 a.m.
6.189 TG2 48.54	Director General of Electrical Communications, Guatemala City, Guatemala, C.A. Irregular 3-9 p.m. No IRC Required.	6.100 YUA 49.18	Director, Bureau Central de Presse, Belgrade, Yugoslavia. S: Short tune on flute. O-C: National Anthem. Daily 12:45 a.m.-8:30 a.m., 1-6 p.m.	6.045 XETW 49.62	Madero 204—Oriente, Tampico, Mexico. S:—chimes. O-C: Cavalry March. Weekdays 10 a.m.-10 p.m., Sundays 10 a.m.-4 p.m. No IRC required.
6.170 XEXA 48.62	Mexico, D. F. (see 11,880 mc.) Weekdays 8:30-11 a.m.; 2:30-4:30 p.m.; 7 p.m.-12 a.m. Sunday 7 p.m.-12 a.m.	6.100 W9XF 49.18	30 N. Wacker Drive, Chicago, Ill. O-C: Star Spangled Banner. Daily 6-9:05 p.m.-1:05-2 a.m.	6.042.3 HJ1ABG 49.65	Apartado 674, Barranquilla, Colombia S.A. S: 1 song with chimes ea. ¼ H. O-C: National Anthem. Daily 11 a.m.-11 p.m.; Sun. 11 a.m.-9 p.m.
6.160 VPB 48.70	Radio Club of Ceylon and So. India. P. O. Box 282, Colombo, Ceylon. S: Time on hour, 6 pps. I: Bow Bells, infrequently. Daily 6:30-11:30 a.m. Saturdays 12:30 p.m.	6.100 WSXAL 49.18	Bound Brook, N. J. (see 17,780 mc.) Sun. 6 p.m.-1 a.m. Weekdays 7 p.m.-1 a.m.	6.040 YDA 49.67	Tandjong Priok, Java N. E. I. (see 15,150 mc.) Daily 7:30 p.m.-2 a.m.
6.158 TV5RD 48.79	Radio Venezuela, Caracas, Venezuela, S.A. I: 5 strokes of bell. O-C: Triunfo Aereo. Weekdays 6:30-7:30 a.m.; 10:30 a.m.-1:30 p.m.; 8:30-10 p.m. Sun. 8:30 a.m.-10:30 p.m.	6.097.5 ZRJ 49.20	African Broadcasting Co., Inc., P.O. Box 4559, Johannesburg, South Africa. Physical session. O: Bugles—Revolve. C: Cook House. I: chimes. C: God Save The King. Weekdays 11:45 p.m.-12:45 a.m.; 3:15-7:30 a.m.; 9-11:30 a.m. (8:30-11:30 a.m. Sat.) Sunday 3:30-4:30 a.m. or 4-5 a.m., 8-11:30 a.m.	6.040 W4XB 49.67	News Tower, Miami, Florida. 7 p.m.-12 a.m. and variable day hours.
6.150 OAXIA 48.78	Sr J Carlos Montefoy D. Casilla No. 9, Chiclayo, Peru. S.A. O: Andacia Arriba. C: Good Night Melody. Daily 8-11 p.m.	6.095 JZH 49.22	Kilbheoval, South Africa. Weekdays 12 noon-4 p.m. Sundays 12 noon-3:20 p.m.	6.040 W1XAL 49.67	Boston, Mass. (see 21,460 mc.) Mon. to Fri. 7-9 p.m., Fri. 10-11 p.m.; specials irregular.
6.150 CJRO 48.78	Winnipeg, Manitoba, Canada (see CJRX, 11,720 mc.) Weekdays 6 p.m.-12 a.m. Sundays 5-10 p.m.	6.090 CRCX 49.26	Rural Route No. 4, Bowmanville, Ont., Canada. Weekdays 7:45 a.m.-5 p.m. Sunday, 10:45-5 p.m. Hong Kong, China (see 9,525 mc.)	6.030 OLR2B 49.75	Prague, Czechoslovakia (see 21,450 mc.) Daily 12:55-4:40 p.m.; Mon., Wed., Fri. 8-10:35 p.m. (see 6,010 mc.)
6.150 H16N 48.78	Mesa, Dom. Rep., W.I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m. 4:40-8:40 p.m.	6.090 XEBF 49.26	Insurgentes 34, Jalapa, Mexico. Daily 7-11 p.m.	6.030 HP6B 49.75	P.O. Box 910, Panama City, Panama. English and Spanish O-C: March, Panama. No signals or bells. Daily 11:30 a.m.-1 p.m.; 5-10 p.m.
6.150 ZRD 48.78	Durban, South Africa (see 6,097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m.; 3:30-7:30 a.m.; 9 a.m.-3:45 p.m.; Sat. to 4 p.m.; Sun. 8-11:30 a.m., 12 noon-3:20 p.m.	6.085.7 HJ5ABD 49.30	Call, Colombia, S.A. Daily 11 a.m.-2 p.m.; 6-11 p.m.	6.030 VESCA 49.75	Toronto General Trust Bldg., Calgary, Alberta, Canada. C: Lighted Out. S: None. Weekdays 9 a.m.-1 a.m. Thurs. to 2 a.m. Sun. 12 noon-12:30 p.m.
6.148 HJ4ABE 48.89	Medellin, Colombia, S.A. I: Morse-letter "M" S: 4 chimes. Daily 9:30 a.m.-1 p.m.; 5-11:30 p.m.	6.082 VQ7LO 49.33	P.O. Box 777, Nairobi, Kenya, Colony, Africa. English used. C: God Save The King. Time signal 6 pps on hour. Daily exc. Sunday 5:30-8 a.m. Daily 11:15 a.m.-3:15 p.m. Tues. and Thurs. 8:15-9:15 a.m.	6.020 XEBQ 49.75	Antillero 35, Masatlan, Mexico Daily 8-11:30 p.m.
6.140 W8XK 48.94	Pittsburgh, Pa. (see 21,540 mc.) Daily 11 p.m.-1 a.m.	6.082 OAX4Z 49.32	Lima, Peru (see OAX4T, 9,562 mc.) Daily 7 p.m.-12:30 a.m.	6.020 DIC 49.83	Zeesen, Germany (see 17,760 mc.) Daily 10:40 a.m.-4:30 p.m.; 4:50-10:45 p.m.
6.140 ZES 48.96	Bulawayo, Rhodesia, South Africa (see ZEC, 5,800 mc. for address). Sun. 3-5 a.m.; Tues. and Thurs. 1:15-3:15 p.m.	6.080 W9XAA 49.34	Chicago, Ill. (see 17,780 mc.) Weekdays 7-8:30 a.m., 8-11 p.m., Sun. 11 a.m.-1 p.m., 8-11 p.m.	6.020 XEUW 49.83	Av. Independencia 98, Veracruz, Mexico. S: Marimba. O: March Victoria. C: La Golondrina. Daily 9 a.m.-12 midnight.
6.137 CR7AA 48.98	P.O. Box 594, Lourenco Marques, Portuguese East Africa. O: A Maria de Fente. C: A Portuguesa. Weekdays 12:15-1 a.m.; 4:30-6:30 a.m.; 9:30-11 a.m.; 12:30-4 p.m. Sundays 6-7 a.m.; 10 a.m.-12:30 p.m.; 2-4 p.m.	6.080 ZHJ 49.34	Penang Wireless Society Headquarters, 40 Perak Road, Penang, S.S. O: Chimes. Vocal song, "Land of Hope and Glory". C: "God Save the King". Weekdays 6:40-8:40 a.m.	6.015 HISU 49.88	Apartado 23, Santiago de los Caballeros, Dom. Rep., W.I. O-C: Organ Maria My Own. Weekdays 7:10-8:40 a.m.; 10:40 a.m.-1:40 p.m.; 4:40-9:40 p.m. Sun. 10:40 a.m.-1:40 p.m. only.
6.130 VPSBG 48.94	Crystal Broadcasting Co., Philharmonic Bldg., Georgetown, British Guiana, S.A. O: Serenade, C: Good Night My Love and God Save The King. Mon., Wed., Fri. 3-4:45 p.m., 4:45-7:45 p.m.; Tues., Thurs., Sat. 10:15-11:15 a.m., 3-7:45 p.m.; Sun. 6:45-8:45 a.m., 10:30-1:45 a.m., 4-6:15 p.m.	6.080 VE9CS 49.34	743 Davis St., Vancouver, B.C., Canada. O: D Canada; C: God Save The King. S: 3 strokes gong. Sun. 12 noon-1:30 a.m. Mon., Thurs., Sat. 9:30 a.m.-8:30 p.m. Tues., Wed., Fri. 9:30 a.m.-3:30 a.m.	6.015 XEWI 49.88	Mexico, D.F. (see 11,800 mc.) Irregular.
6.130 XEUZ 48.94	Mexico D. F. (see 11,880 mc.) Daily 10 a.m.-1 p.m.; 7 p.m.-2 a.m. Dx 1-2 a.m.	6.080 HP5F 49.34	Hotel Carlton, Colon, Panama, C.A. Weekdays 11 a.m.-1 p.m.; 7-10 p.m.; Sun. 10:45-11:30 a.m. 7-10 p.m.	6.013 HJ3ABX 49.89	Apartado 26-65, Bogota, Colombia, S. A. Weekdays 10:30 a.m.-2 p.m.; 5:30-11:30 p.m.; Sundays 12-1:30 p.m.; 6-11 p.m.
6.130 ZBE 48.94	Kuala Lumpur, Malaya States, S.S. Sun., Tues., Fri. 6:40-8:40 a.m.	6.080 XEWV 49.34	Apartado 2616, Mexico D.F. Irregular (see 9,500 mc.)	6.010 PRAS 49.92	Pernambuco, Brazil, S. A. Daily 6-10 p.m.
6.130 LKJI 48.94	Jeloy, Norway (see 9,530 mc.) Daily 11 a.m.-5 p.m.	6.079 DJM 49.35	Zeesen, Germany (see 17,760 mc.) Irregular.	6.010 VK9MI 49.92	M. V. Kanimbia, Svinoy, Australia (see 11,710 mc.) 11 p.m.-7:35 a.m.
		6.075 XECU 49.38	Hidalgo 579, Guadalajara Jal., Mexico. O-C: Ojes Tapatiens. I: Train in motion. Daily 9-11 a.m., 1-4 p.m.; 8-11 p.m. or 12 a.m.	6.010 COCO 49.92	P.O. Box 98, Havana, Cuba. English and Cuban. Daily 6 a.m.-10 p.m.
		6.072 OER-2 49.41	Wien, Austria. (Alternates days with 11,801 kc.) Weekdays 9 a.m.-5 p.m. Sat. to 6 p.m.	6.010 CJOX 49.92	Eastern Broadcasters, Ltd., Radio Bldg., Sydney, N. S., Canada. Irregular.
				6.010 OLR2A 49.92	Prague, Czechoslovakia (see 21,450 mc.) Daily 12:55-4:40 p.m.; Mon., Wed., Fri. 8-10:35 p.m. (see 6,030 mc.)
				6.007 ZRH 49.94	Roberts Heights, South Africa (see ZRJ, 6,097.5 kc.) Weekdays 10 a.m.-4 p.m., Sat. to 4:45 p.m., Sundays 10:30 a.m.-12 noon, 12:15-3:15 p.m.
				6.007 Radio 49.94	Burma Independent Wireless, Rangoon, Burma C: God Save the King. Daily 9:10-9:40 a.m.

6.005 HP3K 49.96	P.O. Box 33, Colon, Panama, C.A. S: 3 chimes, ea. 15 m. O-C: Merry Widow Waltz. Daily exc. Sun. 7-9 a.m.; 11:30 a.m.-1 p.m.; 6-11 p.m. Sun. 10 a.m.-12 p.m.	5.995 TILS 50.80	P.O. Box No. 8, San Jose, Costa Rica, C.A. S: none. O: Washington and Lee Swing. C: Adios Mi Chapparrita. Weekdays 12-3 p.m.; 6-11 p.m. Sundays irregular.	5.713 TGS 52.51	Casa de Presidencial, Guatemala City, Guatemala, C.A. Sun., Wed., Fri. 8-8 p.m. No. I.R.C. necessary.
6.005 CFCX 49.96	P.O. Box 1690, Montreal, Quebec, Canada. Weekdays 7:44 a.m.-1 a.m. Sundays 9 a.m.-11:15 p.m.	5.995 H19B 50.98	P.O. Box 95, Santiago de los Caballeros, Dom. Rep., W.I. O-C: Piano Solo—Vale Evocation. Weekdays 7:25-8:40 a.m.; 11:55 a.m.-2:10 p.m.; 4:55-7:40 p.m. Sundays 11:40 a.m.-2:40 p.m.	5.146 PMY 58.30	Bandoeng Radio Society, Nillay Bldg., Bandoeng, Java, N.E.I. O: March, La Rene Passe. C: On chimes. Good Night and National Anthem. Sun. 6:30 p.m.-1:30 a.m. 4-10:30 a.m. Mon. to Fri. 5:30 p.m.-2:30 a.m. 4-10:30 a.m. 5:30 p.m.-2 a.m. 4-11:30 a.m.
6.005 VE9DN 49.96	Montreal, Quebec, Canada (see CFCX, 6.005 mc.) Sat. 11 p.m.-12 a.m. Fall, winter and spring.	5.995 YV3RA 51.02	Barquisimeto, Venezuela (see YV3RB, 5.565 mc.) Daily 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.	4.900 HJ3ABH 61.22	Apartado 565, Bogota, Colombia. S. A. I: 3 chimes notes. Weekdays 11:30 a.m.-2 p.m. 6-11 p.m. Sunday 12-2 p.m.; 4-11 p.m.
6.006 CXA2 50.00	Rio Negro, Montevideo, Uruguay, S.A. O: Voluntary Trumpeter. C: Good Night Melody. Daily 10:30 a.m.-10:30 p.m.	5.975 HRN 51.11	Tegucigalpa Honduras, C. O: Good Night Melody (Ted Lewis) Daily 7-10 p.m. Veri—100 U. S. cash. Veri slow.	4.880 HJ4ABP 61.48	Emisora Claridad, Medellin, Colombia. S. A. Daily 8 a.m.-11 p.m.
6.000 XEBT 50.00	P.O. Box 79-44 Mexico, D.F. I: 3 blasts on cuckoo horn. Siren near closing. O: Las Mananitas. C: Lieberstraus. Daily 10 a.m.-12:15 a.m.	5.865 H11J 51.15	Apartado 204, San Pedro de Macoris, Dom. Rep., W.I. O-C: Waltz, Sweet Remembrances. English very seldom. S: none. Daily 11:40 a.m.-1:40 p.m.; 5:40-9:40 p.m.	4.860 HJ1ABE 61.73	Apartado 31, Caragena, Colombia. S. A. O: organ—Song of the Islands. English each hour clock strikes the hour. C: Alohe Oe. Weekdays 7 a.m.-1:45 p.m. 4-11:30 p.m. Sundays 9 a.m.-3 p.m.
6.000 HJ1ABC 50.00	Sr. Rafael Valencia Ibanez, Quibdo, Colombia, S. A. O-C: March, Relator S: 2 blows Chinese Gong. Sunday 3-5 p.m. Wed., Sat. 5-6 p.m. Daily 6-9 p.m.	5.850 YV1RB 51.28	P.O. Box 37, Maracaibo, Venezuela, S.A. English and Spanish. O-C: Strike Up The Band. Daily exc. Sun. 10:45 a.m.-12:45 p.m.; 4:45-9:45 p.m. Sun. 8:45 a.m.-9:45 p.m.; Mon., Wed., Fri. 5:45-8:15 a.m. Tues., Thurs., Sat. 5:45-9:45 a.m.	4.841 HJ3ABD 61.97	Apartado 509, Bogota, Colombia. O: Pari Ti Rio Rita. C: Rio Rita and National Anthem. Weekdays 9 a.m.-2 p.m., 6 p.m.-12 a.m., Tues. and Thurs. to 3 p.m. Wed. and Fri. begin 5:30 p.m.
6.800 FIQA 50.00	Director of Posts and Telegraphs Tananarive, Madagascar. Daily 12:30-12:45 a.m.; 2:30-4:30 a.m.; 10-11 a.m.	5.830 TIGPH 51.46	Apartado 800, San Jose, Costa Rica, C.A. C: Good Night Melody (Ted Lewis). Weekdays 3-11 p.m.	4.820 HJ7ABB 62.24	Santander Broadcasting, Bucaramanga, Colombia, S. A. 6-11 p.m.
6.000 RV59 50.00	Moscow, U.S.S.R. (see RKI, 15.040 mc.) No I.R.C. required. Sun., Mon., Fri. 4-5 p.m.	5.813 TIGPH-2 51.51	Apartado 800, San Jose, Costa Rica, C.A. C: Good Night Melody. Daily 7-11 p.m.	4.810 YDE2 62.37	Solo, Java, N.E.I. (see 15.150 mc.) Daily 5:30-11 a.m.; 5:45-6:45 p.m.; 10:30 p.m.-2 a.m.
5.977 Radio 50.19	Rua Capelo, 5, Lisbon, Portugal. OC: Our Lady of Fatima. I: none. Daily 2:30-4:30 p.m. Sunday and Thursday 6-7 a.m.	5.800 Y19RC 51.72	P.O. Box 2009, Caracas, Venezuela, S.A. I: 4 chimes. O-C: Official 188 March. Bugles, whistles before closing. Sundays 8:30-11:30 a.m., 3:30-9:30 p.m. Weekdays 7-8 a.m., 10:30 a.m.-1:30 p.m., 3:45-10 p.m. (off Mondays 9:45 p.m.)	4.790 HJ2ABC 62.68	Sr. Pompilio Sanchez, Prop., Cucuta, Colombia, S.A. Daily 11 a.m.-12 noon, 6:30-9 p.m.
5.970 OAX4P 50.25	Cuzco 25, Huancayo, Peru, S. A. Daily 12-1 p.m., 9 p.m.-12:30 a.m.	5.800 ZEC 51.72	P.O. Box 792, Salisbury, Rhodesia, South Africa. Sun., 3-5 a.m.; Tues. and Fri. 1:15-2:15 p.m.	4.780 HJ1ABB 62.76	Apartado 715 Barranquilla, Colombia, S.A. I: 3 chimes. S: 1 chime between advertisements. C: La Golondrina 7-9 a.m. 11-1 p.m. 5:30-10 p.m.
5.969 HVJ 50.26	Vatican City (see 15.121 mc.) 3-2:15 p.m. Sun. 5-5:30 a.m.	5.790 OAX4D 51.00	All American Cables, Ltd., Cañilla 2338, Lima, Peru, S.A. Signs on and off Morse code. No signals. English and Spanish. Wed., Sat. 9-11:30 p.m.	4.740 HJ6ABC 62.29	Ibaguè, Colombia, S.A. Daily 6-11 p.m.
5.955 HJN 50.35	Minister of Education Nacional, Bogota, Colombia. Daily 11 a.m.-2 p.m.; 5-10:30 p.m.	5.750 YNOP 52.19	Radio Bayer, Managua, Nicaragua, C.A. Weekdays 2:30-10:30 p.m. Veri—50 U. S. Postage.	4.560 HJ2ABJ 64.38	Santa Marta, Colombia, S.A. Daily 11:30 a.m.-2 p.m.; 5:30-10:30 p.m.
5.940 TG2X 50.51	De la Policia Nacional, Guatemala City, Guatemala, C.A. Daily 4-6 p.m. Mon., Thurs., Sat. 10-11:30 p.m. Sundays 1-2 p.m. No I.R.C. required.	5.755 YV3RA 52.15	San Cristobal, Venezuela. English occasional and at closing. S: 6 strokes gong. O-C: March, El Capitan. Weekdays 11:30 a.m.-12:30 p.m.; 5:30-9 p.m. Sun. 5:30-10 p.m.	4.690 HC2ET 65.22	P.O. Box 824, Guayaquil, Ecuador, S.A. I: 12 chimes. Wed. and Sat. 9:15-10:45 p.m. Veri—50 U. S. postage.
5.930 PJC1 50.50	Curacaocha Radio Vereeniging, Willemstad, Curacao, N.W.I. O: Electrical gong. 4 strokes and repeat 5 mins. O-C: National anthem. Weekdays 6:36-8:36 p.m. Sun. 10:36 a.m.-12:36 p.m.	5.725 HC1PM 52.40	P.O. Box 664, Quito, Ecuador, S.A. O-C: La Marcha de Alda. Saturdays 9-11 p.m.	4.273 RV15 70.21	Radio Committee, Khabarovsk, U.S.S.R. English, 2 a.m., EST and at announcements. Daily exc. 6th 12-18-24-30th 3 p.m.-8 a.m. On 6-12-18-24-30th 7:10 p.m.-8 a.m. English programs start at 2 a.m. No I.R.C. necessary.
5.900 YV1RL 50.90	P.O. 247, Maracaibo, Venezuela, S.A. Weekdays 11 a.m.-1 p.m.; 4:30-9:30 p.m. Sun. 8:30 a.m.-2:30 p.m.			4.197 HC1S-2 73.05	Quito, Ecuador, S.A. (see 5.831 mc.)
5.910 YV4RH 50.70	Valencia, Venezuela, S.A. Daily 8-11:30 p.m.			4.002 CT2AJ 75.00	Ponta Delgada, Island of St. Michael, Azores. Wed. and Sat., 6-7 p.m.
5.910 HM2S 50.70	Port-au-Prince, Haiti, W.I. (see 11.570 mc.) Daily 7-10 p.m.			3.640 YDA 62.62	Batavia, Java, N.E.I. (see 15.150 mc.) Weekdays 5:30-10 a.m. (Sat. 11:30 a.m.) 9-7:30 p.m. 10:30 p.m.-3 a.m. Sun. 5:30-10 a.m., 7:30 p.m.-2 a.m.

QUERIES

(Continued from page 141)

Query No. 58: I have a midget receiver using a 78 r.f. 6A7 oscillator and first detector, 78 i.f., 75 a.v.c. and second detector, 43 output and a 25L6 rectifier. I should like to know if I could change this receiver over for 10-meter operation by merely reducing the number of turns on the coils.—A. D., N. Y. C.

Answer: Probably you could . . . probably. However, really successful operation on ten meters and below requires a bit more in the way of design and materials than is incorporated into the less expensive broadcast receivers—better dielectrics, more attention to the distribution of parts, etc.

You can take your coil winding data from any constructional article on a superheterodyne operative on 10 meters—for instance, page 622 of ALL-WAVE RADIO for December 1937. You may

find it necessary to reduce the capacity of the tuning condensers. This can be done by removing plates. For all practical purposes it may be considered that the capacity of a variable condenser varies directly with the number of plates. (Actually it is a function of N-1, where N is the number of plates.) If you halve the number of stator and rotor plates, you will halve the capacity of the condenser. However, it is only necessary to halve *either the rotor or stator plates* to secure practically the same effect.

Coils are always designed for use with condensers of a stated capacity, and A. D. may find it difficult to obtain coil data for the exact condensers he has. The capacity of a variable condenser can be judged roughly from the following table:

7 plates usually	.00015	microfarads.
11 "	".00025	"
13 "	".00025	"
17 "	".00035	"
21 "	".000365	"
23 "	".0005	"
43 "	".001	"

Also, on short-wave receivers, a different padding circuit in the oscillator is

often employed. It would be well to redesign the receiver, following approved 10-meter technique, rather than depend upon the circuit as is.

If upon revamping, the receiver does not perk on ten, the trouble is probably due to the components left over from the original set. Our first suggested substitution would be variable tuning condensers designed for short-wave operation. Next, the substitution of isolantite base sockets in the r.f. and oscillator-first detector circuits. If the receiver still doesn't work, rewind the coils on approved short-wave coil forms. The last resort would be to replace all bypass condensers in the r.f., oscillator and first detector circuits with the finest obtainable.

Do not expect much in the way of 10-meter reception during the summer. However, if your receiver conversion is effected between now and spring, you should secure excellent results. Also remember that ten meters is a daytime frequency, and that, in your location, little will be heard after dusk, with the possible exception of Hawaiians which sometimes hold on until late evening.

OX2QY RIG

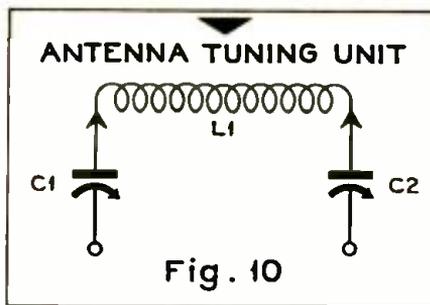
(Continued from page 142)

between the driver and this stage, and a separate transformer, T2, contained in the final amplifier chassis supplies filament voltage for the HK-354's. High voltage is obtained from a separate power-supply in the first relay rack.

The circuit of the antenna tuning unit, which occupies the upper end of the relay rack, is shown in Fig. 10.

It was required that a band of frequencies from 6 megacycles to 15 megacycles or more be covered by the transmitter. Plug-in coils instead of mechanical band switching were decided upon for several reasons.

The care taken in the layout and wiring is evident in the photo of the final stage. It will be noted that the grid circuit tuning condenser is on the bottom deck between the tubes for the shortest possible leads. Since the plate connection on the HK-354 tubes is at the top, the plate circuit tuning condenser is mounted underneath the top deck. The plate leads are, in consequence, less than two inches long.



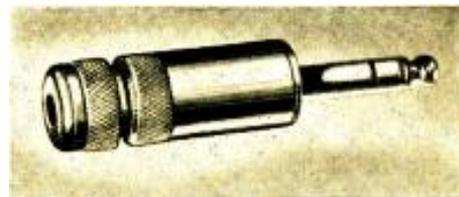
ANTENNA TUNING UNIT (Fig. 10)

C1—Hammarlund TC225A variable, 220 mmfd.
C2—Hammarlund TC225A variable, 220 mmfd.
L1—Johnson Inductor

Conclusion

This example of careful attention to detail is typical of the entire transmitter. The suggestions of experienced amateurs who had actually operated and maintained equipment under adverse conditions made it possible to anticipate and take precautions against some of the most common causes of failure. Insulation undergoes severe strains because of moisture which condenses on equipment when sudden temperature changes occur. Only the best, non-porous, insulators were used. The insulated wire for cables was chosen to have an extra high dielectric strength covering of a

(Continued on page 157)



Three Way Microphone Plug
With Bakelite Shell No. 76 \$1.00
With Polished Nickel Shell No. 76A. \$2.50



Three Circuit Microphone Jack No. 2B, 60c

There are 38 types of YAXLEY Jacks, Extension Jacks and Plugs

The illustrations show but two items in this famous Yaxley line.

Yaxley Jacks are made in four models—the new "X" type incorporating a special dust protector; the standard Yaxley Long Frame type; the Junior (in which the springs are parallel to the panel for compactness); and the Midget.

A variety of spring combinations are available for practically any application, and special models can be furnished on order.

Ask your distributor to show you.

P. R. MALLORY & CO., Inc.
INDIANAPOLIS INDIANA

Cable Address—PELMALLO



DRIVER AND CLASS C. STAGE (Fig. 9)

C11—Hammarlund MCD100M variable, 100 mmfd.
C12—Hammarlund MTCD100B variable, 100 mmfd.
C13—Hammarlund TCD100X variable, 98 mmfd.
C14—Hammarlund TCD100A variable, 98 mmfd.
C15—Cornell-Dubilier type 9 fixed, .004 mfd., 5000 v.
C16—Cornell-Dubilier type 9 fixed, .002 mfd., 1000 v.
C17—Cornell-Dubilier type 9 fixed, .002 mfd., 5000 v.
C18—Cornell-Dubilier type 9 fixed, .01 mfd., 5000 v.
C19—Cornell-Dubilier type 9 fixed, .01 mfd., 1000 v.
C20—Cornell-Dubilier type 9 fixed, .01 mfd., 1000 v.
C21—Cornell-Dubilier type 9 fixed, .01 mfd., 5000 v.

C22—Cornell-Dubilier type 9 fixed, .01 mfd., 5000 v.
C23—Cornell-Dubilier type 9 fixed, .01 mfd., 5000 v.
C24—Cornell-Dubilier type 9 fixed, .01 mfd., 5000 v.
CH1—Hammarlund CHX r.f. choke
CH2—Hammarlund CHX r.f. choke
CH3—Hammarlund CH500 r.f. choke
CH4—Coto-Coil CI-21 r.f. choke
CH5—Hammarlund CH500 r.f. choke
L1—National UR13 coil assembly
L2—National UR13 coil assembly
L3—Coto-Coil BTL inductor
L4—Coto-Coil BT inductor
R1—Ward Leonard No. 507-223, 7500 ohms
R2—I.R.C. 50,000 ohms, 20 watts
R3—I.R.C. 50,000 ohms, 20 watts
NC—National NC-150 neutralizing condenser
T1—Kenyon type T-359 fl. transformer
T2—Kenyon type T-358 fl. transformer

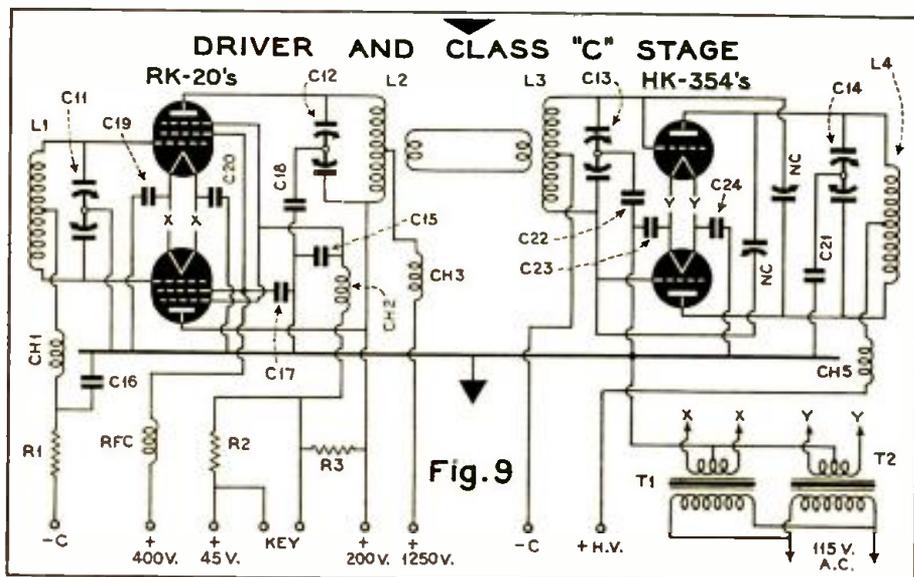


Fig. 9

ON THE MARKET

NEW NATIONAL NEUTRALIZING CONDENSERS

THE NATIONAL CO., Malden, Mass., has introduced a small neutralizing condenser for 6L6s adapted to transmitters, and an entirely new version of the well-known NC-800 neutralizing condenser.



The neutralizing condenser for use with 6L6 tubes is composed of an Isolantite tube, practically identical to the frame of an R-100 choke, with metal caps and pig-tails at each end. The cap at one end is extended to cover a little more than half the Isolantite tube. The other cap supports a screw which can be advanced down the inside of the tube for capacity adjustment. The condenser is light enough to be supported by the pig-tails.

The re-designed NC-800 neutralizing condenser, illustrated herewith, differs from the original in the following particulars: A heavy aluminum mounting base, with three mounting holes, supplants the former metal stamping, and provides greater rigidity. A knurled knob is provided for capacity adjustment. The threaded bearing is 1 9/32 inches long, preventing eccentric operation, wobble, etc. A micrometer type lock is provided which does not require a screw driver or other tool for operation. Fine, accurately machined threads on the rod supporting the top plate also serve to prevent wobble. The two plates are 3/16 inch thick aluminum, rounded and polished to provide maximum breakdown voltage with a minimum of spacing between plates.

The insulating supporting pillars are of genuine Isolantite. Terminals are conveniently located. ALL-WAVE RADIO.

NEW JEFFERSON FILAMENT TRANSFORMERS

TO MORE COMPLETELY meet the requirements for all types of transmitter, receiver and rectifier tubes, Jefferson Electric Company, of Bellwood, Ill., have added three more filament transformers. They are all insulated with ample factor of safety to withstand dependably the high voltages encountered in this service. Of the three new transformers the 464-461 has a secondary of 5V/CT at 12 A and is insulated for 3000 volts. The 464-451 is similar except that it has a secondary of 5V/CT at 20 A. The 464-441 has a secondary of 10V/CT at 4 A and is insulated for 2500 volts. ALL-WAVE RADIO.

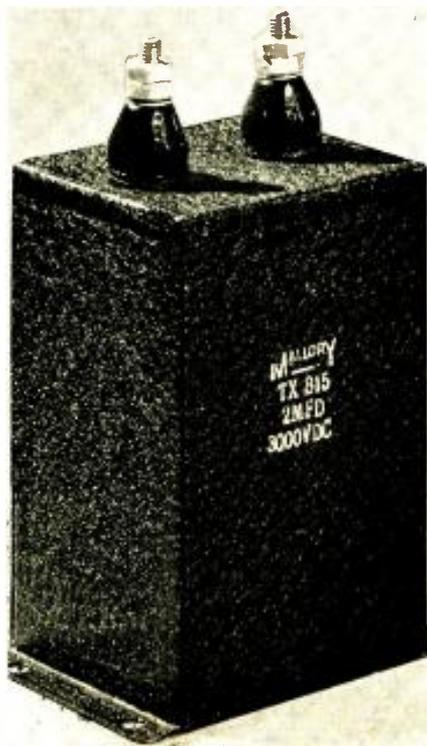
MALLORY TRANSMITTING CONDENSERS

P. R. MALLORY and Company, Inc., announces a new line of condensers, types TX and TZ, for radio transmitter and high-power amplifier applications.

Mallory TX Transmitting Condensers are housed in compact rectangular metal cans, finished with a durable black crackle enamel that matches the other standard transmitter components. Two ceramic stand-off terminal insulators are provided.

Mallory TZ Condensers are dual-purpose units, designed for use in either transmitter filters or heavy-duty power amplifier circuits. These condensers are supplied in round aluminum cans having threaded necks for inverted mounting. Upright mounting can be employed by using a standard ring bracket.

Both types are impregnated with Mallory Compound, a new substance developed after



two years of research. The compound is not a wax nor is it like any of the standard or special-named impregnating oils now offered. It does not contain chlorine, and does not depend on chlorination generally used to develop the high dielectric constant necessary for condensers of compact construction. The natural high dielectric constant of Mallory Compound is combined with unusual resistance to heat, thereby providing a good power factor and an extremely stable d.c. resistance. ALL-WAVE RADIO.

NEW BRUSH PHONO PICKUPS

THE BRUSH Developments Co., Cleveland, Ohio, have announced Models PV-12 and PL-12 crystal phonograph pickups, vertical and lateral respectively, primarily designed for use in broadcasting or wherever



high-fidelity reproduction is desired. Among the outstanding features of design are exceptionally low moment of inertia and low needle pressure. Both pickups employ a sapphire point in place of the conventional type of needle, eliminating the necessity of frequent replacement. These three features assure long record life.

Another feature of both pickups is an adjustable weight on the arm which makes available needle pressures of from .5 ounce to 2 ounces in approximately 1/4-ounce steps. The pickup arms are of cast aluminum and are curved so as to reduce tracking error, and will accommodate all records up to 16 inches in diameter.

Both the PV-12 and PL-12 pickups have flat response characteristics from 30 to 10,000 cycles. The output of the lateral pickup is approximately .05 volt on the average lateral records, while the vertical pickup will have slightly higher output on the average vertical record.

Either of these pickups may be fed into a high-impedance input of anything over 60,000 ohms, or they may be fed into a high-impedance primary, low-impedance secondary transformer for operation into 50, 200 or 500-ohm lines. ALL-WAVE RADIO.

(Continued on page 156)

RADIO SERVICEMEN OF AMERICA INC.

• INCORPORATED NOT FOR PROFIT
304 SOUTH DEARBORN STREET

CHICAGO, ILLINOIS

Qualified Servicemen:

President - - - - T. P. Robinson
Vice President - - A. C. W. Saunders
Secretary - - - - Ingvar Paulsen
Treasurer - - - - Lee Taylor
Executive Secretary - Joe Marty, Jr.

THE organization, Radio Servicemen of America, Inc., has developed from a desire of outstanding radio servicemen in all parts of the country to have an association qualified to assume its rightful place in the industry. The entire aim and desire of RSA is to provide an organization of such character that servicemen will be proud to belong; that the radio industry will consider an integral part of its structure; and that the public will accept because of the high business and professional character of its membership.

The first step taken was to insure, through its by-laws, that the control of the policies and business affairs of the organization should be forever vested in its qualified members, anyone of whom is eligible for service on the board of directors. The by-laws further guarantee that the organization shall be independent and free from subsidy or domination.

An equitable method of representation based directly on radio set population has been worked out whereby the country has been divided into twenty districts. Before June of 1938, members in each district will elect a director to represent them on the national board of directors. As specified in the by-laws, the directors thus elected will constitute the governing body of RSA and will carry on and expand the work thus far done by the first organizing board. The term of office of directors is two years, at the end of which time new directors will be elected by the members in each of the districts.

Qualifications for membership are determined by the local chapters of RSA. Further provision has been made that wherever a local affiliated chapter exists, an applicant must become a member of such local chapter and must be certified to the national office by the proper chapter officers before he can be accepted as a member of the national body; likewise, when a member-at-large moves into an existing chapter area, he must become a member of the local chapter. RSA feels that local problems can best be solved by a united local group acting in the best interests of the majority.

In carrying out these expressed aims and desires, RSA is definitely not interested in a quantity membership, as such. This organization will continue to build its membership from the ranks of radio servicemen who are willing to assume the responsibility of leadership in their profession, true to the ethics of good business and to the welfare of the public they serve.

RSA is the only national service organization that has ever enjoyed the support and cooperation of outstanding individuals as well as all the organized groups within the industry.

Upon acceptance of applications, a member will immediately receive a certificate of membership suitable for framing and a pocket membership card. Regular mailings will be made of advance circuit diagrams which we are receiving by virtue of the cooperation of set manufacturers. A monthly house organ containing interesting news and editorials will be mailed to members. We stand ready at all times to help local chapters and individuals solve problems that affect their welfare. We are embarking upon a program designed to educate the public to the need of reliable radio servicing and will use such media as newspapers, periodicals and local broadcasts in towns where local chapters, already exist. Through the pledged cooperation of publishers, manufacturers and trade journals, we offer our members accurate, expert information and technical advice at no cost. Through these same contacts, a National Speakers Bureau is being established to provide outstanding speakers for all chapters desiring experienced lecturers. Education in actual service problems as well as technical theory is planned for the immediate future.

All of the above services are rendered to our members at only \$2.00 per year for national dues for 1938. Fill out the application form herewith and send it to the national office at once. Where a local affiliated chapter exists, your application will be sent to the proper local Secretary for certification and upon your admission to the local chapter and upon payment of local and national dues for 1938, you will receive immediately your membership card and other material mentioned above.

Fill in necessary information—tear out—mail to R S A,
attention of Joe Marty, Jr., Executive Secretary, 304 S.
Dearborn St., Chicago, Ill.

Radio Servicemen of America, Inc. (Incorporated Not for Profit)

304 South Dearborn St., Chicago, Ill.

APPLICATION FOR MEMBERSHIP

Gentlemen:

I hereby make application for membership in the Radio Servicemen of America, Inc.

Affiliated with Local Chapter in

Personal Name

Home Address

City State

Firm Name

Address

Telephone (home) (firm)

Years Experience Age

Membership in other Associations

Whole or Part Time Radio Serviceman

If Part Time, what portion is devoted to Radio Servicing
($\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, etc.)

What are your other duties

Education other than Radio

Radio Training or Courses

Testing Equipment

It is my sincere desire to become a member and adhere to your principles of fair competition and ethics and if accepted do solemnly swear (or affirm) that I will faithfully fulfill my obligation as a member of the Radio Servicemen of America, Inc.

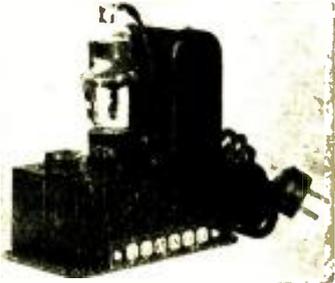
Signed Applicant

Approved: Chapter Secretary

Executive Secretary

AMERICAN AUDIO OSCILLATOR

THE AMERICAN Audio Oscillator is designed as a versatile instrument to fill many requirements of either the radio amateur or serviceman. The unit supplies voltage for the American Code Reader and at the same time allows an operator of a radio transmitter to hear as well as see whatever he is sending. The Oscillator will operate a loudspeaker effectively and uses only a single tube—one 12A7.

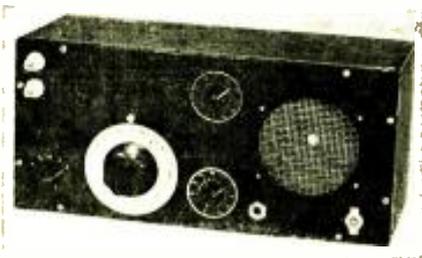


The unit is very attractive in appearance. An easily read terminal strip provides for immediate connections. Variable frequency controlled over a wide range is obtained with the turn of a knob. The unit operates on 110 volts a.c. or d.c. and is manufactured by the American Communications Corporation, 1650 Broadway, New York City, N. Y. ALL-WAVE RADIO.

“ULTRA H. F. CRUISER”

RADIO CONSTRUCTOR Laboratories, 136 Liberty Street, New York, N. Y., announces a new addition to its line of short-wave receivers. The “Ultra H. F. Cruiser,” as it is called, was designed by A. J. Haynes and covers the tremendous frequency range of from 28 megacycles to 80 megacycles. This range includes the new television channels and the latest ultra-high-frequency broadcast allocations recently opened by the Federal Communications Commission. Sound signals of television broadcasts can be heard. The amateur five-meter and ten-meter bands are also included, as well as two-way police radio service.

The circuit uses a 6K7 super-control radio frequency amplifier, a 6J5 super-regenerative detector in a highly efficient circuit, a 6J5 audio amplifier and a 6V6



beam power output tube driving a five-inch dynamic speaker. Transformer coupling is used for the final stage. A 5W4 rectifier supplies the high voltage. The set is full a.c. operated. Its features include efficient band switching, earphone jack, standby switch for amateur work, etc. It is supplied completely wired and tested by the manufacturer. ALL-WAVE RADIO.

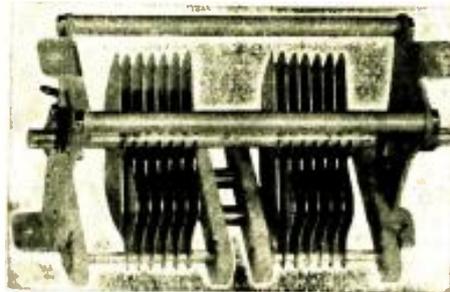
BUD JUNIOR TRANSMITTING CONDENSERS

BUD RADIO INC., of Cleveland, Ohio, has just announced a new Junior line of transmitting condensers with features and improvements never before obtainable in a transmitting condenser of low price, it is said.

In order to conserve weight and space, plate spacers have been eliminated. Brass stator and rotor plates are electro-soldered to their respective shafts, permitting a permanent low resistance connection. The edges of the plates have been rounded and buffed to minimize corona discharge. Rotor plate diameter is 2¼”.

The neat, trim appearance of these condensers is due largely to the fact that no excess metal is used anywhere in their construction. The insulation bars are made of Alsimag 196. A lustrous nickel finish is given to the rotor and stator assemblies. The rotor connection is made through a double-acting phosphor bronze spring placed at the rear bearing. Stator connections are provided at all four corners.

Brackets have been formed on the top and bottom of the end plates so that the condenser can be mounted with the stator either up or down. In either case, the extra set of brackets provides a convenient coil mounting.



In the split-stator models, two more bars of Alsimag 196 are placed at the center of the frame in order to anchor each stator section at all four corners. This has not been the usual practice in the design of a low priced condenser, but it is quite necessary for vibration-free operation.

The minimum capacities of these Junior condensers are exceptionally low, due to their modern efficient design. This results in a larger capacity ratio, which is a very desirable feature in multi-band transmitters. ALL-WAVE RADIO.

C-D TYPE BR ETCHED-FOIL ELECTROLYTIC

A STARTLING REDUCTION in size of electrolytic capacitors is clearly shown in the accompanying illustration (exact size). Cornell-Dubilier engineers have succeeded admirably in designing the new C-D type BR etched-foil electrolytics to a physical size said to be one-fifth that of corresponding types, and retaining the excellent and dependable characteristics outstanding in all Cornell-Dubilier capacitors.

Constructional and servicing advantages are readily seen. The C-D type BR's fit conveniently into the most confined spaces; their high quality characteristics make them ideal for servicing jobs, especially a.c.-d.c. midjets. Both terminals are

insulated, protective cardboard sleeve is supplied to insulate container, the compact unit being hermetically sealed. Installation, therefore, is made as simple as mounting a tubular paper condenser!



Cornell-Dubilier type BR dry electrolytics are available in single sections only, in capacities of 4, 8, 12, 16, 20 and 40 mfd. at 150 volts d.c. and up to 8 mfd., 450 volts d.c. Full details will be sent upon your request. Address Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey. ALL-WAVE RADIO.

TRANSDUCER BALL MIKE

IN ADDITION to their “Bullet” microphones, Transducer Corporation has announced a new Ball Type dynamic microphone, Model MK-35.

The new “Ball Bullet” is housed in a spherical metal case 3” in diameter, finished in “satin black.” It is equipped with a swivel bracket and can be used as either a directional or non-directional microphone.

Sensitivity of the “Ball Bullet” is —52 db., impedance high, approximately 50,000 ohms, or low, approximately 200 ohms.



Frequency response is said to be flat from 30 to 10,000 cycles. It is equipped with cable connector and 25 feet of cable. ALL-WAVE RADIO.

NEW REPRODUCING TABLE

SOUND APPARATUS CO., 150 W. 46th St., New York, N. Y., are offering a complete reproducing table for high-fidelity lateral reproduction. This table includes a dynamic pickup having a flat frequency response of
(Continued on page 169)

(Continued from page 153)

type which does not become brittle and crack with age. The moisture conditions made it necessary to select the best available transformers with respect to impregnation and sealing. Only those given the most careful varnish and vacuum treatment and poured with a non-hygroscopic compound could be absolutely depended upon.

The high quality, clean cut signal of WAWG-OX2QY-W10XAB has been complimented by several broadcast engineers who have expressed surprise at the excellent signal strength laid down in the metropolitan area.

Mrs. MacGregor has been able to follow all transmissions regularly with the S-17 Super Sky rider, at her home in New York City.

ULTRA-HIGH

(Continued from page 137)

tions do not come through every day, but watching this part of the band between 9 a.m. and 12 noon is well worth while.

The London station operates on 41.5 mc. (voice), the French transmitter on 42.005 mc., and the German on 42.5 mc.

Experimental Stations

Clyde Criswell, W26P1, Mission Ranch, Phoenix, Ariz., notifies us that on Dec. 2nd, 1937, at 10:40 a.m. he heard HRX2, San Pedro, Honduras, and HRX7, Los Limos, operating duplex on the announced frequency of 43.0 mc. Mr. Goddard of Riverhead, L. I., also heard HRX7 Clyde C. also states that they operate irregularly on 48.0 mc. about 3 p.m. Clyde and your reporter would like to know whether these are the first South or Central Americans heard on the u.h.f.?

On December 12th at 8:06 a.m. your writer pulled in a station signing as HK3 and calling HK5. No announcement of frequency, etc., were given, but we placed them on about 32.5 mc. Does anyone have any information on this one?

Last fall the New York City Fire Department increased its service by adding two-way radiophone communication with most of its fireboats. Each night at 12 the control station WNYF, 1630 kc., calls upon each boat captain to make his report for the day. The boats are reported to answer on 35.6 mc. Unfortunately, because of the time, only those listeners in the immediate vicinity of the big city will be able to hear this service. All powers 50 watts.

W2XNA..... Fireboat J. Duane
W2XNB..... Fireboat T. Willet
W2XNC..... Fireboat W. L. Strong
W2XND..... Fireboat G. B. McLellan

(Continued on page 159)

McMURDO SILVER MASTERPIECE

"MASTERPIECE VI EMBODIES MERITORIOUS FEATURES TO MY KNOWLEDGE FOUND IN NO OTHER ONE RECEIVER"

Lee de Forest.

● Among the illustrious names on the roster of Masterpiece VI owners, none carries more significance in the world of Radio than Dr. Lee de Forest... inventor of the Audion Vacuum Tube... father of modern radio broadcasting. Commenting on the performance of the Masterpiece VI in the music room of his Hollywood home, Dr. de Forest said:

"To properly appreciate and enjoy the best that Radio can offer, those gifted with culture and refined taste must listen to its interpretation by such an excellent instrument as this one of yours.

"... today's radio-tastes have been so far advanced, by our better musical programs and by such adequate interpreters as your Masterpiece that new and exacting criteria, unknown heretofore, demand compliance.

"This superfine Masterpiece VI nearly meets them all: controlled fidelity and selectivity... wide volume range with expander... both bass and treble controls... universal frequency-coverage... extreme sensitivity... tremendous power... rich reproduction of tone... A.V.C., of course... and other meritorious features to my knowledge found in no other one Receiver. You have done a job here of which you and your staff may well be justly proud."

If you want unlimited, adequate radio reception, you owe it to yourself to investigate McMURDO Silver's Masterpiece VI. Here is radio that assures true interpretation of fine symphonies, thrilling arias... which, with uncanny "reach" goes to the earth's four corners to snare unique and unusual programs. Thirty-six distinctive technical features are responsible for its "Years Ahead" performance... performance that has won the acclaim of Europe's noble families, America's social leaders, internationally famous musicians, technical schools, laboratories, and radio distance receiving champions. Send for details.

McMURDO SILVER CORPORATION
2900-B South Michigan Avenue, Chicago, Illinois

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COMPLETE AN INVALUABLE REFERENCE LIBRARY NOW!

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ORDER FROM ROOM 601, 16 EAST 43rd ST., NEW YORK, N. Y.

Backwash

BRITISH PANORAMA

Editor: I am sorry that I have no hogsheads of tobacco to hand you, after the fashion of Mr. Cooper. I should, however, like to hand you a pat on the back re your magazine.

That it covers a wide field is apparent, for it contains articles which interest both my pal and myself. As said pal owns a Ham transmitter and talks so much of advanced wireless that one thinks he was reared on a diet of H.T. juice and L.F. signals, it speaks much for your paper that it is also of interest and practical help to my humble self, who is veritably the most unlearned of all beginners.

And listen, Ed. Even though you were beaten on the post with the idea of levering several tons of tobacco out of Mr. Cooper, don't forget that there are others beside the said Mr. Cooper who would like to see what you and your staff look like. Also, now that the tobacco wheeze is over, I don't see any useful purpose in confining any photo of your staff to the male sex, if you have any fb YL assistants knocking around. So QSL with your photo, please.

Besides, I sometimes have a grouse against you, just little grouses mind you. And it is so much more zestful if you have a photo of cussee to cuss at. Take Mr. Zeh Bouck for instance. He seems to think the Droitwich News Bulletins are the soul of honor and truth. I admit they are a bit more truthful than Moscow, for instance, but for all that there is quite a lot of dangerous material that slips into the B.B.C. programs, all wrapped up. Without entering into political arguments, which don't mix with any hobby (but politics), most people in England, (no matter if they are Conservative, Labor, Fascist or Liberal), regard the B.B.C. as a chronic case of measles, liable to break out into bright red spots at any moment.

I must say your magazine seems to have a higher tone about it than the average American radio mag. Also, it deals with all waves.

With regard to the situation of my "shack." Mapperley is situated on the Mapperley Plains, a range of high hills, the second highest in Nottingham Shire, at their highest point. Height above sea level about 668 feet. Nottingham City is four miles to the S. W., its position being Lat. 52.57 N. Long. 1.08 W. I am near enough to Nottingham to get cheap juice, but far enough away to miss QRM. We are in the English Midlands. From the top of the "Plains" we can see Derbys, Leicestershire, Rutlandshire. There are no higher hills between our range and the coast to the East, so signals from this direction should be good. Radio reception in general is so good at Mapperley, that the Nottingham

Redifusion Co. have their receiving station at Mapperley. Possibly a Redifusion Company is something new to the American listener, but the idea as worked in this city is for a large company to have a tremendously powerful receiving station and radiate the programs received over land lines to loudspeaker sets in private houses. This costs you the equivalent of 12 cents weekly and you have the choice of two programs. These two programs are picked by the Redifusion Company, who usually put out all symphony concerts, talks, etc., on the "A" line and variety, comic opera, musical comedy, plays, etc., on the "B" line. They do not tie themselves to an all-British program and quite often re-broadcast an American program if there is nothing special on our B.B.C. programs.

KENNETH N. MARWOOD
5TH DIV. ST. J. AMBULANCE BRIGADE
HILL CREST, 148 KENT RD.
MAPPERLEY, NOTTS., ENGLAND

(We shall consider the matter of a group photo including the YL's. They are all excessively beautiful, of course . . . how could we say otherwise and continue living around the place. The American equivalent of your "Redifusion" is the local Muzak Corporation who pipe programs via telephone line into restaurants and private residences.—Editor.)

PAGING C.W. LISTENERS

Editor: Having read your column Backwash for some time, I have decided to put in my "two cents." Hi! Am interested in hooking up with someone interested in c.w. reception. Have seen quite a few AWR letters on the column but have noticed no QRA's were published.

Am studying for my "ticket" which I hope to get in the near future. The rcvr. used at the shack here is a Hallicrafter's Sky Chief.

Well, will be saying 73 after a 100% QSO.

ROBERT TRUHLAR, W11H46
709 W. 61 PLACE,
CHICAGO, ILL.

(You'll probably hear from many of the c.w. boys. There's lots to be done. Here's hoping you get your ticket the first shot.—Editor.)

CANADIAN VIEWPOINT

Editor: Your magazine is certainly read from cover to cover. I have trouble keeping it in the shack because my radio friends sure think it's tops. I have only missed three issues of AWR since it came on the market—Oct. 1935, and May and June, 1936.

As I have to write you about my subscription, I may as well make some com-

ments. The article "Hamfest" by W8QMR is very fine business, but why all the talk about U. S. Hams? How about some Canadian news?

"Globe Girdling" by J. B. L. Hinds is 100%. Even though I'm an amateur, I still get quite a thrill listening to foreign broadcasts. I find the article sure has the right dope on s.w. stations.

"Channel Echoes" by Zeh Bouck is very good, but why doesn't he get more news, or does the Editor make him stay on one page? What say, Zeh?

While there is considerable talk about SWLs and QSLs, I would like to say that some Hams take the attitude of ignoring cards from SWLs and Hams. I have found from experience that the Canadian fellows are the best ones to QSL; they sure appreciate reports from SWLs if these reports are found to be correct. I myself get quite a joy out of exchanging cards, but then we are not all able to QSL.

I might say before closing the rig hr, is a 53 xtal osc., es doubler, and a 45 final, with 50 watts input. The receiver is an 8-tube job, both units homemade. Am having good results and expect to put in a fone section in the near future.

JOHN C. HILL,
27 GLENHOLME AVENUE,
TORONTO, ONT., CANADA

(Thanks for the roses. They help keep the pot boiling. We're already on W8QMR's tail about Canadian dope.—Editor.)

A BOOST FOR "P.R.M."

Editor: Very glad to have received my copy of the PRACTICAL RADIO MANUAL. Only at the Library of Congress, Washington, D. C., the repository of all copyrighted books, may one avail himself of the privilege of examining and comparing books, regardless of context. For instance, considering radio books, the copyrighted volumes doubtless embrace every known title from the earliest to the recent publications. Culling from among them, it becomes apparent that the PRACTICAL RADIO MANUAL, comparatively, is in a distinctive and appealing class by itself, particularly since theory and practice have been clearly detechnicalized to the easy readability of a daily newspaper. In this respect, the Manual should prove to be a welcome boon especially to the layman, the student, as well as the radio experimenter.

N.B. Should I not know whereof my deductions, when the year 1912 was in the initiatory date of my introduction to radio, formerly being "9JA." Mr. Granger has done what others have talked about doing.

CHARLES J. HAVLENA,
41-1424 CAPIN ST., N. W.
WASHINGTON, D. C.

(Continued on page 169)

(Continued from page 157)

W2XNE.....Fireboat W. J. Gaynor
 W2XNF.....Fireboat J. P. Mitchel
 W2XNG.....Fireboat A. S. Hewitt
 W2XNH.....Fireboat J. J. Harvey
 W2XNI.....Fireboat C. W. Lawrence
 W2XNJ.....Tender Connell

The reception of W10XED, also mentioned in last month's article, has been completely verified. W10XED at that time was operating portable in East Denver, Colo., and was on 37.6 mc. It is worthy of note that, in 99% of the cases, correct reception reports of broadcast pickup transmitters are verified.

Bill Martin, Jr., reports having intercepted the Calif. Institute of Technology stations W6XXK, Pasadena, and W6XKY, on the summit of Palomar Mt. They employ 40-watt transmitters and beam antennas, as they are separated by over 80 miles of intervening mountain peaks. It is quite probable that during this month both stations will be heard on the east coast. Frequency is 41.0 mc. All operations by cutting the carrier. They have daily schedules at 1:30 and 6.30 p.m.

Police Stations

We have done little listening on the police frequencies lately, but Clyde C. sends along a few that are best heard in his district.

W5XB, Ft. Worth, 33.1 mc.; W3XBG, Norfolk, Va., 33.1 mc.; W1XAO, Boston, Mass., 35.6 mc.; W2XHL, New Rochelle, N. Y., 40.1 mc.; W2XKJ, East Orange, N. J., 40.1 mc.; W2XFA, Jersey City, N. J., 30.1 mc.; W2XCJ, Bayonne, N. J., 37.1 mc.; W1XLA, Boston, Mass., 37.1 mc.; W1XHX, Lowell, Mass., 37.1 mc.; W2XHQ, Millburn, N. J., 37.1 mc.; W8XF, Hamilton, O., 37.1 mc.; W8XAO, Dearborn, Mich., 37.1 mc.; W3XFZ, Princeton, N. J., W3XBR, Sharon Hill, Pa., 37.1 mc.; W2XQG, Hempstead, N. Y., 40.1 mc.; W6XWO, Compton City, Calif., 33.1 mc.; W6XPA, Los Angeles, Calif., 33.1 mc.

We wish to thank all those listeners and members of the R.S.S.L. who have helped make this column possible and hope that many more will soon join the ranks of reporters.

Address all material, inquiries, etc., to Perry Ferrell, Jr., Linwood, N. J., enclosing return postage if you desire a reply.

SILVER "15-17"

(Continued from page 145)

"15-17" seemed the equal of the lab jobs in all respects. We did not expect, for instance, that the "15-17" would have a high-frequency response as good as

the "standards" but insofar as the ear alone was concerned, little if any difference could be noted when switching from one receiver to another. More surprising was the fact that the bass response of the "15-17" was superior to one of the lab jobs. Considering the matter on the basis of extremes, the "15-17" has the distinction not apparent in most receivers of a musical "presence," captured only when the overall response takes in the deep tones of the organ and

the tinkling of the bells and triangles of an orchestra. The low frequencies give depth while the high frequencies add definite crispness. The "15-17" has both.

The more selective positions of the bandwidth control removed much of the perspective by cutting out the higher frequencies. The 8-kc. position, however, is excellent for most purposes . . . about what you would normally expect from a good receiver. The 3-kc. position is definitely too sharp for good program re-

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Filament Amps	2.5
Amp. Factor	T-40..... 25
Amp. Factor	TZ-40..... 62
Plate Volts	1000
Plate Current	115 ma
Plate to Grid	4.5 mmf
Driving Power	Class C..... Max 10 watts
Driving Power	Class B..... Max 3 watts
Class B. Audio output ..	TZ-40... Two Tubes... 175 watts

EASY TO DRIVE

For CW or buffer operation the grid current should be 15 ma and for plate modulated phone operation should be 23 ma. All ratings given are conservative. These new WONDER TUBES use the famous processed—Heat Tested Speer Carbon Anodes which can be run at red heat without injury to filament emission

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production, but is definitely of value in slicing through bad QRM, which is the principal idea.

The speaker is well able to handle the high power output of the receiver—it has, as a matter of fact, what one might call "floor shaking" qualities; meaning that it will shake the floor before shaking itself into a state of distortion.

Some very weird effects can be obtained by means of the bass response control. With the bass removed and the selectivity switch in the 3-kc. position, the effect is much the same as that obtained with a crystal filter. This can be varied at will, either to reduce background noise during DX reception, to obtain the proper level for speech, or to build up the bass for musical renditions.

Air Tests

The sensitivity of the receiver was well proven during reception tests on all bands. A run through the standard broadcast band in the early evening netted us 76 stations, an average of not quite one station for each 10-kc. channel. No difficulty was had in pulling in the west coast in the late evenings. Reception in the short-wave broadcast bands was equally as good, though conditions during the tests were rather poor. Nevertheless the European locals and the down-unders were picked up with good level, and some severe fading, as indicated by the tuning indicator, was flattened out to a comparatively smooth level by the excellent action of the amplified automatic volume control system.

Conditions at the time were also poor in the ultra-high-frequency bands, and though we had poor luck with the apex broadcast stations, few of which are ever heard in the Proving Post locality, results

on the 10-meter amateur phone band were beyond our expectations. The band appeared hot when it was really poor. The 5s, 9s and 6s were rolling in, as well as a few K6s, COs and LU1DA. The sensitivity of many receivers drops off appreciably at 10 meters, but the "15-17" has a lot on the ball in this region.

The extreme selectivity of the receiver in the 3-kc. setting of the selectivity control was also found of distinct value for the reception of c.w. signals. It was possible to approximate "single-signal" reception by the offset beat method, which required only a slight change in the adjustment of the b.f.o. pitch control at the rear of the chassis.

The frequency drift, as measured from a cold start, was negligible in both the instance of the high-frequency converter oscillator and the beat oscillator, both of which are electron coupled. The use of air trimmers in the r.f. circuits, inductive tuning in the beat oscillator and i.f. stages, and adequate shielding against heat, explains the good frequency stability under all conditions.

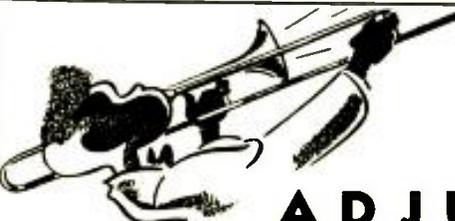
NEWCOMER'S RIG

(Continued from page 126)

Vibrapack and from the Vibrapack to the transmitter should be of heavy wire (No. 12) and no longer than necessary, because of the comparatively heavy current flowing through them. The Vibrapack will draw approximately 5 amperes, while the heaters of the tubes in the transmitter will draw another 5 amperes. Because of this, switching is done at the Vibrapack rather than at the transmitter. Two 15-ampere toggle switches on the Vibrapack "panel" are used for "filament" and "plate" switches. They are wired in series so that it will be impossible to apply plate voltage to the transmitter without the tube heaters being on.

It is necessary to place an 8 mfd. filter condenser across the Vibrapack output if the full 300 volts at 100 ma. is to be secured. The connections shown for both the transmitter and the Vibrapack are such as to utilize the first filter condenser in the transmitter for this purpose. This provides the amount of filtering recommended by the Mallory people for their Vibrapack. Both the filament transformer, T3, and plate transformer, T4, in the transmitter, together with the 5Z3 rectifier tube, are automatically cut out of circuit when the battery power plug is inserted in place of the a.c. power plug. This prevents any damage either to the transformers or to the battery.

The Vibrapack is rated to furnish 300 volts at a 100 ma. on load. In our case




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the storage battery used for test purposes was not up to full charge, the voltage under load being a little under 6 volts. With the same degree of antenna coupling employed for operation of the transmitter on a.c. power the final stage of the transmitter drew 40 ma. with battery power, while the actual plate voltage was 260 volts. This permitted of an input of approximately 10 watts to the final stage for c.w. operation. The total plate current for the entire transmitter drawn from the Vibrapack under these conditions was exactly 100 ma. This was measured by inserting a milliammeter in the power cable at the point marked "X" in Fig. 3.

With the "Fone-CW" switch on the transmitter thrown to the "Fone" position, the plate voltage dropped to 240 volts. The total current load on the Vibrapack was 110 ma. without modulation. Under full modulation this increased to 115 ma. The output on phone is, of course, quite low, the power in the antenna being only of the order of five watts. This five watts of phone carrier, however, should be "worth its weight in gold" (Hi!) for an emergency signal when it is considered that it can be obtained on a 10-ampere drain from a single 6-volt storage battery. Emergency work is usually accomplished on temporarily cleared channels, making this "five watter" capable of communication over considerable distances under such conditions.

GLOBE GIRDLING

(Continued from page 134)

Vedado, Apartado (P. O. Box) 33, Havana, Cuba.

COBX, 9200 kc., Havana, Cuba, advises station is on the air daily from 11 a.m. to 12 midnight. They are only using the above mentioned frequency so far.

Mexicans

XEKM, 6050, kc., Leon, Mexico, mentioned in this section in November last, advises that they have given up the intention of broadcasting on short waves for the present at least. Station has, therefore, been removed from the non-authenticated block where it has been carried since November.

XEME, 7010 kc., Merida, Yucatan, Mexico, seems to have dropped from hearing, as no reports have been received since reported in February.

XETW, 6045 kc., Tampico, Mexico, reported by a number of listeners between 7 p.m. and 10 p.m. Also heard on special English DX program between 1 and 2 a.m. on Sunday. Late advice from

station gives address and schedule as now shown in list. Relays programs of long wave XEFW on 1310 kc. and transmits with 100 watts power. No International Reply Coupon required by station in the issuance of verifications.

U S. Stations

W6XKG, 25950 kc., Los Angeles, California, furnishes letter verifications of reception. Outside of excellent coverage in the United States and Canada this 100-watt station has been reported from England, Ireland, Scotland, Norway, Germany, Australia, New Zealand, Porto Rico, Hawaii, Alaska and Japan.

W4XB, 6040 kc., Miami, Florida, while not on the air at this writing, may be relaying the programs of WIOD when this article will have reached you. The engineers have been delayed in getting it ready to return to the air due to WIOD's change in frequency from 1300 kc. to 610 kc., which entailed a great deal of work. The new address of W4XB is News Tower, Miami, Florida. It is understood that the approximate starting date will be February 15th and that W4XB will operate daily between 7 p.m. and midnight with variable day hours.

W8XAL, 6060 kc., Cincinnati, Ohio, advises that they issue a verification letter and inasmuch as this has always sufficed, they have never used verification cards. They contend that more information can be given in a letter than could possibly be printed on a card.

Amateur Phones

The following is a list of 20-meter amateur phone stations not previously reported or listed:

Country	Frequency	Calls	Time Heard
Africa (South)	LF	ZT1R-ZT1M-ZU5Z	3:15-4:05 p.m.-12 a.m.
Africa (South)	LF	ZS6AJ	11:25 p.m.
Africa (South)	HF	ZT6AK-6AF-6AL-5S	10:30 p.m.-12 a.m.
Africa (South)	HF	ZS5J-ZT6AM-ZS5M	10:30 p.m.-12 a.m.
Africa (South)	HF	ZU5G-5Q-1T	3-10 p.m.
Africa (Mor.)	LF	CN8MB	5 p.m.
Argentina	LF	LU1OV-1QA-4BL-5AN	7-9:52 p.m.
Argentina	HF	LU2BG	8:50 p.m.
Belgium	LF	ON4SS-ON4PA	10 p.m. and 7 a.m.
Barbados	LF	VP6MR	5:13 p.m.
Bermuda	LF	VP9G	5:30 p.m.
Chile	LF	CE1AE	7 a.m.
Colombia	LF	HK5AW-HJ1JN	6:40-7:20 a.m.
Cuba	LF	CO8KJ-2WW-2XX-8BC	4:52-11:36 p.m.
Cuba	LF	CO7HF-8VZ-8JV-8RC	5:36-6:55 p.m.
Costa Rica	LF	TI2DC	5:08 p.m.
England	LF	G5QN-5VX-6GF	2:04-3:45 p.m.
France	LF	F8XT	8:45 p.m.
Hawaii	AB	K6BT-6MTE	4:30-5 p.m.
Irish Free St.	HF	E13CC	7:52 a.m.
Irish Free St. (North)	LF	GI6G	7:57 a.m.
India	LF	VU2BG	6:45 a.m.
Java	HF	PK3WL	6:30 a.m.
Mexico	HF	XE2IY	5:30 p.m.
Portugal	LF	CT1DA-CT1QG	2:09-4:25 p.m.
Porto Rico	AB	K4ENY-4FAY	7 a.m.-12:05 a.m.
Panama	HF	HP1A	5:03 p.m.
Peru	HF	OA4C	11:15 p.m.
Sudan	14350	ST6KI	3 p.m.
U.S.S.R.	LF	U1CR	10:28 p.m.
Venezuela	HF	YV1AC	8:14 a.m.
Venezuela	LF	YV5ABY-5AD-4AO	8 p.m.-12:13 a.m.



New Amplifier for Direct Current Circuits

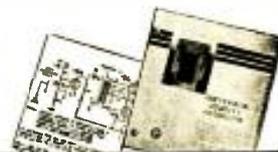
Added to the long list of amplifier circuits developed in the radio research laboratories of the Jefferson Electric Company is the Jefferson 10 Watt 25L6 Amplifier.

This may be connected to the usual 110-115 Volt direct current source of supply found in many sections — and makes unnecessary the use and expense of a converter.

Metal tubes are used throughout, including four 25L6's in the final stage. The extremely high gain of 139 decibels is attained with perfect stability of operation . . . Mikes of the lowest output levels swing the amplifier to full output of 10 Watts.

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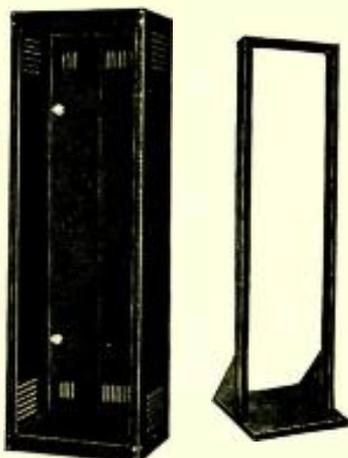
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CHANNEL ECHOES

(Continued from page 135)

astrological make-up—but buy all four anyway.



WE HAVE ON HAND a goodly number of candidates for our suggested "I won't laugh" boycott—the idea being that some courageous member of a studio audience yells out "I won't laugh when the director holds up a sign 'LAUGHTER' at one of the Jack Benny-Jolson-Cantor wise-crack plugs." We're still waiting to hear from Ned Sparks.



THE STENCH OF radiodors is rather heavy this month, and we have as reeks, "The American Family Robinson," stations KFXD, KIDO, KARK, XELO, WBBM, KFAB; Boake Carter and Philco, the paucity of Christmas programs over the NBC and Columbia, Philip Morris, Chesterfields, Lucky Strikes, Pall Mall, Pepsodent, Chase and Sanborn, One Man's Family, Kentucky Club over WJR. And we desire to compliment the following upon their sensitive (?) nostrils: Warren H. Stark, Francis E. McAllan, Robert Baker Young, J. O. Faris, Jr., Paul R. Jones, Lee Williams, and our old reliable John E. Owens. However, the free subscription goes to W. H. Maloney, who, in the following letter, takes the column right out of our hands:

"In regard to 'radiodors,' first 'reek of the month' or whatever you wish to call it, I believe I can offer you the most pungent tidbit of the year.

"Fired with an earnest desire to win friends and influence people, and otherwise survive without benefit of Listerine, Mum and Pepsodent, I tuned in Dale Carnegie (most popular winner and influencer) last night. The last five minutes of his quarter-hour broadcast was taken up with a high-pressure exposition of the virtues of Colgate's Shave Cream. Even at this stage I noticed 'radiodors' in my nostrils, but the punch line hadn't even been uttered. After the aforementioned five minutes of the coolness, softness and stuff concerning Colgate's, Dale came through with this classic—

"Ladies and gentlemen, these things which I have just said about Colgate's represent my own opinion of this marvelous shaving cream. The Colgate people did not ask me to say them [bad, but wait!] they didn't even know I was going to say them!"

"Now wasn't that nice of him—a ducky little surprise party for the sponsor. Honestly, Zeh, I give up. I run a ham station for a hobby, and I've never been on 160 meters. But it can't be that bad.

From now on I'll stay on the ham bands where they may be vulgar but not naive. And just to show you that I'm not an old cross patch and meanie, I'll hand a bouquet to Crosby and his Music Hall. The commercials are so darned good-natured that one can digest them with comparative ease."—Bill Maloney, W9GRV, care of Fred S. James and Co., 175 West Jackson Boulevard, Chicago, Ill.

DE LUXE B. C. SET

(Continued from page 123)

from making it possible to cut in any r.f. unit instantaneously without waiting for the tubes to warm up, this arrangement overcomes any tendency toward frequency drift and greatly increases tube life, since it is the sudden rush of current which occurs when the tubes are first turned on and the subsequent heating of the element structure that causes tubes to become noisy and to change their characteristics.

R.F. Transformer Details

Fig. 7 shows one of the r.f. transformers removed from its can. This particular unit covers a frequency range of 1000 to 1700 kc. It is tuned in the same manner as is any i.f. transformer, but the lower coil may be moved to provide any degree of coupling. If, for instance, a very wide channel must be covered, it is possible to obtain a perfectly flat-topped curve by over-coupling two of the transformers to give a "double-humped" response, with the other two slightly under-coupled so that their peaked characteristic will fill in the hollow. While a skilled technician can make these adjustments by ear, the use of an oscilloscope is strongly recommended.

Transformer Couplings

There are only one or two points that require care; the antenna coupling unit should be slightly over-coupled, rather than otherwise, in order that circuit noise may be properly suppressed. The last transformer should be adjusted in the same way to avoid any tendency toward overload in the final r.f. stage before the proper level is reached at the grid of the detector. In this connection, it should be remembered that best detector characteristics with true linear response require that the signal at the detector grid be comparable to the bias voltage. This is just another way of saying that there should be more or less definite relationship between r.f. gain and audio gain, since obviously, high gain in the audio channel will make it necessary for the detector to operate at a low level. This point will be discussed more fully when

considering the adjustment of the installation as a whole.

Next month we will give construction details on the 15-watt Class A type of high-gain audio amplifier, as well as the details of switching mechanism, remote control relays, and the automatic record-changing mechanism.

A TICKET AT 50

(Continued from page 121)

midnight where we were, and something like noon in the summertime where those dots and dashes were coming from!

That settled it.

Next day I had the "Hand Book," the "Manual" and "How to Become an Amateur" and started in.

For a while I thought there was going to be nothing to it. But I began to hit the snags. Questions kept arising in my mind that the books didn't seem to answer, and in the few opportunities I had a chance to talk with Bill he couldn't quite clear them up to my satisfaction. About that same time I ran across the "Barb and Ernest" articles in ALL-WAVE RADIO and, while they helped a great deal, they didn't clear up all those 162 questions in the "Manual" by a long shot.

So I went a step further and bought Ghirardi's Radio Physics Course. And still I was licked! Maybe I was just dumb—but at that I'll take my hat off to the 50-year-old man who has had comparatively little physics in school or college and yet can teach himself enough radio theory out of the books to pass an exam. Maybe anyone can do it *in time*, but I didn't want to wait till I was 60 to get a license.

Enter the Tutor

Moreover, I was pretty near ready to quit. First I had thought I'd never get the code. Now I figured I was hopelessly bogged down in the theory end. Electrons were doing a hop, skip and jump that just didn't make sense.

But I decided I wouldn't throw in the towel without taking one more crack at it.

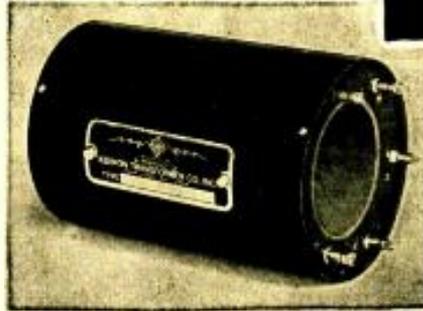
I got a tutor!

The questions I asked him must have driven the poor man almost nuts. Each time I arrived for the lesson I had a whole page full of "stickers" to shoot at him; but each time I left I had the troublesome points cleared up so I could move on to the next section with more confidence. Fortunately for me, my tutor was not only an intelligent teacher but he sure had the gift of patience as well.

Just as there had been a point in the code struggle where it "broke open" rather suddenly, so did the sun seem to break through the fog surrounding the

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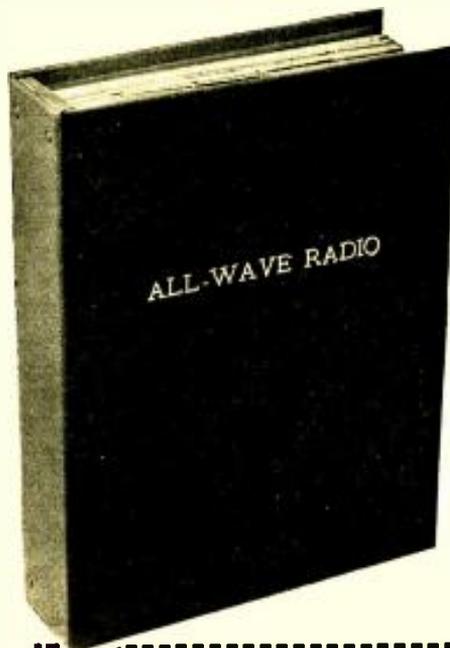


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theory and I began to see what it was all about. I had taken ten one-hour "lessons" over a period of three weeks, when I made up my mind I'd shoot the works. But, remember, I had worked steadily during those weeks almost every night for two or three hours, and sometimes more. Receiving, sending, theory—earphones, brass and diagrams! I just lived with them—and probably wasn't fit to live with.

The Zero Hour

The first thing I knew, it was tomorrow morning.

Was I nervous? What's the use of kidding—sure I was! It happened to be a Saturday when I went to take the rap, and I found at least twenty would-be hams milling about the place. Some of them were adjusting keys at the test desks and others were rattling off practice stuff about 20 w.p.m. When I learned that most of them were back for a second crack at it—and one for a third—I wondered why I had come at all. I almost decided to beat it before I was invited to. But I stuck it out.

Only eight of us could take the code test at one time, and I happened to be among the first group to get the papers properly filled out and was assigned to desk No. 7. I'm not a *bit* superstitious, but believe me I had no kick about getting desk No. 7!

Well, I think the one thing that saved me was the hours and hours I had spent on that commercial stuff. Taking an exam under pressure at 13 w.p.m. (although my estimate is that the test ran at least 15 w.p.m.) is something mighty different from casually listening at the same speed. The stuff seemed to come through just about twice as fast as it actually was, and the old training in 20 and 25 w.p.m. stood me in good stead.

Half the Battle Won

When the names of those that had slipped up were read off and mine was among the missing, boy, did I heave a big sigh! I must have been holding my breath in the meantime.

Well, the rest of it seemed relatively easy. I had spent plenty of time on the key and felt fairly confident I could get by on it. I took good care to concentrate on the letters of what I was given to send, and watched my spacing, and it must have been satisfactory because I got the "OK" after a short run.

When it came to the written part I had no trouble. I almost wished there were

twice as many questions because I felt sure of myself in that direction. Nevertheless, I did plenty of thinking afterwards as to whether Washington would like my work as well as I had myself.

Hooray!

As time went by, I began listening pretty hard for the postman. When the little old ticket finally came through I'll admit I gave a couple of yips and felt like a million. Remember when you got yours? Well, it's just the same even when a guy is 50.

If there is any advice I can give that might be helpful to hams-in-the-making, I'd say—prepare! By that I mean don't try to do just enough to get by—but do that little extra in the way of preparation that gives you confidence. Three months is a long time to wait, when a couple of extra weeks of good hard work might get you through and avoid further delay. Just about one-half of the applicants failed in code receiving the day I took the test. Yet the exam was perfectly fair and well conducted. Take care of your end and the exam will take care of itself!

The Ice Broken

So now I've had my first QSO and the ice is broken. As a starter I have built a simple little crystal-controlled oscillator myself, with advice and assistance from Bill on the side. But having noted that an amateur never seems satisfied with his set for long, I suppose inside of three months I'll be tearing down and building up again. Guess that's half the fun anyway.

So I'm 50, and Bill and I are 50-50. We're both OMs now . . . he W2GUO and yours truly W2KZJ.

NIGHT-OWL HOOTS

(Continued from page 140)

to 1600 kc. among the seven "broadcasting" countries of North America as follows: United States 63, Mexico 15, Canada 14, Cuba 9, Dominican Republic 1, Haiti 1, Newfoundland 2. The new set-up brings into use several unused channels from 1500-1600 kc. and will demand a complete reallocation of frequencies in all of these countries—though no stations will have to be deleted. 'Tis said that Mexican border stations will either have to decrease their

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power or cease broadcasting. We could go into a lot of statistics about how the channels are going to be assigned to each nation, but, Night Owls, you wouldn't be able to get any more definite information out of the plan than we could. Everything is a bit indefinite, at the time of writing, but just as soon as frequency re-allocation begins—why, then we'll keep you posted. May be a bit difficult to tabulate all the changes, but believe us it will be a lot easier than trying to trace the present Cuban stations as they take their monthly strolls along the kilocycles!

"C. B. R." stands for Canadian Broadcasting—Rockies volunteers Gilpin Amos of Kellogg, Idaho.

Jake Fields sends us a famous "Seal of Pele" veri from KHBC. The first one we've ever seen and by way of description let us say that the card is buff with a quantity of black print. At the top in large letters is written "Radio Station KHBC." Then across the card, "The Big Island—Ka Home O Pele." Then the actual message to the reporter and at the bottom, "Aloho Nui Loa Ina Hoa Aloah—Mu Ki La Aoao O Ki Kai." The "Seal of Pele"—Hawaiian Goddess of Fire is affixed in the lower right corner of the card. Not outstandingly attractive, but very unusual and desirable.

Paul Hultquist, of Tucson, Arizona, offers the news that Globe, Arizona, may soon have a new radio station as the F.C.C. Examiner Seward has recommended that a construction permit be granted the local partnership which is applying for a new station.

A veri of WCPO's signal sent to Elbert Games of Trenton, N. J., has been sent us by Night Owl Games for inspection. It's a government postcard printed in ordinary 8 point type with no outstanding call letters. The interesting part of the veri is the note regarding a special DX program—but alas it was by far too late for any advance notice here.

TG-1 is the call of the station on 1510 in Guatemala City—the call letters TG-2 belong to the short-wave station.

Add easy identifications: "You're Not the Only Peach on the Tree"—a recording—is played repeatedly by WDAF when testing. "On Wisconsin" is likewise played by WSIN. . . . Thank Dick Wright for these last two tips.

A few personal notes on things that are happening to DXers you read about on these pages follow. If you are interested in seeing more in the future,

please voice your opinion now. If no reaction is noted we'll confine our writings to DX in the future.

Personal Notes

Enrique Hidalgo, of Cienfuegos, Cuba, who won last season's second prize in the AWR contest, and who also is Sports Editor of the local paper and DX Head of CMHJ, is now coaching the Cuban track and field team at the Fourth Central America Games in Panama City. Enrique promises a letter from Panama about DX conditions there. . . . The Carroll Weyrich's announced the arrival of Carroll, Jr., shortly after Christmas. Now Carroll does his DXing with one hand while the other gently rocks Junior so that he'll shut up long enough for Pop to log that new one! . . . Mike Gojdos is one dollar richer as the result of his winning the distance prize on a DX from KXYZ. . . . And Curt Keirstead is still waiting for that box of chocolates he won by being the first Bay State listener to report reception of WFMD.

Cheers and Jeers

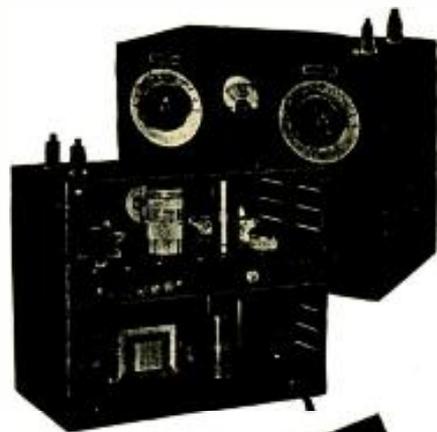
By painstaking care and much effort on the part of the new National Radio Club's officers, the NRC bulletin is now just about tops as far as mimeographed club bulletins go. Not that we criticize any of the others, nor that it contains any better information, but it certainly presents DX News to its members in the form of a really attractive and stylishly written journal of DX news. The bulletin makes full use of the illustrative powers of the mimeograph and actually illustrates various veries received from members. So 'tis the NRC that receives our cheers this month!

Our Jeers? Need you ask? Of course they're for the publications who still persist in making a row over monitored verifications. Weyrich and Ahman are no longer monitoring Daventry (it seems we said that before), Foerster has long since ceased verifying WJRD and WMFO, the QRC has proven to the world that it does not and never did monitor signals, and now ZBW is again verifying directly and the Before Breakfast DX Club has ceased its monitoring! Pray tell us just what monitoring of whose signals the argument is all about? Seems very silly to us for publications to argue about something which really does not appear to exist. That not a single letter has been received from an independent DXer (one not connected with

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any club publication) regarding the question certainly is evidence that DXer's are wise to the scrap and recognize it as a purely inter-club quarrel, and are accordingly not paying a mite of attention to it.

Send all material for this department to Ray La Rocque, 28 Aetna St., Worcester, Mass.

"ONE STOP" SUPER

(Continued from page 120)

Assembly and Wiring

The author strongly advises that all parts be obtained before proceeding with the assembly and wiring. Meissner has provided a punched chassis for the job, included in the accompanying list of parts, which offers the constructor an accurate foundation unit and eliminates the necessity of layout and drilling work. The relative position of each component on the chassis is shown in Fig. 2. The under-chassis layout is shown in one of the accompanying photos. It should be noted that the push-pull input transformer, T8, is mounted under the chassis deck and is shown in the photo in the upper right corner. It will be necessary to drill two clearance holes for this transformer, but aside from these the special chassis is completely punched to take all the components.

Time and labor will be saved if the job of assembling and wiring is done in the following numbered steps:

1. Drill clearance holes for audio transformer, T8.
2. Ream holes for the phasing condenser and a.f. volume control shafts to accommodate the insulated shaft bearings.
3. Mount all tube sockets and terminal tie-lugs.
4. Mount the insulated shaft bearings for phasing condenser and audio volume control.
5. Mount all variable controls on front apron of chassis (See Fig. 2).
6. Adjust stops for correct number of switch points required for the band-width, b.f.o.-a.v.c. and standby tap switches and mount into correct position.
7. Mount "phone" and "R" meter pin jacks and posts.
8. Mount i.f., crystal filter, b.f.o. and noise silencer transformers. Mount terminal tie-lugs as shown.
9. Mount the five r.f. chokes.
10. Insert the rubber grommets for a.c. power cord and filter choke terminals.
11. Wire all 6.3-volt tube heaters, commencing with the 6K7 i.f. and working around to and ending with the 6L6 tube nearest the power transformer. Be sure and twist the heater leads.
12. Mount the three electrolytic filter condensers, placing the dual 8-microfarad unit, C30, nearest the choke, CH1.

13. Start wiring the receiver, using the crystal filter input transformer, T1, as the starting point. From this point on, it should be a very easy matter to follow the placing of all condensers, resistors and associated wiring.

14. To enable you to present a finished and workmanlike job, use colored hook-up wire, especially from all units that terminate at the three tap switches mounted on the front apron of the chassis. Before making the final soldered connections to the various switch points, lace the wires into neat cables, using thin but strong twine to do the job. All told, there should be two cables to the switches.

15. Mount the phasing condenser into the special insulated bracket provided. Wire this condenser into the circuit.

16. Mount the filter choke and power transformer and wire these units into the circuit.

17. Mount the tuning assembly, making sure that the underside of the chassis where the mounting screws come through is cleaned. A bit of steel wool will do a quick and satisfactory job. Wire the six leads from the tuning unit to their correct terminals.

18. The audio transformer, T8, is the last unit to install and wire into position. Before mounting the audio transformer, it will be necessary to make a suitable hole in the case, opposite to the hole provided for the entrance of leads. This extra hole is for the 6R7 plate and "B" plus lead, terminating at the "standby" switch. The original hole in the transformer case will accommodate the grid and ground leads. A drilling templet and terminal diagram showing impedances available is supplied with the transformer. Connect terminals so that the primary and secondary both have 10,000 ohms impedance. Solder the plate, and "B" plus leads of sufficient length and bring them through the hole made in the case. Solder the two grid leads and ground connections and bring these through the original hole provided. Mount the transformer and wire the five leads to their respective terminals.

The communication type receiver cabi-

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net used is modern in design. With its smooth rounded front corners and chrome trim, it surely lends a very welcome appearance in the radio room. The use of the chrome trim pulls the deadness out of the usual all black receiver cabinet. A standard relay panel 10½ inches high is recessed into position provided for it on the cabinet.

The cutting of the dial escutcheon hole is just about the hardest part of the whole job. Save yourself a load of trouble by stretching some craft wrapping paper over the front of the panel, using some sealing tape fastened to the underside of the panel to hold the paper on. This paper will act as a layout templet. Do your layout drawing work on the paper in pencil. When you are finished and have re-checked the drawing, use a center-punch to locate the holes for drilling. To provide the large hole for the escutcheon plate, use a small drill—about No. 48—drilling a lot of holes close together around the outline. Chop out about five of these small holes to allow the entrance of a metal cutting key-hole saw that can be purchased for about 25 cents in any hardware store. After the proper holes have been provided, the receiver can be bolted through the chassis to the bottom of the cabinet.

Alignment of Receiver

If you haven't a good signal generator and output meter, secure the services of a good radio serviceman so equipped to do the job. Although the tuning unit is pre-aligned, it is wise to give it a sort of "brush-up." Printed aligning instructions for both the main tuning unit and i.f. amplifier are part of the coil kit. For this reason the instructions are not being repeated here. Care should be exercised in locating the crystal frequency, as the value of the crystal

filter circuit depends upon the accuracy of the alignment job done here.

Reception Tests

A Taco Selective Beam Antenna was used during tests and proved that an R4 signal could be pulled up to an R8 by selecting the proper beam. The receiver performed beyond expectations in all bands and was found to be particularly "hot" on 10 and 20 meters.

HAMFEST

(Continued from page 127)

Woman No. 2: Oh what's the use—you know Clara-Lou doesn't have the radio turned on much any more.

WE ARE STILL on the market for the unusual in the way of QSL cards. We have a couple on the desk, but unfortunately they are not suitable for reproduction. One from W7FYR is a half-tone reproduction of a photograph, showing army planes flying over Washington (State) terrain. Writes W7FYR: "Wot's wrong wid this crd? Mt. Rainier in the back and St. Helens in fore. Foto by U. S. Army Air Corps of which I am a member. Over 1000 of these cards have been sent to 33 countries. Don't you think the Tacoma Chamber of Commerce shud kick thru? Bands hr are 10, 20, 40—cw only."

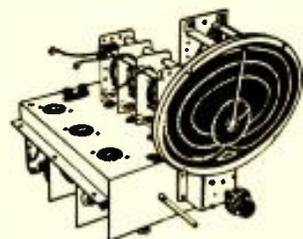
VE3ALG, Toronto, Canada, takes a penny postcard showing the skyline of Toronto as seen from the bay, and makes an attractive and appropriate card of it by super-printing his call across the face. As VE3ALG comments: "This sort of a QSL card shows the other fellow what sort of a place you live in. They are inexpensive, and if a proper view is selected, it does not suggest a postcard, but rather looks like an artistically designed QSL card."

VE3ALG, ERIC ADAMS, also obliges with a photo of his rig. While he has been a ham for only 18 months he has worked 46 states (needing only Utah and Arizona for WAS), and has worked all Canadian provinces, Hawaii, Mexico, Cuba, Venezuela, Ireland, Barbados, and has listeners' reports from England and Czechoslovakia. He is on 7070 and 7164 with a 47 xtal oscillator, 46 buffer and a pair of T20s with 70 watts input in the final.

THE OTHER EVENING—January 15th at 1100p to be exact—we ran into an R8-9 c.w. signal. Had we been on the other end of the QSO we'd have given him an RST589x on his sigs here in Tampa,

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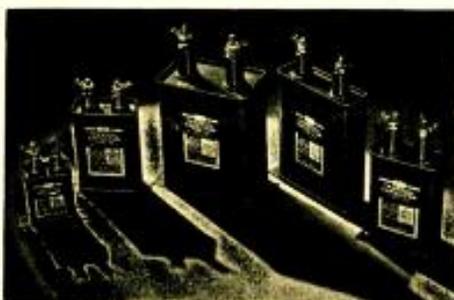
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Florida. The station was WIWC, complaining to W8GVX that he wasn't getting out so well!

HOW HIGH IS your sky-hook? A simple gadget for measuring the height of trees, poles and roof tops from the ground is sketched in Fig. 2. It consists of a cardboard tube about one inch in diameter with a cardboard disk placed in it close to one end. A small hole is pierced in the center of the disk.

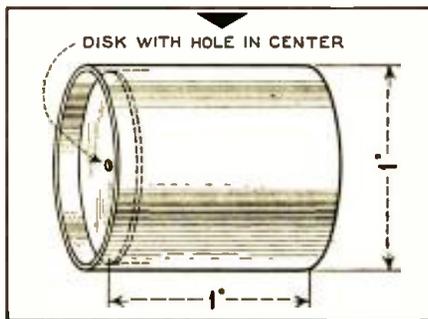


Fig. 2. A simple "heightometer" that does a lot better than guess work in determining antenna height.

The actual dimensions of the tube are not important, but the disk must be placed at a distance from the far end that is exactly equal to the diameter of the tube. The hole should be just large enough so that when the disk end is placed to the eye the far end of the tube can be seen.

In measuring height, place the tube to the eye (disk end) and aim at the object. Back away from the object until it is just framed—from the ground to the height it is desired to estimate. The exact height will be within a foot or two of your distance from the spot on the ground just under the elevated point. In the case of a pole, it will be the distance from the base of the pole.

R.S.S.L. NEWS

(Continued from page 147)

Joe Hester,* W16M1, is interested in forming a local chapter of the R.S.S.L. in Oklahoma. All interested should write him at 1430 So. College Ave., Tulsa, Okla.

With R.S.S.L. Members

Anyone looking over the correspondence that poured in with the requests for the new 1938 Membership Cards would have a hard time believing that the depression or "recession" had hit R.S.S.L. members. Almost every member reporting spoke of new and better equipment he had installed, such as, multi-tube receivers, new antenna systems, oscilloscopes, etc. With all this fine new equipment which so many members have purchased this past year, reception and reports should be better than ever.

Headquarters is pleased to note that many of our members have been studying

up on code and have secured their tickets as amateur operators. Just a few who mention this in current correspondence are: Christopher J. Yorio, W2KYI, of Jersey City, N. J.; Ted Paulson, Jr., W6PJS, of Salt Lake City, Utah; Lee P. Edwards, W9ZSF, of Omaha, Neb.; David W. Burke, Jr., VE3SH, of Sarnia, Ont., Canada, who reports he is on the 40-meter band; Charles Baker, W2KTF, of Baldwin, Long Island, N. Y., who tells us he can now copy 20 words per minute; Carl Soendlin, long active as Section Manager for West Virginia, reports he has a new transmitter on 10 meters (W8LI) and a new receiver.

With so many R.S.S.L. members getting the new "Practical Radio Manual" telling how to qualify for a ham ticket, it can be expected that many more members will be getting licenses in 1938. If you have received your amateur license recently, drop us one of your QSL cards calling this to our attention and we'll try and list the new amateurs who are also R.S.S.L. members.

If any members around Ashland, Kentucky, ever have any interference from power noises, our own R.S.S.L. member, William W. Foster, W8K4, will be able to give them some good advice. In fact that's his job, for he is connected with the radio interference survey for the local power company, and formerly specialized in locating such noises for them.

A Radio School

Miss Edna Doten (W3F49) of Lynn, Mass., sends us an interesting picture of her radio shop and test panel and tells us that she is helping conduct classes in radio. Here is a worthwhile idea for local Chapters—or for a few R.S.S.L. members to concur on. Nothing will yield greater dividends or satisfaction than acquiring a good knowledge of basic radio and electrical fundamentals. Now is the time to start acquiring a good library of radio books. Headquarters will be glad to suggest titles to any member or local Chapter interested. If your local Chapter does provide radio instruction, don't fail to advise us so we can pass the information along to others who might be interested.

Free Classes in Radio

Philip L. Miles, W4H69, is attending the radio code classes at the Harlem Evening High School, New York City. One of the directors of the R.S.S.L. visited the class and found 28 young men busily engaged in learning the code under the able leadership of Mr. Frank Petraglia, a commercial operator of long experience. These classes are held in Room 503 of Harlem Evening High School, 138th Street and 5th Avenue, New York, Monday to Thursday inclusive at 7:30 p.m., under the auspices of the Board of Education and are absolutely free. Any R.S.S.L. members interested are eligible to join this class.

With Foreign Members

Charles Biggs, G44, of Tottenham, England, has just been appointed the

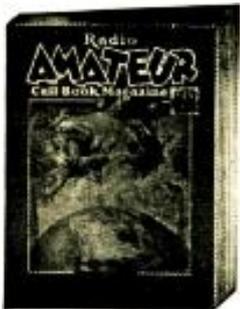
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Honorable General Secretary of the well-known National Radio Society.

D. Mason Gledhill, G 5, of "Beverlac," Tavistock, Devon, England, who formerly had artificial antenna license 2BGT now has a full call of G8QJ. Congratulations!

ON THE MARKET

(Continued from page 156)

from 40 to 8,000 cycles. The moving coil principle for lateral reproduction is said to be an exclusive feature of the Sound Apparatus Company.

The variable equalizer and set of low-pass filters makes it possible to reproduce any record more advantageously in as far as bass and high response as well as background noises can be controlled. The well filtered 16-inch cast iron turn-table is driven by the latest type of synchronous motor which is placed on the floor, thus eliminating the least possible traces of hum.

The dimensions of the table are 32" high, with a top plate of 19" x 19".

A clever, newly designed pickup-controlling device assures a speedy, convenient, and safe pickup operation. For instance, any particular groove of the record can be played without a delay of time and with the chances of errors entirely eliminated.

Special literature on this reproducing system is available. ALL-WAVE RADIO.

JEFFERSON D.C. AMPLIFIER BULLETIN

BULLETIN PA-15, released by the Jefferson Electric Company, Bellwood, Ill., provides the schematic diagram and data on a new 10-watt amplifier, employing four 25L6s in the output, for 115-volt, direct-current operation. This gives complete information on transformers, chokes, chassis and other parts required for the construction of the unit. A copy of the Bulletin may be had by writing the company. ALL-WAVE RADIO.

BACKWASH

(Continued from page 158)

OPINION FROM THE NETHERLANDS

Editor: I can only join my praise to that of the many other s.w. listeners regarding "Globe Girdling" and the Short Wave List in ALL-WAVE RADIO.

So far I've only two copies of AWR—March and November 1937, the first of which was sent to me by W2DKJ (Containing description of his "Flexible 400") in reply to my 10 m. report to him in the Spring of '37. So I got acquainted with ALL-WAVE RADIO and really, it's the best and most interesting magazine I ever saw, without any exaggeration. And Mr. Hinds'

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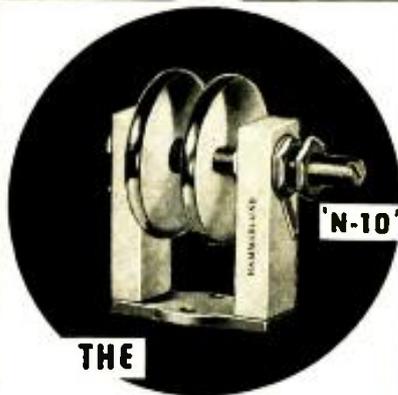
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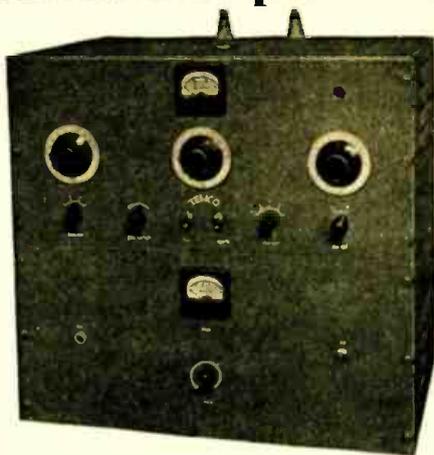
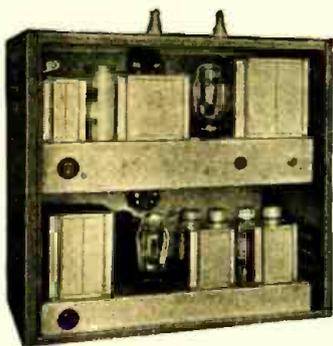
A New 50 Watt Transmitter to Uphold Traditional TEMCO Superiority

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- Complete Coverage from 10 to 160 Meters
- High Fidelity Speech Amplifier with Inverse Feed Back
- Low Impedance Swinging Link Output

Here at last is a low power transmitter for both phone and C. W. which really is outstanding. Although we have never made claims for any TEMCO model beyond an enumeration of its features, it is our belief that the "50" represents the finest value in its power classification on the market today.

TEMCO "50" is the result of months of research in an effort to produce, not just another "50 watter," but a unit which would be in keeping with the high standards of performance and quality which has distinguished other TEMCO models.

We are confident that amateurs with limited budgets who have appraised TEMCO high power units and expressed a desire for their ownership, will welcome the opportunity to purchase this new TEMCO "50" which sacrifices none of the modern features, engineering and efficiency which characterizes the TEMCO 1,000, 600, 350, and 100.



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The units contained in the TEMCO "50" each have their individual power supply. Therefore the R.F. unit may be furnished in a single cabinet when transmitter is desired exclusively for telegraph operation. The modulator unit may be added at any time without making any wiring changes whatsoever. Though not shown, unit comes with rear door. A personal inspection at your dealers will convince you of the merit which we claim for TEMCO "50." Dealers can make immediate delivery from stock.

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section especially is highly interesting. It's just what I had wished to find in magazines here and it gives all the information which any s.w. listener can possibly desire. He has really done something unique and his work has been a very important help to me when hunting after s.w. stations.

I have only one objection, especially when reading Ray La Rocque's "Night Owl Hoots." I get the impression that many listeners exaggerate the importance of their hobby, the only aim in their lives being to get a QSL from some Chinese or African B.C. stations with 50 watts or less, and that they consider reception of some Patagonian broadcaster as the greatest and best thing in their existence in the subliminary word, hi, which would be a sad thing for grown-up men! But perhaps I'm wrong when thinking this of the Night-Owls—and it is, of course, not meant as a sermon!

A. JANSEN,
 BARENDSTRAAT 3
 BOSKOOP, NETHERLANDS

(Thanks for the nice comments. These Night Owls are an odd bunch, as are all intense people, but are probably not quite so one-sided as you suspect.—Editor.)

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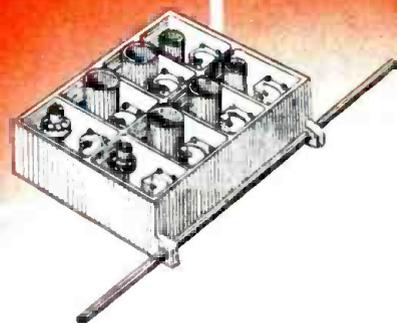
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