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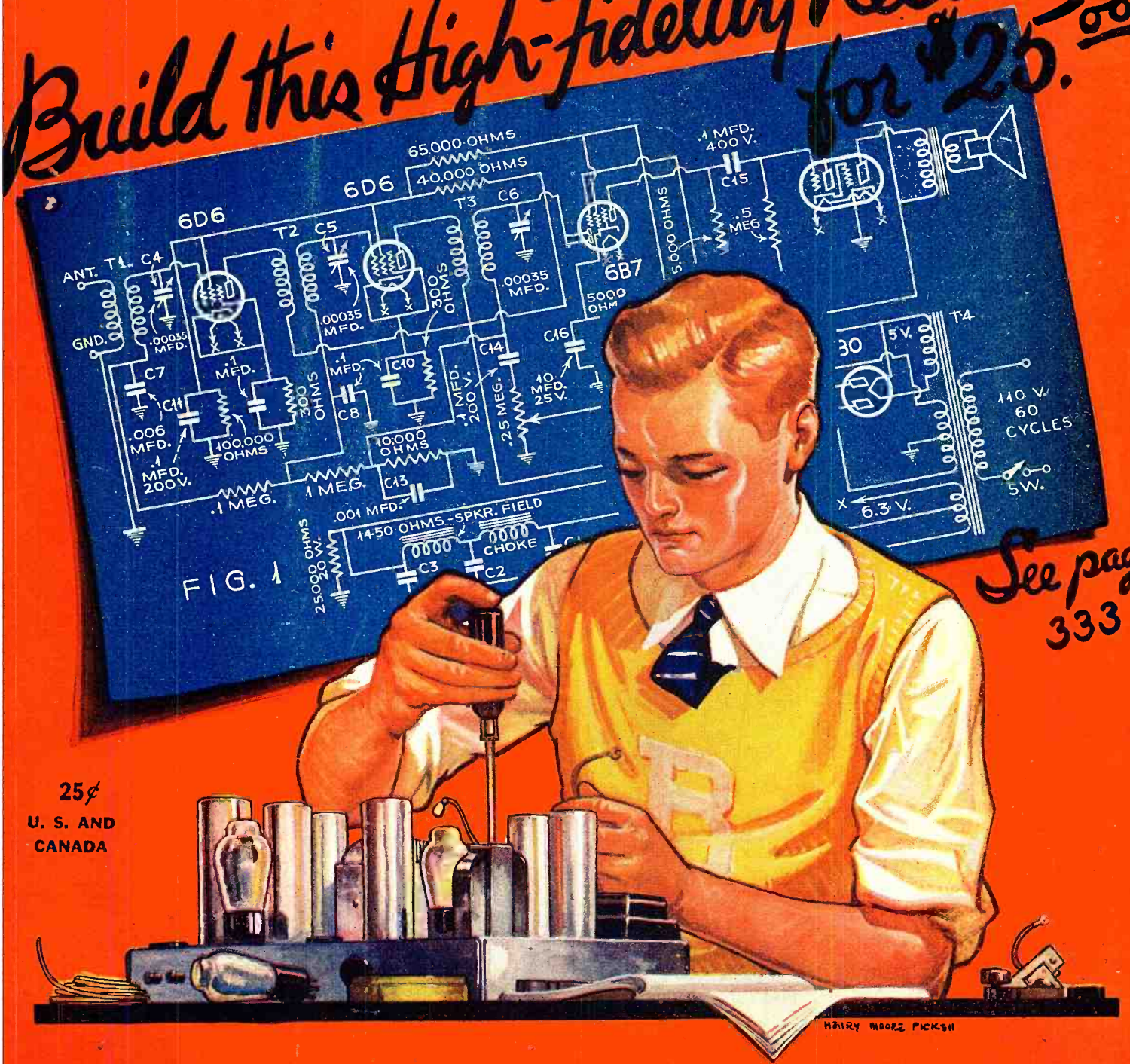


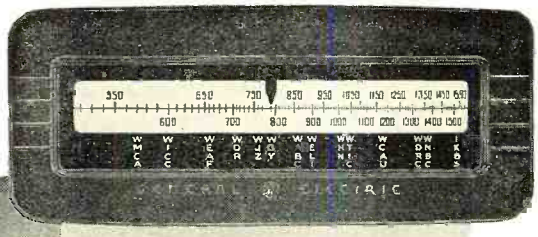
See page 333

25¢ U. S. AND CANADA

HARRY HOOPS PICKSH

AT LAST, A RADIO YOU *CAN'T* TUNE WRONG

Focused Tone



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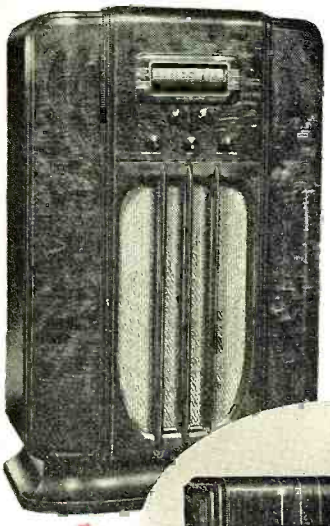
— harsh, blurred, discordant tone. Nine out of ten people unknowingly tune in their radios off focus.



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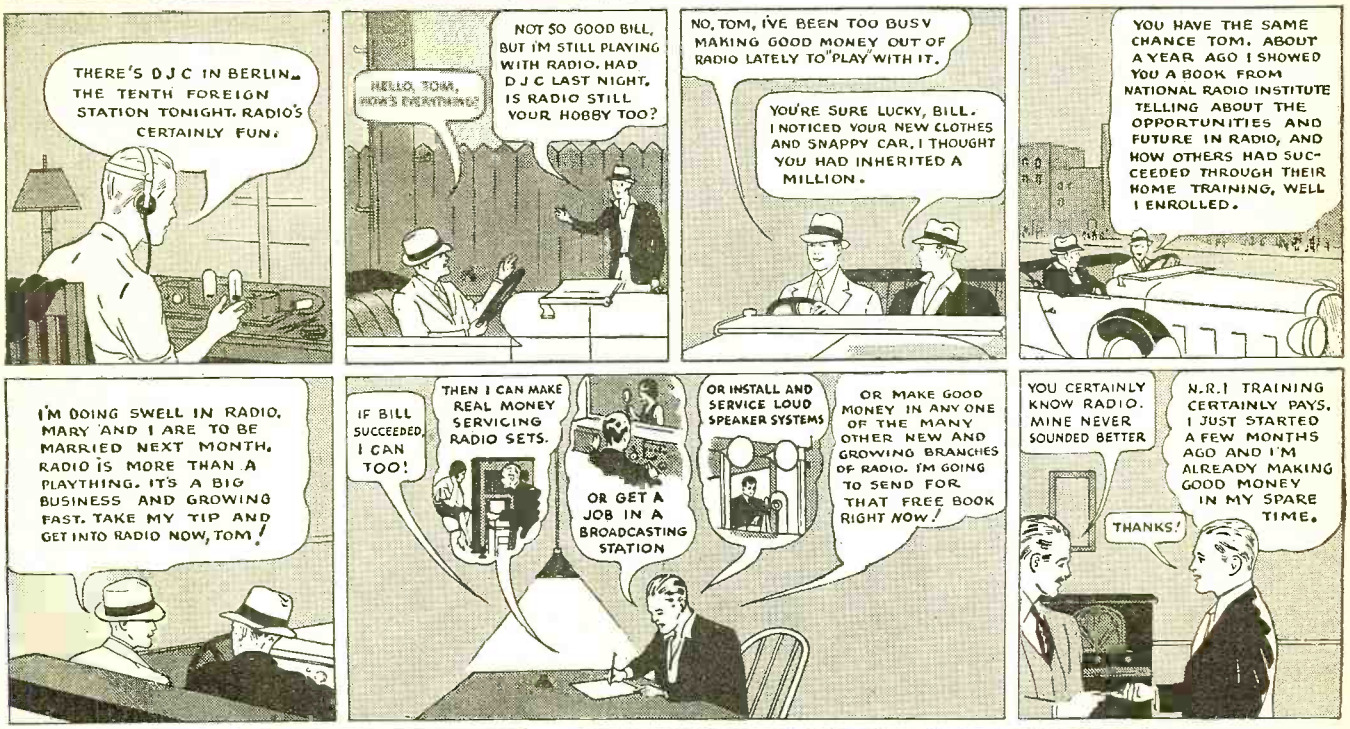

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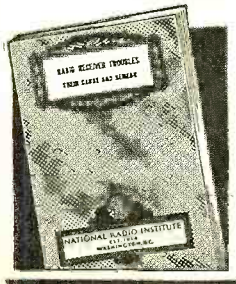

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RADIO NEWS

Edited by LAURENCE MARSHAM COCKADAY

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Vol. XVIII December, 1936 No. 6

Reading Guide to this Issue—

AMATEURS—3, 4, 8, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23, 26, 27, 29
BROADCAST FANS—2, 3, 6, 10, 11, 12, 18, 20, 21, 26, 27, 29
DEALERS—1, 2, 4, 5, 8, 9, 11, 12, 23, 24, 26, 27, 29
DESIGNERS—3, 4, 5, 7, 8, 9, 15, 16, 26, 27, 29
DX FANS—17, 18, 19, 20, 21, 26, 27, 29
ENGINEERS—5, 7, 8, 9, 15, 16, 26, 27, 29
EXPERIMENTERS—3, 4, 5, 6, 8, 9, 11, 15, 17, 26, 27, 29
MANUFACTURERS—3, 5, 16, 26, 27, 29
OPERATORS—3, 7, 16, 26, 27, 28, 29
SERVICEMEN—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17, 18, 21, 23, 24, 26, 27, 29
SET BUILDERS—3, 4, 5, 6, 8, 9, 15, 17, 26, 27, 29
SHORT-WAVE FANS—3, 10, 11, 12, 15, 17, 18, 21, 22, 23, 26, 27, 29
STUDENTS—1, 3, 4, 5, 6, 7, 8, 9, 11, 12, 15, 16, 17, 18, 21, 24, 25, 26, 27, 29
TECHNICIANS—2, 3, 4, 5, 6, 7, 8, 9, 15, 17, 24, 26, 27, 29

Coming Next Month

AN unusual variety of especially worthwhile articles will be presented in the January issue—articles of importance to Servicemen, Amateurs and in fact, to Everyone interested in any phase of radio. For the Service Industry there will be another article on the cut-rate service racket. For the Amateur there will be constructional details on a practical beam antenna and also one of the finest practical discussions of super-regenerative u.h.f. receivers that we have seen. The series entitled "The Radio Beginner" will again appear and will include a discussion of t.r.f. and superheterodyne circuits with the advantages of each.

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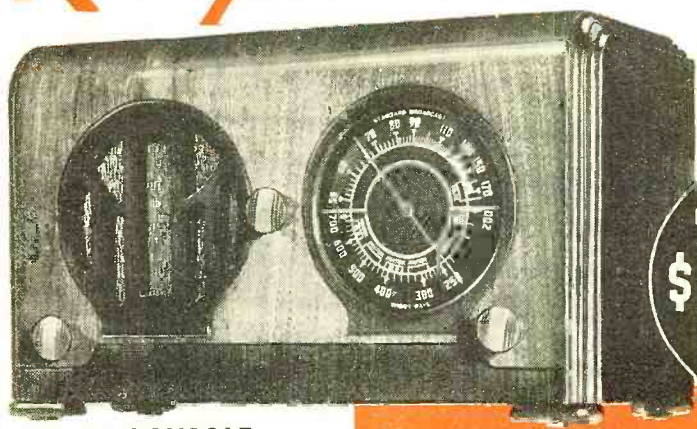

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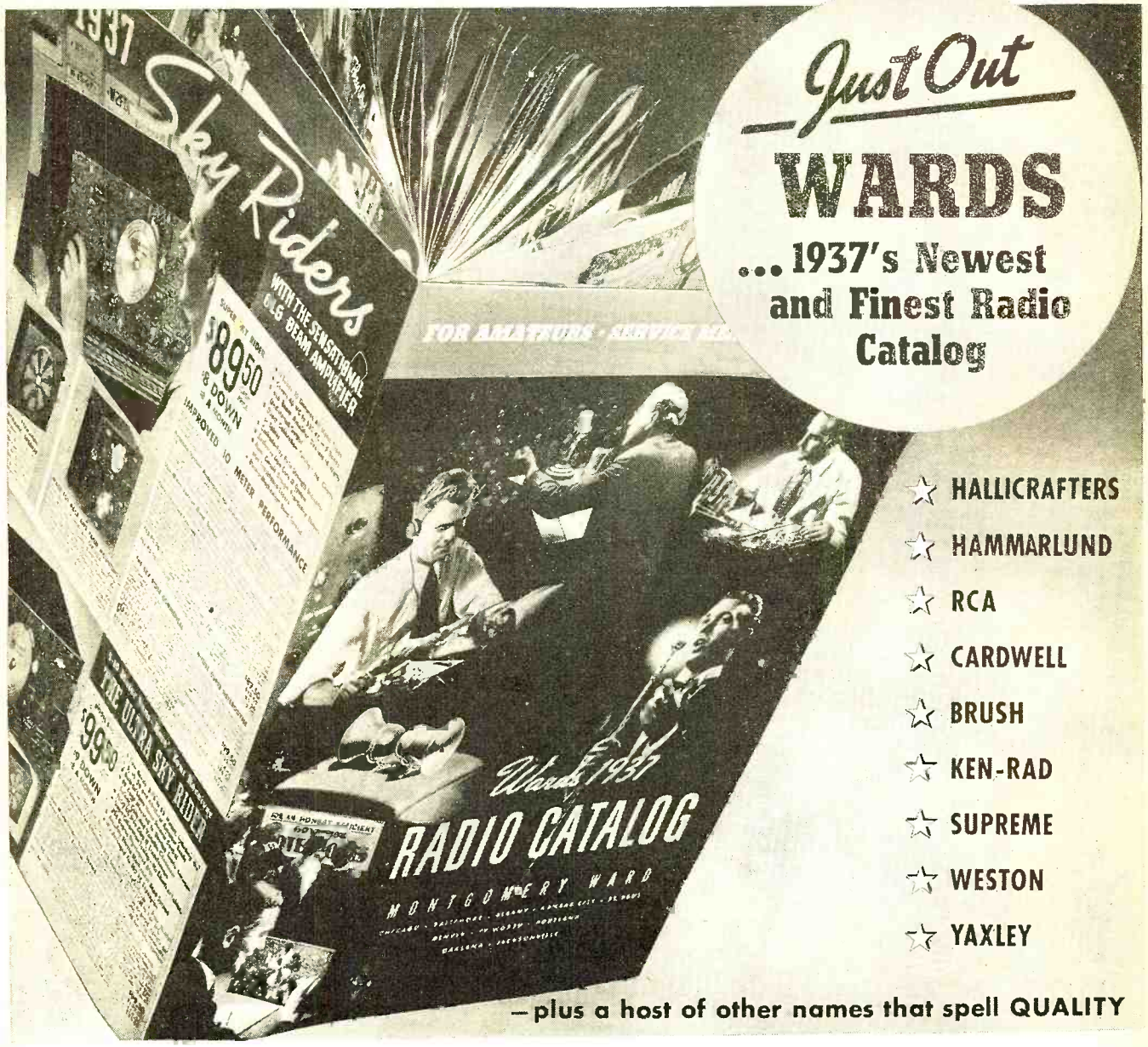

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Radio News

December, 1936

EXPOSING Cut-Rate SERVICE "GYPS"

This scorching investigation, sponsored and supervised by RADIO NEWS, exposes and minutely analyzes the highly developed technique employed by some "gyp" radio service organizations of New York to bilk the Public

By John H. Potts

THROUGH criminal fraud and misrepresentation, many New York radio service organizations featuring fifty-cent service or free inspection extract outrageous fees from the public for simple repair jobs. Every single one of four such concerns selected at random and tested to date resorts to "gyp" methods. We have not chosen fly-by-night companies for examination—all organizations tried have been in business for many years. RADIO NEWS has gathered the evidence—air-tight and incontestable—and we present it in detail in this article.

The practices employed by such concerns wreck public confidence, ruin legitimate servicemen, and disgrace the entire industry. The purpose of this investigation is to analyze the "gyp" methods used that they may be more effectively fought. National organizations, such as the Better Business Bureaus and Institute of Radio Servicemen, have done excellent work in unifying opposition to objectionable trade practices in the service field but they require wider support in order to wage an effective war against the strongly-entrenched and well-financed offenders. The evidence obtained has been made available to the New York Better Business Bureau.

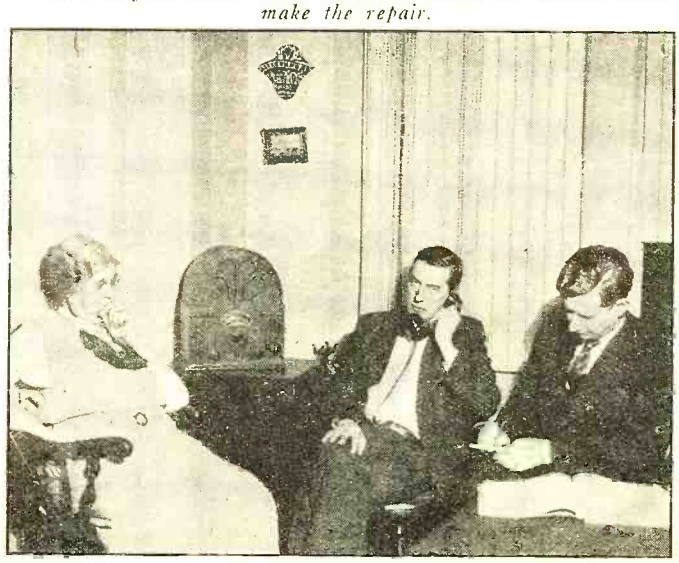
Test Procedure

The method of making this investigation was based on a plan previously employed by Better Business Bureaus in other sections of the country. A simple, 5-tube receiver, of a type particularly easy to service, was chosen. First, it was carefully overhauled in the RADIO NEWS laboratory. New filter condensers and two new resistors were installed. Weak tubes were replaced. Every part in the set was then given a black dot for identification purposes. These dots are plainly visible in the photographs of the chassis.

Next, the receiver was taken to a private apartment in New York City. The set was installed and again tested for operation. Then the speaker voice coil lead was unsoldered at its point of connection to the output transformer, as shown in the photograph. This did not make the set inoperative—a faint, distorted signal could be heard with the volume control full on for strong broadcasts.

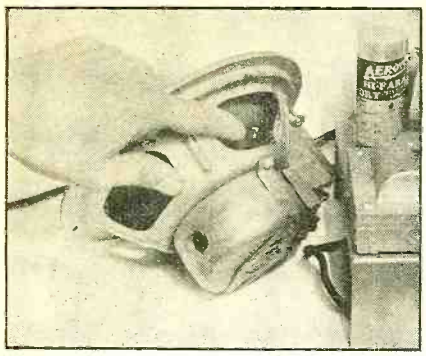
THE INVESTIGATORS IN ACTION

This photograph, taken at the first residential location, shows John H. Potts at the phone and J. M. Borst making notes on the conversation. The lady at the left is the owner of the set shown, which was used throughout the investigation. This receiver was first thoroughly overhauled and put in perfect operating condition. A single lead was then disconnected and service organizations were called to locate the trouble and make the repair.



An A-1 Worker

We (J. M. Borst and the writer) planned to call in servicemen one after the other throughout the day but this was impractical as we soon found that "gyps" do not keep appointments. Company "A", a large chain-store organization, was called at 11 a.m. This was *not* a 50 cent or "free inspection" house. Stated that they could not make a definite appointment but that a serviceman



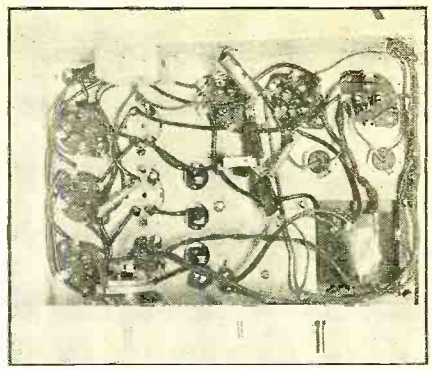
THE DISCONNECTED WIRE

The finger points to the voice coil lead, which had merely been unsoldered from its normal point of connection.

The Plague Of The Service Industry

IN New York City, many inherently honest and competent servicemen have been forced either to toss overboard their moral principles or get out of the business. In many cities, servicemen have banded together in associations to combat this evil. To all legitimate servicemen, the Editors say, "Your battle is ours. We'll see you through."

In presenting this study to our readers, the Editors realize that there will be complaints from certain quarters that public confidence in the radio service business will be undermined, causing hardship to honest, hard-working servicemen. In New York City, where the 50-cent minimum charge is prevalent, public confidence has already been shattered. In the nearby suburbs, where the average minimum charge is higher, racketeering practices are rare, and radio servicing retains its deservedly high standing. If this analysis were solely destructive, there might be some basis for protests, even though ignoring such widespread vicious practices is hardly good citizenship. It will be noted, however, that the writer has maintained a sound, constructive attitude and in the analysis of the data points the way to build public confidence.—*The Editors.*



UNDERNEATH THE CHASSIS

Showing the simple, open wiring and layout of the receiver with the identifying black dot on each part.

would call "sometime in the afternoon". Company "B", a "50 cent" house, was immediately phoned and promised to send a man "before 2 p.m." Company "C" was also called and made a definite appointment for 5 p.m.

We waited and waited, but B's serviceman did not show up. At 3:15 p.m., A's representative arrived, as promised. He was a tall, quiet fellow, poorly dressed, carrying an analyzer and tool kit. Went directly to the receiver and attempted to operate it. Noted the weak, distorted sound and immediately suspected the speaker. Unscrewing the retaining nuts, he removed the speaker and noted the disconnected wire. Guided it to the proper terminal with a pencil and operation was restored. Heated his iron, resoldered the lead and replaced the speaker. Gave it a brief operation check throughout the range. Did not once open his analyzer. Total time—20 minutes. Asked what we usually paid for service and we stated that the usual advertised price in this locality was 50 cents. He said that his company did not make calls for such a price. We agreed on a price of 75 cents, far too little for the service rendered, illustrating the destructive effects of cut-throat competition.

Hooked!

We unsoldered the lead again and waited. At 5:45 p.m. B's serviceman arrived, nearly four hours late, well-dressed, smiling and talkative. Brought only an analyzer. Made no attempt to operate the receiver but instead made a brief point-to-point resistance analysis. Wiggled the volume and tone controls and then announced that a condenser was blown and had to be taken to the shop to be replaced. The cost, he said, would be $4.00. Asked him the price of the condenser and he said it cost $3.25. The balance of $.75 was to represent the labor involved.

Three days later, the set was returned. Again the serviceman was late. It was promised between 6 and 7 p.m. He arrived at a quarter of 8. With three witnesses present, the following conversation took place between the serviceman and the writer:

Q. You're late. We expected you before 7:00 p.m.

A. Got here as soon as we could. (He had a helper with him.)

Q. Did you do all the work on this set yourself or let someone else do it?

A. Yes. Let me show you how well it plays. (Tunes in station.)

Q. That's all right. Where's the bill?

A. Here it is. (Tears off stub.)

Q. (Paid the bill.) What guarantee do you give? The entire set or just the parts and labor you put in?

A. The parts and the labor . . . 6 months.

Q. What parts did you put in?

A. A condenser.

Q. Mark it on the receipt. (Serviceman did so.) Nothing else wrong?

A. No—everything else okay.

Q. Show me the condenser you put in.

A. It's under the set. Have to open it up to show you. (Serviceman left). We immediately removed the chassis and inspected it carefully. No parts whatsoever had been replaced, as verified by the witnesses.

The receiver was now taken to another section of the city and company "D" which covers the entire city, was called next. It was decided to make the test a little easier on the serviceman and to permit him to remove the set and give it a thorough examination before estimating the repair cost. "D" promised to send a man that evening but he did not arrive till the following morning. He took away the set at 10:00 a.m. and promised to have the estimate by 1:00 p.m. The writer phoned at the appointed time but was told to call again at 4 p.m. Did so. The following conversation took place, not with the serviceman but with the high-pressure expert at the other end of the wire. It is interesting to note how the charge is built up by easy steps and it is unfortunate that such real sales ability is misapplied.

Expert Salesmanship

Q. Have you the estimate on the cost of the repairs of our radio now?

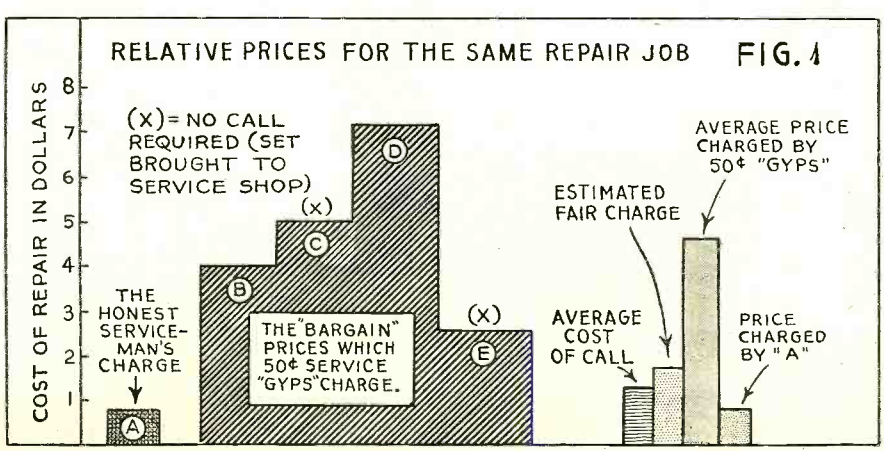
A. Hold the wire, please. I think the serviceman left a report. (A moment later.) The output transformer is burned out. It will cost $3.65 for a new one. (Paused to note the reaction.)

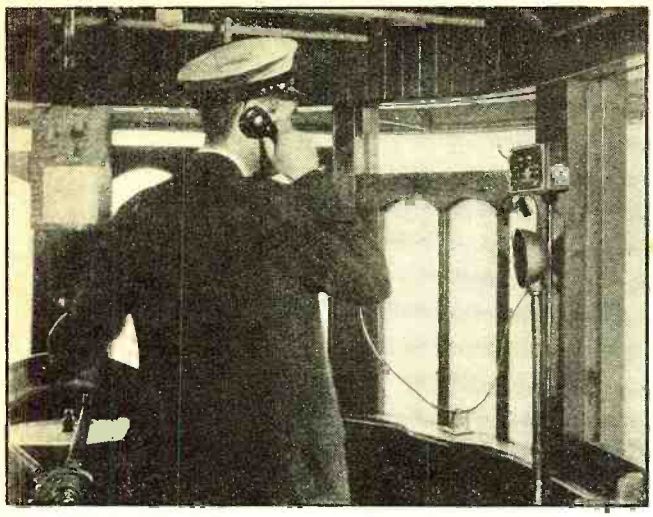
Q. I see.

A. And a coupling condenser which will cost 95 cents.

Q. What will it cost altogether?

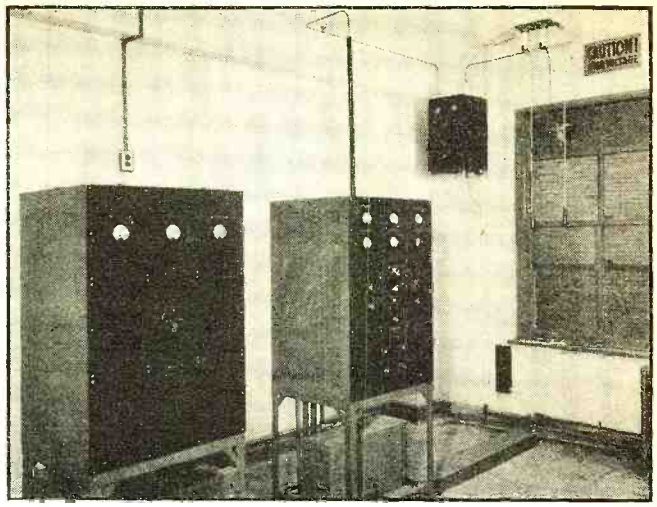
A. The transformer is $3.65, the condenser 95 cents and (*Turn to page 375*)





"HELLO CENTRAL, GIVE ME RECTOR 2 . . . ."

Capt. John F. Cahair talking over the new marine radio telephone aboard the "James P. McGuirl" while steaming down the river.



WHERE SIGNALS JUMP FROM SHORE TO SHIP

This is the shore transmitter installation which works remote control from the receiving station at Rose Bank, S. I., in New York Harbor.

Radio Now Brings

TELEPHONE SERVICE

To Harbor Craft

THE day is not far distant when the owner of a pleasure craft operating in the Sound or other waters near New York City will be able to lift a telephone and talk to his home on land or any other point reached by the land telephone services. This prediction is made after witnessing a test of regular two-way radio-telephone service for commercial craft conducted by the New York Telephone Company utilizing combination radio-telephone equipment on seven boats engaged in freight transportation in the harbor. Five of the boats are tugs operated by the Pennsylvania railroad. One of the other two is operated by the Oil Transfer Corporation and the other by the Socony Vacuum Company.

When the service is opened to the public, company officials expect it to be widely used by various classes of harbor vessels and by craft operating along the Long Island Sound and on the Hudson River.

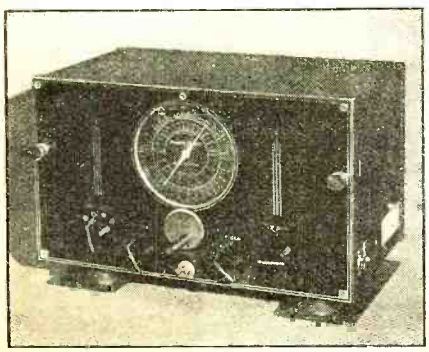
Radio shore equipment installed for sending signals to the boats include a 400-watt, short-wave transmitting station atop the building at 25 Hyatt Street, St. George, Staten Island. The receiving station for picking up signals from the boats is located nearby for interconnecting with the company's regular land wires for telephone services.

The plans for this service have been under way for several years and recently upon the authority of the Federal Radio Commission, the telephone company completed a land installation and has produced a special low-powered, 5-watt set for boat installation.

An improved method of calling the boats and for the boats to call the shore by means of a selective signalling apparatus is also being utilized. Further tests are being carried out in connection with the problem of handling large numbers of messages which might arise in the future under emergency conditions such as foggy weather, when many boats would have urgent need of communication. This portion (*Turn to page* 378)

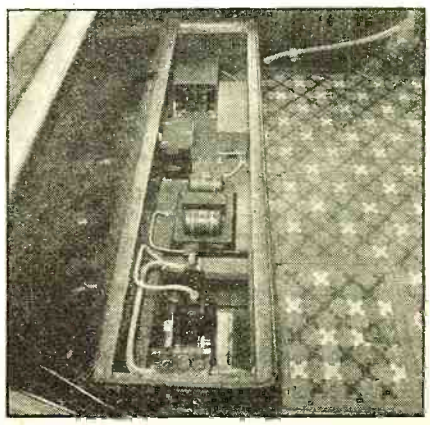
THE RECEIVER

The Type 20A superheterodyne which is employed on shipboard.



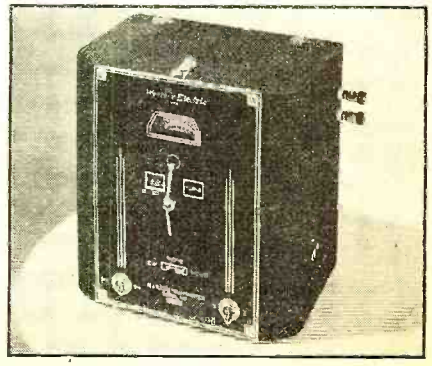
THE COMPLETE INSTALLATION

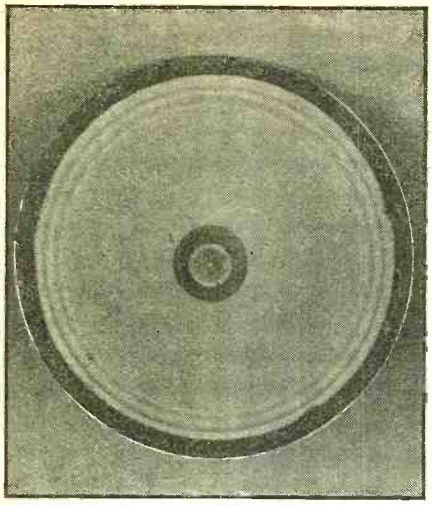
The radio telephone equipment on the tug "Lancaster" installed under a berth. Note the receiver and transmitter equipment at the far end.



COMPACT TRANSMITTER

The transmitter weighs 11 pounds and measured 8½ by 9½ by 6½ inches.





INFINITE BAFFLE TABLE			
SPEAKER MODEL	CUBIC CONTENT MINIMUM	RECOMMENDED MINIMUM	RECOMMENDED INSIDE DIMENSIONS
AZ 8-7	700 CU.IN.	1400 CU.IN.	12" X 16" X 6½"
CZ 10-7	1200 " "	2500 " "	16" X 16" X 9½"
CZ 10-10	1200 " "	2500 " "	16" X 16" X 9½"
HW 12-12	2500 " "	5000 " "	35" X 35" X 10½"
SU 18-12	17500 " "	over 18000 cu.in.	35" X 35" X 15½"

FIG. 1 (CUBIC CONTENT = HEIGHT X WIDTH X LENGTH)

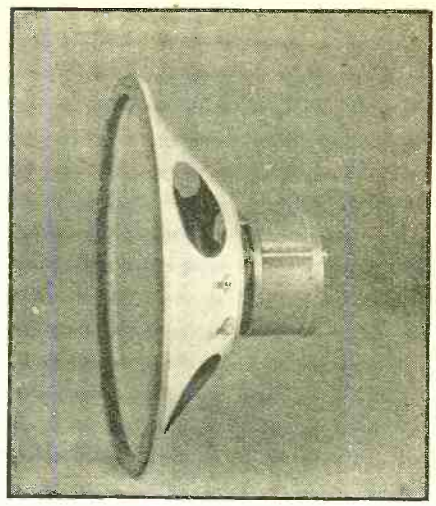
New P. M. Speaker COMBINES Pep and Tone

By Victor Hall

A NEW permanent magnet speaker of advanced design has just been announced by the Cinaudagraph Corporation. It is termed the "Magic Magnet" speaker due to the high flux density of the magnetic alloy, known as Nipermag, used for excitation.

Many unique features are apparent in the construction of this reproducer. The voice-coil is wound on a mica form, which retains its original cylindrical shape under all conditions regardless of humidity, heat, etc. This indicates that troubles caused by warping (with many ordinary types) should not be present with this design. The voice-coil chamber is completely enclosed from the face of the cone so metallic particles and dust cannot work their way into the channel and cause trouble. This type of design also adapts the speaker for use with a completely enclosed infinite

(*Turn to page* 378)



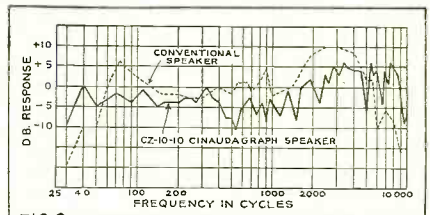


FIG. 2 SPEAKERS TESTED UNDER FOLLOWING CONDITIONS: 1 WATT INPUT. MICROPHONE 18" DISTANT, NORMAL TO SPEAKER. SPEAKER MOUNTED IN INFINITE BAFFLE. CURVE PLOTTED POINT TO POINT.

New A.C.-D.C. Tubes

By B. J. Montyn

THE design of a.c.-d.c. receivers has always been hampered by the lack of a suitable output tube. The new 25B5 and 25N6G tubes are a step forward in improving the condition. The 25B5 is a 25-volt tube consisting of two triodes which are internally coupled in the same way as the 6B5 tube. The 25N6G is the same except for the use of an octal base. The tubes will deliver 2 watts at 9% harmonic distortion, 1.2 watts at 5% distortion with a plate supply of 110 volts d.c. This is almost twice the power obtainable from pentodes which are used at the present time. These tubes are made by the Triad Mfg. Co.

DISTORTION VS. POWER OUTPUT

Figure 3: This series of curves shows plate current and distortion percentage plotted against power output in watts.

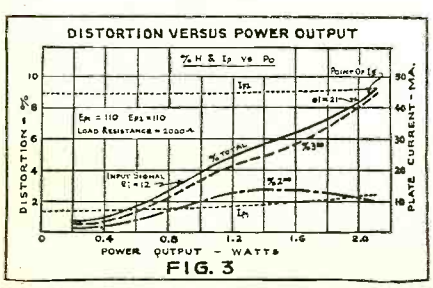


FIG. 3

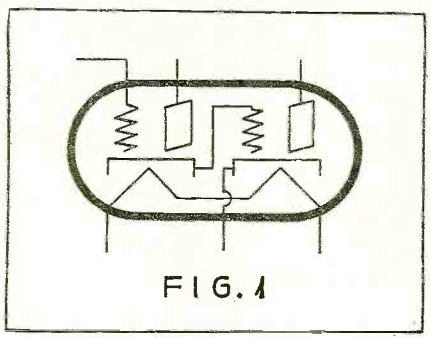


FIG. 1

Figure 1: A graphical picturization of the new 25B5 and 25N6G tubes which are each really two tubes in one.

Figure 1 shows the internal connections of the 25B5-25N6G. The input section is operated with the cathode connected to the grid of the next section. The grid-to-cathode impedance of the output triode then serves at once as the load and the bias resistor. This requires the grid of the output section to be positive all the time. However, that does not make it a Class B amplifier because the variations in plate current are a true replica of the variations in grid voltage.

The following are the characteristics of the tube for operation with a 110-volt and a 180-volt power supply.

Heater volts, 25
Heater current, 0.3

Class A Amplifier

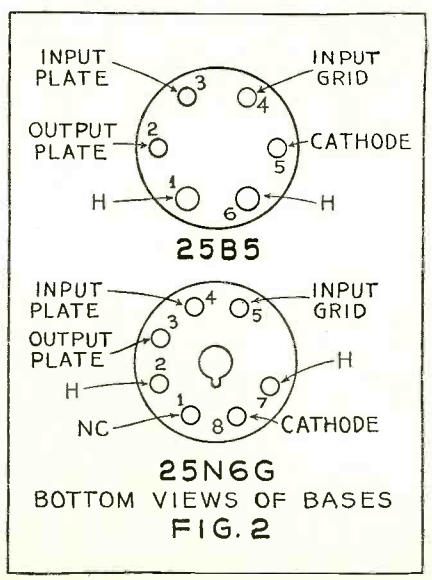
Output plate	110	180 max.	volts
Input plate	110	100	volts
Input grid	0	0	volts
Output plate current	45	46	ma.
Input plate current	7	58	ma.
Amplification factor	25	35	
Plate resistance	11,400	15,200	ohms
Mutual conductance	2,200	2,300	micromhos
Load resistance	2,000	4,000	ohms
Power output	2.0	3.8	watts
Harmonic distortion	9	9	percent
Signal volts for rated power	21	21	r.m.s.

Figure 2 shows the base connections for both the 6-prong and the octal base while Figure 3 shows distortion and plate current plotted against power output.

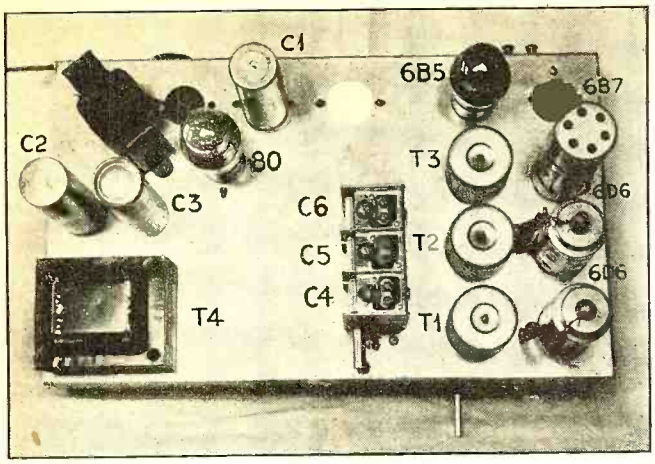
It is recommended that the 25B5-25N6G be driven by a 6Q7 used as diode detector and audio amplifier. The following circuit constants have been found best for 100-volt operation using a 6Q7: Grid bias, (of 6Q7), –1.05 volts; bias resistor 6000 ohms; plate resistor, 0.25 megohm; the gain is then 40.

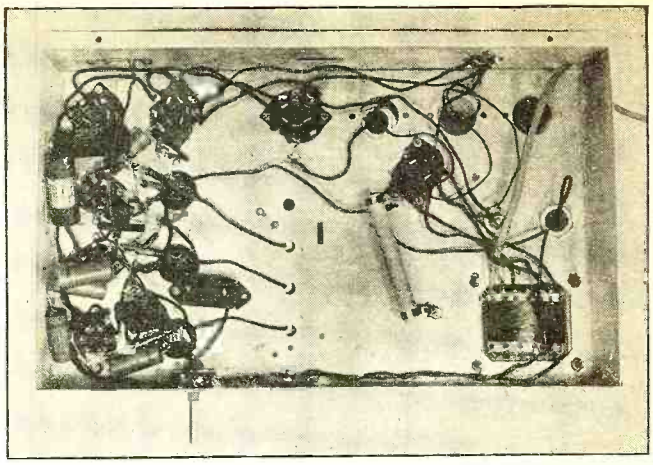
Employing a 6R7 with 100 volts power supply, the recommended values are: Grid bias, –3.5 volts; bias resistor, 8000 ohms; plate resistor, 0.1 megohm; gain, 11. A 6B7 could be used as follows: Grid bias, –2.0 volts; cathode resistor 10,000 ohms; plate resistor, 0.25 megohm; screen volts, 30; gain, 45.

The 6C6 could be employed as a plate detector with a 25,000-ohm bias resistor and 0.5 megohm plate resistor. The screen can be supplied through a 1-megohm resistor or otherwise adjusted to 40 volts. In all these cases the grid leak of the 25B5-25N6G was 1 megohm (its maximum value) and the coupling condenser 0.02 mfd.



BOTTOM VIEWS OF BASES
FIG. 2





You Can Build This Low-Cost

High-Fidelity Receiver

By Philip M. Gotthold

THE receiver to be described here can be assembled quickly and at negligible cost, requires no fussy adjustments, yet reproduces local programs with a purity of tone equalled only by far more elaborate and expensive high-fidelity instruments. It is very broad in tuning—there will be no side-band cutting with this design. The sensitivity is rather low but adequate for good volume from any local station.

The schematic circuit is shown in Figure 1. As illustrated, it incorporates two stages of tuned r.f. using 6D6 remote cut-off radio-frequency pentodes feeding into a 6B7 duo-diode pentode which serves as a diode detector, a.v.c., and first-stage audio amplifier. The output tube is a 6B5 which has high power sensitivity and will deliver 4 watts in Class A operation.

HOW many times have we heard people say, "All I want is a receiver which will bring in the local stations *right?* I don't care anything about getting distance, but I do want good tone quality." Here is a simple receiver which is designed to do just this.

The diode load resistance is unusually low, 10,000 ohms, permitting the use of .001 by-pass condenser across it with considerably less loss in high-frequency response than is obtained with the usual .5 megohm load and .0001 by-pass condenser.

Installing automatic volume control in a tuned r.f. circuit usually introduces difficulties. The by-pass condenser across the diode load, C13, is effectively in series with the tuning condenser, C6, thereby throwing this stage considerably out of line if C6 is small in capacity and reducing the input voltage to the diode. The relatively large by-pass condenser permits a closer approach to proper alignment without resorting to a special coil or tuning (*Turn to page* 374)

THE CIRCUIT LAYOUT

A chassis from the bargain counter, inexpensive parts and this circuit combine to form a simple receiver which makes up in tone quality what it lacks in appearance.

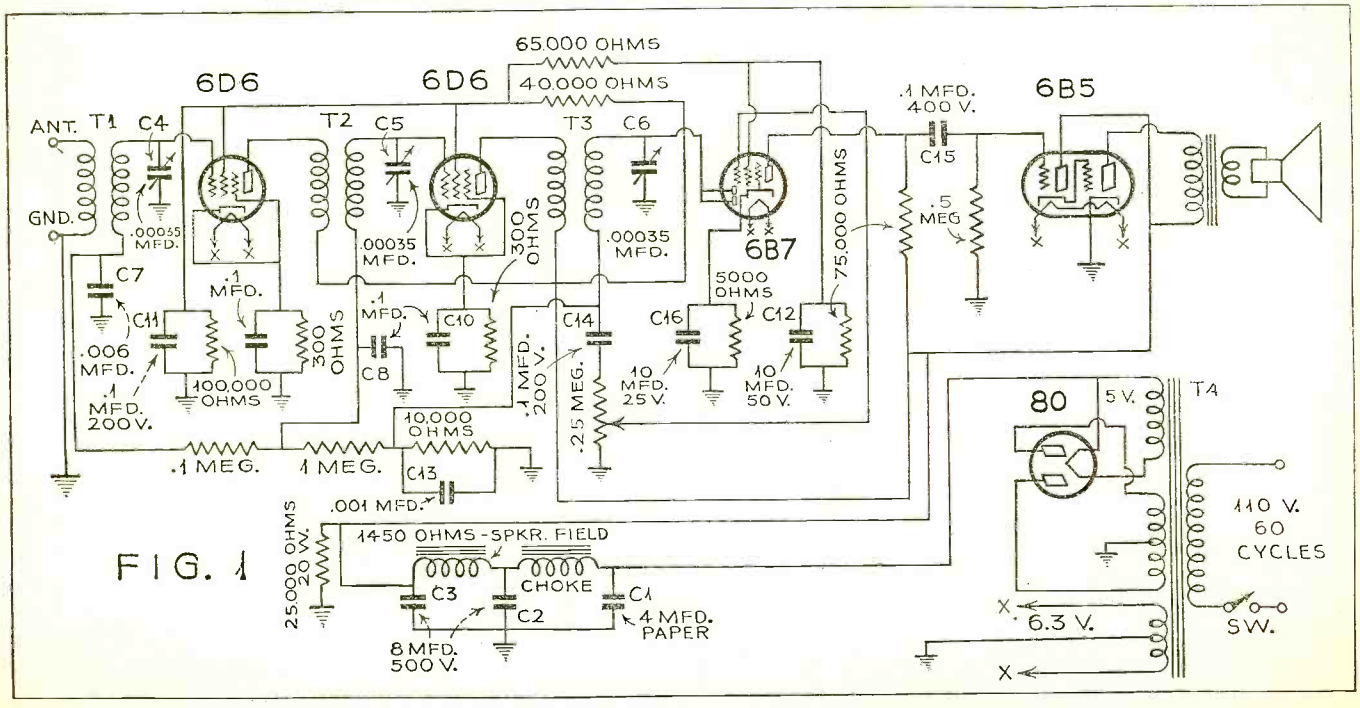


FIG. 1

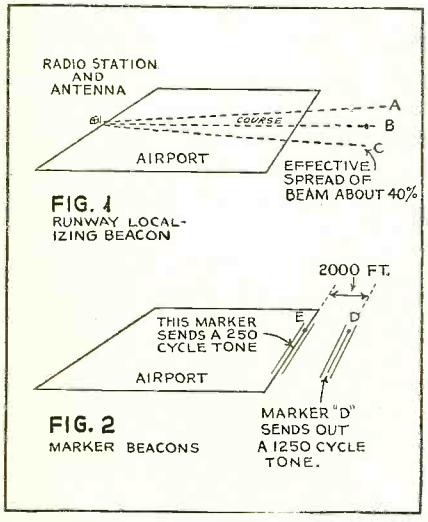
CHECKING OVER AN AIRCRAFT TRANSMITTER

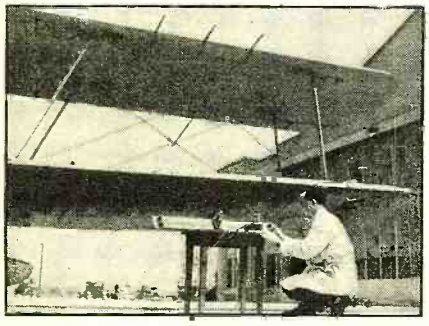
A student, under the guidance of an instructor, adjusts a radio transmitter in the shops of the Boeing School of Aeronautics. Test panels are seen in the background and in the foreground is a receiver with its power supply and neon-lamp indicator.

RADIO AIDS
CREATE JOBS FOR TRAINED

An understanding of radio-range landing beams for airfields and the aircraft and their mode of operation the new service field created by the aviation purposes. This article outlines the latest types developed tiveness required to insure safety and to permit planes to maintain few years ago would

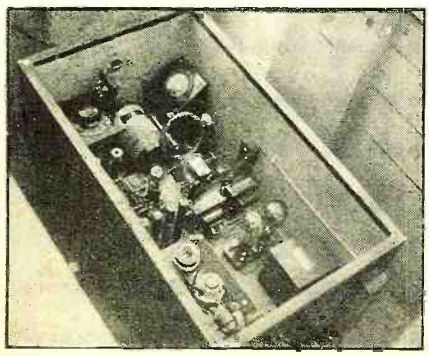
By C. L.





NEW AIRCRAFT EQUIPMENT

Above: Testing landing-beam receiver. Note antenna on upper wing. Below: Marker-beacon transmitter.



RADIO in aviation faces the constant challenge of adverse weather. What shall we do to meet it? Obviously the answer lies not alone in trained personnel, but also in radio equipment. We cannot separate the two. Rapid development of radio equipment, which in turn broadens the service of aviation to the public, brings new jobs to well-trained service and installation men. However, it is not my intention to speak here of service and installation problems. Such a discussion belongs elsewhere. But something of technical advances, both those undertaken on a national scale and some which have come within my own experience, reveal a striking picture of what's going on today in the radio field as related to flying.

At the outset, it is important to remember that the U. S. Department of Commerce is constantly improving and adding new developments to overcome the bad-weather hazard in flying. At the present time we have the aural radio-range beacons and marker beacons by which the pilot can fly when there is little or no visibility, as well as the two-way radio-telephone which keeps the pilot informed of weather conditions along the airway and at his destination.

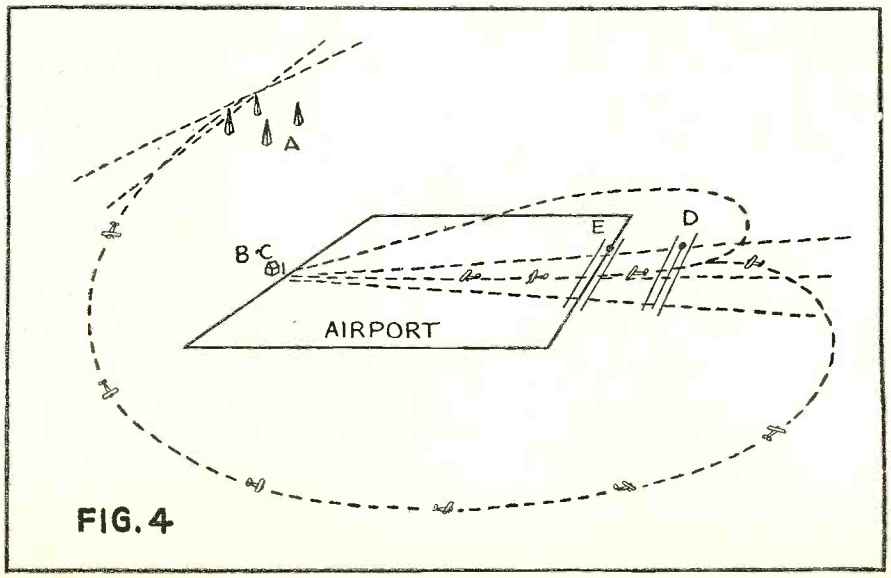
As an improvement on aural radio range beacons the Bureau of Air Commerce is now installing at terminal radio-range stations a radio marker which operates on a frequency of 91 mc., or approximately 3.3 meters, and is modulated with a 60-cycle tone. The antennas at Oakland, Calif., municipal airport project an egg shaped field into the air up to approximately 12,000 feet. At 4,000 feet, the area marked is approximately one mile wide.

The Receiver

An aircraft receiver for such a marker station must be light in weight, compact, rugged, simple to install and maintain and dependable. Also, the indicator employed must be visual. A design which we found practical was con-

FIGURE 4. HOW A BLIND LANDING IS MADE BY RADIO

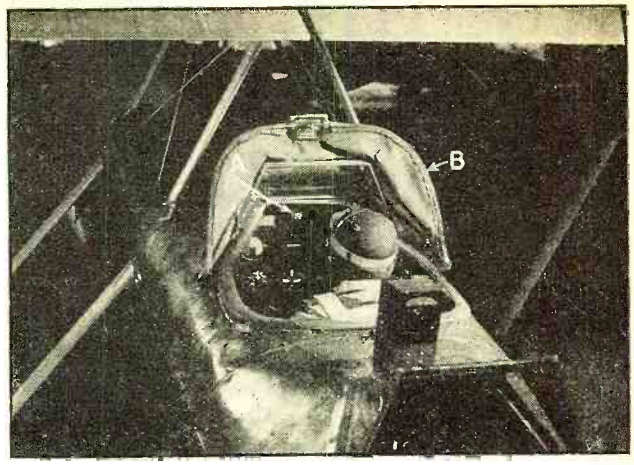
Point "A" is the location of the main radio-range beacon; "B" and "C" is the runway localizing and landing beam; "D" and "E" are the marker beacons.



TO AVIATION

SERVICE AND UPKEEP MEN

beacons, marker stations, runway receivers to pick up these signals on are important bits of knowledge in new types of radio equipment for explains these devices simply and to meet the high standards of effec- under all sorts of weather conditions schedules under conditions which a have meant "grounding"



LEARNING BLIND FLYING AT NIGHT

An unusual night view, looking into the cockpit of a training plane. "A" is the neon-lamp indicator. "B" is the hood which, when pulled down, covers the student so that he has to fly entirely by instrument.

Moser

structed by instructors and students in the Boeing School of Aeronautics radio shop. This receiver weighs 6¼ pounds and measures 6 inches by 7½ inches by 10⅝ inches, giving a cubic displacement of 478.1 cubic inches. The receiver (see Figure 1) consists of one stage t.r.f. with a type 954 acorn pentode tube, grid-leak detector with a type 955 acorn triode, resistance coupled to first audio stage using a 6C6 pentode tube, which is also resistance-coupled to the output audio stage, consisting of a 38 output pentode tube. The output plate circuit is resonant at 60 cycles and is coupled through a condenser to two ¼-watt neon lamps. The neon lamps are mounted one on each instrument panel of a Boeing 40 biplane used for radio and instrument flying.

Checking Operation

Recently the school conducted a series of interesting tests to check operation of this station marker receiver. The receiver was installed in the radio compartment of a Boeing 40C plane, on the WE type shock-proof rack. The power-supply cable was connected to the terminals on the interphone amplifier supply. The antenna consisted of a single piece of No. 18 fixture wire, approximately five feet long, extending down through the fabric on the bottom of the fuselage, the outside section being doped to the fabric with a strip of tape extending toward the tail.

Each neon lamp was installed in the center-top of the instrument panel, one in the forward cockpit, the other in the rear. An accompanying photograph shows the lamp plainly.

On the first flight two lobes appeared at 1,000 feet, with no indication at higher altitudes, indicating that the station was off frequency. The Department of Commerce was notified and this error corrected. The station frequency was approximately 90.5 mc. at that time.

On the second flight, tests were made over station KGO in Oakland at 1,000 and 2,000 feet for (*Turn to page* 371)

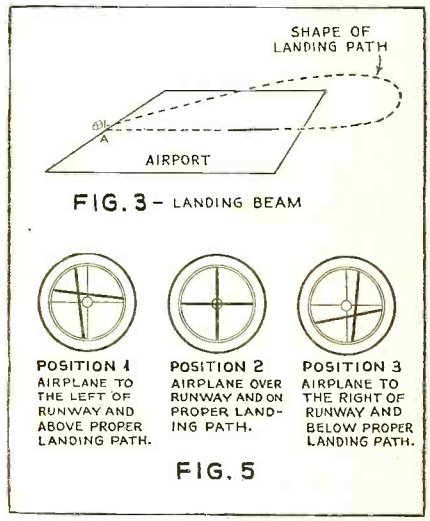
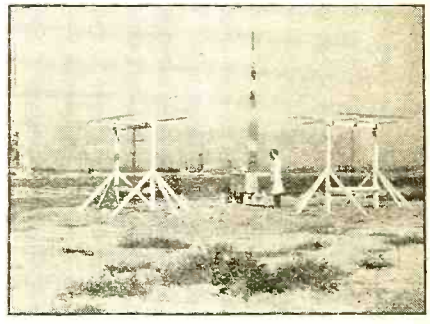


FIG. 3 – LANDING BEAM

FIG. 5



THE FIELD ANTENNAS

Above: These two antennas radiate energy which lights the neon lamp in the cockpit. Below: Top view of marker receiver for planes.

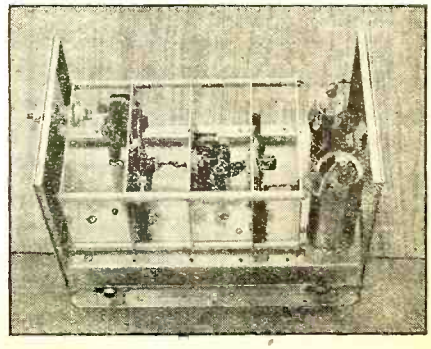


FIGURE 6. CIRCUIT DIAGRAM OF PLANE RECEIVER

This is the circuit used in the cone-of-silence marker receiver, a top view of which is shown in the lower right-hand corner of this page.

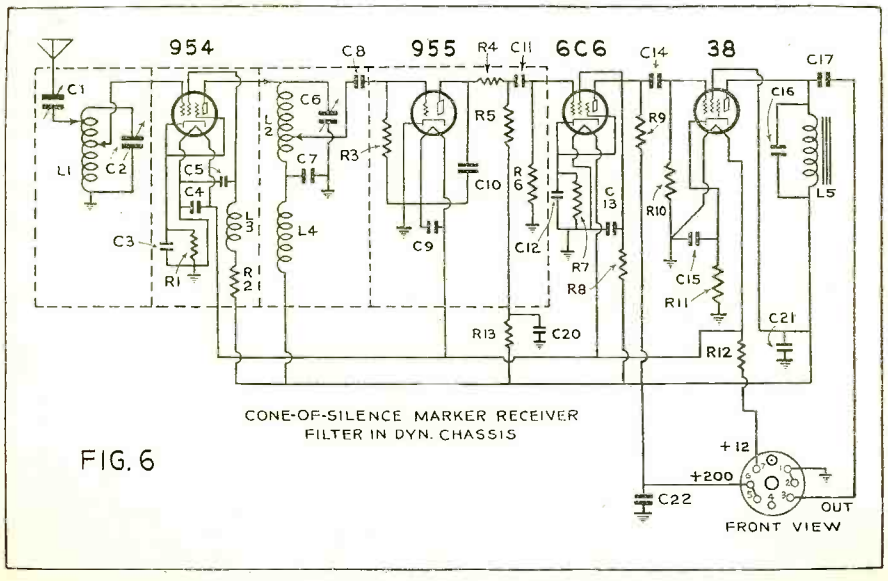


FIG. 6

SUPPLEMENTARY TUBE CHART

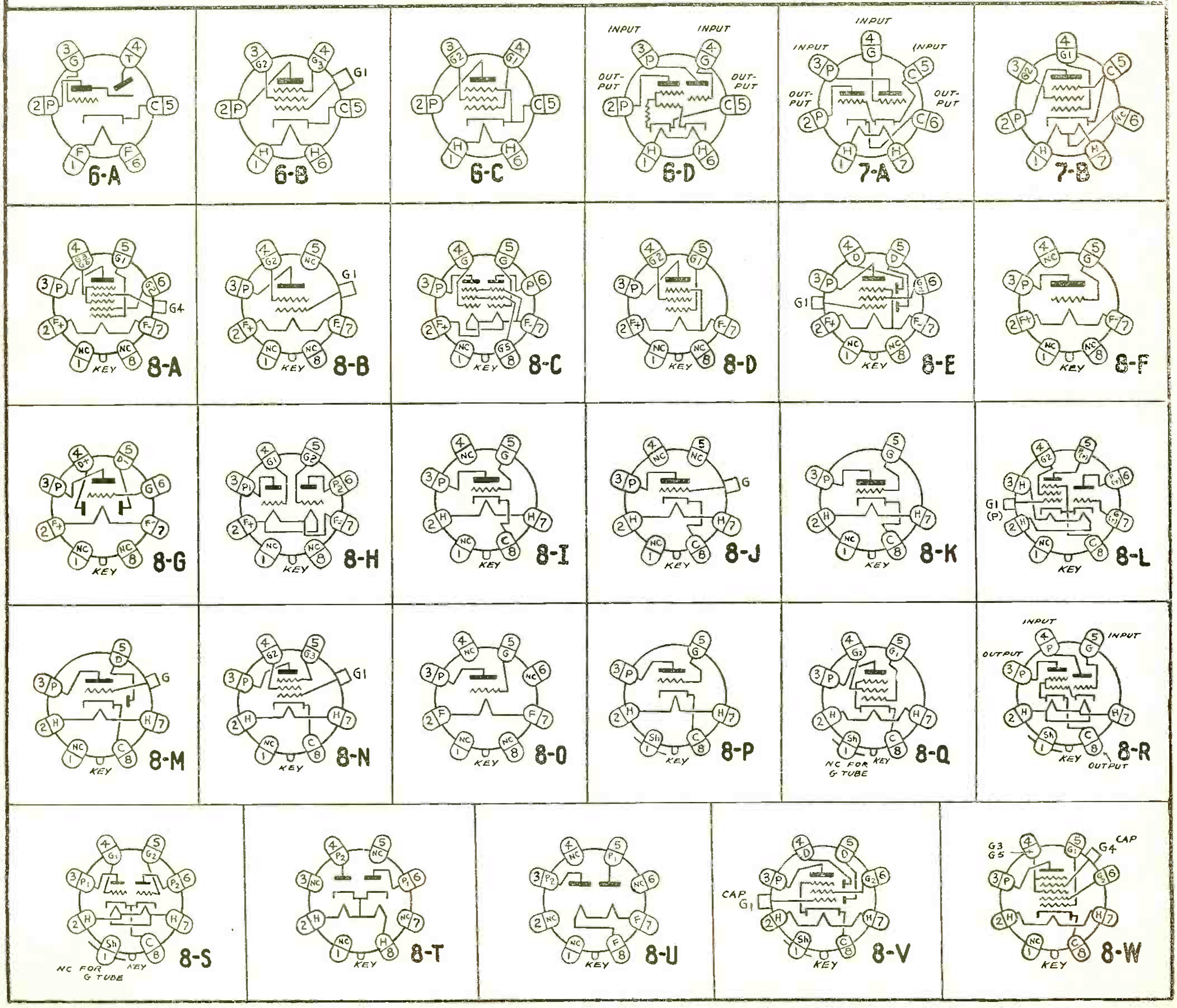
TYPE NO.	DESCRIPTION: TYPE	DESCRIPTION: CATHODE	BASE: SEE SOCKET CONN. CHART	FIL. CURRENT AMPS	CAPACITANCES MICRO-MICRO-FARADS: GRID-PLATE	CAPACITANCES: INPUT	CAPACITANCES: OUTPUT	OPERATING CONDITIONS AND CHARACTERISTICS: WHEN USED AS	PLATE SUPPLY VOLTS	SCREEN GRID VOLTS	GRID BIAS VOLTS (NEG.)	PLATE CURR. MA.	SCREEN CURR. MA.	AMPL. FACTOR	PLATE RESIS. OHMS	MUT COND. μmhos	MAX. UNDIST. POWER OUTPUT WATTS	RECOMM. LOAD RESIS. OHMS	CUT-OFF BIAS VOLTS
2.0 VOLT D.C. DETECTOR AND AMPLIFIER TUBES																			
1C7G	HEPTODE	FIL.	8-A OCT. 8-PIN	0.120	0.3	6 10	6 9	OSC. SECTION	180		.05 MEG.	3.3						R_{c2}=0.02 MEG	
								MIXER SECT.	135	67.5	3.0	1.3	2		0.55 MEG.	300	CONVERSION		
									180	67.5	3.0	1.5	2		0.75 MEG.	325	CONDUCTANCE		
1D5G	TETRODE VAR. MU.	FIL.	8-B OCT. 7-PIN	0.060	0.007 MAX.	4.8	11.5	AMPLIFIER	180	67.5	3.0	2.3	0.6	705	1.05 MEG.	750			20
1D7G	HEPTODE	FIL.	8-A OCT. 8-PIN	0.060	0.8	5	6	OSC. SECTION	135		0.5 MEG.	2.3							
					0.25	10.5	9	MIXER SECT.	135	67.5	3.0	1.2	2.5		0.4 MEG.	275	CONVERSION		
									180	67.5	3.0	1.3	2.4		0.5 MEG.	300	CONDUCTANCE		
1E5G	TETRODE	FIL.	8-B OCT. 7-PIN	0.060	0.007 MAX.	4.6	11	FIRST DETECT.	180	67.5	6.0								
								AMPLIFIER	180	67.5	3.0	1.7	0.6	780	1.2 MEG.	650			8
1E7G	DBLE. PENT.	FIL.	8-C OCT. 8-PIN	0.240				AMP. PUSH-PULL BOTH SECTIONS	135	135	7.5	6.5	2.0				0.65	24.000	
								EA. SECT.	135	135	4.5	7.5	2.1	350	.22 MEG.	1600			
1F5G	PENTODE	FIL.	8-D OCT. 7-PIN	0.120				AMPLIFIER (CL."A" PENTODE)	135	135	4.5	8.0	2.6	340	.2 MEG.	1700	.34	16.000	
1F7G	DUO DIODE PENTODE	FIL.	8-E OCT. 8-PIN	0.060	0.007	4	9	R.F. AMPLIFIER	180	67.5	1.5	2.0	0.6	650	1 MEG.	650			12
								A.F. AMPLIFIER (RESIS. COUPLED)	135	135 SUPPLY	2.0	0.42	0.34	41 GAIN			25.2 V. PEAK	.25 MEG. PL. RES.	
											0.8 MEG. SCREEN RESISTOR							0.5 MEG. GRID RES.	
1H4G	TRIODE	FIL.	8-F OCT. 7-PIN	0.060				AMP.	135		9.0	3.0		9.3	10.300	900			
									180		13.5	3.1		9.3	10.300	900			
1H6G	DUO DIODE TRIODE	FIL.	8-G OCT. 8-PIN	0.060	3.6	2	3	TRIODE AMP.	135		3.0	0.8		20	35.000	575			
1J6G	TWIN TRIODE	FIL.	8-H OCT. 8-PIN	0.240				COMPLETE CL."B" (BOTH SECTIONS)	135		6.0	1.0	STATIC PLATE CURRENT FOR				1.6	10.000	
									135		3.0	4.0	TWO TUBES. MAX. PEAK PLATE				1.9	10.000	
									135		0	10.0	CURRENT PER PLATE, 50 MA.				2.1	10.000	
6.3 VOLT A.C. OR D.C. DETECTOR AND AMPLIFIER TUBES																			
6B8	DUO DIODE PENTODE	HTR.	8-V OCT. 8-PIN	0.300	0.007	3.3	9.5	R.F. OR I.F. AMP. & DETECT.	250	125	3.0	10.0	2.3	800	0.6 MEG.	1325			21
6D8G	HEPTODE	HTR.	8-W OCT. 8-PIN	0.150	1.0	6.0	5.5	OSC. SECTION	135		0.05 MEG.	} GRID LEAK							
									250 THRU 20.000 OHMS		0.05 MEG.								
					0.3	8.0	11.0	MIXER SECT.	135	67.5	3.0	8.0	TOTAL CATH-		0.4	325	CONVERSION		25
									250	100	3.0	13.0	ODE CURRENT		0.32 MEG.	500	CONDUCTANCE		38.5
6J5G	TRIODE	HTR.	8-I OCT. 7-PIN	0.300	3.4	3.8	3.3	AMP.	250		8.0	9.0		20	7700	2600			
6K5G	TRIODE	HTR.	8-J OCT. 7-PIN	0.300	2.0	2.4	3.6	AMP.	250		3.0	1.1		70	0.05 MEG.	1400			
6L5G	TRIODE	HTR.	8-K OCT. 6-PIN	0.150	2.7	3.0	5.0	AMP.	135		5.0	3.5		17	11,300	1500			11
									250		9.0	8.0		17	9000	1900			20
6N5	CATH. RAY	HTR.	6-A SMALL 6-PIN	0.150				TUNING INDICATOR	PLATE SUPPLY 135 VOLTS THRU 0.25 MEG. TARGET 135 VOLTS I_b=0.5 MA. & SHADOW 90° FOR E_c=0. SHADOW 0° FOR E_c=−12 V.										
6P7	TRIODE PENTODE	HTR.	8-L OCT. 8-PIN	0.300				TRIODE	100		3.0	3.5		8	18.000	450			
								PENTODE	250	100	3.0	6.5	1.5	900	.85 MEG.	1100			50
6Q6G	SING. DIODE TRIODE	HTR.	8-M OCT. 6-PIN	0.150	1.8	2.5	5.2	AMP.	135		1.5	0.9		65	.65 MEG.	1000			
									250		3.0	1.2		65	.62 MEG.	1050			
6S7G	VAR. MU. PENTODE	HTR.	8-N OCT. 7-PIN	0.150	.007 MAX.	4.6	7.8	R.F. OR I.F. AMP.	135	67.5	3.0	3.7	0.9	850	.68 MEG.	1250			2.5
									250	100	3.0	8.5	2.0	1100	.63 MEG.	1750			38.5
954	ACORN PENTODE	HTR.	SPECIAL	0.150	0.007	3.0	3.0	R.F. OR I.F. AMP.	90	90	3.0	1.2	0.5	1100	1 MEG.	1100			
									250	100	3.0	2.0	0.7	2000	1.5 MEG.	1400			
								DETECTOR	250	100	6.0							0.25 MEG.	
955	ACORN TRIODE	HTR.	SPECIAL	0.160	1.4	1.0	0.6	CL."A" AMP. R.F. OR A.F.	90		2.5	2.5		25	14,200	1700			
									135		3.75	3.5		25	13,200	1900			
									180		5.0	4.5		25	12,500	2000	.135	20.000	
								CL."C" R.F. PWR. AMP. OR OSC.	180		35.0	7.0					0.5		
1603	LOW MICRO-PHONIC PENTODE	HTR.	6-B SMALL 6-PIN	0.300	0.010	5.5	7.0	PENT. AMP. CL."A"	100	100	3.0	2.0	0.5	1185	1 MEG.	1185			
									250	100	3.0	2.0	0.5	1500	1.5 MEG.	1225			
					2.8	3.0	11.5	TRIODE CONN. CL."A" AMP.	180		5.3	5.3		20	11,000	1800			
									250		8.0	6.5		20	10,500	1900			
2.5 VOLT A.C. OR D.C. POWER AMPLIFIER TUBES																			
2B6	DUAL TRIODE	HTR.	7-A MED. 7-PIN	2.25				INPUT SECTION	250		24	4		7.2		600		8000	
								OUTPUT SECTION	250		+2.5	40		18		3500	4.0	5000	
6.3 VOLT A.C. OR D.C. POWER AMPLIFIER TUBES																			
6B4G	TRIODE	FIL.	8-O OCT. 8-PIN	1.0	16	7	5	SING. CL."A" AMP.	250		45	60		4.2	800	5250	3.2	2500	
								PUSH-PULL FIXED BIAS	325		68	40 PER TUBE					15 TWO TUBES	3000 P-P	
								CLASS "A" SELF BIAS	325	BIAS RESIS. 750 OHMS		40 PER TUBE					10 TWO TUBES	5000 P-P	
6D5	TRIODE	HTR.	8-P OCT. 6-PIN	0.7				SINGLE CL."A"	275		40	31		4.7	2250	2100	1.4	7200	
								PUSH-PULL CL."AB"	300		50	23 PER TUBE					5	5300 P-P	
6K6G	PENTODE	HTR.	8-Q OCT. 7-PIN	0.4				AMP.	180	180	13.5	18.5	3.0	150	81.000	1850	1.5	9000	
									250	250	18.0	32	5.5	150	68.000	2200	3.4	7600	
6N6	DUAL TRIODE	HTR.	8-R OCT. 7-PIN	0.8				SINGLE TUBE	EA. 300		0	OUTPUT 45	INPUT 8	58	24.100	2400	4.0	7000	
									EA. 325		0	OUTPUT 51	INPUT 9.0	58	24.100	2400	5.2	7000	
								PUSH-PULL	EA. 300		0	45	8				10.0	10.000	
									EA. 300		0	51	9.0				13.5	10.000	
6N7	TWIN TRIODE	HTR.	8-S OCT. 8-PIN	0.8				CL."A" PARALLEL CONNECTION	250		5	6		35	11.300	3100		20.000 TO	
									294		6	7		35	11.000	3200		40.000	
								COMPLETE CL."B" BOTH SECTIONS	250		0	14 PER PLATE					8.0	8000 P-P	
									300		0	175 PER PLATE					10.0	10.000 P-P	

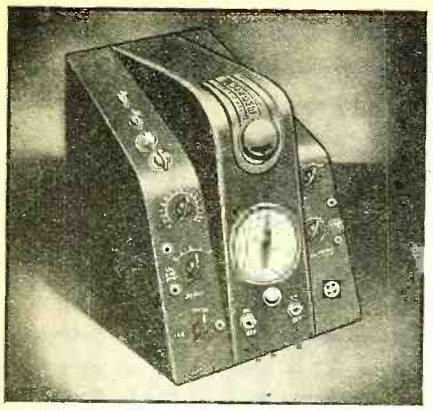
TYPE NO.	DESCRIPTION: TYPE	DESCRIPTION: CATHODE	BASE SEE SOCKET CONN. CHART	FIL. CURRENT AMPS.	CAPACITANCES MICRO-MICRO-FARADS: GRID-PLATE	INPUT	OUTPUT	OPERATING CONDITIONS AND CHARACTERISTICS: WHEN USED AS	PLATE SUPPLY VOLTS	SCREEN GRID VOLTS	GRID BIAS VOLTS (NEG.)	PLATE CURR. MA.	SCREEN CURR MA.	AMPL. FACTOR	PLATE RESIS. OHMS	MUT. COND. µmhos	MAX UNDIST. POWER OUTPUT WATTS	RECOMM. LOAD RESIS. OHMS	CUT-OFF BIAS VOLTS
7.5 VOLT A.C. OR D.C. POWER AMPLIFIER TUBES																			
1602	LOW MICROPHONIC TRIODE	FIL.	MED. 4-PIN BAYONET	1.25	7	4	3	CL."A" AMP.	350		32	16		8	5150	1550	0.9	11000	BIAS RESIS. 1950 OHMS
					FORMERLY DESIGNATED AS -10 SPECIAL				425		4.0	18		8	5000	1600	1.6	10200	2150 OHMS
SERIES FILAMENT POWER AMPLIFIER TUBES																			
12A5	PENTODE	HTR.	7-B SM. 7-PIN	0.32/12.6V. or 0.63/6.3V.				AMP. CL."A" PENTODE	100	100	15	17	3	70	35000	1900	0.85	4500	
									180	180	27	36	6	80	32000	2500	3.5	3800	
18	PENTODE	HTR.	6-C SM. 6-PIN	0.32/14V.				AMP. CL."A" PENTODE	250	250	16.5	34	7.5	185	79.000	2350	3.0	7000	NOTE CHARACTERISTICS SIMILAR TO 42, 2A5
25A6	PENTODE	HTR.	8-Q OCT. 7-PIN	0.32/25V.				AMP. CL."A" PENTODE	95	95	15	20	4	90	45.000	2000	0.9	4500	
									135	135	20	39	8.5	99	42000	2350	2.0	4000	
									180	135	20	40	8	96	40.000	2400	2.75	5000	
25B5 25N6G	DUAL TRIODE	HTR.	6-D MED. 6-PIN 8-S OCT. 7-PIN	0.32/25V.				DYNAMIC COUPLED AMP.	110	INPUT PLATE 110	0	45	INPUT PLATE 7	25	11400	2200	2.0	2000	
									180	100	0	46	5.8	35	15.200	2300	3.8	4000	
25B6G	PENTODE	HTR.	8-Q OCT. 7-PIN	0.32/25V.				AMP. CL."A" PENTODE	95	95	15	45	4 – 12			4000	1.75	2000	

RECTIFIER TUBES

TYPE	DESCRIPTION		CATHODE	BASE	FIL. AMPS.	FIL. VOLTS	MAX. A.C. VOLTS PER ANODE	MAX. D.C. OUTPUT CURR. MA.	MAX. PEAK INVERSE VOLTS	MAX. PEAK PL. CURR MA.	MAX. VOLTS DELIVERED TO FILTER (NOM.): CONDENSER INPUT	CHOKE INPUT
5V4G	FULL WAVE	HIGH VACUUM	HTR.	8-T OCT. 8-PIN	2.0	5.0	400	200	1100	700		
5X4G	FULL WAVE	HIGH VACUUM	FIL.	8-U OCT. 8-PIN	3.0	5.0	500	250	1400	700	480	360
5Y4G	FULL WAVE	HIGH VACUUM	FIL.	8-U OCT. 8-PIN	2.0	5.0	350	125	1000	400	300	225
							400	110	1100	350	370	275
							550	135	1500	300	FOR CHOKE INPUT ONLY: USE 70 H. MIN.	425

SOCKET CONNECTIONS-BOTTOM VIEW





Latest TESTING Instruments

As Modern As Tomorrow

By Richard Feeney

THE new Supreme Model 535 "Diagnomoscope" is a combination of a completely self-contained cathode-ray oscilloscope and a dual-purpose all-wave signal generator, housed in a single metal cabinet. This new instrument, offering compactness, rugged construction, attractive up-to-the-minute appearance and advanced engineering design, is an outstanding representation of the modern trend in cathode-ray testing equipment.

Laboratory technicians and servicemen especially, are now realizing that to properly check or service present-day receivers and multi-tube audio amplifying systems they must be equipped with modern testing equipment. Certainly this cathode-ray testing instrument meets their requirements for the wide variety of useful testing purposes that it can be applied to, in radio work.

The component circuits can be used either individually or in a wide variety of combinations covering almost every known test, incorporating oscilloscopic r.f. or a.f. signal-generator functions. Visual alignment of circuits is made possible and, among other applications, waveforms, audio and harmonic distortion can be observed and studied by means of "patterns" projected on the cathode-ray screen. Facilities are also provided for shifting the phase relation of input signals as an aid to the study of Lissajou figures.

The horizontal and vertical amplifiers of the oscillograph unit provide a gain of approximately 40 and are designed to have a practically flat frequency response from 20 to 90,000 cycles. They are equipped with graduated gain controls for facilitating comparative tests.

The signal generator provides a variable radio-frequency output which may be amplitude modulated (or frequency modulated) at a constant band width. The range covers all the frequencies which lie between 125 kc. and 15 megacycles with sufficient harmonic content for further extension of the range.

The signal generator is of the direct-reading type which affords a means for visual alignment as well as alignment of receivers by use of the generated "standard test voltage," with the carrier modulated 30% at 400 cycles. Included are a beat-frequency audio oscillator and an amplifier calibrated from 50 to 10,000 cycles, designed to have a constant output, the harmonic content not to exceed 5%. Provision has been made for external amplitude modulation of the carrier in order that it might meet all modern test requirements.

The Diagnomoscope employs 10 tubes in all, consisting of one 906 type cathode ray tube, one 885, one 879, two 57's, one 6A7, one 6F7, one 76, one 84 and one 80 rectifier tube.

New DOUBLET Antenna

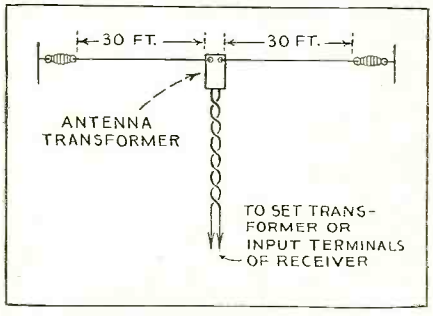
Suppresses Noise

By Robert Ames

GREATLY-INCREASED sensitivity on all frequency ranges is one of the outstanding features of the new Philco all-wave aerial, as compared with their previous deservedly popular systems. This improvement has been effected without sacrifice of the distinguishing advantages incorporated in their previous kits.

The new Philco Universal all-wave aerial has two 30-foot horizontal, flat-top antenna lengths, forming a doublet 60 feet overall. A new antenna transformer is employed at the center junction of the doublet. This transformer is far more efficient than that used in their previous models. The sensitivity is improved 200 percent at 6 megacycles and 400 percent at 12 megacycles, according to their tests. The transmission line is 65 feet long, and is formed of weather-proofed twisted pair. All connections are soldered at the factory, making for easy and quick installation.

This antenna system can be used with any set having a built-in transformer for doublet antennas. For other sets, a special set transformer is available to adapt them to this aerial.



USES TWISTED PAIR FEEDERS
This new antenna is easy to install for use with all-wave receivers.

Provision is made in the design of the system to take care of excessively noisy conditions, such as may occur when there is much electrical machinery and wiring in the immediate neighborhood. In such unusual cases, additional noise reduction may be obtained by adding another ground connection directly to the aerial transformer, to supplement the ground which should always be made to the receiver chassis. This additional lead, when required, is made by soldering one end to the terminal provided at the base of the antenna transformer and connecting the other end to the nearest available ground such as a "standpipe," on the roof. If none is available, the wire may be run to the nearest radiator or water pipe on the top floor of the house.

This aerial kit was installed in a noisy city location, about 150 feet from a trolley-car line and on a street with considerable automobile traffic. It gave appreciable noise reduction so that reception of many foreign short-wave stations could be accomplished without objectionable background noise.

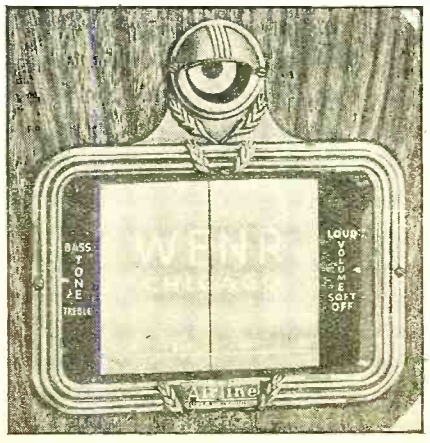
Unique "MOVIE" Dial

Projects Calls

By John Strong

MONTGOMERY WARD announces a new line of 1937 receivers with a new tuning dial departure that is bound to create a great deal of interest among radio listeners. It is called the

(*Turn to page* 379)



In tests at the Westchester Listening Post such stations as Hawaiian K6MVV and K6MW were brought in R9+ on 10 meters and 7 states were heard on 5 meters

Sets New Standards in SHORT WAVE *Reception*

This new receiver brings to the ultra high frequency fan, for the first time, the advantages and refinements of a real "communications" set

By L. M. Cockaday and S. Gordon Taylor

THE operating tests of the "Ultra Skyrider" receiver have provided a good deal of novelty for the reason that this is the first receiver of this advanced type to be produced for ultra-high-frequency operation. It has many novel features and because of this, plus the unusual operating conditions found in the u.h.f. ranges, a little practice was required in learning how to properly operate the receiver in the ranges below 10 meters. Once this was learned, however, results obtained exceeded anything the authors had previously encountered in tuning these ranges.

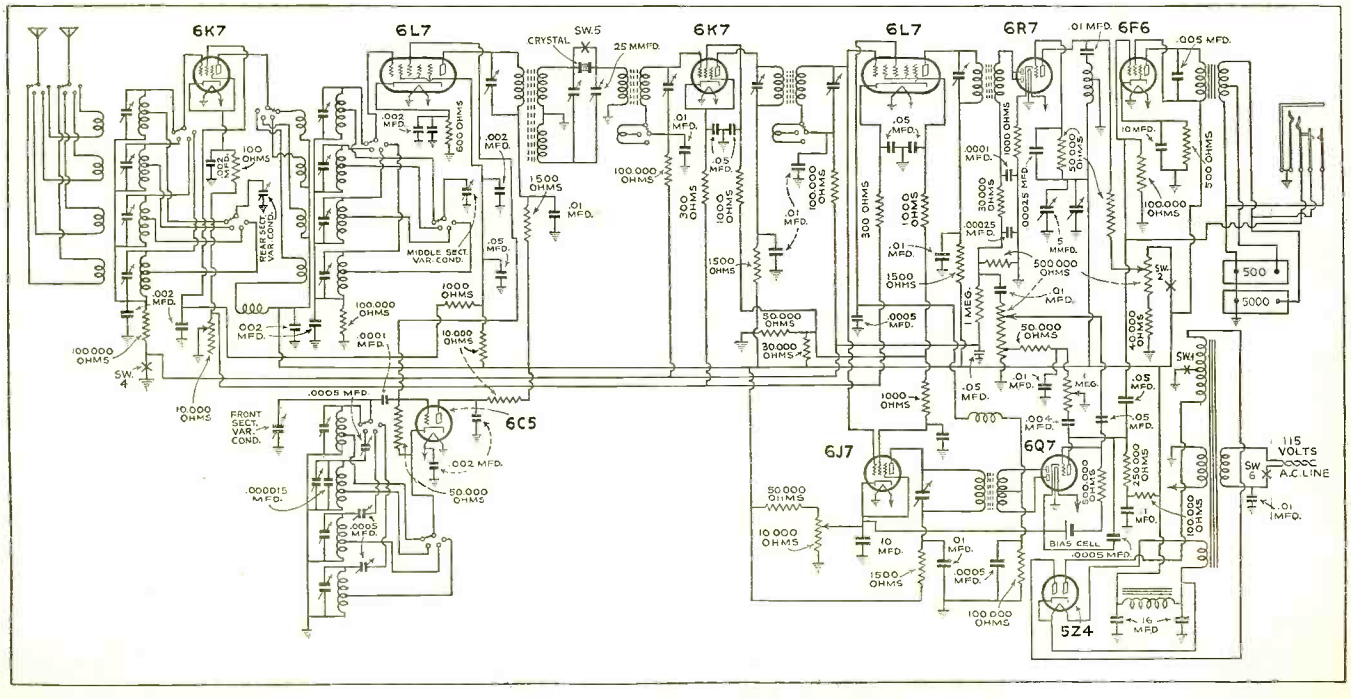
In the ranges down to 10 meters, operation is like that of any other good communications receiver; in fact, this holds true down to 5 meters. Results in the 10-, 20- and 40-meter amateur bands and all the short-wave broadcast bands were eminently satisfactory. It might be thought that the selectivity would be less than normal, due to the use of 1600 kc. for the intermediate frequency. This would be true except for the fact that the crystal filter, which may be effectively used on phone as well as c. w. reception, results in an overall degree of maximum selectivity (which may be varied by means of the "phasing" control) exceeding that of receivers using the conventional low intermediate frequency.

Below 10 Meters

The tests on wavelengths above 10 meters were just comprehensive enough to prove the effectiveness of the receiver there; then most of the effort was concentrated on the 5- and 10-meter amateur ranges—and the broadcast ranges in that region. This was done because the receiver was designed primarily for these ultra-high frequencies and therein lie its outstanding novelty and appeal.

Tests of the 10-meter operation were, of course, limited to such times as this band was "open", and in the month of September such times are relatively few and short. The first week in October, however, fair reception conditions existed off and on for two successive days (October 3 and 4) and during that time over 50 amateur stations were logged, close to 40 of them being R8 or better. Countries represented were: U. S., Canada, Mexico, England, Porto Rico, Hawaii, Czechoslovakia, Austria, and Denmark.

The 5-meter "Ham" band offers the severest test for any ultra-high-frequency receiver because of the severe over-modulation and frequency modulation encountered in many of these signals, and the large number of stations operating on these frequencies around New York City, set up two important and opposing requirements—high selectivity and the (*Turn to page* 370)



The "HAM" Shack

Conducted by
Everett M. Walker
Editor for Amateur Activities

G5CV, LONDON
This is the "Ham" shack of W. Walters of that city who works the 40, 20 and 5 meter band regularly.

Curing B. C. L. Troubles

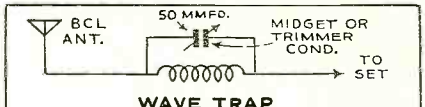
AMATEUR broadcast interference is, and has been since the inception of aural broadcasting, one of the most serious problems confronting the amateur operator. Recently there has been much discussion of this subject both editorially and before the Federal Communication Commission. There is much to be said about "rights" on both sides, but the fact remains that broadcast listeners outnumber the amateur at least twenty to one, and therefore, the amateur should do all within his power to keep such interference from becoming a handicap.

Indications are that most of the broadcast listeners' interference is caused by 'phone operators, and by far the greatest number of complaints are received by the authorities about stations operating on 160- and 75-meter bands. Higher frequencies seem to be comparatively free of interference complaints.

There is probably a good reason why 'phone operators bear the brunt of the complaints. Their signals obviously are understandable to the layman. Interference from c.w. stations, on the other hand, cannot be so easily tracked down. Frequently "key clicks" are mistaken for some form of electrical interference—in the same category with oil burners, vacuum cleaners, heating pads and other household appliances that cause much more interference than the amateur.

There is no reason why the amateur and broadcast listener cannot enjoy their respective hobbies and entertainment without serious interference. But the amateur should do all he can to keep interference at a minimum. He should constantly check with his neighbors to find out if he is causing any disturbance. He should cooperate in every way possible to prevent such complaints from becoming a menace.

Of course, it must be said, that listeners with antiquated receivers have little to hope for by way of eliminating an offending signal. The Federal regulations provide that amateurs are not required to observe quiet hours unless they interfere on "modern radio receivers." This automatically excludes old battery sets and others in the antiquated category wherein it would be impossible to eliminate interference from even the smallest-powered transmitter. In such sets, and particularly those with grid-leak detection, it frequently is possible to take out half the tubes in the set and still hear a nearby amateur signal.



WAVE TRAP

COIL DATA FOR FOUR PRINCIPAL BANDS

BAND	COIL SIZE
160 METERS	80 TURNS 2 IN. - No 24
80 "	35 " 2 " " 18
40 "	12 " 2 " " 18
20 "	7 " 2 " " 18

Elimination of broadcast interference should begin in the amateur's station. There is no reason why a station of reasonable power should cause any interference at all if it is properly adjusted. There are so many things that contribute to broadcast interference in a transmitter that the amateur operator should constantly check for trouble.

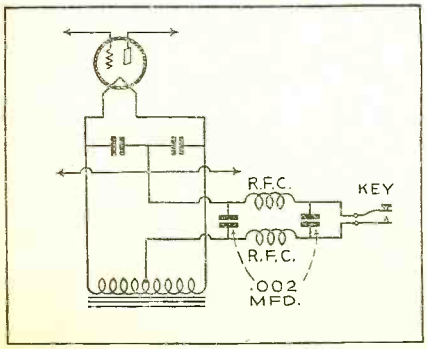
For instance, in a 'phone transmitter one of the most frequent causes of disturbance is the neutralization of the modulated and buffer stages. If the modulated amplifier is not properly neutralized, it will give the signal a "lisp," and the "lisp" will interfere with broadcast reception. Further, modulation percentage is another important factor. Over-modulation, of course, will cause serious disturbances, and frequently 100 percent modulation of a powerful transmitter is about as bad. If high power is to be used, it is a wise practice, particularly during the early evening when broadcasting listening is at a peak, to cut modulation peaks to between 80 and 90 percent. A transmitter so modulated, even up to a half-kilowatt of power, will cause practically no interference. For instance, with the writer's own transmitter—using 450 watts input in the final amplifier, it is possible to receive all broadcast stations on a "standard" receiver (six years old) located five feet from the transmitter without any semblance of interference. If it is possible to eliminate interference under such circumstances, it is reasonable to assume that listeners with other "standard" and modern sets will not have cause for complaint. The writer has been in his present location for five years and, thus far, has had only three listeners complain of interference. All three were some distance from the transmitting antenna, but in each case the receiver was an old model rather susceptible to interference. In all cases, the interference was eliminated with a wave trap.

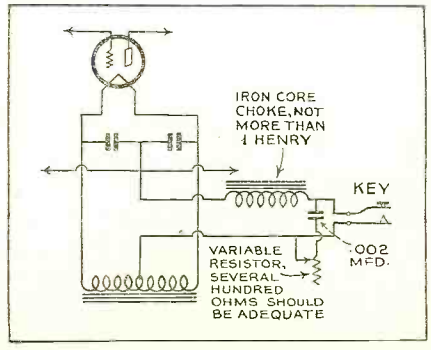
Killing Key Clicks

Key clicks are the severest form of interference caused by c.w. stations. Yet, key clicks are far more easily eliminated today than they were in the days of single tube transmitters. A filter will invariably do the trick. Diagrams of two such devices are illustrated. The keying method also is helpful. Keying in the oscillator circuit is one of the most practicable from this standpoint. If the key is inserted in series with the cathode-bias resistor, there will be practically no resultant click. This method may be employed with the 6L6 and 6A6 types of tubes more readily than with others. In the case of the 6L6 however, it is important that the voltage for the screen be obtained through a voltage divider, rather than a series-dropping resistor. Obviously, if the tube stops drawing plate current, the screen voltage will jump, with consequent damage to the tube if the latter method is used.

Poor Adjustment

The main point in keeping BCL QRM at a minimum is keeping the transmitter in order. It will be found that the operator of the poorly-adjusted transmitter is the recipient of the most complaints. For this reason, 'phone stations on 160 meters frequently find themselves faced with many interference cases. In most instances the 160-meter man has a new transmitter and it takes considerable experience before all of the "bugs" are ironed out. The majority of amateurs are eager to co-operate with the complaining lis-





¶ A Department for the amateur operator to help him keep up-to-date

LUCKY GIRL?

Or should we have used the words "Lucky Guy" in this title. It seems that Tony Landry, W2IRT, took Miss Anne Scott, pictured above, to the IRSM show at the Hotel Pennsylvania recently. Upon signing a door card she found that she had won a cathode-ray oscilloscope and now Tony is experimenting with all sorts of waves, forms and patterns, thanks to the YL.

teners and help the hams who are causing trouble. If by any chance an operator finds himself in lots of "trouble" it might be a good plan for him to ask help of others who have been through the BCL QRM mill.

If interference cannot be eliminated by proper transmitter adjustment, and not all of it can, the simplest device for overcoming it is a wave-trap in the antenna circuit of the broadcast receiver. Circuits for such units are simple and they may be constructed for a few cents. It is better to spend a few cents, however, than to endure the complaints of listeners who frequently threaten to do everything under the sun to get the offending operator put "off the air." Wave-traps consist essentially of a resonant circuit, tuned to the frequency of the amateur's signal. They merely block out that frequency. They are effective in about 100 percent of otherwise incurable cases, and frequently will do the trick even on antiquated battery sets.

A Simple Method

Another and simpler method that frequently will work in not too serious cases is the insertion of an ordinary 2.5 millhenry choke coil in series with the antenna lead of the broadcast set. Such chokes, of course, cost only a few cents and in addition usually are effective at almost any amateur frequency. On the other hand it is necessary to install a wave-trap for each frequency used by the amateur causing the trouble.

Amateurs by and large are eager to cooperate with broadcast listeners. They naturally do not want to cause a disturbance in a neighborhood, and usually will go to great length to combat the problem. There are a few (a decidedly small minority) who seem to feel that they have a prior right to operate a transmitter by reason that they are licensed by the government.

Amateur-B. C. L. Rights

Those who take this attitude are decidedly wrong. After all, both the amateur and the broadcast listener have their "rights"; the broadcast listener to his entertainment without interference; the amateur to his hobby. The broadcast listeners are in the majority, and should the "amateur menace" get beyond control, they undoubtedly would have a good case under the American system of government. It is up to the amateur to prevent any such situation from ever coming to pass.

A Friendly Attitude

If the amateur is courteous when he receives a complaint he undoubtedly can appease the listener to his satisfaction so each may enjoy radio. For instance, if a listener complains, the amateur should tell him it probably can be cleared up without difficulty. He should attempt to become friendly with the listener. It is not an unwise plan to invite him to see the "rig" after things are straightened out. A majority of amateurs questioned on the problem have adopted this procedure. They find that by bringing the listener to the station, he becomes greatly interested in what the amateur is doing and usually departs a good friend and a firm believer in amateur activities, once in a while becoming an amateur himself.

What some amateurs will do to satisfy broadcast listeners is typically brought out in a case recently brought to the attention of the writer. In this particular case, the listener was next door to the amateur and his receiving antenna was directly under the transmitting antenna. The receiving set was a ten-year-old battery model. The listener complained not only to the amateur but to the Federal Communication Commission at Washington. Instructions were transmitted to the local radio supervisor to investigate.

The R. I. and His Kit

Accordingly, the inspector and an assistant appeared on the troubled scene, armed with all sorts of equipment including a "standard" receiver—a popular make midget super-heterodyne. Tests were made. It was found impossible to eliminate interference in the battery-operated set, despite the fact no signal could be heard on the "standard" set, except on the operating frequency of the amateur's station. Nothing could be found wrong with the operation of the transmitter. So it was suggested the two, listener and amateur, try to get together and solve the problem, it being explained to the listener that his antiquated receiver was the chief reason why he was experiencing interference. It was also suggested that the amateur keep off the air when there was something the listener wanted to hear.

An Unusual Ham Sign

The cast aluminum plaque shown here makes an attractive name-plate for the transmitter panel and for other ham purposes. It is cast in aluminum with the letters and border raised ⅛ inch above the black background and is 4 inches long, 1½ inches wide and ¼ inch thick. They are made up to order with any call for one dollar each. RADIO NEWS will be pleased to furnish the manufacturer's name and address on request.

WILLIAM S. PALEY

AMATEUR ACHIEVEMENT AWARD

EDWIN K. COHAN, engineering director of the Columbia Broadcasting System, has announced the establishment of an award by William S. Paley, CBS president, to be presented annually to the radio amateur who "has contributed most usefully to the American people, either in research, technical development or operating achievement." The American Radio Relay League has been designated permanent custodian of the award, upon which will be engraved the name of each year's winner. A smaller replica will be given the individual winner selected by an impartial board of authorities on amateur radio. The board will be named at a later date.

In commenting on the establishment of the award, the CBS president said: "We in commercial broadcasting owe a debt of gratitude to those thousands of experimenting enthusiasts who first broke the ground in the limitless field that is radio today. The great progress that the amateurs have made in the past twenty years has been an inspiration to us in our particular sphere of endeavor. In establishing this annual award, I wish it to be an acknowledgement of the valuable contribution which the amateur radio operators in the United States and Canada have made to radio science and communication, as well as to the public service which they have rendred in times of emergency."

However, the irate listener was not satisfied with this arrangement. He was not in position, financially, to buy a new set; so he demanded that the federal authorities require the amateur to buy him a "standard" set. This, of course, they could not do, it being entirely out of their province. However, the amateur in this particular case, to satisfy the listener, actually took his receiver out of his living room and "loaned" it to the listener.

This, of course, is an unusual case. There are not many amateurs in position to supply listeners with modern equipment to replace their antiquated sets. But, it does demonstrate the eagerness of the amateur to co-operate.

There are many amateurs who operate their equipment not knowing they are causing interference. It is a good plan to canvass the neighborhood frequently. In any event every effort should be made to prevent QRM cases from getting to the official files of the Commission; every one that does is a black mark, so the fewer in the future, the better for the amateur fraternity in general.

The anticipated hearing before the Federal Communication Commission for the

(*Turn to page* 370)

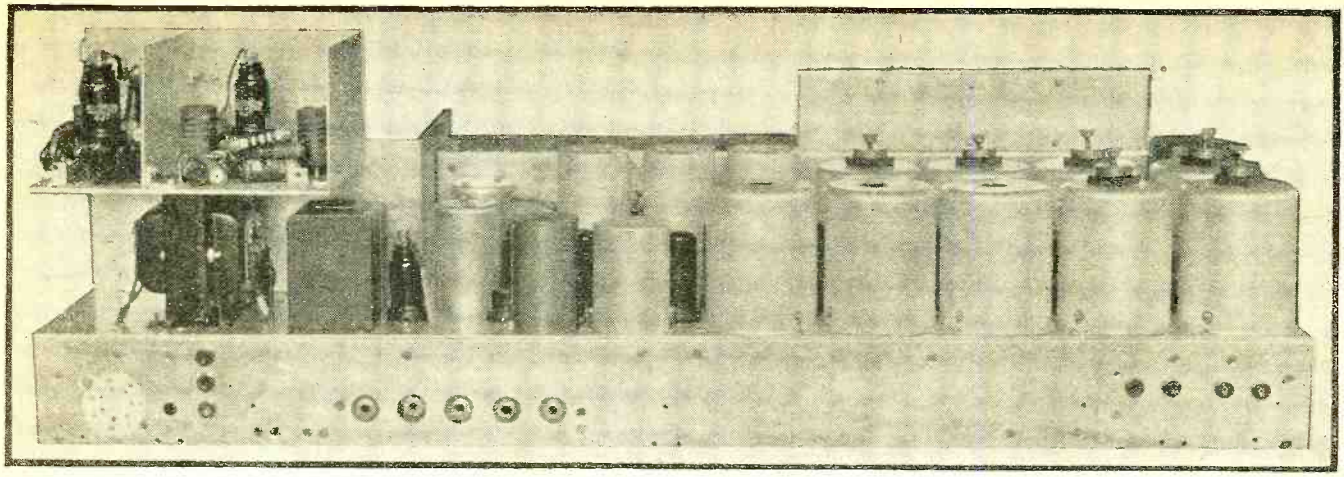


FIGURE 22—REAR VIEW OF THE COMPLETED CHASSIS SHOWING ARRANGEMENT OF PARTS AND CONNECTIONS

The Radio News Laboratory Model

5-10-20 METER SUPER

(Operating Data)

By Frank H. Jones

IN two previous articles, running consecutively in RADIO NEWS, the author has given the technical details of this extremely sensitive superheterodyne employing a number of new principles that have made the series important to constructors whether or not they build the complete receiver. In this concluding article Mr. Jones gives some very valuable information on lining up and operating the various circuits.

ONCE you get all of the constructional work and wiring done on this receiver, it is well to remove the entire metal cabinet sides and bottom, as you will probably have to turn the set upside down quite a few times before you are finished with all the testing and alignment of the various sections of the circuit. Naturally in a complicated circuit such as this one, it is essential to check over absolutely every connection to see that no wire is in the wrong place, and that no connection has been forgotten. A triple check should be made and if you have any one to help you, let him check over the entire circuit also. This will avoid a lot of grief later on.

The following are a few hints and ideas to help you get the set working and lined up properly. Put the 6K7 tubes in sockets 1 to 5 inclusive. Put a 6L7 in the V6 socket. Cut the B-plus lead temporarily and connect a d.c. voltmeter across the B-plus lead. Turn on the power and note if the voltmeter reads around 200 to 250 volts. If this is O. K. now feel all the tubes and if they are warm their filaments are probably all right. Connect the B-plus lead and the voltage should not drop lower than around 180 volts. If everything runs all right shut off the power and proceed as follows.

Turn switch 2 off normal. Have available a modulated signal generator and set this to 14,200 kc., and couple it to the grid of V6. Have the dial of gang condenser C-1 to C-4 set on 300. Have all trimmer condensers set as nearly as possible to the same capacity. Have all inductance trimmer plugs about one-third "in." Now turn on the power, and advance the audio gain to "full." Of course the 6C5 and the 6F6 of the audio circuit in the 1-10 section should be in place also.

Aligning R. F. Section

Now you should get a signal, but if you don't, move the trimmer plug up and down and you will then peak the signal with the inductance trimmer. Do not touch the trimmer condensers as yet.

Now couple the generator to the grid of V5 and repeat the operation, peaking the signal with the inductance trimmer. The signal now should be much louder. Do the same with V4 and V3, and by now you will have to reduce the audio gain a whole lot. Connect the signal generator to the antenna input of V2 and repeat the process. Then connect the generator to antenna input of V1 and adjust the trimmer till signals peak at the same setting of the condenser gang Cv and Ch. Now go over them again, with the generator on either antenna input V1 or V2 and, with the audio gain set so you can just barely hear the signal, adjust the trimmer condensers on T6 for peak. Next peak the trimmer condenser on T5 and so back to T1 and T2.

While these adjustments are being made the regeneration control of V5 should be set at nearly maximum. If you should get any unwanted oscillation, watch out that you haven't forgotten any of the flexible shielding over the grid and plate leads, as every one

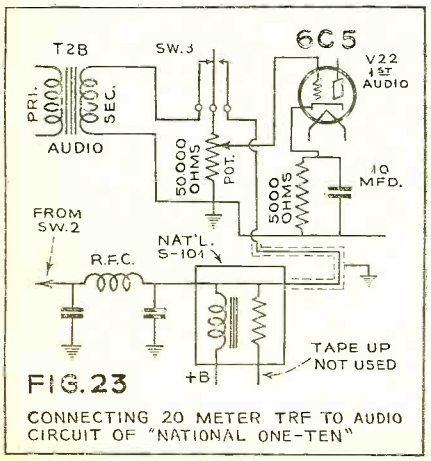


FIG. 23

CONNECTING 20 METER TRF TO AUDIO CIRCUIT OF "NATIONAL ONE-TEN"

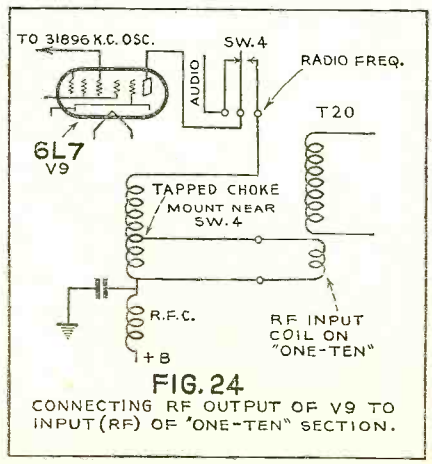


FIG. 24

CONNECTING RF OUTPUT OF V9 TO INPUT (RF) OF "ONE-TEN" SECTION.

of them carries shielding right up to the grids and plate terminals.

Now take off the signal generator and connect a receiving doublet antenna, with any sort of untuned transmission line from 100 to 500 ohms impedance, and tune and listen.

You will find that you get signals from anywhere and you can build them to R9 by adjusting the antenna tuner. There will be very passable selectivity, which you can sharpen considerably by the regeneration control.

Next, and just as an interlude and to be sure it is working, connect your 10-meter antenna to the antenna input posts of the National 1-10 section.

Using Super-regenerator

With switch No. 3 turned off normal and all others normal, advance the super-regeneration control till you hear a slight hiss. Then tune dial "C" between 0 and 200. Of course you must have put in the 10-meter coils in this section. That's all there is to this section. If the 10-meter band is at all alive you may surprise yourself right off the bat by picking up Buenos Aires, 5000 miles away, or Europe, or even Asia.

Next set your signal generator to 1748 kc. Put a 6L7 in socket V7 and make a temporary connection of the audio circuit to the plate of V7. Couple the signal generator loosely to the plate of V6. Turn on the power and adjust trimmer condensers in the coil can of T7 for maximum signal. You may find that you have to add or remove a few turns from either the primary or secondary of T7 so that condenser gang C5 and C6 will track over the range.

Adjusting Oscillator

It is best to tackle the oscillator and harmonic amplifier circuits next. If you are an amateur with transmitting experience, this will be fairly easy, otherwise you may have a little difficulty, in which case it might be well to call in the aid of some friendly transmitting amateur. The oscillator crystal is shown plugged into its socket under the chassis near the left end of the large section and just to the right of a shield partition and near the back. It is the square holder model and is an "AT"-cut crystal. Plug a 6F6 in socket V15 and have the test meter plugged into jack 15.

Turn on the juice and rapidly adjust the tuning condenser through top of can of the 2658 kc. fundamental coil, for a

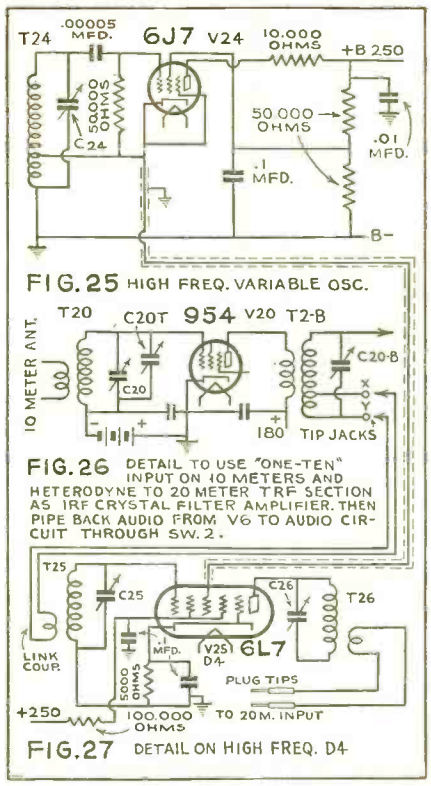


FIG. 25 HIGH FREQ. VARIABLE OSC.

FIG. 26 DETAIL TO USE "ONE-TEN" INPUT ON 10 METERS AND HETERODYNE TO 20 METER TRF SECTION AS IRF CRYSTAL FILTER AMPLIFIER. THEN PIPE BACK AUDIO FROM V6 TO AUDIO CIRCUIT THROUGH SW. 2.

FIG. 27 DETAIL ON HIGH FREQ. D4

dip in plate current. When you get that, the crystal is oscillating at its fundamental frequency. You can check it in a "monitor" or you can use the family all-wave receiver. Next adjust the condenser of the 7974 kc. coil in the same manner. This will give you the third harmonic of the crystal frequency. Now put tubes V16 and V17 in place. Adjust the tuning condenser of the V16 combination till you are sure you have picked out the second harmonic of 7974 which is 15,948 kc. Adjust the condenser of the V17 combination for amplification of this 15,948 kc. frequency. For the time being you can leave V18 and V19 if you care to and go ahead with aligning the main part of the receiver. Later you can put in operation V18 and V19 when you need them.

Now connect your audio temporarily to plate of V7. Turn on the power and by tuning T7 you will hear a 14,200 kc. signal come out on 1748 kc. Make any adjustments indicated.

Next, put the signal generator on 910 kc. Put the proper tubes in sockets V8, V9, V10, V11, V12, V13, V14. Set switches as per Figure 18 to take audio from V9. With the signal generator "on" adjust trimmers of T8 and T10 for the best signal. The lead going from V8 to T9 should be temporarily disconnected. After T8 and T10 are lined up, then connect V8 again to T9 and adjust T9 till you get maximum "squelching". With the above connection open, you can put a pair of headphones in the diode circuit for lining-up purposes.

Making Dials Correspond

With the switches set as above, for taking audio from V9, put a 14,200-kc. signal into the antenna input and with the oscillator harmonic and fundamental frequencies running, you will now hear the 910-kc. frequency coming out, which was produced by mixing the 1748 frequency with the 2658-kc. frequency. Minor adjustments may now be made in all of the trimmers so that dial "B" will correspond quite closely with the dial settings of dial "A".

Therefore, to tune in a signal with triple detection, taking the audio from D3, V9, simply set dials "A" and "B" about the same, generally leaving condenser gang C5, C6 at a minimum. When you hear the wanted signal, adjust both A and B for maximum signal. If QRM is slight, there is all the signal you want. If QRM is heavy, peak C5 and C6 within its little dial. You will have cut the audio gain away down near zero. If QRM is worse than heavy, increase the regeneration on V5. Ordinarily, this setting will cut through almost the worst possible QRM.

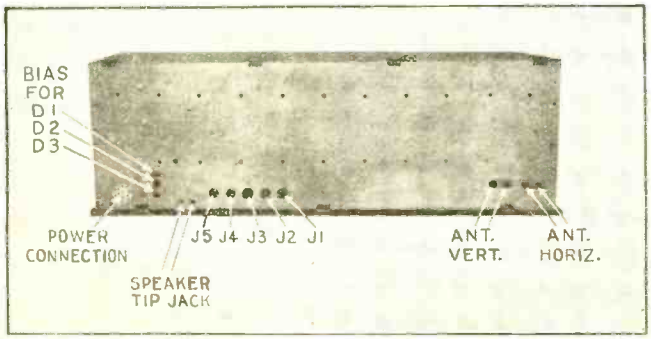
Crystal Operation

If you have one or two particular friends you wish to work with regularly, get twin 20-meter crystals as described earlier in this article, and when you work with them, just switch in the crystal filter by putting switch No. 1 "off" normal (or in crystal filter position) and tune to your friend's frequency, using the phasing control to suit conditions. Condenser C3A will peak this circuit right on the nose. Use plenty of regeneration in the V5 circuit, for the selectivity required right after a crystal filter.

Circuit details in Figures 23 to 27 inclusive, show the ultra-high-frequency oscillator and ultra-high-frequency mixer D4. (*Turn to page* 381)

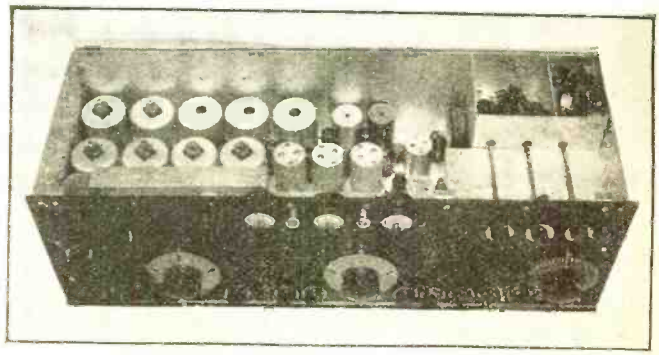
REAR VIEW OF SET

Figure 20—This rear view of the chassis and cabinet shows the connections for power, speaker, antennas and bias. The top lid folds back on four hinges



LOOKING INTO THE SET

Figure 21—This is an "operator's" view of the set with the top lid of the cabinet folded back. Notice the ventilating holes in sides and back



POLICE RADIO Now "Up in the Air"

By Gordon Fraser

SHORT-WAVE radio has become indispensable to municipal and state police departments throughout the country. Now it appears that its usefulness will be further extended through radio equipped police aircraft, if we are to judge from results of a test and demonstration recently staged at Cleveland in which Deputy Traffic Commissioner Martin A. Blecke, in a radio equipped blimp, directed police cars below.

With a special short-wave transmitter and receiver installed in the airship, Commissioner Blecke was able to not only give orders to traffic men in Cleveland's 25 radio police cars in which short-wave receivers were installed but also carried on a two-way conversation with one of the cars, which had been equipped by General Electric engineers with a transmitter as well as a receiver.

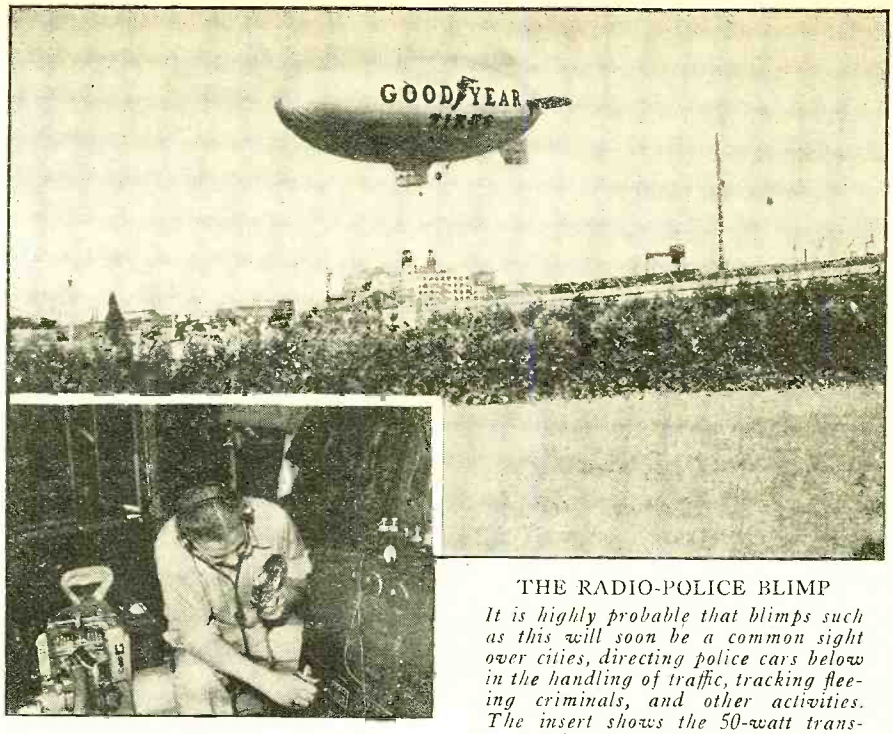
From the air, Commissioner Blecke had an unobstructed bird's-eye view of the entire city and the many arteries of traffic. As certain roads became unexpectedly congested, he would call to his traffic men to proceed to the location and help the officer on the beat. Any unusual conditions experienced in relieving the congestion would be reported back to the commissioner from the test car which carried the two-way equipment.

Aerial Traffic Direction

"I can see great possibilities in directing traffic from the air," Commissioner Blecke said after the demonstration. "I had a perfect view of all roads of the city at all times, could see where traffic was heaviest and it was an easy matter to dispatch extra help by means of the short-wave radio transmitter telephone.

"In addition to traffic regulation, I can see where such a set-up would prove most helpful in the pursuit of criminals. From the airship it would be a comparatively easy matter for me to keep my eyes constantly on the fleeing criminals. I could direct the police cars so they could block roads and eventually close in on the criminals. If they should duck to shelter in some building or yard, I could see them and by radio it would be no trouble for me to direct officers to the place of concealment.

"The dirigible is ideal for this purpose. It can fly slower, in fact almost stand still at times, whereas an airplane must cruise at greater speeds and thus it would be more difficult to keep your eyes trained on any particular persons or location. This demonstration has proven to me the wonderful possibilities for doing police work from the air, providing you have the (*Turn to page* 379)

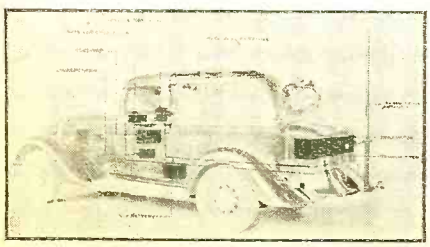


THE RADIO-POLICE BLIMP

It is highly probable that blimps such as this will soon be a common sight over cities, directing police cars below in the handling of traffic, tracking fleeing criminals, and other activities. The insert shows the 50-watt transmitter installed on board.

A MODERN POLICE CAR

In addition to the usual short-wave police receiver, a complete 15-watt transmitter is a part of the equipment used to maintain 2-way communication with headquarters and with the blimp.



Advantages of an "R" METER

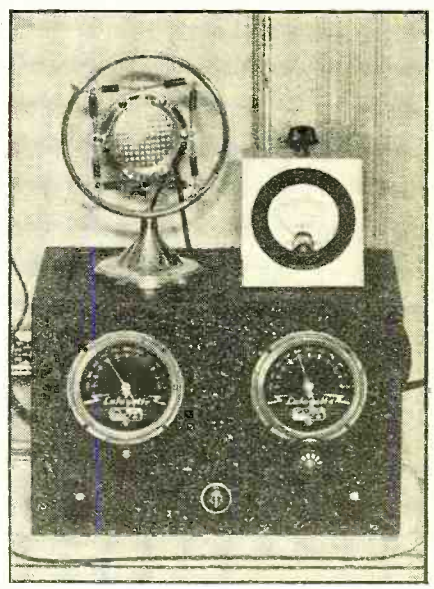
By W2JCR

THE brief article in the August issue under the title "Installing Your Own 'R' Meter" has apparently created a good deal of interest. Those who like the idea will be interested in some additional advantages offered by a meter installed in the i.f. plate circuit of a.v.c. superhets as explained in that article.

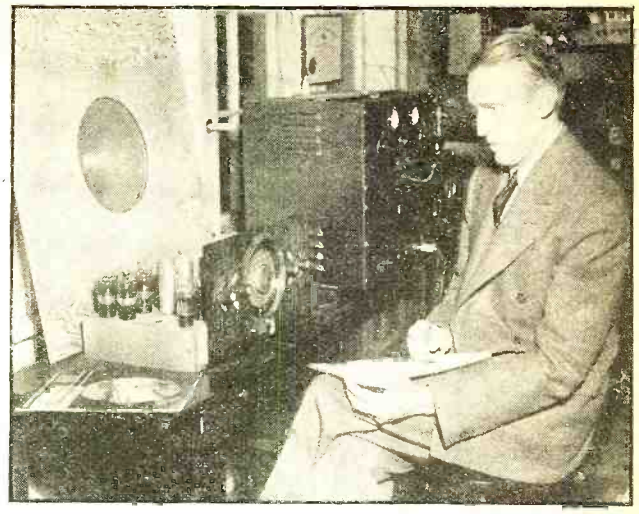
It was pointed out that the use of such a meter provides a definite basis for giving "R" reports. In addition to this, however, there are other ways in which the "R" meter serves to make better reports possible. For instance it gives a definite check on the modulation of received signals. If a signal is modulated 100 per cent or less there will be no fluctuation of the needle after the signal is tuned in, whereas modulation over 100 per cent will result in "wobbulation" of the meter. The meter will show the carrier level of any signals and will rise and fall as the signal fades in and out but will not be affected by modulation unless overmodulation is taking place. The only exception to this is when the meter is incorporated in a receiver in which, due to overloading or poor design, detector action takes place in the amplifier stages.

The "R" meter is a perfect indicator when making adjustments in the receiver,

(*Continued on page* 378)



New DIAL DISK Proves Worth On AIR TESTS



By Wm. C. Dorf

REMINISCING over radio receiver developments of the last five years, it is quite a surprise to realize the vast progress attained in all-wave receiver refinements and design. Within this time we have witnessed the introduction of metal tubes, new circuits, improved reproducers and audio systems, large easy-to-read tuning dials, wider tuning ranges and many other new developments.

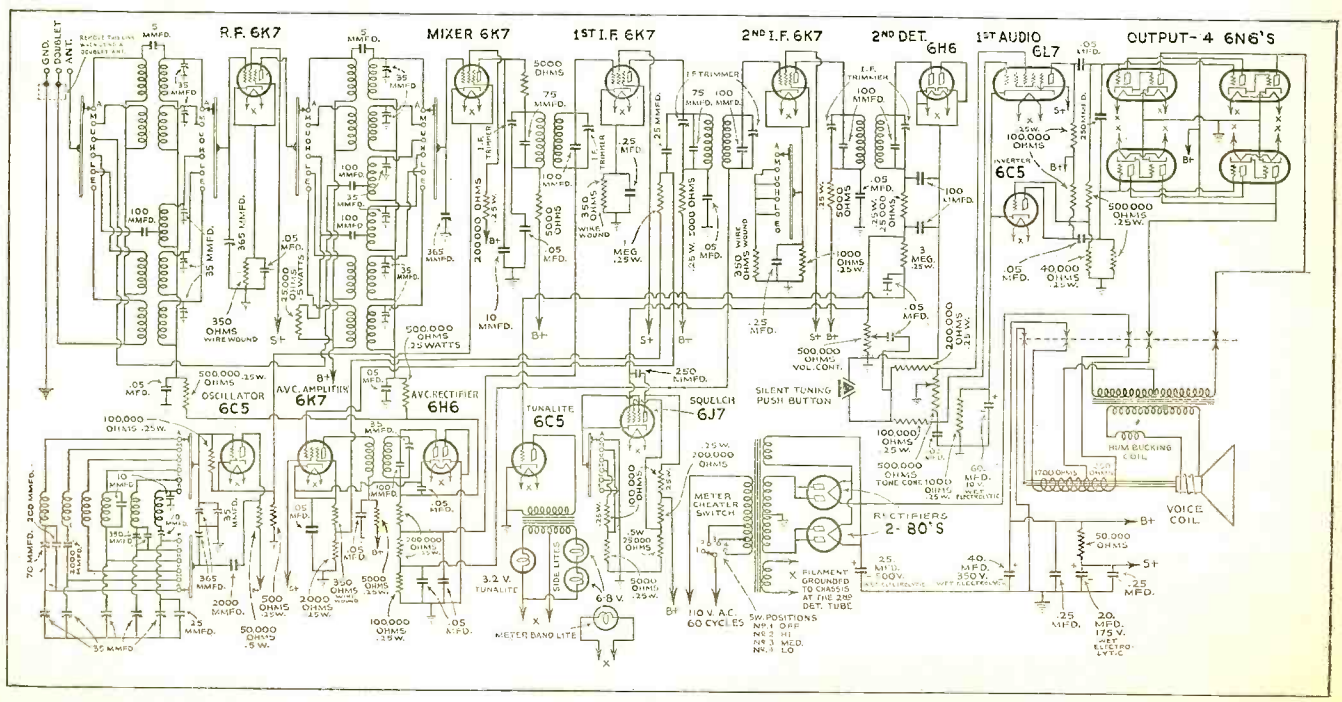
IN looking over the old receivers in the laboratory, the writer was reminded that not so long ago it was necessary to operate two dials and several controls in order to tune in a local broadcast station, the quality of reproduction of which, the experts of that time agreed with great deliberation, was practically the "last word". Remember the old drum dial with its fancy escutcheon and dial window about one inch square with so-called illumination that required superior eyesight to know when the set was tuned to the desired station. If the set covered the short waves, there was also the inconvenience of plug-in coils. These reflections and recollections were caused by the arrival of the latest Midwest 18-tube, all-wave receiver submitted to the RADIO NEWS laboratory for operating tests. The many refinements offered in this latest 1937 set emphasized the improved receiver conveniences and reception possibilities provided in the new instruments.

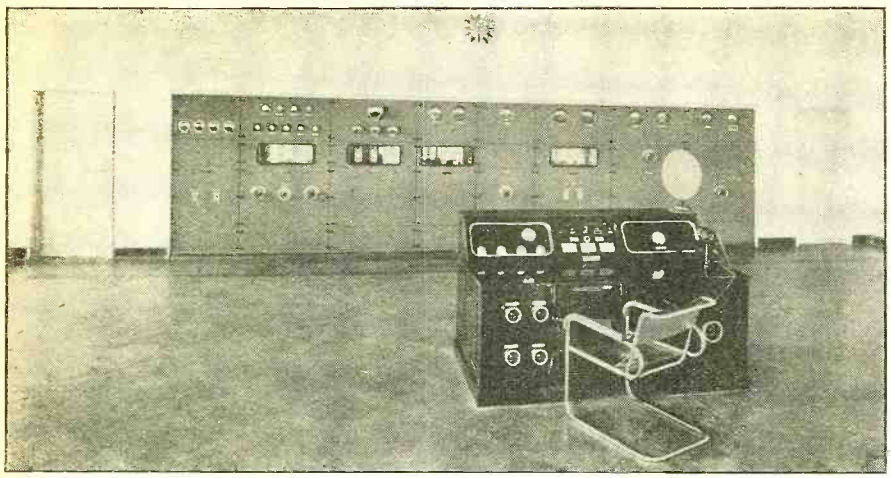
The outstanding refinements in this receiver include an extremely wide tuning range (in six bands covering from 4½ to 2400 meters), silent tuning between stations, a four- position power saver, visual tuning indicator and true-tone musical reproduction made possible by the "Fidel-a-stat" dual-channel program expander. Four triple-twin type 6N6's are connected in a double, push-pull, power-output circuit and there is a large attractive 6½-inch dial disc that simplifies tuning to the *nth* degree. The top half of the disc is calibrated in kilocycles and megacycles and the aviation, amateur, foreign short-wave and other ranges are conveniently marked. The lower half of the dial is shown in meters. In addition there are other guides for broadcast and short-wave tuning. The dial rotates past a thin pencil of light which points out, with calibrated accuracy, the frequencies to which the set is tuned. The tuning indicator light is *dimmest* when the station is properly tuned in.

The circuit diagram for the new receiver is shown in Figure 1. Eighteen tubes are employed and their types and functions are outlined on the diagram. The set is designed to operate with either metal tubes or the metal-glass equivalent with octal base.

The receiver was operated at three RADIO NEWS Listening Post stations which included a Country, a Suburban and a City Listening Post. The tests were made with different types of aerials and the three locations presented entirely different operating conditions. That the set came through these comprehensive tests in a creditable manner was proven by the reception results and the excellent log of short-wave stations shown at the end of this article.

The instrument was first tried out at the Fairfield Listening Post, approximately 50 miles from New York City. The operators were S. Gordon Taylor, Broadcast Band DX Editor and the writer. The aerial (*Turn to page 374*)





EMISSORA NACIONAL,
LISBON, PORTUGAL

Modern in every detail, even to the operator's chair is CT1AA, the 20 kw. station on 690 kc.

THE DX CORNER

S. GORDON TAYLOR

(*For Broadcast Waves*)

NUMEROUS stations complain that they seriously question the advantages of putting on special DX programs and undertaking the expense of verifying reports because the great majority of the reports received either contain no information which is helpful to the station engineers, or contain information so vague that it is of little use.

Where a station goes to the trouble of putting on special programs or of verifying reception reports it is only fair that DX'ers reciprocate the courtesy by including in their reports specific information concerning quality and strength of reception, comments on fading or interference, and information on the receiving equipment employed.

To determine just what sort of information stations like to get, RADIO NEWS appointed a committee of Observers to contact various stations and obtain their suggestions. This committee headed by Observer A. J. Parfitt, 2071 East 83rd Street, Cleveland, Ohio, has now submitted its report after several months of study. This report is printed below and it is hoped that DX'ers will give it serious consideration.

Your Reports

"As Chairman of the special committee appointed by you to study the question of 'What Radio Stations Want to Know About the Reception of Their Signals' I wish to respectfully submit the following report, which was compiled from the many replies from the Station Engineers contacted by myself or through the splendid co-operation of Observers E. L. Kimmons and Walter F. Johnson. I wish to take this opportunity to thank my two co-workers heartily for their co-operation. My association with them in this work has been a most happy one.

"Some stations of course did not reply to our questionnaire, but many stations replied promptly and gave us many important suggestions on what they considered important information which could be easily supplied by the average DX fan. From these many letters we compiled the following list which contains only the subjects which were requested by two-thirds of the total stations heard from:

1. **Receiver**—Give make, model and number of tubes.

2. **Antenna**—State kind and direction it is erected. If of the single straight wire type give length and height above ground.

3. **Signal Strength**—The "R" code is a satisfactory method of giving this quality if the DX'er is accurate and honest about it. (97% want signal strength reports obtained by a meter as described in RADIO NEWS, if possible.)

4. **Fading** — The "QSB" code is O. K. if given frequently and as accurately as possible. (If signal-strength meter is used it is shown automatically with signal strength.)

5. **Modulation**—If this quality is understood by the DX'er reporting, such reports are very valuable. Otherwise the QSA code will make a satisfactory substitute.

6. **Interference**—State kind if known, approximate source if known, also approximate intensity compared to station's signals.

7. **Static**—State kind (man-made or atmospheric), approximate intensity compared to station signal. The QRN code is a satisfactory method of giving the average intensity.

8. **Location**—If a very small town or village, give a large well-known city as a reference point and state the number of miles you are located North, West or South of this reference city.

9. **Time**—Give the time in the Local Standard Time of the station broadcasting.

10. **Return Postage**—*Always include return postage with your reports of reception if you want a verification mailed you.*

Verification Data

1. **Time**—Give the time in Local Standard Time of station.

2. **Selections**—Give title, name of orchestra if known, and state if orchestra, vocal, piano, violin, etc.

3. **Announcements**—Give such parts of announcements as relate to local sponsors, local time, or where a mistake is made. (This is conclusive evidence of reception.)

4. **Reports**—May be in letter form, or may be submitted by a form which you have worked out, if unable to work out a satisfactory form of your own suggestions will be made and help given for return postage by the writer."

(*Signed*) A. J. Parfitt, Chairman

With the Clubs

The Canadian DX Relay

The headquarters of the CDXR have been moved from Goderich to 2014 Lorne Avenue, Saskatoon, Sask., Canada, and a twice monthly bulletin will be edited by Charles Hesterman. The CDXR will devote its activities exclusively to the Broadcast Band. Another Foreign DX Contest started on Sept. 1st, 1936, the awards will consist of trophies, subscriptions to radio magazines, memberships in CDXR and cash! The contest is open to CDXR members only. Dues are $1.00 per year. For further information regarding this exclusively Broadcast Band DX Club, write to Charles Hesterman at the address given above.

URDXC Celebrates

The Universal Radio DX Club is celebrating its third anniversary. During these three years the membership has grown rapidly, until it now includes DX'ers from almost every state of the U. S. A., Canada, Alaska, Chile, Sweden, Ireland, England, Japan, Hawaii, and New Zealand. A weekly bulletin is sent to all members. Officers are: Charles C. Norton, President; Russell K. Heller, Vice President; Leslie W. Orton, 2nd Vice President; Luther L. Putname, 3rd Vice President. Directors: Count Alexis (Ollie) Ross, Ralph H. Schiller, Alexander Maley, Maynard Fischer, James B. Wooten, Warren E. Winkley, Martin J. Olthoff, John F. Fisk, Lee Chadwick. Short Wave Editor: Robert A. Curtis (N1EXZ). CPC Chairman, Warren E. Winkley. Headquarters, 2018 Green Street, San Francisco, California.

LPO FORESTIERI

Carl hails from the Bronx, N. Y. City, and has been DX'-ing for 9 years. He has 857 verified B.B. stations to his credit, including 18 countries.

National Radio Club

The N.R.C. cordially invites RADIO NEWS readers to become members of their organization. A 6-page club bulletin, which is alive with S.W. dope, DX tips, etc., is issued weekly from Sept. 1 to May 1 and monthly during the summer, to all members. The membership fee is $1.25 per year with no initiation fee. For further information write to Robert H. Weaver, President, 603 West Market Street, York, Pennsylvania.

DX Calendar

Below are given lists of special DX broadcasts which are scheduled for November and December. The initials following an item indicate the organization to which the program is dedicated and where a RADIO NEWS special has been arranged for by an Observer, his name is given in the schedule.

Don't fail to tune in the RADIO NEWS specials on this list and as many others as possible—and above all, don't fail to report to each station tuned in, giving them as much information as you can concerning their signal strength, fading, quality, etc. Where verifications are desired it is always desirable to enclose return postage.

Hours shown are Eastern Standard Time and are all a.m. unless otherwise indicated.

Specials

Day	Hour	Kc.	Call	State	Kw.	Club
1	3-4	1230	KGGM	N. M.	.25	NRC
1	4-5	850	WKAR	Mich.	1	NRC
4	2:30-3	1370	WHBQ	Tenn.	.1	NNRC
13	1:30-7:30	1060	WJAG	Nebr.	1	NNRC
13	**4:50-5:10**	**1370**	**KVL**	**Wash.**	**.1**	**R. News Davis**
14	11-12p.m.	1040	CP4	Bolivia	10	NNRC
18	2:30-3	1370	WHBQ	Tenn.	.1	NNRC
21	3-4	1370	KIUP	N. M.	.1	NNRC
25	2:30-3	1370	WHBQ	Tenn.	.1	NNRC
28	3-4	1370	KFRO	Texas	.1	NNRC
28	6-7	1310	WTRC	Texas	.1	NRC
			December			
2	2:30-3	1370	WHBQ	Tenn.	.1	NNRC
16	2:30-3	1370	WHBQ	Tenn.	.1	NNRC
16	5:30-6	1350	WAWZ	N. J.	.5	NNRC
19	3-30-4:30	1370	KVL	Wash.	.1	UDXC
19	4:30-5:30	1370	KRE	Calif.	.1	UDXC
20	3-4	760	KXA	Wash.	.25	UDXC
20	4:30-5:30	710	KMPC	Calif.	.5	UDXC
23	2:30-3	1370	WHBQ	Tenn.	.1	NNRC
26	3-4	1370	KFRO	Texas	.1	NNRC
26	6-7	1310	WTRC	Texas	.1	NRC
30	2:30-3	1370	WHBQ	Tenn.	.1	NNRC

WARREN E. WINKLEY

In spite of his responsibilities as a director and C.P.A. chairman of the URDXC, and Official L.P.O., Warren doesn't seem to be borne down by the cares of DX. Maybe it's the California climate.

Radio News Specials

KNEW, 1500 kc. and KNET, 1420 kc. both dedicated their October frequency checks to RADIO NEWS. Both were arranged by Observer Davis of Elkhart, Texas, but unfortunately notice was not received early enough to permit advance announcement to be made in these columns. Observer Davis has also arranged with KVL, 1370 kc., to dedicate its November 13 frequency check (4:50-5:10 a.m.) to RADIO NEWS. The cooperation of Observer Davis and these stations is much appreciated.

DX in Massachusetts

Observer Reichardt, Reading, Mass., reports the following Broadcast Band stations heard by him during September. The times given are E. S. T.

5 to 6:30 p.m.	*12 to 1 a.m.*	*4 to 6 a.m.*
Cologne	Cologne	1YA
Stuttgart	Stuttgart	KGU
Frankfurt	Frankfurt	2NR-KGMB
Fecamp	Nurnburg	3GI
Hamburg	Hamburg	2KO
Bordeaux	Munich	4VA
Beromunster	Bordeaux	2AY
Sottens	Rennes	3WL
Klagenfurt	Fecamp	3MB
Torun	Lille	7JU
Strassburg	FPTT	4IP
EAJ-7	Postes Parisien	3XY
EAJ-15		3TR
CT1GL		2NC
FPTT		4BC
Lyons la Doua		4AK
British Stations		2CH
1013 kc.		3KZ
958 kc.		3DB
878 kc.		JFAK
804 kc.		
668 kc.		

The Latest Norwegian List

Following is the Norwegian station list as revised September 23. This information was received direct from the Norwegian Director General of Telegraphs.

Call	*Name*	*Kc.*	*Kw.*
LKA	Alesund	252.9	10
LKB	Bergen	850	1
LKD	Bodo	850	10
LKI	Finnmark	355	5 (10)
LKF	Fredrikstad	776	1
LKH	Hamar	519	0.7
LKK	Kristiansand	1276	0.5
LKG	Narvik	1222	0.3
LKN	Notodden	1357	0.5
LKO	Oslo	260	60
LKP	Porsgrunn	850	1
LKR	Rjukan	1348	0.15
LKS	Stavanger	1276	0.5
LKM	Tromso	282	10
LKT	Trondelag	629	20

Correspondents Wanted

Observer L. W. Mathie, 927 Farm Road, Waipukurau, Hawkes Bay, New Zealand, would like to correspond with Broadcast Band DX'ers in other parts of the world.

European DX

Observer Gaiser, Butler, New Jersey, reports that "Radio Vitus," Paris, France, now operates on 1348 kc.; that the 50 kw. transmitter in northern Ireland now operates on 997 kc. and that on 749 kc. Marseilles can be heard occasionally testing with 100 kw.

Notes From Readers

Observer Jensen (Cowley, Wyoming): In a recent letter received from Dr. Brinkley he stated that XEAW (now licensed for 50 kw. but, according to his engineers, putting 59 kw. into the aerial) will, sometime in January 1937, be operating on an aerial power of 100 kw. XEAW uses a single tower umbrella antenna, with reflector. The Doctor also stated that if U. S. A. stations should be licensed to use 500 kw. (I understand about six of them have asked for this power) he might possibly boost the power of his XERA to 1,600 kw. At present XERA engineers figure they are putting 350 kw. into a three-tower aerial system with a reflector which is calculated to give a gain of one-third to the North.

CHARLES C. NORTON

DX'ers who know him by name and reputation, as president of the URDXC, and as an Official L.P.O., now have an opportunity to see what he looks like.

Observer Hunt (Encinitas, Calif.): Indications are that the 1936-1937 DX season will be very satisfactory. WOR is being heard in the evenings with a signal as strong at times as WLW. This latter station has been heard here at the edge of the Pacific as late as 8:30 a.m., E.S.T. DX'ed three mornings late in September from 4:30 P.S.T. until daylight in an effort to correct my list of 29 Japanese verifications, the list being somewhat upset by the changes in the frequencies of the JO's. Reports were sent to several stations which are now using their new frequencies, JOBK-1, 690 kc.; JOIK, 810 kc.; JOFK, 830 kc.; JOBK-2, 940 kc.; JODK-2, 610 kc. Also heard the call of JOGK, which did not change frequency, on 790 kc. Several other JO's were heard, but faded before sign-off. XGOA on 660 kc. has a much stronger signal than last season. The station on 560 kc. which no doubt is MTCY has a very strong signal. On two mornings a station on 635 kcs. has been heard, the announcer up to 5:00 a.m., P.S.T. being a lady, but from then to sign off, with no call given, the program seems to be news items read by a man. The sign-off is about 5:30 a.m., P.S.T., right after the singing of what is probably the "Internationale". This station no doubt is in Vladivostok. There is a new Tijuana, Lower California, Mexico, station with the call XEBG operating on 820 kc.

Observer Tomlinson (Portchester, N. Y.): The TA's started off with a bang on September first, nearly six weeks ahead of last year, at least in this location. From the first to the twelfth, evening reception was very good, then dropped off to come back strong on September 18. The following have been heard so far during the late evenings; (time is D.S.T.):

Station	*Kc.*	*Time (P.M.)*
Fecamp	1113	7:00 to 8:00
Frankfort	1195	7:30 to 8:9
Hamburg	904	Best 7:30
Bordeaux	1077	7:00 to 7:30
Madrid	1095	7-7:30, irreg. to 9 p.m.
Paris FPTT	695	Best 7:30
Nice	1185	7:00 to 7:30
Toulouse	913	7:00 to 7:30
Toulouse-Muret	776	7 to 7:45
Belfast	977	Best 7:30

(*Turn to page* 363)

BROADCAST STATIONS IN THE U. S.

(Arranged by Frequency and Wavelength. Call Letters Included)

Compiled by **John M. Borst**

550 kc., 545.5 m.
KFUO, KFYR, KOAC, KSD, KTSA, WDEV, WGR, WKRC, WSVA.

560 kc., 535.7 m.
KFDM, KLZ, KSFO, KWTO, WFIL, WIND, WIS, WQAM.

570 kc., 526.3 m.
KGKO, KMTR, KVI, WKBN, WMCA, WNAX, WOSU, WSYR-WSYU, WWNC.

580 kc., 517.2 m.
KMJ, KSAC, WCHS, WDBO, WIBW, WTAG.

590 kc., 508.5 m.
KHQ, WEEI, WKZO, WOW.

600 kc., 500.0 m.
KFSD, WCAC, WCAO, WICC, WMT, WREC.

610 kc., 491.8 m.
KFRC, WDAF, WIP, WJAY.

620 kc., 483.9 m.
KGW, KTAR, WFLA-WSUN, WHJB, WLBZ, WTMJ.

630 kc., 476.2 m.
KFRU, KGFX, WGBF, WMAL, WPRO.

640 kc., 468.7 m.
KFI, WAIU, WOI.

650 kc., 461.5 m.
KIRO, WSM.

660 kc., 454.6 m.
WAAW, WEAF.

670 kc., 447.8 m.
WMAQ

680 kc., 441.2 m.
KFEQ, KPO, WPTF.

690 kc., 434.8 m.
(Reserved for Canadian Stations.)

700 kc., 428.6 m.
WLW.

710 kc., 422.5 m.
**KIRO, KMPC, WOR.

720 kc., 416.7 m.
WGN.

730 kc., 411.0 m.
(Reserved for Canadian Stations.)

740 kc., 405.4 m.
KMMJ, KTRB, WHEB, WSB.

750 kc., 400.0 m.
KGU, WJR.

760 kc., 394.7 m.
KXA, **WBAL, WEW, WJZ.

770 kc., 389.6 m.
KFAB, WBBM.

780 kc., 384.6 m.
KEHE, KELW, KFDY, KFQD, KGHL, WEAN, WMC, WTAR.

790 kc., 379.7 m.
KGO, WGY.

800 kc., 375.0 m.
WBAP, WFAA, WTBO.

810 kc., 370.4 m.
WCCO, WNYC.

820 kc., 365.9 m.
WHAS.

830 kc., 361.4 m.
KOA, WEEU, WHDH, WRUF.

840 kc., 357.1 m.
(Reserved for Canadian Stations.)

850 kc., 352.9 m.
KIEV, KWKH, **WESG, WKAR, WWL.

860 kc., 348.8 m.
WABC-WBOQ, WHB.

870 kc., 344.8 m.
WENR, WLS.

880 kc., 340.9 m.
KFKA, KLX, KPOF, WCOC, WGBI, WPHR, WQAN, WSUI.

890 kc., 337.1 m.
KARK, KFNF, KFPY, KUSD, WBAA, WGST, WILL, WJAR, WMMN.

900 kc., 333.3 m.
KGBU, KHJ, KSEI, WBEN, WELI, *WFMD, WJAX, WKY, WLBL, WTAD.

910 kc., 329.7 m.
(Reserved for Canadian Stations.)

920 kc., 326.1 m.
KFEL, KOMO, KPRC, KVOD, WAAF, WORL, WPEN, WRAX, WSPA, WWJ.

930 kc., 322.6 m.
KMA, KROW, WBRC, WDBJ.

940 kc., 319.2 m.
KOIN, WAAT, WAVE, WCSH, WDAY, WHA.

950 kc., 315.8 m.
KFWB, KHSL, KMBC, WRC.

960 kc., 312.5 m.
(Reserved for Canadian Stations.)

970 kc., 309.3 m.
KJR, WCFL, WIBG.

980 kc., 306.1 m.
KDKA.

990 kc., 303.0 m.
WBZ, WBZA.

1000 kc., 300.0 m.
KFVD, WHO.

1010 kc., 297.0 m.
KGGF, KQW, WHN, WNAD, WNOX.

1020 kc., 294.1 m.
KYW, WDZ.

1030 kc., 291.3 m.
(Reserved for Canadian Stations.)

1040 kc., 288.5 m.
KRLD, KTHS, **KWJJ, *KYOS, WESG, **WTIC.

1050 kc., 285.7 m.
KFBI, KNX, *WEAU.

1060 kc., 283.0 m.
**KTHS, KWJJ, WBAL, WJAG, WTIC.

1070 kc., 280.4 m.
KJBS, WCAZ, WTAM.

1080 kc., 277.8 m.
WBT, WCBD, WMBI.

1090 kc., 275.2 m.
KMOX.

1100 kc., 272.7 m.
KGDM, **KWKH, WLWL, WPG.

1110 kc., 270.3 m.
KSOO, WRVA.

1120 kc., 267.9 m.
KFIO, KFSG, KRKD, KRSC, WCOP, WDEL, WISN, WTAW.

1130 kc., 265.5 m.
KSL, WJJD, WOV.

1140 kc., 263.2 m.
KVOO, WAPI, WSPR.

1150 kc., 260.9 m.
WHAM.

1160 kc., 258.6 m.
WOWO, WWVA.

1170 kc., 256.4 m.
WCAU.

1180 kc., 254.2 m.
KEX, KOB, WDGY, WINS, WMAZ.

1190 kc., 252.1 m.
WATR, WOAI, WSAZ.

1200 kc., 250.0 m.
KADA, KBTM, *KDNC, KFJB, KFXD, KFXJ, KGDE, KGEK, KGFJ, KGHI, KGVO, KMLB, KOOS, KSUN, *KVCV, *KVEC, KVOS, KWG, WABI, WAIM, *WAYX, WBBZ, WBNO, WCAT, WCAX, WCLO, WCPO, WEST, WFAM, WHBC, WHBY, WIBX, WIL, WJBC, WJBL, WJBW, WJNO, *WJRD, WKBO, WLVA, *WMFR, WMPC, *WNRI, WRBL, WTHT, WWAE.

1210 kc., 247.9 m.
*KANS, KASA, KDLR, KDON, KFJI, KFOR, KFPW, KFVS, KFXM, *KGLO, KGY, KIUL, *KLAH, *KOCA, KPPC, *KROY, KVSO, KWTN, WALR, WBAX, WBBL, *WBLY, WBRB, WCOL, WCRW, WEBQ, WEDC, WFAS, *WFOY, WGBB, WGCM, WGNY, WHBF, WHBU, WIBU, WJBY, WJEJ, WJIM, WJW, WKOK, WMBG, WMFG, WMFN, WOCL, WOMT, WPAX, WSAY, WSBC, WSIX, WSOC, WTAX.

1220 kc., 245.9 m.
KFKU, KTW, KWSC, WCAD, WCAE, WDAE, WREN.

1230 kc., 243.9 m.
KGBX, KGGM, KYA, WFBM, WNAC.

1240 kc., 241.9 m.
KGCU, KLPM, KTAT, KTFI, WKAQ, WXYZ.

1250 kc., 240.0 m.
KFOX, WCAL, WDSU, WHBI, WLB, WNEW, WTCN.

1260 kc., 238.1 m.
KOIL, KPAC, KRGV, KUOA, KVOA, WHIO, WNBX, WTOC.

1270 kc., 236.2 m.
KGCA, KOL, KVOR, KWLC, WASH, WFBR, WJDX, WOOD.

1280 kc., 234.4 m.
KFBB, WCAM, WCAP, WDOD, WIBA, WORC, WRR, WTNJ.

1290 kc., 232.6 m.
KDYL, KLCN, KTRH, WEBC, WJAS, WNBZ, WNEL.

1300 kc., 230.8 m.
KALE, KFAC, KFH, KFJR, WBBR, WEVD, WFAB, WFBC, WHAZ, WHBL, WIOD-WMBF.

1310 kc., 229.0 m.
KCRJ, KFBK, KFPL, KFXR, KFYO, KGCX, KGEZ, KGFW, *KHUB, KINY, KIT, KIUJ, KMED, *KOCA, *KPDN, KRMD, KROC, *KROY, *KRRV, KTSM, KVOL, KXRO, WAML, WBEO, WBOW, WBRE, WCLS, WCMI, WDAH, WEBR, WEMP, WEXL, WFBG, WFDF, WGH, WHAT, WJAC, *WLAK, WLBC, WLNH, WMBO, WMFF, WNBH, WOI, WRAW, WROL, WSAJ, WSGN, WSJS, WTAL, WTEL, WTJS, WTRC.

1320 kc., 227.2 m.
KGHF, KGMB, KID, KRNT, WADC, WORK, WSMB.

1330 kc., 225.6 m.
KGB, KMO, KSCJ, WDRC, WSAI, WTAQ.

1340 kc., 223.9 m.
KGDY, KGIR, KGNO, WCOA, WFEA, WSPD.

1350 kc., 222.2 m.
KIDO, KWK, WAWZ, WBNX.

1360 kc., 214.3 m.
KCRC, KGER, WCSC, WFBL, WGES, WQBC, WSBT.

1370 kc., 219.0 m.
KAST, KELD, KERN, KFGQ, KFJM, KFJZ, KFRO, KGAR, KGFG, KGFL, KGKL, KICA, *KIUP, KLUF, KMAC, *KOBH, KONO, KRE, KRKO, KSLM, *KTEM, KUJ, KVL, KWKC, KWYO, WABY, WAGF, WATL, *WBLK, WBNY, WBTM, WCBM, WDAS, *WDWS, *WEOA, WGL, *WGRC, WHBQ, WHDF, WHLB, WIBM, WLLH, WMBR, WMFD, WMFO, *WMIN, WOC, WPAY, WPFB, *WPRA, WQDM, WRAK, WRDO, WRJN, WSVS.

1380 kc., 217.4 m.
KOH, KQV, WALA, WKBH, WNBC, WSMK.

1390 kc., 215.8 m.
KLRA, KOY, WHK.

1400 kc., 214.3 m.
KHBC, KLO, KTUL, WARD, WBBC, *WEGL, WIRE, WLTH, WVFW.

1410 kc., 212.8 m.
KGNC, WAAB, WBCM, WHIS, WROK, WSFA.

1420 kc., 211.3 m.
KABC, KABR, KALB, KBPS, KCMC, *KEUB, KFIZ, KGFF, KGGC, KGIW, KIDW, KIUN, *KNET, KORE, KRBC, KRLC, *KRLH, KUMA, KWBG, KXL, WACO, WAGM, WAPO, WAZL, WCBS, WCHV, WEED, WEHS, WELL, WGPC, WHDL, WHFC, WILM, WJBO, *WJBR, WJMS, WKBI, WLAP, WLBF, WLEU, WMAS, WMBC, WMBH, WMFJ, WMSD, WPAD, WPAR, *WPRP.

1430 kc., 209.8 m.
KECA, KGNF, KSO, WBNS, WHEC, WHP, WNBR, WOKO.

(Turn to page 361)

ALL SET FOR THE TESTS

The receiver set up at the Fairfield Listening Post. The giant 18-inch, high-fidelity speaker is shown in the center of the overhead baffle. The small speaker is not a part of this receiver

Tests Prove Merits of "LAB-BUILT" *SUPER*

A report of the results obtained in tests of the Silver "Masterpiece V", conducted at the Fairfield and New York City Listening Posts

By S. Gordon Taylor

THE fidelity of reproduction of the "Masterpiece V" receiver is so excellent that it at times seriously interfered with the conduct of the Listening Post tests of this receiver. Time and again the test periods would be devoted to listening to a program of fine music from a local broadcast station, the sheer enjoyment of which was too much to resist. Until the habit was formed of skipping the good locals when running tests, not much was accomplished either in the way of short-wave of DX listening.

Tone Fidelity

The reasons for this impressiveness was found primarily in the fact that the overall frequency response of the receiver is such that it exceeds the audio-frequency range of most broadcast stations. By means of the two tone controls, bass and treble, the frequency response can be altered to suit individual taste, room acoustics and the requirements of different types of programs. It proved to be an interesting experiment to turn both controls to zero, thus eliminating all high and low tones and leaving only the reproduction of a very narrow range of tones centering around about 600 cycles. The effect was much like listening to a program through a metal tube. Then by gradually increasing the setting of the treble control the program would start to take on life, although still flat and "stringy". As the base control was advanced, the program would assume depth and body and finally, by the proper adjustment of the two controls a balance would be found where the music would become life-like in the extreme.

The "Volume Expander" system is one which really works. With its knob set in the extreme position and the volume control knob adjusted to make the soft passages in the music just comfortably audible, the loud passages would fill the room—in fact would rise to a level much too high for the home. However, by setting the expander knob at an intermediate level (the level is continuously variable) the right degree of expansion would be found, adding further realism to the music and overcoming the "leveling-off" of volume which takes place in the studio control room—a process which is necessary if the broadcast station is to maintain a reasonable modulation level at all times, yet not exceed 100 percent modulation on the loud passages.

High Selectivity

Proceeding with the tests, the effect of the band width switch was studied. In the broad, or "Hi-Fi" position, which is intended for use in receiving local stations, the quality of reproduction was as described above. In the "Sharp" position the quality of reproduction still remained above the average but the selectivity and sensitivity increased tremendously with the result that distant stations were tuned in 10 kc. either side of each local station without any interference from the locals, except occasionally from the two strongest. A typical example of this is in tuning in the New Orleans station on 850 kc. while the 50 kw. local, WABC, was in full stride on 860 kc. This was accomplished on numerous occasions in New York City tests, in a location where WABC is the second strongest station heard. WOR, the strongest, seldom causes interference with the Chicago and Cincinnati stations on either side of it, and so it is with the other locals.

The ability of the receiver for DX work is almost unlimited. It offers an unusually good signal-to-noise ratio with the result that even during the latter part of the Summer, whenever static was low enough to permit, stations in Minneapolis, Texas, Denver and numerous other distant locations including Mexico and Canada, were brought in often with thoroughly enjoyable volume, quality, and freedom from noise. This freedom from noise and the extreme sensitivity are undoubtedly due in large part to the fact that the receiver employs two tuned radio-frequency stages ahead of the first detector. During the late Autumn and Winter months these features will undoubtedly permit some excellent DX accomplishments.

S. W. Tuning Easy

In starting the short-wave tests the first outstanding feature noticed was the effective band-spreading system. In the 25-meter band, for instance, the range from 11.5 to 12.0 mc. requires a 60 percent, or about 210-degree, revolution of the large tuning knob. Due to the large size of this knob, this means that the fingers travel nearly 3 inches in tuning through this one band.

The tuning system is unique and simplified to the utmost. Suppose the operator is tuning in the 25-meter band and wants to tune to the 31-meter range. Turning the tuning knob in the usual way, he will find the pointer moving rapidly and he continues to the far end of the desired band. Then turning the knob in the reverse direction he will find that it has automatically shifted to slow-motion action, providing band-spread tuning for one complete turn of the knob, enabling him to comb the 31-meter band thoroughly, back and forth, within this range of one turn of the knob. Going beyond the limit of one knob revolution in either direction, the high-speed action is resumed, permitting a quick shift from one tuning range to any other.

To further add to the convenience in tuning, the accurately calibrated dial is about 8 inches in diameter, and over it moves a knife-edge pointer. The calibrations for the 5 ranges are arranged concentrically, progressing from the low-frequency range on the inside, with a scale length of 4 inches, to the ultra high-frequency range (*Turn to page* 377)

The DX for the

Conducted by Laurence

SORT-WAVE BROADCASTER

The "mail man," E. S. Darlington, at station W2XAF reads letters from listeners to his large audience of short-wave observers.

THE forty-fifth installment of the DX Corner for Short Waves contains the World Short-Wave Time Table for 24-hour use all over the world and Official Observers' reports of stations heard this month. Consult these two items regularly and make your all-wave set pay big dividends!

Reappointment Reminder

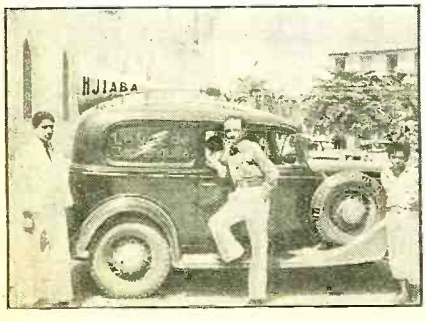
WE wish to remind Listening Post Observers that if they desire to be reappointed for 1937 they should send in a separate card along with their report stating that they wish reappointment. No Observers will be carried over to next year unless such a request is made, so, fellows, don't forget to apply soon.

Observers Working Over Time

This month there has been such a huge increase in reports of short-wave stations heard that we have to give practically the whole department over to it, although we have much other information we would like to include. For this reason listings of new organizations desiring to be associated with the DX Corner and other material will have to be left over to next month.

Reports of Listening Post Observers and Other Short-Wave Readers of the DX Corner

Listed in the following columns is this month's consolidated reports of short-wave stations heard by our wide world listening posts. Each item is credited with the Observer's surname. This allows our Readers to note who obtained the information. If any of our Readers can supply Actual Time Schedules, Correct Wavelengths, Correct Frequencies and any other Important Information (in paragraphs as recommended), the DX Editor, as well as our Readers, will be grateful for the information. On the other hand, Readers seeing these reports can try their skill in pulling in the stations logged and in trying to get complete information on these transmissions. The report for this month, containing the best information available to date, follows:



VOICE OF BARRANQUILLA

Our roaming Observer, Morgan Foshay, visits South America and takes this picture, left, of Senor Elias Pellet, owner of stations HJ1ABB and HJ1ABA.

Europe

HBP, Geneva, Switzerland, 7799 kc., reported heard 5:15 p. m., E. S. T. Observer Azevedo of Portugal reports that there is always good reception from this station. 38.47 (from veri) (Gaskell). Heard Sunday 11:15 a. m., E. S. T. (Jordan).

HBL, Geneva, Switzerland, 9595 kc., reported heard 5:15 p. m., E. S. T. (Azevedo). Also heard on 14535 kc. Reported heard by Gaskell and Lake on Saturday at 5:30 to 6:15 p. m., E.S.T.

TPA4, Paris, France, 11720 kc., reported heard 7 p. m., E.S.T. (Azevedo). 25.60 m. heard 10 p. m., E.S.T. (Coover). Heard on 11715 kc. according to Partner. Heard according to time table (Wolf).

TPA2, Pontoise, France, 19.68-15240 kc., reported heard 6 p. m., E.S.T. (Coover). Heard 6:40 a. m., E.S.T. (Azevedo).

TYB, Pontoise, France, 8070 kc., reported heard Saturday 3 a. m., E.S.T. (Sahlbach). Sahlbach reports them on 9040 kc. daily 3-4 a. m. and 12:30-1:30 p. m., E.S.T.

TPA3, Paris, France, 11880 kc., reported heard 3 p. m., E.S.T. (Azevedo). Heard September 6 at 2:40 p. m., E.S.T. On daily 11:15 a. m. to 6 p. m., E.S.T. (Sands). Heard 1-3 a. m., E.S.T. (Silvius).

SM5SD, Stockholm, Sweden, 11710 kc., reported heard 4 p. m., E.S.T. (Azevedo).

SM5SX, Stockholm, Sweden, 11705 kc., reported heard 9 a. m. to 6 p. m., E.S.T. relaying Motala program. Wednesdays a special transmission to N. and S. America 6 to 7 p.m. E.S.T. (Styles). 400 watts. Also as an amateur station, broadcasting occasionally on 14344 kc. Announcement: "Stockholm Motala". Address: Radio Station SM5SX, Royal Technical University, Stockholm, Sweden. (Piorko).

HAS3, Budapest, Hungary, 15370 kc., reported heard Sundays 9 to 10 a.m., E.S.T. (Azevedo, Devaraj, Atherton, Andrews).

HAT4, Budapest, Hungary, 9125 kc., reported heard Sundays 6 to 7 p.m., E.S.T. (Shamleffer, Cindel).

SPW, Warsaw, Poland, 13653 kc., reported heard 11:53 a.m., E.S.T. (Azevedo). Gaskell and Piorko report this station on 13635 kc. on Mon., Wed. and Fri. from 12:30 p.m. to 1:30 p.m., E.S.T. (from a veri) 10 kw. power. Announces in Polish, English and French. Ends with Polish national anthem. (Andrews, Reichardt).

PHI, Huizen, Holland, 17775 kc., reported heard 1:20 p.m., E.S.T. (Azevedo). Heard 8 a.m. to 10 a.m., E.S.T. (Stabler).

PCJ, Eindhoven, Holland, 9590 kc., reported heard 7:10 p.m. E.S.T. (Azevedo). Also heard on 15220 kc. at 4:30 a.m., E.S.T., daily. Heard on 31.28 m., 8 p.m. to 9 p.m., E.S.T. (Coover). Markenson reports hearing them from 8 a.m. to 10 a.m., E.S.T. Heard by Edlin, Scala, Lopez. Sands and Atherton report the schedule as

A HEARTY "HELLO"

Karl Schotte, otherwise known as "Scotty," announcer at DJE and DJD, Germany, sends greetings to RADIO NEWS *readers through Observer Edward DeLaet.*

Corner SHORT WAVES

M. Cockaday

Sun. 19.71 m., 8:30 a.m. to 11 a.m., E.S.T. Tues. 19.71 m., 4 a.m. to 6 a.m., Wed. 19.71 m., 7 a.m. to 11 a.m., Thurs. 31.28 m., 7 p.m. to 10 p.m., E.S.T. (from veri). Dressler reports them on Wed. 7 p.m. to 8 p.m. and not 8 p.m. to 9 p.m., E.S.T. Slogan: "The Happy Station" (Alfred). Address: The Happy Station, Philips Radio, Eindhoven, Holland.

GSB, Daventry, England, 9510 kc. (Azevedo).

GSC, Daventry, England, 9580 kc. (Azevedo). 31.32 m., reported heard 9 p.m., E.S.T. (Coover). Heard according to time-table. (Wolf).

GSD, Daventry, England, 11750 kc. (Azevedo).

GSF, Daventry, England, 15140 kc. (Azevedo). Heard according to time-table. (Wolf).

GSG, Daventry, England, 17790 kc., reported heard 1:40 p.m. to 5:45 p.m., E.S.T. (Azevedo, Westman). Heard according to time-table. (Wolf).

GSO, Daventry, England, 15180 kc., schedule 12:15 p.m. to 1:40 p.m., E.S.T., at which time GSG continues broadcast (from announcement). (Azevedo, Westman).

I2R04, Rome, Italy, 11810 kc., reported heard 2:30 p.m., E.S.T. (Sands, Scala). Heard 2 p.m. E.S.T. (Azevedo). 25.4 m., heard 6 p.m., E.S.T. (Coover).

HVJ, Vatican City, 5969 kc., reported heard irregularly about 2 p.m., E.S.T. (Azevedo).

OXY, Skamlebaek, Denmark, 6060 kc., reported heard daily from 2 p.m., E.S.T. (Azevedo).

TFJ, Reykjavik, Iceland, 12235 kc., reported heard 2:40 p.m. to 3:30 p.m., E.S.T. (from a veri). (Gaskell). Reported heard Sunday 1:43 to 2:35 p.m., E.S.T. on 12225 kc. (Alfred). On 24.52 meters, 7 kw. (Atherton).

OER2, Vienna, Austria, 6072 kc., reported heard 4:45 p.m., E.S.T. (Azevedo).

LKJ1, Jeloy, Norway, 9530 kc., programs in English and Norwegian, 25 kw., 12 m. to 3 a.m., E.S.T. (Styles, Azevedo).

Lisbon, Portugal, 25.36 m., approximately. (Styles). Slogan: "Emisora National".

CT1AA, Lisbon, Portugal, 9600 kc., reported heard Tues., Thurs., Sat., 3 to 6 p.m., E.S.T. Wants reports. Also reported on 9650 kc. (Alfred, Hynek).

CSW, Lisbon, Portugal, 31.41 m., 9550 kc., National Broadcasting System asked for reports. (Smith).

EAQ, Madrid, Spain, 9860 kc., reported heard daily 5 p.m., E.S.T. (Azevedo). 30.4 m., heard 10 p.m., E.S.T. (Coover). Observer Piorko reports them on various frequencies. Gallagher reports their signal strength improved. Calls "Estacion EAQ Madrid en services de la Republica Frente Popular".

ORK, Ruysselede, Belgium, 10330 kc., reported heard daily 1:30 p.m., E.S.T. (Azevedo). Reported heard regularly on 29.04 m., 1:30 to 3 p.m., E.S.T. (Piorko).

LZA, Sofia, Bulgaria, 14920 kc., reported heard Sundays 11:10 a.m., E.S.T. (Azevedo). On daily from 7 to 8:30 a.m. and 2 to 2:45 and Sundays 2 a.m. to 6:30 p.m., E.S.T. Pilgrims reports this station on 2:30 a.m., E.S.T. Sundays, 2 kw. power. (Reichardt, Bourne).

Radio Belgrade, Yugoslavia, 6090 kc., reported heard 4 a.m. to 5:45 a.m., Sunday 5 p.m. to 1:30 a.m., daily 9 to 10:30 p.m., 1:30 to 7 p.m., E.S.T. (Eggenweiler, Andrews). Azevedo reports them on 6100 kc.

OLR, Podebrady, "Radio Praha," Czechoslovakia, 15230 kc., reported on the air 5 a.m. to 12 noon and 3 p.m., E.S.T., from an announcement. Reports welcomed. (Bishop). Heard on 19.69 m., 15230 kc., 4 to 10 p.m., E.S.T. (Coover). They want and will verify correct reports promptly. Observer Williams reports this station on 25.51 m. and 49.05 m. (from announcement), heard at 11 a.m., E.S.T., once on 19.69 m. Billinghurst reports this station has been broadcasting on 19.69 m since July 24, 1936, but changed to 25.51 m. on Sept. 6, 1936. Schedule 4 to 11 a.m. and 2 p.m., E.S.T. Special broadcasts to the U. S. A. 9 to 11 p.m., E.S.T., Mondays and Thursdays Partner reports this station broadcasts from Prague instead of Podebrady. (Beyer, Sholin, Lee, Fallon, Markenson, Lueth, Atherton). Gallagher, on Pacific Coast, reports an absence of their signals since the last report. (Andrews, Smith). They are said to change their frequency every week. Daily 8 a.m., noon, 3 p.m., E.S.T., transmitting for 1½ hours. (Verbrugghe, Fallon, Putnam, Allison, Scala). Heard testing on about 6110 kc., 11760 kc., 15200 kc. (Piorko). New station with no schedule given yet. Heard 5 a.m., 11 a.m., 2 p.m., E.S.T., testing daily. (Reichardt). Send reports to Czechoslovakia Broadcasting Co., Prague, Czechoslovakia.

DJN, Zeesen, Germany, 9540 kc. (Silvius, Azevedo). Heard according to time-table. (Wolf).

RADIO TANANARIVE

In the mail bag this month we found this photograph of a QSL from Madagascar. Here is another fine one to try for, fellows.

A NEW ONE TO TRY FOR

Observer Hartman of South Amboy received this veri from station HIN, now being heard well in many distant lands.

DJL, Zeesen, Germany, 15110 kc., heard 5 p.m., E.S.T. (Azevedo, Coover). Observer Westman reports DJL on the air regularly for Africa from 11:35 a.m. to 4:30 p.m. (from a veri). Dressler reports them dropped from the DJB and DJQ schedule. Heard irregularly 4:50 to 10:45 p.m., E.S.T. (Silvius, Bourne, Partner). Heard 8 to 10 a.m. for North America.

DJQ, Zeesen, Germany, 15280 kc. (Azevedo). Same program as DJB 4:50 p.m. to 10:30 p.m., E.S.T. (Dressler). Heard according to time-table. (Wolf). Heard 5 to 7 a.m., E.S.T. for South America. (Partner, Dittman).

DJR, Zeesen, Germany, 15340 kc. (Azevedo). Heard 8 to 10 a.m., E.S.T. for Central America. (Partner).

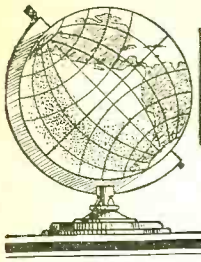
DZA, Zeesen, Germany, 9680 kc. (Azevedo).

DZC, Zeesen, Germany, 10290 kc., reported heard 4 to 6 p.m., E.S.T. (Azevedo, Stabler). Also heard calling Buenos Aires.

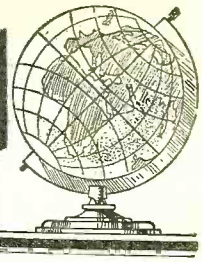
DZE, Zeesen, Germany, 12130 kc. (Azevedo).

DZH, Zeesen, Germany, 14460 kc. (Azevedo).

(*Turn to page 354*)



WORLD SHORT WAVE TIME-TABLE

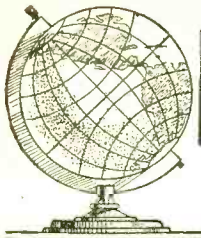


Compiled by LAURENCE M. COCKADAY

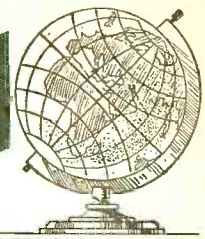
Hours of transmission for the World's Short Wave Broadcast Stations

												FILL IN LOCAL TIME												
8	9	10	11	M	1	2	3	4	5	6	7	EASTERN STANDARD TIME	8	9	10	11	N	1	2	3	4	5	6	7
01	02	03	04	05	06	07	08	09	10	11	12	GREENWICH MEAN TIME	13	14	15	16	17	18	19	20	21	22	23	00

HOURS OF TRANSMISSION	Wave-length Meters	Call Letters	Frequency Kc.	City Country	HOURS OF TRANSMISSION
D	13.93	W8XK	21540	Pittsburgh, Pa.	D
D	13.94	W2XE	21520	New York, N. Y.	D D D D D D
D	13.97	GSH	21470	Daventry, England	D D D D
D	16.86	GSG	17790	Daventry, England	D D D D D D D D
	16.87	W3XAL	17780	Bound Brook, N. J.	D D D D D D D D
	16.88	PHI	17775	Huizen, Holland	P P S
D D D D D D D D	16.89	DJE	17760	Zeesen, Germany	D D D
	19.52	HAS3	15370	Budapest, Hungary	S S
	19.56	DJR	15340	Zeesen, Germany	D
	19.57	W2XAD	15330	Schenectady, N. Y.	D D D D D D
D	19.60	GSP	15310	Daventry, England	D D
D D D D	19.62	LRU	15290	Buenos Aires, Arg.	D D D D D D
	19.63	DJQ	15280	Zeesen, Germany	D D D S S D D D D
	19.65	W2XE	15270	New York, N. Y.	D D D D D
D D	19.68	TPA2	15244	Pontoise, France	D D
AM AM D D D D D D D D	19.69	OLR	15230	Podebrady, Czech.	D D D D D D D
T T S	19.71	PCJ	15220	Eindhoven, Holland	W W W
	19.72	W8XK	15210	Pittsburgh, Pa.	D D D D D D D D D D D
D D D D D D D D D D D D	19.74	DJB	15200	Zeesen, Germany	D D D S S D D D D
S S	19.76	RV96	15180	Moscow, U.S.S.R.	
	19.76	GSO	15180	Daventry, England	D D D D
D D D D D D D D D D D D	19.81	RKI	15140	Moscow, U.S.S.R.	D D S
D D	19.82	GSF	15140	Daventry, England	D D D D D D
XS	19.84	HVJ	15121	Vatican City	I
D D S S	19.85	DJL	15110	Zeesen, Germany	D D D D D D D
S S S S S S S S D D S	20.00	SV1KI	15000	Athens, Greece	XS XS XS XS XS
S D	20.04	LZA	14970	Sofia, Bulgaria	S S S U U S S
S S S I XS XS	20.55	JVH	14600	Nazaki, Japan	D Z
	22.16	SPW	13653	Warsaw, Poland	C C C S S S
	22.95	VPD	13075	Suva, Fiji Islands	
S S S V S	24.52	TFJ	12235	Reykjavik, Iceland	S S
D D D	25.00	RV59(RNE)	12000	Moscow, U. S. S. R.	S S S S D H H
D D	25.24	TPA3	11885	Pontoise, France	D D D D D D
D D	25.27	W8XK	11870	Pittsburgh, Pa.	D
D D	25.36	W2XE	11830	New York, N. Y.	D D
D D	25.36	W9XAA	11830	Chicago, Ill.	D D D D I I D D 1
D D D D D D	25.40	I2RO	11810	Rome, Italy	D D D D D D D D D D XS XS
D D D D D D D D D D D D	25.49	DJD	11770	Zeesen, Germany	D D D D D D D D D D
D D D D D D D D D D D D	25.53	GSD	11750	Daventry, England	D D D D D
D D D D D D D D D D D D	25.58	CJRX	11730	Winnipeg, Canada	D D
D D D D D D D D D D D D	25.60	TPA4	11720	Pontoise, France	D D D D D
D D D D D D D D D D D D	25.62	HJ4ABA	11710	Medellin, Col.	D D I D D
S S	26.24	COCX	11435	Havana, Cuba	D D D D XS S S
D D D D D D D D D D D D	27.02	HIN	11280	Trujillo, D. R.	D D D D D D
Sa Sa D D D D D D	27.35	HS8PJ	10955	Bangkok, Siam	M M D I
I D D I I I I	27.93	JVM	10740	Nazaki, Japan	E
	28.14	JVN	10660	Nazaki, Japan	I E
	29.04	ORK	10330	Ruysselede, Belgium	D D I I
D D D D D D D D D D D D	30.43	EAQ	9860	Madrid, Spain	S S D D
D D D D D D D D D D D D	30.75	COCQ	9750	Havana, Cuba	D D D D D D D D D D D D
K K K	31.00	CQN	9677	Macao, Asia	K
D D D D D D D D D D D D	31.07	YNLF	9655	Managua, Nicaragua	D D D D D D
	31.09	CT1AA	9650	Lisbon, Portugal	G G G I
	31.25	RAN	9600	Moscow, U.S.S.R.	D
D D D D Sa	31.25	HJ1ABP	9600	Cartagena, Col.	D D D D D D
D I	31.27	HH3W	9595	Port-au-Prince, Haiti	D D
M	31.27	HBL	9595	Geneva, Switzerland	Sa Sa
S S S S S S S S	31.28	W3XAU	9590	Philadelphia, Pa.	D D D D D D D D
W W	31.28	VK2ME	9590	Sydney, Australia	S S S S
D D	31.28	PCJ	9590	Eindhoven, Holland	T AG V
D D I	31.28	HP5J	9590	Panama City, Pana.	S S D S D
I I D I XS XS XS XS XS XS	31.30	HJ2ABC	9585	Cucuta, Colombia	D D D D
D D	31.32	VK3LR	9580	Lyndhurst, Australia	XS
D D D D D D D D D D XS XS	31.32	GSC	9580	Daventry, England	D D
D D D D D D D D D D D	31.35	W1XK	9570	Millis, Mass.	D D D D D D D D D D D D
D D D D	31.38	DJA	9560	Zeesen, Germany	D D D D D
D D D D D D D D D D D D	31.40	TIPG	9559	San Jose, C. R.	D D D D D
D D D D D D D D D D D D	31.45	DJN	9540	Zeesen, Germany	D D D D D
D D D D	31.48	W2XAF	9530	Schenectady, N. Y.	D D D
D D D	31.48	LKJ1	9530	Jeloy, Norway	D D D D D D D
	31.55	GSB	9510	Daventry, England	D D D D D D
C C C XS XS XS	31.55	HJU	9510	Buenaventura, Colom.	C C
	31.55	VK3ME	9510	Melbourne, Australia	
D D D D XA XA M M	31.56	XEFT	9505	Veracruz, Mex.	D D D D D
I I Sa S S S S S	31.58	HJ1ABE	9500	Cartagena, Col.	D XA XA S S S D XS XS
D D D I I D D	31.75	TGWA	9450	Guatemala City	I I
	31.82	COCH	9428	Havana, Cuba	D D D D D D D D D D
	31.35	HS8PJ	9350	Bangkok, Siam	M M
	32.88	HAT4	9125	Budapest, Hungary	S
XM XM	33.53	HCJB	8948	Quito, Ecuador	XM XM XM XM
D D D D D D D D	34.29	ZBW	8750	Hong Kong, China	D D Sa
XA XA XA	34.62	CO9JQ	8665	Camaguey. Cuba	
	38.48	HBP	7797	Geneva, Switzerland	Sa Sa
D	39.95	JVP	7510	Nazaki. Japan	D D AM
W	41.80	CR6AA	7177	Lobito, Angola, Afr.	W W L L L
	42.80	EA8AB	7010	Tenerife, C. I.	C C
D D	43.48	HI3C	6900	La Romana, D. R.	D D D
D D	43.99	XGOX	6820	Nanking, China	D D D S
AC D	44.14	HIH	6796	San Pedro, D. R.	AC AC S AC
I I D D D D	44.44	JVT	6750	Nazaki, Japan	Z
D D I I T T	44.71	TIEP	6710	San Jose, Costa Rica	I D D
S S	45.00	HC2RL	6667	Guayaquil, Ecuador	S S S
Th Th Th	45.25	HIT	6630	Trujillo, D. R.	XS XS D D
	45.34	PRADO	6618	Riobamba, Ecuador	T T



WORLD SHORT WAVE TIME-TABLE



(Continued from the Previous Page)

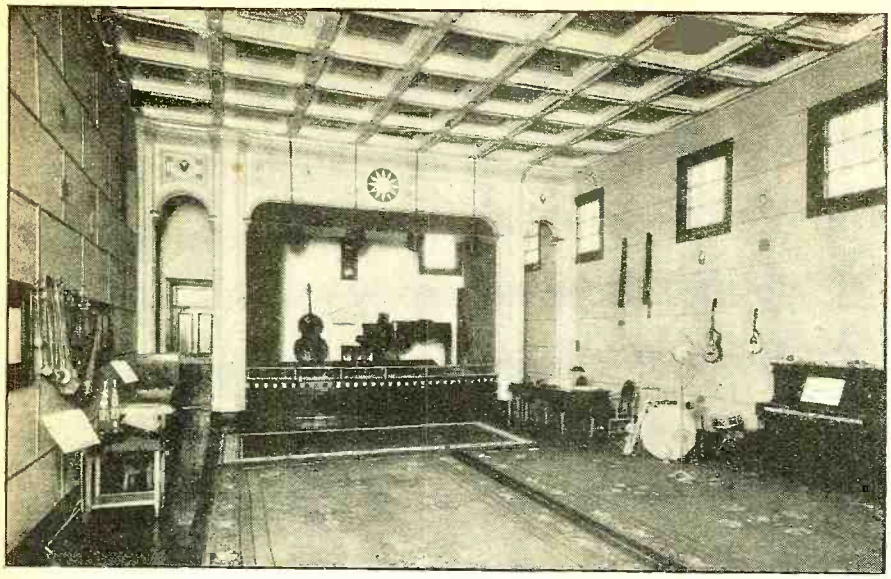
Hours of transmission for the World's Short Wave Broadcast Stations

												FILL IN LOCAL TIME												
8	9	10	11	M	1	2	3	4	5	6	7	EASTERN STANDARD TIME	8	9	10	11	N	1	2	3	4	5	6	7
01	02	03	04	05	06	07	08	09	10	11	12	GREENWICH MEAN TIME	13	14	15	16	17	18	19	20	21	22	23	00

HOURS OF TRANSMISSION												Wave-length Meters	Call Letters	Frequency Kc.	City Country	HOURS OF TRANSMISSION											
D	D											45.38	RV72	6611	Moscow, U. S. S. R				I							
												45.80	HI4D	6550	Trujillo, D. R.				XS	XS	XS			XS	XS	XS	XS
D	D											46.01	YV6RV	6520	Valencia, Venezuela				D	D	D				D	D	D
D	I											46.08	HIL	6510	Trujillo, D. R.											D	D
												46.66	HI1S	6430	Puerto Plata, D. R.					D	D					D	D
D	D	D	I	I	I							46.91	HI8Q	6395	Trujillo, D. R.				D	D	D				D	D	D
D	D										D	47.06	YV4RC	6375	Caracas, Venezuela										D	D	D
I	I	Sa	Sa									47.24	HRP1	6350	SanPedroSula,Honduras					D	D					D	D
I	I	I										47.54	HIZ	6310	Trujillo, D. R.					S	S	S		I	I	I	I
XS	XS											47.62	YV12RM	6300	Maracay, Venezuela												
	D	D										47.77	HIG	6280	Trujillo, D. R.												XS
XS	XS	XS										47.77	CO9WR	6280	Sancti Spiritus, Cuba		D			D				D	D		
L	L	L										48.11	HRD	6235	La Ceiba, Hond.					S	S						
AM												48.15	OAX4G	6230	Lima, Peru												L
D	D	I	I	I								48.19	HJ1ABH	6225	Cienaga, Colombia												AM
												48.50	HI1A	6185	Santiago, D. R.				D	D	D						D
D	D	D	D									48.70	VPB	6160	Colombo, Ceylon			D	D								
			Sa	Sa								48.70	CJRO	6160	Winnipeg, Canada											D	D
D	D											48.78	VE9CL	6150	Winnipeg, Can.												
D	D											48.78	HJ2ABA	6150	Tunja, Colombia						D						D
	D	D	D									48.78	YV3RC	6150	Caracas, Venezuela				D	D	D			D	D	D	D
D	D	D		D	D	M						48.78	HJ5ABC	6150	Cali, Colombia				D	D	S						
		D	D	D								48.78	COKG	6150	Santiago, Cuba		D	D	D		D	D		D	D	D	D
								XS	XS	XS		48.86	W8XK	6140	Pittsburgh, Pa.												
D	D	D										48.88	CR7AA	6137	Lourenzo Marques, A.	S	S	S		XS	XS	XS	XS				
D	D	D	D	D	D							48.94	XEXA	6130	Mexico. D. F.												D
D	D	D	D									48.94	COCD	6130	Havana, Cuba												D
D	D	D										48.96	HJ3ABX	6128	Bogota, Col.										D	D	D
		D										49.02	HJ1ABB	6120	Barranquilla, Col.				D	D					D	D	D
D	D	D	D	D								49.02	W2XE	6120	New York, N. Y.												
AH	AH	AH	AH	AH								49.10	CHNX	6110	Halifax, N. S.		D	XA	XA	XA	XA	XA	XA	D	Sa	D	D
J	J	J	J	J								49.18	W3XAL	6100	Bound Brook, N. J.										AH	AH	AH
D			XS	XS			XS	D	XS	XS	S	49.18	W9XF	6100	Chicago, Ill.												
D	D	D										49.20	ZTJ (JB)	6098	Johannesburg, Africa	S	D	D	XS	D	D	D	D				
D	D	D	D									49.22	HJ4ABE	6095	Medellin Col.				D							D	D
XS	XS	XS										49.26	CRCX	6090	Toronto, Canada										D	D	D
XS	XS	D										49.30	HJ5ABD	6085	Cali, Col.												N
									XA	XA		49.31	HJ3ABF	6084	Bogota, Col.				D								XS
D	D	XS	XS									49.32	VQ7LO	6083	Nairobi, Kenya, Afr.	E	E		U	U	U	XC			XS	XS	
D	D	D	D							D	D	49.34	HP5F	6080	Colon, Panama					S	D	XS		S	S		D
											XS	49.34	W9XAA	6080	Chicago, Ill.	D	D	D	D	D	D	D	D	D	D	D	D
							D	I	I	I	I	49.34	ZHJ	6080	Penang, S. S.	XS											
D	D											49.41	OER2	6072	Vienna, Austria	I	D	D	D	D	D	D	D	D	Sa	Sa	
			D	D	D	D					D	49.42	YV7RMO	6070	Maracaibo, Ven.				D	D					D	D	D
D	D	D										49.50	W8XAL	6060	Cincinnati, Ohio	D	D	D	D	D	D	D	D	D	D	D	D
												49.50	W3XAU	6060	Philadelphia, Pa.												
D	D	D	D									49.50	OXY	6060	Skamleback, Denmark				S	S	D	D	D	D	D		
D	D	D										49.59	HJ3ABD	6050	Bogota, Col.												D
	D											49.59	HI9B	6050	Trujillo, D. R.					D						D	D
XS	XS	XS		Sa								49.63	HJ3ABI	6045	Bogota, Colombia												
							D	D	D	D		49.65	HJ1ABG	6042	Barranquilla, Col.					XS	XS	S				XS	XS
F												49.67	YDA	6040	Tandjong Priok, Java												
D	D	D										49.67	W1XAL	6040	Boston, Mass.										S	S	F
			D								D	49.75	HP5B	6030	Panama City, Pana.					D				I			D
		S	S	S	S					N	N	49.83	XEUW	6020	Veracruz, Mex.	D	D										
D	D	D	I									49.85	ZHI	6018	Singapore, Malaya	N											
			Sa	Sa								49.90	HJ3ABH	6012	Bogota, Colombia				D	D	D	D		S	S	D	D
D	D	D	D	I								49.92	COCO	6010	Havana, Cuba		D	D	D	D				D	D	D	
												49.95	HJ1ABJ	6006	Santa Marta, Col.					D							D
D											D	49.96	CFCX	6005	Montreal, Can.	D	D	D	D	D	D					Sa	
				Sa								49.96	HP5K	6005	Colon, Panama	D				D						D	D
D	D	D	D	D								49.96	VE9DN	6005	Montreal, Canada							D					
												50.00	XEBT	6000	Mexico City, Mex.			D	D	D	D	D	D	D	D	D	D
Z	Z	Z									S	50.00	RV59	6000	Moscow, U. S. S. R.						I	I	D	D	D		
		D	D									50.17	HIX	5980	Trujillo, D. R.	S	S	S		D	D			D	D		
D	D	D										50.21	XECW	5975	Xantocam. Mexico												
D	E	E	E									50.25	HJN	5970	Bogota, Col.				D								
												50.25	XEWI	5970	Mex. D. F.,							S		C			
XSa	D	Sa	Sa									50.26	HVJ	5969	Vatican City							D					
XS	XS											50.50	TG2X	5940	Guatemala City												
D	D	S	S									50.72	HH2S	5915	Port au Prince, Haiti						D						
D	D											50.76	HRN	5910	Tegucigalpa, Hond.					D		S	S	S	D	D	D
D	D											50.85	YV8RB	5900	Barquisimeto, Ven.					D						D	D
D	D											51.15	HI1J	5865	San Pedro, D. R.					D	D	D				D	D
D	D											51.46	TIGPH	5830	Alma Tica, Costa Rica					D	D						D
D	D											51.72	YV2RC	5800	Caracas, Venezuela		S	S	D	D	D	S	S	S	D	D	D
	AH	AH	AH									51.90	OAX4D	5780	Lima, Peru		AN	AN	AN								
			D	D	D			D	D			55.45	ZBW	5410	Hong Kong, China												
D	D	D	D	D	D	D	D	D	D	D	D	70.21	RV15	4273	Khabarovsk, Siberia	D	D								D	D	D

List of Symbols

A—Thursday, Sunday
C—Monday, Wednesday, Friday
D—Daily
E—Tuesday, Thursday
F—Friday
H—Sunday, Monday, Wednesday, Friday
G—Tuesday, Thursday, Saturday
I—Irregularly
J—Tuesday, Thursday, Friday, Sunday
K—Monday, Friday
L—Wednesday, Saturday
M—Monday
N—Monday, Wednesday, Thursday
O—Monday, Tuesday, Wednesday, Friday
P—Except Tuesday, Wednesday
S—Sunday
T—Tuesday
Th—Thursday
U—Sunday, Monday, Thursday
V—Sunday, Wednesday
W—Wednesday
Z—Tuesday Friday
AC—Monday, Thursday, Saturday
AG—Tuesday, Sunday
AH—Monday, Wednesday, Saturday
AL—Except Monday, Sunday
AM—Monday, Thursday
AN—Tuesday, Saturday
Sa—Saturday
XA—Except Saturday, Sunday
XB—Except Tuesday, Thursday
XC—Except Tuesday, Thursday, Sunday
XM—Except Monday
XS—Except Sunday
XY—Except Tuesday, Sunday
XSa—Except Saturday



STUDIO XGOX

A modern studio in an oriental setting is this view of XGOX, Nanking.

The DX Corner (Short Waves)

(*Continued from page* 351)

DJA, Zeesen, Germany, 9560 kc. (Azevedo, Silvius).

DJB, Zeesen, Germany, 15200 kc., 19.7 m., reported heard 4 p.m., E.S.T. Dressler reports this station synchronized with DJQ from 4:50 to 10:30 p.m., E.S.T. (Azevedo, Coover, Dittman). Heard according to time-table. (Wolf).

DJD, Zeesen, Germany, 11770 kc., reported heard according to time-table. (Azevedo, Wolf, Silvius, Dittman, Lowe).

DJE, Zeesen, Germany, 17760 kc., reported heard daily to 12 noon, E.S.T. (Azevedo, Westman). Observer Williams reports hearing DJE up to 2 a.m., E.S.T.

RNE, Moscow. U.S.S.R., 12000 kc., 25m., reported heard every Sunday 10 to 11 a.m., E.S.T. Special program in English. (Devaraj). Heard by Observer Styles at 11 a.m., E.S.T. Heard on Sunday on 24.99 m., and 7 p.m., E.S.T. on weekdays and 7 a.m., E.S.T., Wednesdays on 31.51 m., 9520 kc. Hartman reports hearing them 4 to 5 p.m., E.S.T., Sunday, Monday, Wednesday, and Friday.

RV96, Moscow, U.S.R.R., 9520 kc. Observer Azevedo reports this station changed to 9600 kc. He also reports this station on 15050 kc. Observer Styles heard this station on 19.46 m., 15180 kc., Sunday, at 11 a.m., and 2:30 p.m., E.S.T.

RAN, Moscow, U.S.S.R., 31:51 m., 20 kw., from a veri. (Gaskell). On 9520 kc., heard in English 7 to 7:30 p.m., E.S.T. (Alfred). Gallagher, Partner and Betances report hearing this station on 9600 kc., 7 to 8 p.m., E.S.T. Dressler reports them on 6:30 to 7:30 p.m., E.S.T. Requests reports. Announced daily schedule beginning 7 a.m., E.S.T. On 9600 kc., 7 to 7:30 pm., E.ST. (Hartman, Atherton). Dressler reports them on 9595 kc., 6:30 to 7:30 p.m., E.S.T. English program beginning at 7 p.m., E.S.T.

RV72, Moscow, U.S.S.R., 6611 kc., heard irregularly 4:30 p.m., E.S.T. (Azevedo).

RV59, Moscow, U.S.S.R., 12000 kc., reported heard 3 p.m., E.S.T. (Azevedo). Moscow Experimental on 39.95 m., reported heard 5 p.m., E.S.T., Sept. 11. (Smith).

Asia

Frank Andrews of KFI and Charles Morrison report that Japan is preparing a series of new 50,000 watt stations to carry the Overseas hour this fall. JZH, 6095 kc.; JZI, 9535 kc.; JZJ, 11800 kc.; JZK, 15160 kc.; JZK, 17785 kc. Look for them.

JVB, Nazaki, Japan, 18190 kc., reported heard 12 m. to 12:30 a.m., E.S.T. (Howald).

JVF, Nazaki, Japan, 15610 kc., heard phoning KWU, 1:30 a.m., E.S.T. (Gallagher).

JVE, Nazaki, Japan, 15660 kc., heard phoning 1 a.m., E.S.T. (Gallagher).

JVD, Nazaki, Japan, 15860 kc., heard calling KWO around 1 a.m., E.S.T. Often works PLE. (Gallagher).

JVN, Nazaki, Japan, 28.14 m., heard irregularly between 2 and 10 a.m., E.S.T., by Williams. Heard on 10660 kc., until 8 a.m., E.S.T., daily. Gallagher reports them broadcasting 2 to 2:30 a.m., 3 to 8 a.m., E.S.T. Often heard broadcasting baseball games. Heard 6:30 to 7 a.m., E.S.T., daily. (Dressler).

CUBAN VERIFICATION

Many of our readers reported the new station COCQ during the last two months. Here is verification card.

JVM, Nazaki, Japan, 10740 kc., reported heard 2 a.m. and 2:45 p.m., E.S.T. (Azevedo). On daily at midnight. Baseball games in Japanese. (Gallagher). Heard by Dailey testing Fridays around 2:30 p.m., E.S.T.

JVH, Nazaki, Japan, 14600 kc., reported heard 2:45 p.m., E.S.T. (Azevedo). 20:55 m. on Tuesdays and Fridays at 3 to 4 p.m. and daily 1 to 2 a.m., E.S.T. (Gaskell). Wolf reports them on 12 to 1 a.m., E.S.T. daily. News in Japanese and English and Japanese music. Gallagher reports them testing irregularly in addition to their regular program. Overseas Broadcast Midnight-1 a.m., E.S.T. (Partner, Howald). Address: Broadcasting Corp. of Japan, Atagoyama. Tokyo, Japan.

ZEK (ZBW), Hong Kong, China, 34.29 m., reported heard daily 6 to 9:30 a.m., E.S.T., Chinese and European music. Occasionally relays Daventry. Address: Box 200, Hong Kong. (Devaraj, Gallagher).

XGOX, Nanking, China, changed from 9490 kc. to 6820 kc., same schedule, 6:30 to 9:30 a.m., E.S.T. (Partner). Pilgrim reports the schedule as 8:40 to 10:40 a.m., E.S.T. except Sunday. Sunday approximately 9:40 to 11 a.m., E.S.T. Heard by Dailey on 9640 kc.

CQN, Macao, China, 9530 kc., reported heard Mondays and Fridays, 8 to 9:30 p.m., E.S.T. Observer Styles says that this is a Portuguese Station. Gallagher reports them on 9600 kc. and broadcasting other than Monday and Friday. Heard 5 a.m. and 7:45 a.m., E.S.T.

ZHI, Singapore, S.S., 6010 kc., reported heard 7:50 a.m., E.S.T. (Gallagher).

ZGE, Kuala-Lumpur, F.M.S., 6135, reported heard to 10:40 a.m., E.S.T. (Howald).

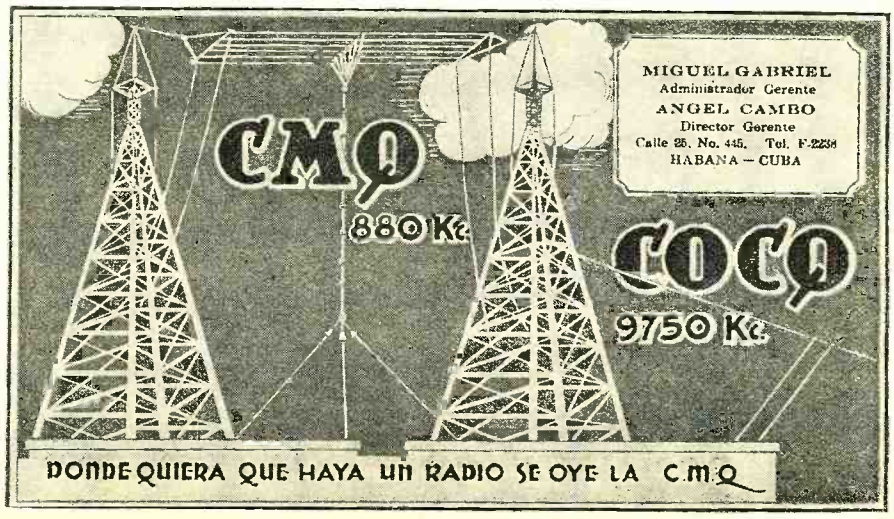
PMH, Bandoeng, Java, 6720 kc., reported heard daily 5 to 10 a.m., E.S.T. (Sholin, Pilgrim). Heard irregularly by Gallagher 7 to 10 a.m., E.S.T.

PMN, Bandoeng, Java, 10260 kc. (from veri) heard 6 p.m., E.S.T. (Howald and Azevedo). This station has directional antennas directed N.W. Heard by Gallagher relaying YDB between 7 and 10 a.m., E.S.T. (Howald, Street, Azevedo, Partner).

YDA, Tandjong, Priok, Java, 3040 kc., 10 kw., reported heard 9:30 p.m. to 2 a.m., E.S.T. on 6040 kc., from veri. (Howald, Street).

YDB, Soerabaja, Java, 9610 kc., 1 kw. (from veri), reported heard 9:30 p.m. to 2 a.m., E.S.T., on 11860 kc.

(*Turn to page* 364)



THE SERVICE BENCH

Conducted by Zeh Bouck, *Service Editor*

. . . Auxiliary Oscillators . . . Service Shops . . . Kinks . . . Service Sales Promotion . . . Transformer Repairs . . . The I. R. S. M. Show . . . Servicing: Steinite . . . . . Edison . . . Dayfan . . .

AN AUXILIARY OSCILLATOR FOR THE SERVICE SHOP

THERE are many instances where an extra oscillator is as convenient as the proverbial third hand would be. Stan "The Radio Man" Trier sends through the following in appreciation of this fact: "Any serviceman who would not give 30 minutes of his time for an audio oscillator—don't bother reading this article. As to the others—dig down in your junk box deeply enough to reach that old neutrodyne coil and condenser assembly that you have been saving for the last 6 years for some unknown reason. Dust it off and mount it on a board (or in a cigar box) with the coil upright. (Of course, if you want to spend more than 30 minutes on the job, you can make a more presentable instrument.) Mount a 4-hole socket inside the coil. Open the secondary winding at the tap so as to make two windings, and connect as shown in Figure 1. Turn the condenser rotor to maximum capacity and

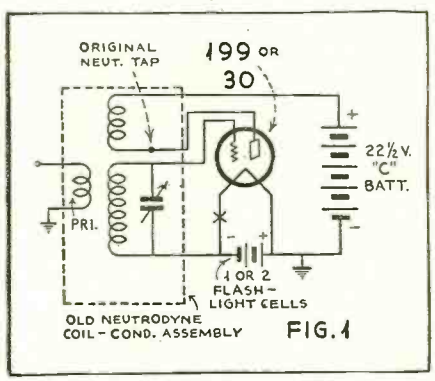


Figure 1. A simple and inexpensive auxiliary oscillator for use in conjunction with regular equipment.

tighten the shaft so that it will stay put. You now have a fixed-frequency oscillator for use with your service oscillator operated with modulation "off." The latter will provide a variable beat with the fixed oscillator. Connect the output of both oscillators to the antenna post of the receiver—the primary winding of the old neutrodyne coil being employed for output. Varying the service oscillator will provide everything from zero frequency up. (*The receiver, of course, must be tuned to the frequency of the fixed oscillator.*—ED.)

"You'll find it great for locating rattles in speakers and auto radios, distortion in audio-frequency systems, and for any job where an audio oscillator will help, provided calibration is not necessary."

(*If you can read as closely as one kilocycle on your service oscillator, you have a calibrated audio oscillator—merely by remembering that one kilocycle equals one thousand cycles. In other words, an audio frequency of 5000 cycles will be produced when the service oscillator is tuned 5 kc. off zero beat with the fixed frequency oscillator. Personally, we'd prefer having the auxiliary oscillator also variable, so that different radio frequencies can be picked, in order to eliminate possible interference from a powerful local station. A foot or less of unshielded lead makes a good antenna for the modern set. Obviously, practically any secondary coil from a discarded tuned r.f. receiver can be used. The primaries will usually contain enough turns for oscillation. Try reversing connections before adding turns. A half-dozen turns of wire over the lower end of the secondary will provide an output coil. This can be tapped if a variable output is desired. The condenser is of course connected across the secondary and the primary is placed in the plate circuit.*—ED.)

NEW SERVICE CONTEST

RADIO NEWS is offering this month Cash Prizes of $10, $5, $4, $3 and $2 for photographs of service activities accompanied with full details. Also, other illustrative material, such as original advertisements, sales literature, etc., may be entered. The subject matter may be your Service Bench, a novel Counter or Window Display, a Sales Campaign, Publicity Stunt, a Successful P. A. Set-up, etc. All material used, other than that of prize-winning caliber, will be paid for at our usual rates. Send *your* contribution to—

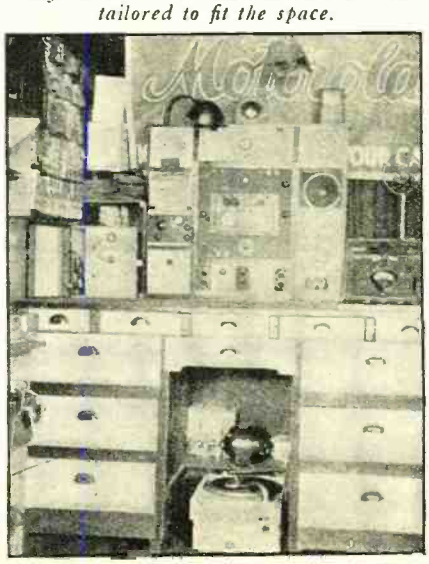
Yours for better servicing,
THE CONTEST EDITOR.

THIS MONTH'S SERVICE BENCH

The particular feature of this month's Service Shop is that, although complete in all essential details, it was designed by S. Trochimowicz ("Stan's Corner Store"), Nanticoke, Pa., to fit a limited space. He writes: "I am an independent serviceman—servicing all makes, home and auto, as

(*Turn to page* 380)

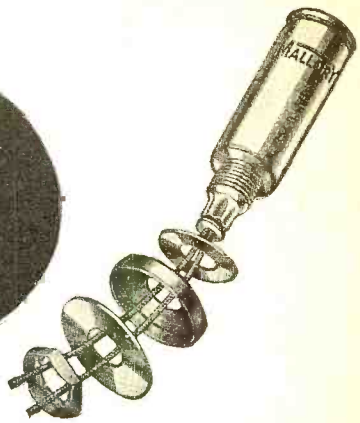
Figure 2. This service bench was tailored to fit the space.



No Worry over Installation Problems

P.R. MALLORY & CO. Inc.

MALLORY



Replacement Condensers are Universal in Application

Mallory *HAS* solved the question of universal application—and now 69 Mallory Replacement Condensers service 100% of all sets using electrolytic condensers.

Mallory provides practical universal mounting features for both round can and carton type condensers. Mallory has eliminated completely the need for splicing leads. Mallory has produced universal application for a line of humidity-proof, surge-proof, temperature-proof condensers of greater efficiency and smaller size—a quality combination that simply cannot be duplicated. Only Mallory has all these points of superiority! And with it all, Mallory offers a free service to service men that is the finest help ever devised for practical field servicing—the Mallory Condenser Service and Replacement Manual.

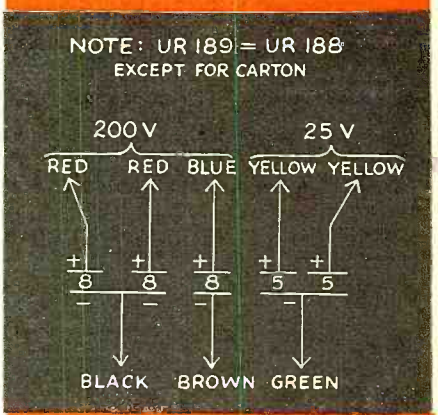
20 Minutes of Reading will Yield Big Dividends in Time Saving . . . .

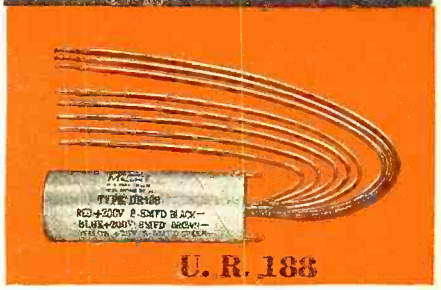
Give 20 minutes to the reading of 12 pages in the Mallory Condenser Replacement Manual and save yourself hours of servicing time. That means more profit and satisfied customers. That means quick solution of the knotty problems.

Thousands of service men have written us . . . "Sure do give satisfaction". . . . "Your parts are 'tops' with us". . . . "Best by far—no jobs bounce back". . . . "The Manual is a real guide". . . . These are only fragments of enthusiasm, but they tell a mighty story of Mallory quality.

Ask your distributor about Mallory-Yaxley—today. And if you haven't received your Mallory Condenser Manual, write us—today! We'll send your copy free.

Two examples of new Mallory Universal Replacements





P.R. MALLORY & CO. Inc.
MALLORY

P. R. MALLORY & CO., Inc.
INDIANAPOLIS INDIANA
Cable Address — PELMALLO

YAXLEY

RADIO PHYSICS COURSE

ALFRED A. GHIRARDI

Lesson 57. Filters

THE single filter section described in Lesson 55 (even though it is better than a single coil or single condenser alone) does not give very sharp reduction of current at the cut-off frequency Another inductance, connected in series with the load side of the circuit will improve the filtering action. This additional inductor has the effect of sharpening the cut-off. This circuit is called a "T" section of a filter because it resembles the capital letter T. Two of these sections may be connected as shown at (A) of Figure 1 to give sharper cut-off. This is sometimes called a Campbell Filter of T sections. When more than one section is used in any filter, different values of L and C are used for the center section and the end branches, as we will see. *The terminal unit of any multi-section filter is always different from the value of the units in the body of the filter.* It is evident from (A) of Figure 1 that the joining of the two T sections gives us, at the center, a combined inductance which is equal to the sum of the two section inductances joined in series. (B). This is the general rule that applies to all T-section filters—the end chokes are always ½ as large as the others. A 3-section T filter would look as shown at (C).

The sharpness of the cut-offs of filters depends upon the number of sections, as well as upon the resistance of the apparatus. A filter composed of only a single section will not give as sharp a division between what is passed and what is blocked as will a filter of several sections. The number of sections which are actually used in any particular case depends, of course, upon how sharp it is desirable to have these cut-offs and upon the cost of the apparatus. In general, two or three-section filters are all that are necessary, and in some cases even one section is sufficient.

If the variation in frequency is plotted horizontally, usually upon a logarithmic scale, while the corresponding *attenuation* or "*reduction*" of the current caused by a high or low-pass filter is plotted vertically on a uniform scale, the so-called *attenuation curve* of the filter is obtained.

If the filters had no resistance or leakage losses, the T-type filter described above would give similar results to the π ("pi") type to be described next. However, under practical operating conditions it may be said that in general, the T-type of filter section is preferable to the "pi" type for *constant voltage* circuits. Of course this is only a general rule, as other factors will often alter the conditions. The calculations for the T-type filter will be considered together with those of the "pi" type filter since they are identical.

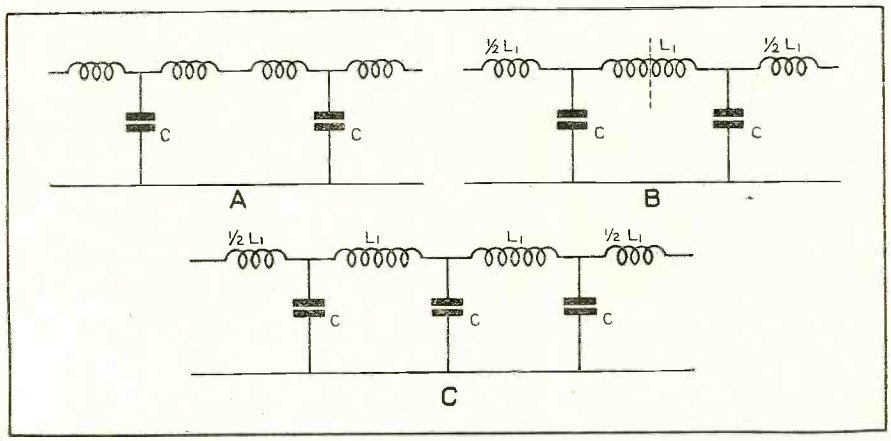


Figure 1—Method of forming a multi-section T-type filter from several single units. A 2-section filter is shown at the upper right and a 3-section filter is shown at the bottom.

Therefore this may be simplified as shown at (B) by considering the center inductance L_1 equal to 2 times each outside inductance, which is now called $\frac{1}{2} L_1$ for convenience. This relation should be remembered. In practical filters of this type, the center choke L_2, either consists of two chokes in series as shown at (A), each one having half the total inductance value L_1, or if a single choke is used, its inductance must be twice as great as that of each outside or end choke as shown at

High-Fidelity Improvements

By Peter L. Jensen

The trend in sound reproduction is toward greater realism. Due to a listener's habit, high fidelity sets will for some time be equipped with gadgets permitting present-day reproduction to be duplicated. The trend will be toward the use of non-directional sound-emitting devices, giving uniform sound pressure at all frequencies throughout a room. Electrical-circuit "bass" compensation will be more popular and will be extended to lower priced sets. Permanent magnet dynamic speakers will become popular.

Statistics!

Washington — During the month of March, 1936, the average weekly earnings of employees in radio factories was $18.23, an increase of 1.4 percent over the previous month and .9 percent over the earnings in March 1935. The average number of hours worked was 33.4 hours per week, 1.9 percent more than in February and 1.3 percent more than in March 1935. The average hourly earnings of factory employees during March 1936 was 54.7 cents, .3 percent less than in February, also .3 percent less than in March of last year. The total payroll was down 3.8 percent compared with February but only .9 percent below that of March 1935.

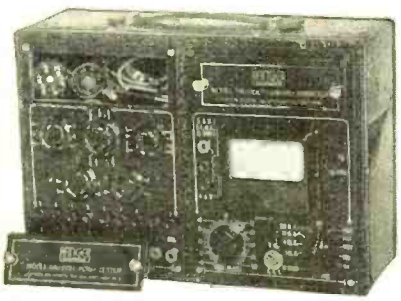
TWO PRECISION TESTERS FOR THE PRICE OF ONE

Each Ranger-Examiner Combination puts together in one case two (2) units of test equipment every serviceman needs in his everyday work. The savings effected in design and in using this exclusive Ranger-Examiner grouping permits offering these combinations of two Precision Testers at prices you would normally expect to pay for one.

Each item is precision built throughout by the oldest company in the service equipment field. Their past contacts with the trade as well as with every advancement in the field of radio make them fully acquainted with the needs of the service profession. From the standpoint of sheer merit Ranger-Examiner testers are becoming popular favorites with radio servicemen.

RANGER EXAMINER

COMBINATION FREE POINT TESTER AND VOLT-OHM-MILLIAMMETER—MODEL 640-740



Model 640 Free Point Tester has five (5) sockets. Panel includes automatic switch type and single action jacks. Model 740 Volt-Ohm-Milliammeter Unit has a 3" Triplett Precision instrument with scale reading 10-50-250-500-1000 A.C. and D.C. volts at 1000 ohms per volt, 1-10-50-250 D.C. M.A.; low ohms 0-300; high ohms to 250,000 at 1.5 volts. Rheostat adjustment. Model 640-740 is contained in the standard size metal carrying case.

Dealer Price. **$27.00**

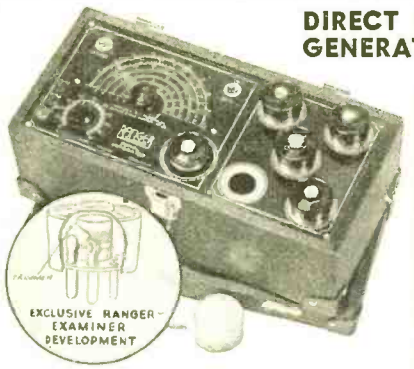
ADDITIONAL COMBINATIONS

Using the same standard size metal carrying case the following additional combinations may be had; the testers in all cases being identical with foregoing descriptions and complete with necessary accessories.

Model 540-740
Signal Generator and Volt-Ohm-Milliammeter. Dealer Price.... $36.00

Model 440-740
Tube Tester and Volt-Ohm-Milliammeter. Dealer Price..... $37.50

DIRECT READING SIGNAL GENERATOR—MODEL 557



Model 557 has the same features as described for Signal Generator Model 540 except that it is installed in a black leatherette carrying case and is an integral part of the case. The five individually calibrated coils are nested on the side as shown, handy for instant use. The attractive panel is silver and black.

Dealer Price. **$18.00**

COMBINATION TUBE TESTER AND SIGNAL GENERATOR—MODEL 440-540

Model 440-540 has the two separate testers installed in a sturdy metal carrying case for shop or field use.

COMPLETE DEALER PRICE $33.60

Model 440 Tube Tester checks all type tubes. Condition of tubes is read directly on GOOD-BAD Triplett instrument scale while load values are applied. Circuit designed to indicate inter-element shorts and leakages. Illuminated dial A.C. instrument for line volts adjustment, also shows when tester is connected to power supply.

Model 540 Signal Generator uses plug-in type coils. Five frequency bands cover 110-20,000 K.C. All readings are direct and fundamentals. Each coil is individually calibrated by peaking with trimmer condensers. Accuracy within one per cent (1%) from 110-3000 K.C.—2% for higher frequencies. Completely shielded. Attenuation and stability are outstanding features. Complete with coils, two type 30 tubes, batteries and necessary accessories.

Model 440-540 consists of these two instruments installed in a sturdy metal case with built-in compartment having "Snap-on" cover for accessories, finished in electro black baked enamel, panels in silver and black. Every essential feature is incorporated in these outstanding instruments. No extravagance. No added unnecessary cost. To see one—to use one—means you will be glad to own one.

D.C. POCKET VOLT-OHM-MILLIAMMETER—MODEL 735

Contained in sturdy black molded case with silver and black panel, rounded corners. Ranges are 15-150-750 volts; 1.5-15-150 M.A.; ½-1000 low ohms; 0-100,000 high ohms at 1.5 volts. Provision for external batteries to be used for higher resistance measurements.

Has Triplett D'Arsonval precision instrument accurate within 2 per cent. Selector switch for all ranges. Provides for all essential D.C. measurement requirements in servicing.

Size is 3 1/16" x 5⅜" x 2⅛" deep—is easily carried in the pocket. Handy for the laboratory. Complete with battery, test leads and alligator clips.

Dealer Price..... **$10.80**

SEE THEM AT YOUR JOBBER—WRITE FOR CATALOGUE

RANGER EXAMINER

Readrite Meter Works
1215 College St., Bluffton, Ohio

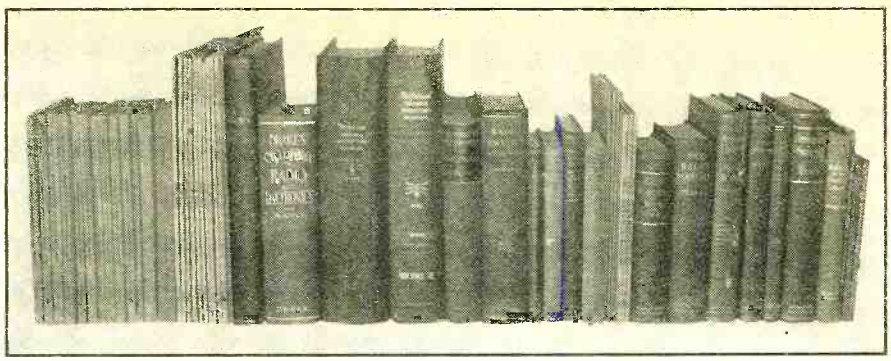
Without obligation please send me more information on .....

Ranger-Examiner Combination .....

Name .....

Address .....

City ..... State .....



THE TECHNICAL REVIEW

CONDUCTED BY THE TECHNICAL EDITOR

Old Wires and New Waves, by Alvin F. Harlow; Appleton-Century Company, 1936. This book traces the history of communication from the ancient times till today. Beginning with the fire beacons which were used at the fall of Troy in 1183 B.C., it describes various other signals such as the wardrums, fire beacons of the Indians, the heliograph and the semaphore. Finally, electricity was used and one reads about the invention of the telegraph, telephone and radio. The book is written in a readable style and gives many hitherto unknown details of the origin of some important inventions.

The "Radio" Antenna Handbook, by The Engineering Staff of Radio; Radio Ltd., 1936. A book of interest to the amateur and short-wave listener dealing with the principles and practice of antenna design for short-wave communication. The working of the antenna has been much of a mystery to many and it does not seem to get its fair share of attention in the usual textbooks. Therefore, this book on antennas should be welcomed by short-wave enthusiasts. It is full of useful information on the different types of antennas and feeders to be employed with transmitters. The commercially available short-wave receiving antennas are also described.

Radio Service Handbook, by J. T. Bernsley; Gernsback Publications, 1936. This book aims to combine within one volume most of the information useful to servicemen. Within its 1,000 pages it contains chapters on radio theory, service equipment, locating troubles in the oldest and the newest receivers; furthermore, there are numerous tables giving data on manufacturer's models and their peculiarities. What is more, there seems to be evidence that the author has done some servicing himself which is nearly unprecedented in books for servicemen.

The book consists of 7 parts; the first part deals with the theory of circuits and describes the working of the various sections and parts which make the modern receiver. The second part is concerned with test equipment, giving explanations of how it works, circuits and details of commercial units, and chapters on how to make your own. Part three describes the actual procedure of servicing. The fourth part contains information on high-fidelity receivers, automobile sets, noise elimination, etc., while the fifth part deals with conversions and modernizing. In part six the author suggests ways of self-improvement and also suggests an organization to look out for the serviceman's interest.

Part seven contains numerous tables, such as the following: a list of intermediate frequencies of different makes and models; voltage divider data of manufactured sets; list of antenna equiped cars; car battery grounds; field coil resistances; volume control data for different makes; tube complement of commercial sets, a list of typical troubles; condenser replacement table, etc.

Manual of RCA Receivers; RCA Manufacturing Co., 1936. There is no title on this book, so we have taken the liberty of calling it a manual for that's what it is. Servicemen will find in it the complete service data, circuits, specifications, etc., of the new line of RCA receivers.

Review of the Proceedings of the Institute of Radio Engineers for September 1936

A new High-Efficiency Power Amplifier for Modulated Waves, by W. H. Doherty. A technical discussion of Mr. Doherty's linear power amplifier consisting of tubes in parallel where the second tube goes into action only when the power is above carrier level. A great saving in power and equipment is thus effected.

A Modern Two-Way Radio System, by S. Becker and L. M. Leeds. An account of a two-way police radio system where communication can be established between headquarters and any car or between any two cars with headquarters as "exchange." Included are details of the J antenna with concentric feeder.

Electrical Measurements at Wavelengths Less Than Two Meters, by L. S. Nergaard. It appears that ultra-high frequency voltages are best measured with diode voltmeters. This article describes results obtained with the 955 and with a special diode tube when making measurements down to 100 centimeters.

The Limitations of Resistance-Coupled Amplification, by W. F. Curtis. The author demonstrates that the frequency response curve of a resistance-coupled amplifier is identical to that of an idealized tuned amplifier.

Review of Contemporary Literature

This department calls attention to articles appearing in recent publications. They are not included in the free booklets. The name of the publication and the date is given for each article. Addresses of publishers will be furnished on request.

Quiet, Please; The General Radio Experimenter; July-August 1936. A description of a new noise meter in accordance with the new standards set by the A.S.A.

Nomograms for Symmetrical Attenuation Circuits; by E. A. Hanney; The Wireless Engineer; September 1936. A chart for rapidly finding the attenuation in T, Pi and lattice networks. The ranges for the characteristic impedance are from 300 to 1200 ohms, of attenuation from .1 to 40 db.

Resistance-Coupling Design Charts; by G. Koehler; Electronics, August 1936. Charts to determine the gain of resistance-coupled amplifiers in terms of tube and circuit constants.

Modulation Measurement; by C. G. Seright; Electronics; August 1936. Description of a method employing a diode followed by a linear d.c. amplifier.

An Automatic Sensitivity Tuning System; by A. W. Barber; Radio Engineering; September 1936. Describing an economical system of facilitating exact tuning in receivers equipped with a.v.c. A switch adds a condenser across the a.v.c. making the time constant very large, then the receiver reacts normally. After tuning is accomplished, the condenser is cut out.

Multi-Tube Oscillators for the Ultra-High Frequencies; by P. D. Zottu; QST; October 1936. Oscillators on ultra-short waves cannot simply be connected in parallel. A multi-tube oscillator can be made by coupling independent oscillators to a common tank coil.

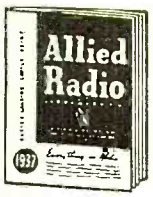
Cosmic Cycles and Radio Transmission; by Harlan True Stetson; Proceedings of the Radio Club of America; July 1936. The author describes the influence of sun spots on radio and presents evidence tending to show that the moon raises tides in the ionosphere thereby affecting radio transmission.

Reactance and Resistance in Series; Aerovox Research Worker; July 1936. A chart for rapidly finding the impedance of reactance and resistance in series.

Free Bulletins

152-Page Catalog

Every serviceman, radio experimenter and dealer will be desirous of obtaining a copy of the 1937 Allied radio catalog. It contains 152 pages and features latest all-wave receivers, kits, replacement parts, amateur equipment, P. A. apparatus and service instruments. To obtain a free copy of this book, simply send in your request to RADIO NEWS, 461 Eighth Avenue, New York City.



Latest Catalog

The new Yaxley 24-page radio parts catalog illustrated below lists an unusually large assortment of replacement volume controls, fixed resistors, all kinds of switches, and Mallory replacement vibrators for all popular makes of motor car sets. Servicemen and dealers can obtain a free copy of this new book by simply sending their request on their letterhead to RADIO NEWS, 461 Eighth Ave., New York City.

Resistor Catalog

The 1937 edition of the Atlas Resistor Company catalog includes an extensive line of wire-wound, tubular resistors for radio and industrial electrical-control requirements. It also lists heavy-duty, transmitting, bleeder resistors. Copies are obtainable free of charge from RADIO NEWS, 461 Eighth Avenue, New York City.

Information on Public Address Equipment

RADIO NEWS offers through the courtesy of the United Sound Engineering Company a large 6-page catalog describing their complete line of low-power portable P. A. systems, powerful 60-watt 12-tube amplifiers and accessories. To obtain this catalog simply send in your request to RADIO NEWS, 461 Eighth Avenue, New York City.

RADIO NEWS Booklet Offers Repeated

For the benefit of our readers, we are repeating below a list of valuable technical booklets and manufacturers' catalog offers, which were described in detail in the June, July, August, September, October and November, 1936, issues. The majority of these booklets are still available to our readers free of cost. Simply ask for them by their code designations and send your requests to RADIO NEWS, 461 Eighth Avenue, New York, N. Y. The list follows:

Je2—Radio Parts Catalog of Allied Radio Corp. Free.
Je5—Spring Radio Catalog of Radolek Co. Free.
Jy1—Tube Engineering Bulletin on Harmonic Analysis of Modulation. Ken-Rad Corp. Free.
Jy2—Free Tube Chart of the Raytheon Production Corp.
Jy3—Public Address Catalog of Operadio Mfg. Co. Free.
Jy4—Latest Radio Parts Bulletins Utah Radio Products Co. Free.
At2—Modulation Booklet. United Transformer Corp. Free.
At4—P. A. Equipment Catalog. Wholesale Radio Service Co., Inc. Free.
At5—Amateur Radio Booklet. New York Wireless School. Free.
S1—Catalog on Permanent Magnet Speakers Cinaudagraph Corp. Free.
S2—Recording Equipment Catalogs. Presto Recording Corp. Free.
S3—Cornell-Dubilier Corp. Folder on New Service Condensers. Free.
S4—Webster Company Catalog on Sound Systems and Accessories. Free.
S5—Transformer Replacement Catalog. United Transformer Corp. Free.
O1—1937 Catalog of Insuline Corp. Free.
O2—Transformer Guide, Johnson Transformer Co. Free.
N1—Transmitting Tube Guide. Free to Amateurs and Station engineers. Taylor Tubes, Inc.
N2—Free Tube Base Chart. Weston Electrical Instrument Corp.

Station List

(*Continued from page* 348)

1440 kc., 208.3 m.
KDFN, KLS, KXYZ, WBIG, WCBA, WMBD, WSAN.

1450 kc., 206.9 m.
KIEM, KTBS, WGAR, WHOM, WSAR, WTFI.

1460 kc., 205.5 m.
KSTP, WJSV.

1470 kc., 204.1 m.
KGA, WLAC.

1480 kc., 202.7 m.
KOMA, WKBW.

1490 kc., 201.3 m.
WCKY.

1500 kc., 200.0 m.
KBIX, *KBST, KDB, KGFI, KGFK, KGKB, KGKY, KNEL, KNOW, KOTN, *KOVC, KPLC, *KPLT, KPQ, *KRNR, KUTA, KVOE, KXO, WCNW, WDNC, WGAL, *WHBB, WHEF, WJBK, WKBB, WKBV, WKBZ, WKEU, WMBQ, WMEX, WNBF, *WNLC, WOPI, WRDW, WRGA, WSYB, WTMV, WWRL, WWSW.

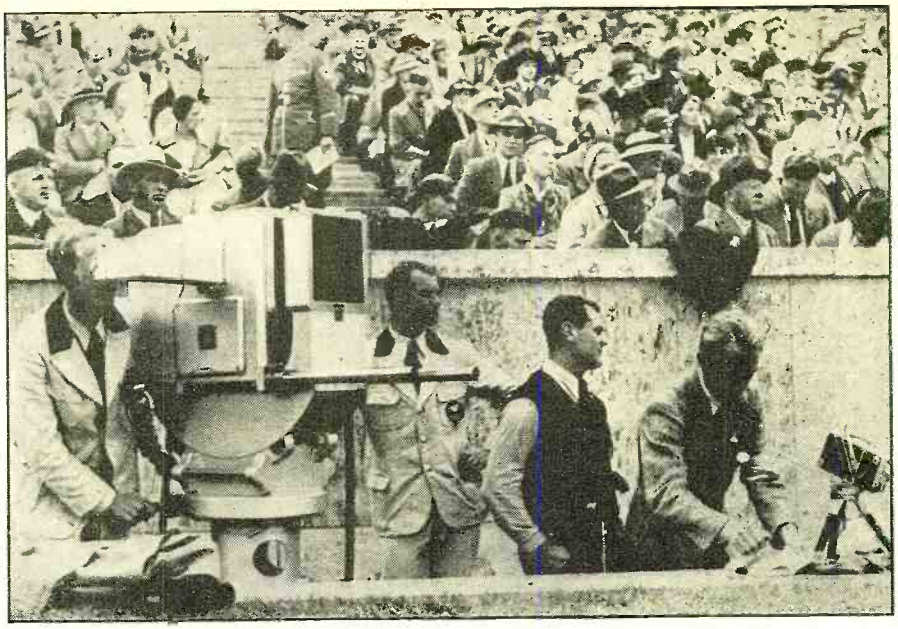
1530 kc., 196.1 m.
W1XBS, W9XBY.

1550 kc., 193.6 m.
W2XR, W6XAI.

* Construction permit.
** By special authorization.

Introduces Engineering News

New York, N. Y.—The Kenyon Transformer Co., announces the initial issue of the "Kenyon Engineering News," a publication devoted to the amateur service engineer, sound technician and experimenter. The first number contains interesting and helpful data on an electronic mixer, tone equalization and also includes a series of helpful engineering charts on the use of the decibel.



QRD? QRD? QRD?

CONDUCTED BY GY

SEEING as how every one is passing some crack or other about the television situation in these here parts, it behooves us to also throw our hat into the central station, as it were.

WHEN and if television breaks in all its glory, there will be a crying need for real radiomen, servicemen, etc. . . . And the boys who thought they could fool the public and put their shingle out as radio service doctors because they knew the difference between an electric light bulb and a vacuum tube, won't be able to get away with it this time. Yeh, me hearties, it's the midnight oil and study, study, study again.

Yes, my hearties, television in America is something to look forward to as it certainly will open up many new jobs for the trained radioman and operator. The Heading photo this month shows an operator focusing the television camera at the Summer Olympic games in Germany.

OUR Westcoaster who has been sort of laying low for the past few issues has given us this dope to chew on; "Jobs better and better, in Broadcast and Airways especially." Mackay Radio opened a radio service depot in Los Angeles and they report that *increased business necessitates more servicemen.* The West Coast steamship owners report they have notified Maritime Federation that they desire a change in agreement. This looks like it means more labor trouble because they state that the impossible demands of Communist (or whoever the leaders may be) leaders on the West Coast is forcing business to ship via truck and rail rather than by uncertain, irresponsible waterways dominated by them. And the rumor is that a big battle fund is now available, similar to the one in 1921 when steamship companies broke the unions. There is some hope for operators when a 15 w.p.m. speed demon got himself a job recently on a West Coast ship, and jobs are picking up rapidly, but there seems to be a scarcity of good operators, especially around the Southern California diggings. Police radios are booming as more municipalities are supplying funds and installing equipment. Uncle Sam in his various bureaus is doing likewise. Why doesn't ARTA try to seek more employment for their members in other radio branches? Not a bad crack, what?

We wonder if any of the boys remember "Doc" Forsythe? Recently one of his friends stopped off at Sailors Snug Harbor, Staten Island, N. Y., to see him and was surprised to learn that he was the first visitor the old operator has had in almost two years. To quote this op, "You can imagine my feelings when I learned that with one or two exceptions, all of "Doc's" old friends had apparently forgotten him and that I was his first caller in almost two years. You know "Doc's" eyesight is none too good; he can't read anymore and listening to his radio is about all the diversion he has. Besides that, being the only radio op in an institution with over 900 old shellbacks, old-time skippers and fishermen, is not exactly my idea of congenial surroundings, although "Doc" did not complain on that score. I would like to issue an appeal to all old-timers who knew "Doc" Forsythe to pay him a visit the next time their ships dock at New York. While visiting hours are supposed to be from 13.00 to 16.00, "Doc" sez he can receive callers almost any time during the day and early evening. It is a nice ferry ride from the Battery and a short bus trip to the door. To those who do not live near New York or who never call at this port, he says, "Drop me a postcard from any foreign port." As it seems extremely unlikely that "Doc" will ever sail the seven seas again or visit any of the many ports his eyes have seen, it seems very little to ask of his old friends, that they should occasionally remember one of their own in this manner. Friends are sometimes thoughtlessly neglectful and a reminder goes a long way in refreshing the minds of those who do not mean to forget. His address is Mr. James F. Forsythe, Sailors Snug Harbor, Staten Island, New York.

A young chap, formerly with Mackay Radio and with a reserve officer's commission in the Navy, failed a radio telegraph op's exam. for Dept. in Los Angeles. Typical questions were: name three types of crystal detectors, explain action of three-element vacuum tube, describe a salt water rheo-

stat, draw a wavemeter, etc. . . . He retained his temporary position with the department until some politico-op. turned on the heat and he was shifted to a clerk's duties. If a Lieutenant in the Naval Reserve can't answer these simple questions, we wonder what the average "first class" must know. And speaking of the forces, did we mention that Hinman Bostrom is with U. S. Marines in Shanghai getting a lot of experience and writing some swell letters to his old friends?

The ARTA should look into this! There was a young chap who wouldn't take a scab job during a recent strike and he made a deposit on membership in ARTA, but now he cannot get into ARTA on account of *no experience!* He's going to scab some day if something isn't done for his type of operator. Lots of school grads are following suit, but with smart legislation something could be done before it is too late. Our compliments to Haddock, who tries to keep the delegates in line and tries to undo the harm they sometimes do, even though his devotion to duty costs him money and health. Why can't delegates model themselves after Merv Rathborne, who uses his head, or Haddock, who shows good judgment. Lots of West Coast ships are being sold to East Coast companies because shippers claim too many delegates are trying to tell them their business.

Occasionally this column gets really hot and bothered with some of the goings-on in the ranks. What with rumors that finally become facts, new faces and reports from various parts of the country insisting that certain changes should be made in the governing or executive body of radiomen, you can't blame a chappie, what? Of course, there will be those who peeve easily and those who think our remarks are all to the ginger. Some of us cannot be convinced we're wrong even if we are, and then there are those who believe "Right or wrong, my country. . . ." you know. We all think our ideas are the best, so why argue with guys like that. "A man convinced against his will, is of the same opinion still." The main thing is that we are for, and by radio ops. whether in the air, at sea or in a control broadcast room. So if occasionally we get vociferous and insist that certain changes be made, remember that we really have the interests of the operator at heart. Sometimes our enthusiasm may get the better part of our discretion . . . so with 73. . . . ge. . . . GY.

The DX Corner (Broadcast Band)

(*Continued from page* 347)

Lyons	1393	7:15 to 7:45
Lyons La Doua	648	Best 7:30
Lille	1213	Best 7:30
London Regional	877	7:15 to 7:45
Nurnburg	1267	Best 7:45
Hilversum	995	7:15
Paris	1456	7 to 7:30
West Regional	804	Best 7:30

Did not get up for early morning reception till September 18th, and Cologne 658, Hamburg 904, Munich 740, Stuttgart 574, Liepzig 785, Frankfurt 1195 and Nurnburg 1267 were all good. Was very much surprised, for I didn't hear them until middle of October last year with any volume at all.

The TP's are behind last year. Have not heard one over R3 in four weeks, although the second week in August I had the two Hawaiians and 3GI quite good. South Americans very poor in September

The DX Corner (Short Waves)

(*Continued from page 354*)

Reported on 9540 kc. (Howald, Street, Gallagher, Andrews, Reichardt).

PLP, Bandoeng, Java, 11000 kc., 1.5 kw. (from veri), antennas directed N.E. Heard 2 a.m. and 8 a.m., 5:30 to 10 a.m., E.S.T. (Partner, Howald, Street, Gallagher, Andrews).

YDA7, Pekalongan, Java, 3270 kc., .05 kw. (veri).

The above Java stations are on the air daily from 6 to 7:30 p.m., 10:30 p.m. to 2 a.m., 5:30 to 10:30 or 11 a.m., Saturdays till 11:30 a.m., Sundays 7:30 p.m. to 2 a.m., 5:30 to 10:30 a.m., E.S.T. (Street, Howald).

PLH, Bandoeng, Java, 15150 kc., heard Monday and irregularly until noon. (Pilgrim, Andrews, Betz, Partner). Heard 5:30 to 11 a.m., E.S.T.

VUC, Calcutta, India, 49.00 m., reported heard irregularly at noon, broadcasting in Bengali and English. (Devaraj, Williams). Wordsworth reports VUC on 49.10 m. to 6109 kc. on daily 2:06 a.m. to 4:36 a.m. and 7:06 a.m. to 12:06 p.m., Sundays on at 10:06 p.m. to 2:36 a.m. and 7:36 a.m. to 11:06 a.m., E.S.T.

HS8PJ, Bangkok, Siam, 32.09 m., reported heard Thursdays 7 to 9 a.m., E.S.T. (Devaraj). Heard on 24.32 m., 10980 kc., Mondays 8 to 11 p.m., E.S.T. (Styles). Observer Williams reports them on 32.09 m. Thursdays and on 19.34 m. Mondays 8 to 10 a.m., E.S.T. (announcement). Ask for reports and will verify. Heard by Pilgrim, power 10 kw. Heard by Baadsgaard on 15.80 m. Woman announcer. Address: Experimental Short-Wave Broadcasting Station, Bangkok, Siam.

F3ICD, Radio Saigon, French Indo-China, 11370 kc., reported testing at 7 to 9:30 a.m., daily. Sahlbach reports them on approximately 11730 kc. Announce in French and English, early mornings. (Craft, Andrews, Devaraj). Radio Philco. Address: Box 295.

North America

CJRC, Winnipeg, Canada, 6150 kc., assigned freq. (Partner).

CJRX, Winnipeg, Canada, 11720 kc., reported heard 6 p.m., E.S.T. (Azevedo, Partner). Heard according to time-table. (Wolf).

VE9HX (CHNX), Halifax, Canada, 6130 kc., heard 9:13 p.m., E.S.T. (Azevedo).

W1XAL, Boston, Mass., 11795 kc., heard 6:10 p.m., E.S.T. (Azevedo). Was on the air between Sept. 13 and 18 with Harvard Tercentenary programs on 6040 kc. and 15250 kc. (from announcement). Heard testing with London on 15,250 kc. at 12 to 12:30 p.m., E.S.T. by the "Queen City DX'er." Heard by Edlin, Howald. Heard 9 to 11 a.m., E.S.T. (Wilkinson). Schedule Fridays 7 to 8:45 p.m., E.S.T. and Sundays 5 to 6:30 p.m., E.S.T. on 6040 kc., Saturdays 5 to 6:45 p.m., on 11790 kc. (Engineering Dept. of W1XAL).

W8XK, Pittsburgh, Pa., 6140 kc., reported heard 4 p.m. and 9:08 p.m., E.S.T. (Azevedo). Also reported on 11870 kc. Silvius reports them on the air daily from 7 to 10 p.m. instead of 5 to 9 p.m., E.S.T. Wolf reports them on 15200 kc. and 11870 kc. On according to time-table. (Gallagher).

A NEW YORK DX ACE

Meet Irving Cohen, pictured in his DX corner. He is a member of the 6000 to 12500 Mile Club, with twenty veris over 6000 Miles.

W2XAF, Schenectady, N. Y., 9530 kc., reported heard daily 10 p.m., E.S.T. (Azevedo). Heard by Wolf according to time-table.

W1XK, Springfield, Mass., 9570 kc., reported heard daily 10 p.m. (Azevedo). Piorko reports hearing them on 11790 kc. also. Heard by Wolf according to time-table.

W2XAD, Schenectady, N. Y., 15330 kc., reported heard daily p.m. (Azevedo.) Observer Devaraj reports hearing this station at 8:30 a.m., E.S.T. on 19.56 m. Heard by Wolf according to time-table.

W3XAL, Bound Brook, N. J. 17780 kc., reported heard daily 4 p.m., E.S.T. (Wolf, Azevedo). On according to time-table.

W10XDA, Schooner Morrisey, 14320 kc., reported heard 6 p.m., E.S.T. (Partner).

KKZ, Bolinas, Calif., 21.91 m. Relay to Hawaii 9-10 p.m., E.S.T. Sept. 12. (Atherton).

KKW, Bolinas, Calif., 13780 kc., heard relaying NBC Programs 9:40 p.m., E.S.T. (Alfred).

KKQ, Bolinas, Calif., 11950 kc., heard 12:20 a.m., E.S.T. (Alfred).

W3XL, Bound Brook, N. J., 17310 kc., reported heard Sunday 8-9 p.m., E.S.T. (Howald). Heard by Partner 4-7 p.m., E.S.T., Sunday.

W8XAL, Cincinnati, Ohio, 6060 kc., reported heard 12:08 a.m., E.S.T. (Azevedo).

XECR, Mexico City, Mexico, 40.6 m., reported heard 7 p.m., E.S.T. (Coover). Sundays, 7-8 p.m., E.S.T. (Roman).

XB5Q, Mexico, D. F., 11000 kc., reported heard 8:15-10:30 p.m., E.S.T., irregular. (Lake).

XEWI, Mexico City, Mexico, 11900 kc., heard with special programs August 30, 1-2 a.m., and Sept. 8, 10-11 a.m., E.S.T. (Gallagher).

XEUW, Vera Cruz, Mexico, 6020 kc., reported heard as late as 2:40 a.m., E.S.T (Alfred).

Central America

CO9JQ, Camaguey, Cuba, 8665 kc., heard 5:30-6:30 p.m. and 8-9 p.m., E.S.T., daily except Saturday and Sunday (Hynek).

CO9WR, Sancti Spiritus, Cuba, 6250 kc., heard 1:15 p.m., E.S.T. (Westman).

COCQ, Havana, Cuba, 9750 kc. (from veri), 7 a.m.-12 midnight (Azevedo) relays CMQ. Slogan "La Casa de los Medio-La RCA Victor." Observer Foshay reports the frequency as 9800 kc. Heard by Coover, Markuson, Edlin. Heard irregularly 4-12 M. by Horwath. Power 4kw. Address: Calle 25 No. 445 (from verification). Will verify (Hartman, Alfred, Fallon, Dressler).

COCX, Havana, Cuba. 11435 kc., daily 7 a.m.-10 p.m. (from announcement). (Howald, Anca, Betances.) Slogan: "Cigaros y Tobacos La Corona," "La Radio Philco." Observers Wolf, Fallon, Foshay and Sahlbach report the frequency as 11500 kc. Relays CMX (Alfred). Heard by Partner, Beyers, Sholin, Markuson. Heard by Sahlbach, 5:45-11 p.m., E.S.T., regularly. (Stabler, Atherton.) Dressler reports them on 11250 kc. and sometimes to 11400 kc. Imitates trams, whistles, guns, etc. Heard by DeLaet calling W9VWZ, 20 meter amateur and asking for reports. Horwath reports them on 11423 kc. irregularly, 3-12 p.m. Address: Apartado 32. Can be identified by 4 chimes before station call and by a clock striking the hours in the background. Edlin reports them on 11450 kc. Heard by Gallagher. Andrews reports this station owned by Larin of Havana and operated by Art Miles an amateur on 11570. Testing with 2000 watts (Verbrugghe). Partner reports their schedule as Sunday 6-9 p.m., Monday and Friday 7 p.m.-1 a.m., Thursday and Saturday 7-11 p.m., E.S.T. Pilgrim reports hearing them on 11560 kc., 1-3 a.m., daily. E.S.T. Heard by Putnam on 3 of the above mentioned frequencies (Lopez, Leary, Silvius).

COCO, Havana, Cuba, 6010 kc., heard daily, 8 p.m., E.S.T. (Azevedo).

COCH, Havana, Cuba. 25.75 meters, reported heard 2-15-4 p.m. (Hamilton). Observers Wolf, Azevedo and Atherton report this station on 9428 kc., heard from 8:30 p.m., E.S.T., on regu-

larly. Observer Coover reports this station on 31.8 meters, heard at 7 p.m., E.S.T. De Marco reports COCH on 11500 kc., on at 7 a.m. 3 p.m., E.S.T. Address: General Broadcasting Co., Calle B., No. 2 Vedado, Havana, Cuba. Heard according to time table.

HIN, Trujillo, D. R., 11190 kc. Heard 6:15 p.m., announce in English (Hamilton). 11280 kc., according to Edlin, Reilly and Shamleffer, who also reports that the station is owned and operated by the Dominican Political Party. Usually on about 4-5 p.m., except Sunday. Announce in French, Spanish and English. Will verify. Observer Westman reports this station on 6496 kc., on from 4:15-4:45 p.m., Saturdays. Observer Alfred reports the frequency announced as 11290 kc. Slogan: "La Voz del Partido Dominicano." Schedule 12 N.-2 p.m., and 7:30-11 p.m. Daily on 11280 kc. at 4:30-5:30 p.m., according to Dumas, Halverson and Betances. Observer Sahlbach reports HIX on 6250 kc., heard 7:30 p.m. Observer Harris reports them on 26.6 meters, 5-6 p.m., and 48.5 meters at 12 noon? 2 p.m., and 7:30-9:30 p.m. on 6245, according to McKay, Atherton, Betances. Address: P. O. Box 48, Ciudad Trujillo, D. R. (Scala, Putnam, Leary, Augustine). According to Halverson they are on 11740 kc. According to a "veri" the frequencies are 11280 and 6243 kc. Power 750 watts.

HI1J, San Pedro de Macoris, D. R., 5865 kc., heard 6:38 p.m. (Azevedo).

HI8Q, Trujillo City, D. R. Betances reports they have moved from 6240 to 6260 kc. and from 6260 to 6395 kc. Slogan: "Emisora Carta Real."

HIT Trujillo City, D. R., has a harmonic on 13280 kc. (Partner).

HIX, Trujillo City, D. R. On 12262 kc. for special programs and verifies (Partner).

HI1S, Puerto Plata, D. R., heard irregularly 7:20 p.m. (Azevedo).

HI5N, Santiago de los Caballeros, D. R., 6135 kc., heard 8:35 p.m. (Azevedo).

HIG, Trujillo City, D. R., 6280 kc., heard 7:30 p.m. (Azevedo, Lopez).

HIZ, Trujillo City, D. R., 6310 kc., heard 6:10 p.m. (Azevedo).

HI3C, La Romana, D. R., 6750 kc., announced frequency, heard 12:45-3:20 a.m. (Alfred). Alfred reports then on 6730 kc., 12:30-6:30 p.m., E.S.T., daily. Power: 50 watts. Slogan: "La Voz de la Feria"; will verify.

HH2S, Port-au-Prince, Haiti, 5915 kc. Schedule announced as 6-9 p.m., E.S.T. Except Sundays (Stabler).

HH3W, Port-au-Prince, Haiti, heard on 31 meter band and about 6325 kc. or 6340 kc. (Betances, Sahlbach, Hynek). Heard on 9595 kc., 1-2 p.m., 7-8:30 p.m., E.S.T.

HRD, La Ceiba, Honduras, 48.12 kc., heard 10 p.m., E.S.T. (Coover). On 6235 kc., off at 11 pm. (Lopez). Slogan: "Emisora Atlantida la Ceiba Honduras."

TGW, Guatemala City, Guatemala, 9450 kc., heard 9-12 p.m., E.S.T. (Stabler, Lopez).

TG1X, Guatemala City, Guatemala, 9450 kc., heard 12 mignight-5 a.m., E.S.T., Sundays. (Alfred).

YNLF, Managua, Nicaragua, 9655 kc., heard 10-10:30 p.m., E.S.T. "La Voz de Nicaragua" (Alfred).

TI4NRH, Heredia, Costa Rica, 9685 kc., heard 7-10 p.m., E.S.T., and later (Sahlbach). Heard by Edlin on 9670 kc. 11:30-12 midnight. Heard daily 8-9 p.m. and 10:30-11 p.m., E.S.T. (Betances). Alfred reports them on about 9560 kc. 9:30-10 p.m., E.S.T. Heard by Stabler. Heard 9:30-10 p.m., E.S.T., on 9559 kc (Alfred)

TIPG, San Jose, Costa Rica, 6410 kc., heard 7:15 p.m. (Azevedo). Alfred reports hearing them on old frequency Sept. 4. Heard 6-11:30 p.m., E.S.T. (Stabler). Partner reports hearing them on 9550 kc., same schedule as time table.

TI2PG, San Jose, Costa Rica, heard on 9565 kc. (Styles, Partner, Hartman, Verbrugghe, Truzuskowski).

TIGPH, San Jose, Costa Rica, 5830 kc., heard 10:30 p.m., E.S.T. (Azevedo).

TITA (or TICA), San Jose, Costa Rica, 13000 kc., heard 8-11 p.m., except Sundays. Sundays, 8-9 p.m. (Sahlbach).

TIVL, San Jose Costa Rica, 6990 kc., evenings irregularly (Betances). Slogan: "La Voz del Morazan."

TI8WS, Punta Arenas, Costa Rica, 7550 kc., 6-12 midnight, E.S.T. (Hynek).

HP5J, Colon, Panama, 9590 kc. The English announcer is Mr. George Williams. He broadcasts the only English news in Central and South America at approximately 6:40 p.m., E.S.T. News is introduced by Sousa's "Black Horse Troop." Station opens and closes with playing of "Disciplina, Honor and Abregacion." Evening schedule 6:40-10:30 p.m., E.S.T. The Spanish announcer is Nacho Valdez (Williams, Billinghurst, Andrews).

South America

HJ1ABE, Cartagena, Colombia, 9500 kc., 11 a.m.-1 p.m. and 6 p.m.-10 p.m., E.S.T. (Azevedo). Slogan: "La Voz de los Laboratorios Fuentes." New Collins 202A transmitter. Special program on every Monday night, 9:30-10:30 p.m., E.S.T., sometimes broadcast from 7 a.m.-9 a.m. (Foshay). On 31.38 meters (Coover, Al-

The DX Corner

(Short Waves)

(Continued from page 365)

fred). Frequency 9750 kc., according to Reilly, irregularly 8 a.m.-11 p.m., E.S.T. Markuson reports them on 6115 kc., heard daily until 10:45 p.m. An I.R.C. must be sent with reports before QSL card will be returned. Heard by Wolf according to time table. Also heard by Gallagher.

HJ1ABP, Cartagena, Colombia, 9600 kc., from veri, daily, 6:45 a.m. (Azevedo). Power: 1 kw. Will verify (Coover). Heard until 11 p.m. (Hartman). Slogan: "La Voz de Cartagena" (Piordo). Heard according to time table (Wolf). Lopez heard it from 6-11 p.m., E.S.T.

HJ4ABE, Medellin, Colombia, 5930 kc., heard until 11 p.m. (Markuson).

HJ1ABA, Barranquilla, Colombia, 9540 kc., heard 8:30 p.m., E.S.T. (Alfred). Silvius reports hearing them on 5930 kc.

HJ1ABC, Quibdo, Colombia, 6000 kc., heard 10:30 p.m., E.S.T. (Azevedo).

HJ3ABH, Bogota, Colombia, 6012 kc., heard 10:35 p.m. (Azevedo). Slogan: "La voz de la Victor."

HJ1ABJ, Santa Marta, Colombia, 6020 kc., heard 9:15 p.m. (Azevedo).

HJ1ABG, Barranquilla, Colombia, 6042 kc., heard 8 p.m. (Azevedo). Slogan: "Emissora Atlantica." Observer Foshay reports increased power. 11 a.m.-1 p.m. and 6 p.m.-12 midnight, E.S.T. Also frequency as 6040 kc. Gallagher reports a special program Sept. 1, 12-1 a.m.

HJ3ABD, Bogota, Colombia, 6050 kc., 6 p.m.-11 p.m., E.S.T. (Azevedo). Observer Foshay reports frequency as 6020 kc.

HJ4ABB, Manizales, Colombia, 6105 kc., heard daily 8:30 p.m., E.S.T. (Azevedo).

HJ3ABX, Bogota, Colombia, 6128 kc., 6 p.m.-11:30 p.m. (Azevedo and Alfred). Slogan: "La Voz de Colombia." Observer Foshay reports the frequency as 6200 kc.

HJ4ABU, Pereira, Colombia, 6150 kc. (from veri). "La Voz de Pereira" (Betances). 7-8 p.m., except Sundays.

HKV, Bogota, Colombia, 8795 kc., irregularly, 8:30 p.m.-12 midnight on Friday (Cindel).

HJ4ABA, Medellin, Colombia, 11710 kc., heard 10-11 a.m., E.S.T. (Lowe).

HJ4ABD, Medellin, Colombia, 5940 kc., new frequency, formerly 5760 kc. (Gallagher, Betances). Slogan: "La Voz de Catia." Heard by Lopez on 5700 kc., 9-11 p.m., E.S.T.

HJ2ABC, Cucuta, Colombia, 9580 kc. Gallagher reports this station overmodulates and spoils its own broadcasts. Partner reports they have moved from 9570 kc. to 9585 kc. with increased power same schedule.

YV1ORSC, San Cristobal, Venezuela, 5720 kc., heard 7 p.m., E.S.T. (Azevedo).

YV5RMO, Maracaibo, Venezuela, 5850 kc., heard 6:45 p.m. (Azevedo). Heard from 8-10 p.m. (Stabler).

YV8RB, Barquisimeto, Venezuela, 5900 kc., heard daily, 5:50 p.m. (Azevedo).

YV7RMO, Maracaibo, Venezuela, 6070 kc., heard 8:10 p.m. (Azevedo). Slogan: "Radiodifusora Maracaibo."

YV3RC, Caracas, Venezuela, 6160 kc., heard 5:15 p.m., E.S.T. (Azevedo). On 6155 kc. according to Partner who reports them slightly off the assigned frequency.

YV6RV, Valencia, Venezuela, 6520 kc., heard daily, 6:22 p.m., E.S.T. (Azevedo).

YV12RM, Maracay, Venezuela, 6300 kc., heard 7 p.m. (Azevedo). Heard Mondays, 9-10 p.m. (Alfred). Slogan: "La Voz de Aragua."

YV2RC, Caracas, Venezuela, 5800 kc. Heard as per time table. Slogan changed to "Radio Caracas." (Cindel, Alfred).

YV9RC, Caracas, Venezuela, 6400 kc., irregularly, 9-12 p.m. (Gallagher).

VP3BG, Georgetown, British Guiana changed to 6300 kc. (Sahlbach).

VP3MR, Georgetown, British Guiana, 5969 kc., heard 4:56 p.m., E.S.T. (Azevedo). Betances reports they have moved to 6010 kc. (from announcement). Sahlbach reports them on 6200 kc.

HC2JSB, Guayaquil, Ecuador, 9510 kc., daily, 6:20-11:20 p.m., E.S.T., except Sundays (Sahlbach, Lake).

HCK, Quito, Ecuador changed to 3750 kc. Mondays 8:30-10:30 p.m., E.S.T. (Sahlbach).

HCJB, Quito, Ecuador, 8948 kc., except Monday, 12 noon-2 p.m., 6-10 p.m., E.S.T. Slogan: "La Voz de Los Andes." Also on 4107 kc., same time "Broadcasting Provincial." Station address: Director Clarence W. Jones, Casilla 691, Quito, Ecuador (Jones).

PRADO, Riobamba, Ecuador, 6618 kc. Thursday schedule, 9:30-11:30 p.m., E.S.T. (Alfred).

OCI, Lima, Peru, 10970 kc. Calls Bogota, Colombia evenings (Hynek).

OCJ, Lima, Peru, 10970 kc., heard testing with music Sept. 6, 1:30 a.m., E.S.T. (Gallagher).

A MASSACHUSETTS OBSERVER
Stanley Ormsby of Worcester, Mass., greets fellow listeners from his Listening Post. He is a stout supporter of RADIO NEWS *as the picture indicates.*

PRF5, Rio de Janeiro, Brazil, 9500 kc., heard daily, 5:15 p.m., E.S.T. (Azevedo). Heard 4:45-5:45 p.m. by Edlin and Smith.

CEC, Santiago, Chile, 10670 kc., heard daily, 7:10 p.m., with a short talk, then phone till about 7:30 p.m., E.S.T. (Alfred). Heard on 9545 kc., daily 7-8 p.m. (Lake).

CB960, Santiago, Chile, 9600 kc. Heard Sept. 12, 11 p.m.-1 a.m., with special program to the NNRC. Address: P. O. Box 1343. Slogan: "Radio Pilot." (Alfred).

LRU, Buenos Aires, Argentina, 15290 kc., daily, 3 p.m., E.S.T. (Azevedo). Heard daily, 8 a.m.-midnight (from a veri) (Markuson), on 19.6 meters (Bourne).

Africa

Radio Tetuan, Spanish Morocco, 43.04 m., heard daily at 4:15 p.m., E.S.T., with Spanish war news (Smith).

IUG, Addis Ababa, Ethiopia, 15450 kc., reported heard 9:30-10:15 a.m., E.S.T. (Howald).

SU1CH, Cairo, Egypt, wishes it known that his station is a private affair and not in any way connected with a network. (SU1CH wishes to have this published.) (Gaiser.)

SUZ, Egypt, 13830 kc., reported heard occasionally on their regular schedule (Andrews).

EAJ43, Tenerife, Canary Islands, 10350 kc., reported heard irregularly around 2:15 p.m., E.S.T. (Azevedo). Heard by Sahlbach on 10715 kc. at 7 p.m., E.S.T. News from Spanish rebels, 20 kw. (Andrews).

CR7AA, Lourenco Marques, Africa, 6134 kc., reported Sundays, 8-11 a.m., E.S.T. (Westman).

ZSS, Capetown, South Africa, 18890 kc. (Andrews).

VQ7LO, Nairobi, Kenya, East Africa, 6080 kc., reported heard Sundays noon and Tuesdays, 9 a.m., E.S.T. (Dailey).

Tananarive, Madagascar, 6000 kc., 400 watts, reported heard Mon. 10-11 a.m., Tues., Wed., Thurs., Fri., Sat., 12-15 a.m.-4:30 a.m., 10-11 a.m., Sun. 2:30-4 a.m., E.S.T. (Station Manager).

Oceania

KKH, Kahuku, Hawaii, 7520 kc., used again for regular Monday evening program to the CBS, 11:30-midnight. Also on early mornings 12:30 a.m., E.S.T., with test programs (Dressler, Alfred).

KIO, Kahuku, Hawaii, 11680 kc., reported heard 12:45 a.m., E.S.T. (Alfred). Relaying KGMB. Gallagher reports them on 11710 kc., heard testing Aug. 24, 8:30 p.m., E.S.T., heard with special program for Idaho, 12:30-1 a.m., E.S.T., Aug. 27.

KKP, Kahuku, Hawaii, 16030 kc., reported heard Wednesdays 12:30-1 p.m., E.S.T., with program for the States. Heard Monday, 11:30-12 p.m., E.S.T. Used for point to point transmissions (Wolf). Relays KGMB, Tuesdays, 12:30-1 a.m., E.S.T. (Gallagher).

VPD, Suva, Fiji Islands, 12075 kc, off the air (Sholin, Partner).

VPD2, Suva, Fiji Islands, 9540 kc., heard relaying ZJV, 5:30-8 a.m., E.S.T. (Alfred, Andrews). Daily except Sunday (Kemp, Markenson, Sahlbach, Reichardt). Reported heard 4:30-7 a.m., E.S.T. (Partner).

VK3LR, Melbourne, Australia, 9580 kc., reported heard 2:53 a.m., E.S.T. Azevedo reports this to be a hard catch. Heard by Observer Smith testing and calling HSI, Bangkok at 12:35 p.m. on 31.32 meters.

VK2ME, Sydney, Australia, 9590 kc., reported heard Sundays 1:30 a.m., E.S.T. (Azevedo). On 31.28 m. Observer Devaraj reports hearing them Sundays, 5-8:30 a.m., E.S.T.

VK3ME, Melbourne, Australia, 9501 kc., reported heard best at 6:30 a.m., E.S.T. (Fallon).

VK6ME, Perth, West Australia, 9590 kc., reported heard testing around 3-6 a.m., E.S.T., irregularly (Partner). Address: Amalgamated Wireless, Perth, West Australia.

ZLT, Wellington, New Zealand, 11050 kc., reported heard irregularly 2-3 a.m., E.S.T. (Silvius).

Readers Who Are Awarded "Honorable Mention" for Their Work in Connection with This Month's Short-Wave Report

Albert Pickering, Edward DeLaet, H. Giese, M. de Brun, Walter E. Bishop, Harry J. Potthoff, Thomas P. Jordan, Ralph Clarke, Clayton D. Sands, Robert Mugnet, Werner Howald, N. C. Smith, Juan Santos, Arthur B. Conver, Frank Driscoll, R. D. Stewart, George Pasquale, Morgan Foshay, E. H. Wordsworth, Harry Lueth, Robert G. Billinghurst, S. Gaskell, George C. Sholin, Grace M. Beck, R. W. Sahlbach, A. Petitjean, Frank W. Edlin, Harry Wolf, J. N. Street, Virgin L. Gossett, Edward DeLaet, Alfred J. Stansfield, Fletcher W. Hartman, Wm. D. Watkins, Morton D. Meehan, Jose L. Lopez, R. G. Summers, Paul C. Bird, Frank Andrews, G. C. Gallagher, P. Piorko, Fred W. Alfred, E. J. Dailey Jr., Byron Silvius, M. J. Markuson, H. Kemp, Fred Atherton, J. V. Trzuskowski, Richard Verbrugghe Jr., Anton J. Cindel, Manuel E. Betances, Jerry M. Hynek, George L. Loke, J. Wendell Partner, Albert Augustine, Harold P. Leary, R. N. Putnam, Leon Stabler, Fred C. Lowe, E. Scala, Jr., Kenneth Dressler, A. F. Dittmann, E. L. Frost, G. Hampton Allison, Thomas Fallon, C. W. Bourne, Robert F. Gaiser, A. B. Baadsgaard, Fred A. Pilgrim, Caleb A. Wilkinson, M. F. Mert and Bob Meade, Eduardo Rudea, Jr., W. Reichardt, Louis J. Horwath, Lowell Halverson, Ethel W. Lee, Ed McKay, F. T. Reilly, G. L. Harris, G. T. Beyer, Ellsworth Dumas, C. Roman, S. G. De Marco, R. Shamleffer, L. E. Williams, H. Westman, L. C. Styles, Augusto Anca, Arthur Hamilton, and C. R. Davaraj.

Important Notice for Radio Beginners

Reprints of the five installments of the Beginners Series are included in the 1937 Radio Data Book which is given free with a subscription for 5 issues of RADIO NEWS at $1. (Canada & Foreign, $1.25.)

Listeners who tuned to 5000, 10,000 or 15,000 kc. between August 29 and September 12 heard a station emitting a musical note, night and day, without any pause or announcement. This was station WWV at Beltsville, Md., and the musical note was the standard "A" whereby all musicians tune their instruments. The test was arranged by the National Bureau of Standards at the request of musical organizations and for the benefit of musicians, musical instrument manufacturers, piano tuners and others. If successful, regular transmissions of the standard pitch may be arranged.

WHAT'S NEW IN RADIO

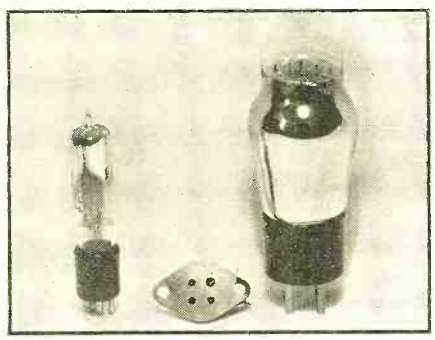
WILLIAM C. DORF

Beam-Power Tube Used in New Table Receiver

This attractive table-type set made by the General Electric Co., utilizes the following ten tubes: three 6K7's, one 6A8, one 6J7, one 6H6, one 6F5, one 6C5, one 6L6 and one 5Z4. It has a tuning range from 500 to 18,000 kc. and is equipped with the new "Focused Tone" tuning development, silent tuning and many other new features.

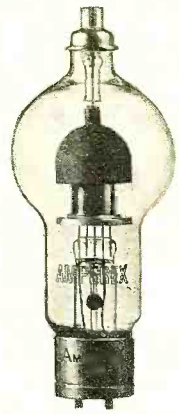
Tiny European Tubes

The Winchester Company, agents in the United States for the English "Hivac" tubes, supplies the information that these midget tubes are now available in five different types, comprising a triode detector, a multi-grid pentode, a screen grid tube with a mu of 360, a special audio power tube and the type XL shown in the illustration. For comparison in size, it is shown with the standard type 30 tube, right, the illustration also shows the special, small 4-prong socket the tube employs. Principal operating specifications of this tube are as follows: filament 2.0 volts, filament current 0.06 amps., plate volts 100 max., amplification factor 12, overall length 3 inches and overall width ⅝ inch.



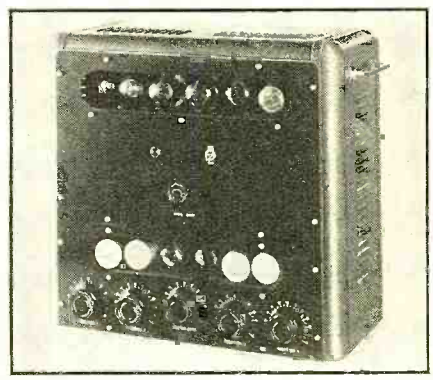
New Rectifier for Amateurs

The tube illustrated below is the new mercury vapor rectifier type 575A announced by the Amperex Electronic Products, Inc. It is an intermediate rectifier planned to fill the gap between the 872A and 869A. Filament 5 volts, current 10 amps., overall length 10½ inches, maximum diameter 3⅛ inches, base standard 50 watt. Maximum ratings. For operation at supply frequency up to 150 cycles and ambient temp. range of 15°-50° C., peak inverse voltage 15,000 volts, peak plate current 6 amperes, average plate current 1.5 amperes, average tube voltage drop, 10 volts.



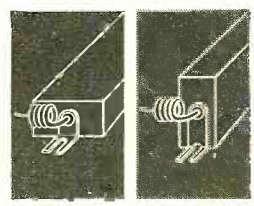
12-Tube Amplifier With New Beam-Power Tubes

The Webster Company announces the model 4P-60, 12-tube amplifier, designed to deliver an undistorted power output of 60 watts. The specifications of this new compact sound system are as follows: gain 143 db., one to four position input, can handle from 1 to 10 permanent magnet type speakers and has a universal tapped output impedance circuit. The tube equipment comprises: four 6C6's, two 6A6's, one 76, one 6E6, two 6L6 beam-power tubes, and one 83 and one 5Z3 rectifiers.



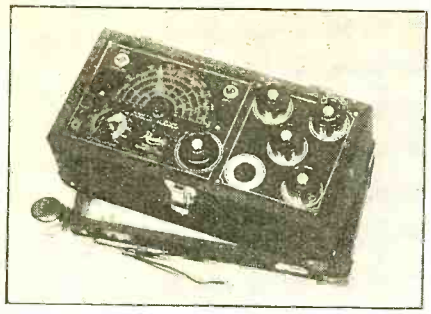
Handy Flexible Condenser Mounting

The Solar "Little Giant" dry electrolytics are now available with an adjustable mounting lug at each end of the container permitting easy and convenient mounting of the condensers in any position. Although the connection wires are generally of sufficient support for these midget condensers this new style of "Flex-mount" takes care of tight corners and difficult installations where it is advisable to mount the condenser more rigidly.



Signal Generator with Plug-in Coils

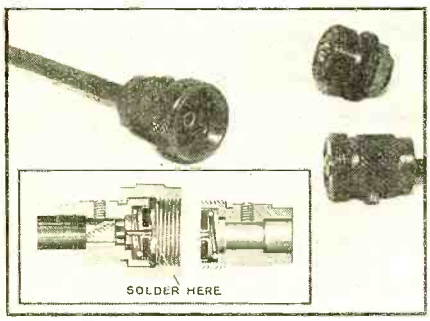
The Readrite "Ranger-Examiner" direct



reading, all-wave signal generator uses individually calibrated plug-in type coils for each of the five frequency bands from 100 to 18,000 kilocycles. Each coil is calibrated by an exclusive method of peaking with a trimmer condenser built as an integral part of the coil. Guaranteed accuracy is within one per cent for broadcast and intermediate bands; three per cent for short-wave bands. Attenuation and stability are outstanding features. Strong signals, both modulated and unmodulated, are furnished.

Cable Connector

Here is a new all-metal coupling unit introduced by the Bruno Laboratories which permits instant connection or dis-



connection of two single-conductor shielded cables. A reference to the cross-section drawing at the bottom of the illustration clearly shows the positive self-wiping connection is made by simply holding the two halves together and tightening the threaded collar. The contact is maintained by two strong spring washers which are held under pressure when the two parts comprising the connector are screwed together. The connector itself is finished in gunmetal and can accommodate cables 5/16-inch in diameter or less. The odd part shown in the photograph is one available for mounting on a chassis or cabinet where detachable cables are to be employed.

New Microphone Stand Lends Professional Appearance

The Federal Microphone Stand Mfg.

Co., announces a new 3-section portable floor microphone stand. Its minimum height is 27½ inches and with all sections ex-

(*Turn to page* 383)

The "Ham" Shack

(*Continued from page 341*)

consideration of additional amateur 'phone frequencies within the present allocations is *all off!* As reported previously in these columns the board of directors of the American Radio Relay League voted, last May, to take up the question before the commission. A hearing was granted and the question was to be considered in detail at a hearing scheduled for October 20. The commission's announcement calling off the hearing follows:

"On June 9, 1936, the Federal Communications Commission ordered that a public hearing be held before the Telegraph Division, beginning at 10 a.m. on October 20, 1936, for the purpose of assisting the commission in determining the action to be taken on the request of the Board of Directors of the American Radio Relay League that the Commission's rule 377 be amended to permit Class A amateur radiotelephony operation (type A-3 emission) on the 3850 to 3900 kilocycles in addition to the present 3900 to 4000 kilocycle band (F. C. C. Docket No. 4010).

"The Commission has been formally notified that the American Radio Relay League desires to withdraw its request. The Commission does not have pending before it any request of any other party to be heard in this connection. Therefore, the Telegraph Division has today directed the cancellation of the hearing and the discontinuance of all proceedings in connection with Docket No. 4010."

The announcement is dated September 22, 1936.

Calls Heard

By Robert Muguet. 58 Rue de Verdun á Meudon (S. et O.), France, on 20 meter 'phone: CO2HY, CO2KY, CO2QQ, CO2SV, CO8VZ, FA8BG, HI7G, KA1BH, LU4BA, LU6AP, NY2AE, PY1DK, PY2BA, PY2BK, PY2CK, PY2EG, SU1CH, SU1SG, SU1TM, TI2FG, VE1BA, VE1CM, VE1CR, VE1EF, VE2GA, VE2HE, VE2HY, VE3BB, VE3BF, VE3DF, VE3MB, VE3VR, VE3YB, VK2NV, VP3BG, VP6YB, VO1I, W1ADM, W1BKY, W1BOI, W1BQQ, W1ZE, W1CRW, W1DEC, W2DA, W2DH, W2EDW, W2GOG, W2HCE, W2JZZ, W2MG, W2ZB, W3BBB, W3BRA, W3BOP, W3BPC, W3CG, W3CPY, W3EKU, W3EWW, W3EZD, W3GBC, W3GBP, W3JFH, W3NF, W3PC and W3CK.

By Matthew Bills, 1151 Thirty-ninth St., Brooklyn, N. Y., on 20 meter 'phone: G5BJ, G5NI, G5MI, G5JO, G6XR, G6LK, G6QF, G6CW, SU1CH, F8MG, K6KKP, K6JLV, EA2BH, EA3VQ, EA7DA, EA7AI, CE1AR, HP1A, YV5AA, LU4BH, LU5CZ, LU8AB, HK3JB, VP4TH, VP9R, ON4VK, SM5SX, HH2B, NY2AE, VO1I, VO1J, XE1DC, XE1KQ, XE1G, XE1HH, XE2AH, HI5X, HI6O TI2RC, TI2AV, TI5JJ, W1OXDA, CO2SV, CO2WK, CO2WZ, CO2KY, CO2HY, CO2AU CO2JM, CO2LL, CO6OM, CO7HF, CO8YB, EI2J, CX2AK, VP3BG, TI2FG, YN1HS, F8DR, VO4Y, G2MV, G6DL, G6WU, XE2HF, CO2R, VE1CR, VE1DC, VE2HY, VE2WE, VE3DF, VE3WV, W4ASE, W5BMM, W6AM, W6KSO, W6LR, W6FYJ, W6DWE, W6MDN, W6ITH, W6ZH, W6DEP.

On 20 meter C.W.: I1TKM, YM4AA, HB9X, CP1AA, PY2GD, LY1ZB, K5AY, XE2C, VE5RM, PA0JMW, PA0LR, F8OL, F8RC, OK1KL, OK2RS, CM2AO, CM2AZ, CM7AB, D4AOO, D4XCG, D4TPJ, G5QA, G5GL, G5SS, G5QY, G5IQ, G5YQ, G6CO, G6DT, G6IR, G6XW, G6JBO, PY2CD, OK2HX, XE2N, CM2RM, CM2DO, K5AC, U1AP, OZ5M, OZ7ON, PA0YO, PA0MQ, G2ZY and G5BJ.

By H. Kemp, 250 Walnut Street, Waterbury, Conn., on 20 meter 'phone: VK2ABD, NY2AE, VK3IR, HI6O, VP6XB, PY2CK, G5NI, YN2HS, HI5X, VP4TH, EA1CK, VP3BG, HI1C, W7CEO, VK2AP, CT1CV, VK2EG, VE5BU, XE2LU and HP1A.

Microphone for GC-2 Portable Transmitter

A large number of inquiries have been received from readers asking for the maker's name of the microphone used with the GC2 portable transmitter described in the October issue of RADIO NEWS. Mr. Arthur H. Lynch, the author, takes this medium as a "QST" to advise that the Stromberg-Carlson Model 6 hand microphone provided fine results with this new portable unit.

The Ultra Skyrider

(*Continued from page 339*)

ability to pass a wide frequency band. The "Ultra" meets these seemingly impossible requirements by providing variable i. f. selectivity. In the tests it was found that in receiving clean signals from good m.o.p.a or crystal-controlled transmitters, the "sharp" position could be used to excellent advantage. In this position signals 1 degree apart on the band-spread dial could be readily separated (the average band-spreading is 20 kc. per degree) unless one or both were suffering from frequency modulation. Signals which badly interfered with one another on more ordinary 5-meter receivers were in many cases found to be not only completely separated on the "Ultra", but with an absolutely quiet space of as much as 10 or 15 degrees between them.

It is in the sharp position that the sensitivity is maximum also. At the Westchester Listening Post, (W2JCY) North Pelham, New York, for instance, 5-meter stations were heard from Connecticut, Massachusetts, New Hampshire, New Jersey, Pennsylvania and Georgia, which comes pretty close to establishing a record for consistent 5-meter DX.

In the "medium" position the band-pass is sufficiently wide to permit understandable reception of signals having a limited amount of frequency modulation. For instance most "linear" modulated oscillators are received in this position and also many of the more stable transmitters of the t.n.t. type, unity coupled, etc. The selectivity, while less than in the "sharp" position, is still much above the average.

In the "broad" position the selectivity is still above that of superregenerative receivers and superhets using resistance-coupled i.f., and all but the very worst frequency-modulated signals can be received.

From the foregoing discussion it will be evident that this idea of variable selectivity is an excellent and highly effective one. In the "sharp" and "medium" positions, interstation q.r.m. becomes a thing almost unknown. Furthermore, automobile ignition noise is reduced so effectively by the noise silencer circuit that much of the noise which mars reception when using an ordinary superhet is completely absent and noise of even an R9 level on the average u.h.f. superhet is reduced to negligible proportions.

One point which will interest many hams is the advantage of such a receiver as this in working "duplex". For instance, the tests showed that with the receiver in the "sharp" position, duplex q.s.o.'s were possible with other stations operating 200 kc. from the frequency employed for the crystal controlled, 60-watt transmitter at W2JCR. Further than this, with the transmitter on and modulated, the receiver can be tuned within 100 kc. of the transmitting frequency with absolutely no interference. To duplex this close to the transmitter frequency requires stable signals at both ends, of course, but in any event this receiver certainly opens up new possibilities so far as duplex operation is concerned.

As with other ultra high-frequency receivers, a regular 5-meter antenna produces the best results on 5, and is also highly effective on 10 meters. Also for 10 meters, and for the higher wavelengths a regular "L" type can be used effectively.

Aviation Radio

(*Continued from page 335*)

shock excitation. A very slight glow was noticed lasting about three seconds. Since KGO power is only 7.5 kw., this would indicate that considerable indication would result over station KPO with a power of 50 kw. We hope to make such flights later. Meanwhile, flights were made over the Oakland Municipal Airport marker station at 1,000, 2,000, 3,000, 4,000, 5,000 and 6,000 feet at an indicated air speed of 90 m.p.h. and the signal was timed. No wind corrections were made for ground speed, since only a rough check on the field pattern and a check on receiver performances were all that was required on these flights. Full brilliance of both neon lamps was had on each test up to and including 6,000 feet. Results indicated that the field pattern was approximately normal for the marker station.

Altitude	Width of Field
1,000 ft.	2,600 ft.
2,000 ft.	5,000 ft.
3,000 ft.	6,000 ft.
4,000 ft.	7,500 ft.
5,000 ft.	5,000 ft.
6,000 ft.	4,000 ft.

When landing at the west end of the field, an indication was had at approximately 500 feet altitude at a distance of about 3,000 feet from the station. This showed small lobes at base of the main field pattern. These small lobes are of no consequence because of their low angle and weak fields. For practical application, these radio markers would be installed at aural radio-range stations located at fields where aircraft make scheduled landings.

The pilot flying an aural radio range course at, for example, 4,000 feet altitude, "over the top" or under conditions of zero visibility, turns on the marker receiver when a few miles from the field. As his aural signals increase in intensity, he knows that he is nearing the station. When he is within ½ mile, the neon lamp flashes on and remains on until he has passed through the cone of silence and flown ½ mile on the opposite side of the station, thus giving him a positive visual indication to supplement the cone of silence, which is an area of reduced signal strength directly above the aural-range stations and used previously for locating the station.

After locating the radio-range station by the above procedure, the pilot knows his position in regard to the airport field. He then can make his approach to the field, coming down through a ceiling (providing the ceiling is 500 feet or more above the ground and visibility good underneath). If, however, the ceiling is lower than 500 feet and visibility is poor or zero, or there are dangerous obstructions below a 500-foot ceiling, he must have further aid to make a safe landing on the airport field.

This problem is now foremost in the minds of radio engineers in aviation service. Several systems have been developed to land aircraft by means of radio. The most promising system is that developed by the U. S. Bureau of Standards. Space precludes a complete discussion of the merits of this system, but following is a description of the system as installed at the Oakland Municipal Airport.

First let us consider the following requirements of such a system:

1. The system must indicate to the pilot the position of the aircraft in three dimensions; laterally, longitudinally, and vertically.

2. The system must be accurate and de-

pendable over a wide range of weather conditions and flying equipment.

3. Equipment on the aircraft must be simple to operate and the information received easily interpreted. (Preferably visual.)

4. Aircraft equipment must be compact, light, easy to install, conveniently located, easy to adjust and maintain, and the cost not prohibitive.

5. The equipment should be designed to operate in conjunction with existing radio facilities such as radio-range beacons and radio-marker beacons.

Component parts of the Bureau of Standards system are a runway localizing beacon, two marker beacons, and a landing beam. The runway localizing beacon (lateral control) gives the position of the aircraft with respect to the airport, keeping the aircraft directed to and over the desired landing runway. This component consists of a 200-watt transmitter of the visual radio-range beacon type, operating on a frequency of 278 kc. and feeding two multi-turn loop antennas. There are four courses radiating from this type of station which are normally 90 degrees apart. A goniometer is provided which will swing the courses through a sector of 40 degrees. Only one course is needed for the runway localizer beam and this one is oriented with the prevailing wind over the desired runway.

The regular radio range-beacon receiver (tuning 200 kc. to 400 kc.) used on the aircraft is modified, by the addition of a reed converter to change the 65 cycle and 86.7 cycle signals from reed to a dial type indicator and an automatic volume control is added if one is not already incorporated in the receiver. The vertical pointer of the combined instrument (see Figure 5) indicates the position of the aircraft left or right of the course. When landing, the aircraft is flown to keep the vertical pointer in center position. (See Figure 1.)

The two marker beacons (longitudinal control) give the position of the aircraft as it approaches the boundary of the airport field. These marker beacons consist of two simple low-power, radio-frequency oscillators and audio oscillators with power supplies. The antennas are horizontal and approximately 2,000 feet long, placed approximately 3 feet above the ground. To eliminate reflections from the ends (and setting up of nodes at intervals along these antennas) each antenna is terminated at each end with 600-ohm resistors. The radiated space patterns from these antennas are walls of radio signals extending upward, through which the aircraft passes when approaching the field on the localizer beam.

The radio frequency of these markers is 3105 kc. One marker beacon is located at the boundary of the field with the antenna parallel with the boundary line. The modulation of this transmitter is a 250-cycle tone. The other marker beacon is located 2,000 feet from the boundary line with the antenna parallel to the boundary. This transmitter is modulated with a 1250-cycle tone. (See Figure 2.)

The aircraft receiver for the two marker beacons is a simple grid-leak detector and one stage of audio, using the 200-volt dynamotor plate supply of the range beacon receiver. The antenna is a single (insulated) wire which may be taped to the leading edge of the aircraft's wing or taped to the bottom of the fuselage. The tuning and sensitivity of this receiver, when once adjusted, requires no further attention except service checks and maintenance.

The pilot making his approach on the localizer beam passes over the first marker 2,000 feet from the field boundary and hears the 1250-cycle tone in his headphones, which indicates his longitudinal position in regard to the field. As he passes over the boundary marker, he hears the 250-cycle tone indicating that he is over the field.

The landing beam (vertical control) is given by a horizontally-polarized, ultra-high-frequency beam which is directed at a small angle above the horizontal, providing a gliding path for the aircraft. This beam is oriented along the path of the localizer beam and extends out over the two marker beacons for a distance of several miles (see Figure 4).

The transmitter for the landing beam consists of a push-pull oscillator, employing two 500-watt triode tubes with 3,000 volts, 60-cycle a.c. applied to the plates. The output is 500 watts of radio-frequency modulated with a 60-cycle tone.

Power from the transmitter is fed through a parallel-wire transmission line to a directive antenna array consisting of three sets of horizontal ½-wave doublets placed vertically, ½-wave apart and ½-wave above the ground. This array is backed by a reflector array consisting of ½-wave reflectors placed ¼-wave from antennas.

The curvature of the landing beam is due to reflection from the ground and, of course, can be controlled by the amount of power fed to the antenna array.

The receiver on the aircraft comprises a grid-leak detector and two stages of audio-frequency amplification. The detector is untuned; a simple high-pass filter being used between the detector input and transmission line which is coupled to the horizontal antenna located slightly forward of the leading edge of a wing. The output of this receiver passes through a mechanical filter (tuned to 60 cycles) which provides freedom from static and other interference. This output is rectified and fed to the horizontal pointer of the combined instrument. (See Figure 5.)

The receiver is adjusted by placing the aircraft on the desired runway at the desired spot for landing and tuning the high-pass filter for a half-scale reading on the horizontal pointer. This gives a line of constantly received signal below the inclined axis of the beam, or marks out a landing path suitable for the aircraft and airport. The pointer, being at half-scale reading for this path, always represents the position of the aircraft in regard to proper vertical position for landing.

A study of this system will show that the important requirements first mentioned are met in very ingenious ways. Using the diagram in Figure 4 as a guide, we will now describe a landing by the above system.

The pilot is flying the regular aural radio-range course to the airport at an altitude of 4,000 feet. In his headphones he hears a 1,000-cycle monotone interrupted each 12 seconds by the identification signal of the radio-range station, indicating to him that he is on the proper course to the airport. He uses the manual volume control on his beacon receiver because the automatic volume control would not give him a proper cone of silence indication.

The aural signal increases in intensity indicating that he is nearing the station. When he is within ½ mile of the station, the neon lamp on his instrument panel comes to full brilliancy, warning him of his position. He then reduces the volume of the aural signal until it is just audible, permitting a good cone of silence indication.

As he is almost over the station, the aural signals build up in intensity, fade out, then build up again, indicating his passing directly over the radio range station. He then knows his exact position in regard to the airport field. Making a wide "timed" turn to the left, he flies for a pre-

determined time to get his position for the localizer beam.

In the meantime he has thrown a master switch which turns on all radio landing equipment on the aircraft. As he tunes in the localizer station, the vertical pointer on the combined instrument shows that he is to the left of the proper course. He then makes a wide left turn, maneuvering his aircraft until the vertical pointer is in center position, indicating that he is on the course directing him to the field and over the desired runway.

At this position the aircraft should be about five miles from the field and have about 4,000 feet altitude. The pilot flies his ship to keep the vertical pointer on center position. The ship then begins to lose altitude, and in a few seconds enters the landing beam. The horizontal pointer of the combined instrument begins to rise to center position. When the pointer is at the center or exactly horizontal, the pilot puts the aircraft into a glide keeping both vertical and horizontal pointers crossed on the bulls-eye in the center of the instrument.

The aircraft is now in proper vertical and lateral paths for the landing. Continuing on, the aircraft passes over the first marker located 2,000 feet from the field, indicated by the 1250-cycle tone in the pilot's headphones, thus giving him his longitudinal position. He now quickly checks his sensitive altimeter which should show an altitude of approximately 300 feet.

A few seconds later the pilot hears the 250-cycle tone in his headphones, indicating that he is over the boundary of the field. A quick check of his sensitive altimeter shows an altitude of 100 feet. He continues until his wheels touch the ground or until he sees the runway. There will be a few cases where the runway is obscured when the aircraft is within ten feet of the runway. If the runway is visible at 10 or 20 feet altitude, a normal landing with tail down can be made. If the runway is obscured, a wheel landing must be made or the aircraft allowed to settle on the field, or, common vernacular is, "mush in".

The reader will note that the use of ultra-high-frequencies is already established for aviation radio services. We may anticipate the use of these frequencies in the future for control of remote-communication receivers, student-flight instruction, airport traffic control, etc. Looking into the future, we see that this brings with it new radio equipment, new problems, and a new technique, offering abundant opportunities for the well-trained man in the aviation radio service.

Our experimental work with the ultra-high-frequencies at the Boeing School of Aeronautics has given many interesting results. This work, to date, has consisted largely of building small modulated oscillator transmitters. Frequencies used were 62 mc. (4.8 meters) and 66 mc. (4.5 meters).

On one trial very good results were obtained with a modulated oscillator employing two type 56 tubes coupled to a vertical antenna. This transmitter was used on the ground and a superregenerative receiver was installed on a plane. The receiver was connected to the regular plane transmitting antenna which is a mast extending up through the fuselage acting as a lead-in for two horizontal wires extending to the wing tips. With this combination, a good signal was had up to 15 miles distance and up to an altitude of 11,400 feet.

Only one dead spot was noticed, and this was almost directly over the airport with the plane in full sight. When the plane was out of sight behind the hangars, the signal remained practically constant. The

dead spot might possibly be explained by the fact that the vertical mast was acting as antenna on the plane and was shielded by the plane when directly overhead.

Frequency stability is the most important problem in ultra-high-frequency work. We find, as have others, that the use of parallel rods (or short-line control) offers the best answer to this problem for aircraft where weight is important.—C. L. Moser, *Radio Instructor, Boeing School of Aeronautics.*

"Hi-Fi" Receiver

(*Continued from page* 333)

condenser section. If conditions are such that greater selectivity is necessary, C13 may be replaced with a still larger value to allow more accurate alignment. Broad tuning, however, is desirable in this type of receiver and, for best quality, a slight misalignment is an advantage.

Delay action in this a.v.c. system is obtained by the voltage drop across the cathode biasing resistor of the 6B7. This applies a constant negative potential to the diode and reduces the circuit damping for weaker signals.

The power supply employs an 80 rectifier with condenser input. The peak voltage is too high to permit the safe use of an electrolytic condenser at this point so a 4 mfd., 800 volt paper condenser, C1, is specified. The type of condenser employed in this chassis is assembled in an electrolytic can. If desired, two condensers of lower voltage rating may be used in series to obtain the required peak voltage rating. The two remaining condensers in the filter circuit, C2 and C3, are 8 mfd. electrolytics.

Since a fine speaker is essential for best results from any high-fidelity receiver, the Philco type U-7 high-fidelity model is employed in this design. The output transformer is mounted on the speaker, and though designed for push-pull output tubes, the full primary winding closely meets the proper load requirements of the single 6B5. The 1450 ohm field winding likewise is suitable as the second section choke in the filter circuit.

The apparatus is assembled on a standard size drilled chassis which was really intended for a much larger receiver. However, it happened to be on hand and, though the layout is unsymmetrical, it serves the purpose very well. In the home in which this model is employed the chassis is installed in a nook and the speaker mounted in the wall so appearances are of no consequence. The tuning and volume control are operated by a flexible drive.

The coils and condensers are standard types, obtained from a mail-order house. The power transformer secondary is designed to give 375 volts each side of center tap at 90 ma. It has a center-tapped 6.3 volt 3 amp. winding and a 5 volt, 3 amp., winding for the rectifier tube. The choke is likewise designed to carry 90 ma. and is rated at 30 henries. The large 25,000 ohm bleeder resistor is an Electrad 50 watt type but a 20 or 25 watt one will be equally suitable.

The layout is indicated in the photograph. In wiring, keep the tuning condenser stator leads close to the chassis, likewise the antenna lead.

In operation, best results will be secured with a fairly long antenna, 75 to 100 feet. If interference is experienced, a .0001 mfd. fixed condenser may be inserted in series with the antenna lead. If still greater selectivity is desired, a wave-trap or antenna tuning device such as the Radio News Tenatuner, may be used to advantage.

New Dial Disk

(*Continued from page* 345)

employed was an L type about 80 feet long with a lead-in of 10 feet. All the important European, Central and South American stations were easily received with good volume. Australia was also logged. Reviewing the reports at this Post, the operators recall the excellent program received from station HAT4, Budapest, Hungary. The effectiveness of the automatic volume control and the fine reproduction were demonstrated by these tests.

Broadcast band tests were, unfortunately, handicapped on several occasions by heavy static. When conditions permitted, a number of Southern and Midwestern calls were logged. The receiver's selectivity and sensitivity were indicated when stations WLW, 700 kc., and WGN, 720 kc., were brought in without interference from WOR, the local on 710 kc. Also, WLS, 870 kc., and WWL, 850 kc., were heard with only a slight background trace of WABC, 860 kc.

The set was transported to the Westchester Listening Post about 20 miles from Times Square. At this station, L. M. Cockaday, Short-Wave DX Editor, assisted at the controls. Our log of short-wave stations was duplicated here with the addition of two Japanese calls; the Australian stations came in with greater signal strength and a number of additional South Americans were heard. The RCA double-doublet antenna system was employed.

The third check was conducted in an apartment house in the Bronx, New York City. This location was adjacent to two very busy thoroughfares and tests at first were marred by a great deal of ignition noise from passing trucks and man-made interference. A doublet antenna was erected with a 30-foot span each side of the matching transformer and a lead-in using a twisted pair 65 feet long. The new antenna minimized interference and was the answer here for considerably improved short-wave DX reception. It was no trick at all to receive the Europeans, South Americans, etc. Many amateur calls were brought in on the different bands, the 20-meter range naturally providing the distant calls. Airplane and police stations were received on their assigned bands; also some commercial experimental stations on the ultra-high-frequency range and several amateurs within range on the 5-meter band.

List of Short-Wave Stations Logged

Station	*Frequency*	*Location*
GSG	17790	Daventry, England
DJR	15340	Zeesen, Germany
W2XAD	15330	Schenectady, N. Y.
DJQ	15280	Zeesen, Germany
W2XE	15270	New York, N. Y.
PCJ	15220	Eindhoven, Holland
DJB	15200	Zeesen, Germany
GSO	15180	Daventry, England
GSF	15140	Daventry, England
RV59 (RNE)	12000	Moscow, U.S.S.R.
TPA3	11885	Pontoise, France
W8XK	11870	Pittsburgh, Pa.
W2XE	11830	New York, N. Y.
DJD	11770	Zeesen, Germany
GSD	11750	Daventry, England
CJRX	11730	Winnipeg, Canada
TPA4	11720	Pontoise, France
JVM	10740	Nazaki, Japan
EAQ	9860	Madrid, Spain
COCQ	9750	Havana, Cuba
HJ1ABP	9600	Cartagena, Col.
HH3W	9595	Port-au-Prince, Haiti
W3XAU	9590	Philadelphia, Pa.
VK2ME	9590	Sydney, Australia
HP5J	9590	Panama City, Pana.
GSC	9580	Daventry, England
W1XK	9570	Millis, Mass.
DJA	9560	Zeesen, Germany
DJN	9540	Zeesen, Germany
W2XAF	9530	Schenectady, N. Y.
RAN	9520	Moscow, U.S.S.R
GSB	9510	Daventry, England
HJU	9510	Buenaventura, Colom.

VK3ME	9510	Melbourne, Australia
XEFT	9505	Veracruz, Mex.
HJ1ABE	9530	Cartagena, Col.
COCH	9428	Havana, Cuba
HAT4	9125	Budapest, Hungary
CO9JQ	8665	Camaguey, Cuba
JVT	6750	Nazaki, Japan
CO9WR	6280	Sancti Spiritus, Cuba
HI8Q	6420	Trujillo, D. R.
HRD	6235	La Ceiba, Hond.
CJRO	6160	Winnipeg, Canada
YV3RC	6150	Caracas, Venezuela
COKG	6150	Santiago, Cuba
W8XK	6140	Pittsburgh, Pa.
COCD	6130	Havana, Cuba
W2XE	6120	New York, N. Y.
W3XAL	6100	Bound Brook, N. J.
W9XF	6100	Chicago, Ill.
HJ4ABE	6095	Medellin, Col.
CRCX	6090	Toronto, Canada
HP5F	6080	Colon, Panama
W9XAA	6080	Chicago, Ill.
YV2RMO	6070	Maracaibo, Ven.
W8XAL	6060	Cincinnati, Ohio
W3XAU	6060	Philadelphia, Pa.
HI9B	6050	Trujillo, D. R.
HJ1ABG	6042	Barranquilla, Col.
HP5B	6030	Panama City, Pana.
DJC	6020	Zeesen, Germany
COCO	6010	Havana, Cuba
CFCX	6005	Montreal, Canada
HP5K	6005	Colon, Panama
XECW	5975	Nantecam, Mexico
HJN	5970	Bogota, Col.
HRN	5910	Tegucigalpa, Hond.
YV2RC	5800	Caracas, Venezuela

Exposing "Gyps"

(*Continued from page 330*)

service charge and labor, $2.50. Seven dollars altogether.

Q. Very well, can you deliver it tomorrow morning?

A. I could not promise definitely—we can have it for you sometime tomorrow.

Q. We'd like to know just what time.

A. (Decided to check authorization.) I could call you. What is the address, please. (I told him.) And the phone number? (I gave it again.) What time would you like to have it delivered in the evening?

Q. Any time that's convenient for you.

A. I think I can have it between 5 and 6 p.m.

The serviceman arrived at 6:45 p.m. The writer and four witnesses were present. The following conversation took place.

Serviceman—This radio has lots of pep.

A. It ought to have . . . we've spent enough money on it.

Serviceman—Have you had it fixed lately?

A. Yes. New condensers were installed and the man who put them in says now there was something wrong with the speaker.

Serviceman—There was nothing wrong with the speaker. The output transformer was burned out and the coupling condenser blown. (Hooks up set and hands over the bill.)

Q. What guarantee do I get? I don't want to get hooked again.

Serviceman—That's the guarantee stamped on the bill.

Q. The guarantee covers "material and work" but the bill does not show any material.

Serviceman—We have the record of the parts installed. (Pulls out slip on which is written "output transformer $3.65, Coupling condenser $.85.) (Note! The condenser had been previously quoted at $.95.)

A. You have the record but I haven't. Write it on the bill.

Serviceman started to write it on the face of the bill—then changed his mind and wrote on the back of the receipt "output transformer" "coupling condenser." Then left.

The set was again removed from its cabinet and all parts checked in the presence of witnesses. No parts whatsoever had been replaced. Past masters of gyp practices, no small detail which would ex-

tract a dime from the public had been overlooked. Even the *2% municipal sales tax on the parts paid for, but not supplied, had been added to the bill!* (New York City tax collector please note).

To expedite matters, we decided to bring the set to the service man on succeeding tests rather than have him call. The next concern "E" had a sign over the door "Radio Service by factory-trained experts." We dropped in and were told that there would be no charge for inspection or an estimate, so we left the set. The next day we phoned and received an estimate of $2.50. The trouble, it was stated, was a short-circuit. We authorized the repair and called for the set three days later. Asked the serviceman what he had to do to fix it. "Replaced the voice coil," he said. "Write it on the receipt," we asked, and he did so, strangely enough, without hesitation. Brought the set back to the laboratory for examination. No voice coil "replaced," of course, but we did find the new 80 tube had been removed and a used 83 substituted. Took the 83 back and asked why he had changed the tube. Said a condenser was also short-circuited and it had blown the original tube. Asked for a new 80 but all he would do was furnish another used tube of a cheaper make. Re-examined the set—no condensers had been replaced.

Next, we wanted to try company "C" which had failed to send a serviceman at the appointed time on the first day of the investigation. The receiver was taken to a down-town store of this same cut-rate organization. Unfortunately, it was entrusted to the tender mercies of one of their salesmen who stated that the receiver was not worth fixing and should be traded in. We insisted on an estimate in accordance with their "free inspection" offer. Again the trouble was said to be a blown condenser. Apparently, this is a popular diagnosis among the "gyps". It would cost $5.00 to replace it and take 6 days. We authorized the repair and sent for the set at the appointed time. "Not ready," he said. "We are waiting for a special part." Two days later we tried again. "Still waiting for the special part," he said. We gave up. Sent down for the set which had now been in their possession for 9 days. Another employee now stated that it could be repaired in 24 hours but that he had had no authorization to go ahead and fix it. Our original salesman then appeared and repeated that he had authorization but could not have it fixed until they got the "special part." An argument ensued which may still be in progress. We don't know. We got the set back—no charge. It was in its original wrapping paper which had apparently not been removed. The conversation regarding the nature of the trouble and the $5.00 estimate was recorded by a stenographer listening in to our phone conversation. "Gyp" salesmen are paid a salary and a commission on set sales. Apparently they get no commission on service sales.

Figure 1 shows the relative costs of this simple repair job. The average cost of a

service call has been estimated at $1.30 based on a survey conducted by leading authorities. Based on this average, a fair charge for the job should be $1.50 to $2.00. We have taken an average at $1.75. The average price charged by these "gyps" is shown as $4.65 while that of the honest worker was $.75. We believe an undercharge is likewise bad. It is unfair to others.

Nothing in the foregoing should be construed as being derogatory to radio service companies in general which feature 50-cent service, free inspection and the like. Many such organizations get a sufficiently large volume of legitimately profitable business so that they can afford to take a loss on jobs of the type described in this article. Others, not so fortunate, are having a hard time to make both ends meet. The public in the past has not discriminated between the good and the bad, and many have suffered for faults of the few. One way to rebuild public confidence is to feature frank, straight-forward methods in all phases of the business. Our investigation shows that no "gyp" likes to give an itemized bill when he has charged for parts not installed. To do so is a criminal offense. Most legitimate concerns don't bother with itemized bills, either. Under the circumstances, it would seem desirable to feature a business-like bill as a definite, tangible means of assuring the public that they get what they pay for.

Offering a commodity at a loss in the hope of attracting trade is called "loss leader" merchandising. It is a practice which manufacturers fight continually since it ruins the sale, for the time being, of the particular article offered at the price it was originally intended to sell. Offering service on a "loss leader" basis is open to precisely the same objection and is basically one of the causes of the conditions described herein. The public feels that labor, which is after all the serviceman's main source of income, has little value. To get a fair price for labor, many have to charge high prices for parts; others, as we have seen, to charge for parts not installed. Labor such as giving estimates and installing aerials must be skimped or a loss results. Thus sloppy jobs became so prevalent that the New York Fire Department has had to order thousands torn down.

In an article to follow this subject will be covered in further detail and will include suggestions to the public to help them safeguard themselves against such practices as are described above.

Testing a Super

(*Continued from page* 349)

at the outer edge, with a scale length of 12 inches. This wide-spread arrangement permits accurate reading on any range but to further facilitate this a small dial plate moves, just behind the tuning knob. This is calibrated in 200 divisions and serves the same purpose as the "second" hand used on some receivers, providing an auxiliary reading which enables the operator to accurately log any station, and again find that same station by resetting to the same readings on the main and auxiliary dials.

Rather than go through a long listing of the stations heard during the short-wave tests of this receiver it should suffice to say that even to one who has operated innumerable high-grade receivers on the short waves over a long period of years, this receiver leaves nothing within reason to be desired. The sensitivity and selectivity show up to the same excellent advantage that they do on the broadcast band, as described above. Short-wave broadcast stations have been heard on every continent except Africa (and this has never been heard in either of the test locations). All continents have been heard on amateur phone and also on c.w. It is realized that these accomplishments are not world beaters—but after all what more can be accomplished?

Perhaps a better way of judging the short-wave ability of the receiver is in the way it brings in the foreign s.w. stations. Here perhaps more than anywhere else, the excellent signal-to-noise ratio of the receiver is evident; and likewise the effectiveness of its a.v.c. system. At times when the foreign stations are suffering from fast fading the a.v.c. action is so perfect that the programs may still have high entertainment value. During the past two days, for instance, this condition existed, with the fading causing the tuning indicator eye to vary rapidly from a closed position to ¼ open, indicating a large change in signal strength, yet the speaker output suffered substantially no variation—certainly not enough to in any way mar reception.

The inclusion of the ultra-short-wave range in an all-wave receiver is a relatively new thing but it will not be long before the owner of such a receiver will find it a distinct asset. Thus far there are only a few broadcast stations operating on these tiny waves but it is in this range that the finest quality broadcasting will take place in the future. These waves will provide spectacular DX down to below 10 meters at times when these bands "open up". Below about 8 meters reception is limited to a range of 100 miles except on rare occasions.

U. S. W. Tests

During the RADIO NEWS tests the only ultra-short-wave broadcast station within range was W2XK, the Empire State Tower station. This was brought in, both in the New York City and the Fairfield, Connecticut, tests in a manner comparable in every way with local broadcast-band stations and with outstanding tone "quality". Numerous amateur phone stations were heard on both the 5- and 10-meter bands. The latter were not numerous as the 10-meter band is substantially dead during the Summer. The former were of course limited to the stations which were stable in frequency. The few crystal-controlled stations and the more numerous m.o.p.a. stations on 5 meters, within range, were heard well. The frequency-modulated signals were, however, not understandable in most cases, due to the high selectivity of the receiver. Naturally no really comprehensive tests can be made in these u.h.f. ranges at this early date in their development but enough could be accomplished to indicate that when the broadcasting stations, which are now being licensed in greater numbers on these ranges, are in operation the receiver will give an excellent account of itself.

In summary, it may be said that this receiver should meet the most exacting requirements of even the most critical radio listener as it combines excellent electrical design with beauty of appearance, ease of operation and all-wave coverage.

Jobs in Politics

New York, N. Y.—During the campaign of this year, the Republican National Committee has hired a staff of radio engineers to take care of their P.A. systems, broadcasting and news reel connections. The battery of microphones before the speaker have been replaced by a single microphone and amplifier, owned by the Committee. The various services are connected to the amplifier without having to use their microphones.

An "R" Meter

(*Continued from page* 344)

or aligning the r.f. or i.f. stages. In effect it indicates the level of the signal at the input to the second detector and therefore will show immediately any change which results in greater amplification. It will likewise provide a continuous check on all tubes ahead of the second detector.

Another useful application is when testing the effectiveness of different receiving antennas. When depending on the ear alone a 25 or 30 per cent improvement in the antenna will oftentimes not even be noticeable, whereas even slight improvements are noticeable on a meter.

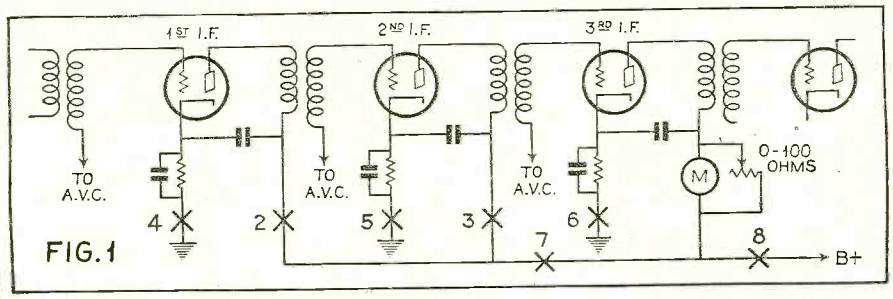


FIG. 1

Used in conjunction with a 5-meter superheterodyne which has a resistance coupled i.f. amplifier and automatic volume control, the meter provides an absolute check on frequency modulation of received signals. In receivers such as this, the intermediate frequency is somewhere around 50 to 100 kc. and because of the low intermediate frequency every signal is heard at two points very close together. These points are the normal and the image frequencies and of course are separated by twice the intermediate frequency. If the oscillator is tuned midway between these two points, it will beat with the incoming signal at zero frequency and no signal will be passed along to the i.f. amplifier and no signal will be indicated by the meter. However, if the signal is frequency-modulated this will not be true because the signal will not remain at zero beat with the oscillator. In such a case the meter instead of remaining at the no-signal position will fluctuate, the amount of fluctuation depending on the amount of frequency shift taking place in the transmitter. The check seems too simple to be accurate, but very careful tests at W2JCR show it to be infallible. It might be added that 90 per cent of the 5-meter transmitters show very marked frequency modulation and not more than perhaps 1 or 2 per cent show absolute frequency stability. This statement is made in order that those who try this scheme will not be fooled into believing that the meter is not functioning properly if practically all signals checked show rather violent frequency modulation.

Figure 1 shows the meter and its shunt rheostate in the plate circuit of a final i.f. stage. X2 to X7 show other positions where it may be connected providing all i.f. tubes are subject to a.v.c. If the meter available has a range of over 10 milliamperes it should be connected at X7 or X8. In the other positions a lower range meter is required because the range should be less than the current flowing in the circuit in which it is connected. The rheostat is then used to adjust the meter sensitivity to provide full-scale deflection when no signal is present. In positions 4, 5 and 6 the meter is at ground potential but in all other positions it is at high d.c. potential and the leads should therefore be insulated to prevent accidental contact. At W2JCR the practice is to connect the meter at M, X2 or X3, the choice depending upon which position is more readily accessible in the wiring of the receiver.

Harbor Craft Radio

(*Continued from page* 331)

of the present tests with the seven boats has shown very remarkable results and the problem of calling a land station from a boat is simply to lift an ordinary looking French handphone, press a button on ship and give the operator the number you desire. The equipment is shown in the accompanying illustrations.

The transmitter for the boats is a 19A Western Electric radio transmitter of 5 watts power and operating on the frequency band from 2 to 7 mc. The transmitter is crystal-controlled and two crystal frequencies may be used. The receiver employed is the Western Electric 20A superheterodyne, utilizing four tubes and capable of operating in a number of bands from 200 to 10,000 kc., with the exception of the frequencies between 400 and 550 kc. The boats transmit on a frequency of 2198 kc. and receive on a frequency of 2590 kc. At the land station these frequencies are reversed, of course. The master control-unit is in a small rectangular box shown in the upper left-hand illustration. It contains a switch hook for holding the hand-set, an indicating lamp for the receiver, an indicating lamp for the transmitter, a volume control and a calling bell. This unit entirely controls the operation of the receiver and the transmitter. When a ship is called the call bell rings and all that is necessary to do is to take off the hand-set from its hook and answer the call. When talking from the boat a small button is pushed but in receiving the button is released. No operator's license is required on the boats, only a station license which is easily obtainable.

New P. M. Speaker

(*Continued from page* 332)

baffle of relatively small dimensions, making for high quality reproduction with minimum baffle space requirements.

An infinite baffle table for speakers of various sizes is shown in Figure 1. An ordinary console cabinet can be used for the purpose if the back is closed and the interior is lined with heavy felt, cotton batting, or other sound-absorbing material. The dimensions given in the table are the minimum sizes recommended. Larger boxes may of course be employed if convenient. They should be made completely air-tight. Since the "Magic Magnet" speaker has no field coil to dissipate heat, it is particularly suitable for this application.

The response curve of the "Magic Magnet" speaker in comparison with a good speaker of conventional design is shown in Figure 2. It will be noted that the re-

sponse is excellent up to 9000 cycles and the usual low-frequency peak at 75 cycles has been moved down to 40 cycles, giving a more uniform response throughout the entire range. This feature is not only excellent for high-quality broadcast reproduction but also for p.a. work. The absence of pronounced peaks makes it possible to work a "flat" microphone closer to the speaker without acoustic feedback.

The cone is a polyfibrous type, employing three special materials so combined as to give the desired frequency response. A member of the RADIO NEWS editorial staff visited the modern factory where these speakers are manufactured and noted that the care which has been devoted to their design has been retained throughout production. The performance of these speakers, under test in the RADIO NEWS laboratory, was found to be highly satisfactory in every respect.

Police Radio

(*Continued from page* 344)

short-wave radio facilities available."

For the demonstration, General Electric installed a portable 50-watt transmitter as well as receivers in the blimp. From the air this transmitter has a range of about 500 miles. It operates on a frequency of 150 meters, in close proximity to the regular channels assigned to the police. The car with a 15-watt transmitter was one developed by General Electric in Schenectady for police work where two-way conversation with headquarters is desired.

Movie Dial

(*Continued from page* 338)

"Movie Dial", as it works on the same principle as a moving picture projector. As the operator turns the tuning control, the call letters of the country's leading stations (with the names of the cities) flash onto a screen in illuminated letters as illustrated in the accompanying photograph. For locating the smaller stations the dial is calibrated in kilocycles.

The short-wave bands are by no means

(*Turn to page* 383)

THE SERVICE BENCH

(*Continued from page* 356)

well as P. A. equipment. On the left in Figure 2 is a tube shelf, all tubes being within easy reach from the bench. A portable tube tester and an all-wave oscillator are built into the left side of the panel. Weston meters are mounted in the center. Various voltage outlets are available, including 6 volts, for auto radios. A neon lamp, a.c.-d.c. test is used for condensers, and a Candohmeter for resistance check. A dynamic speaker is arranged with various input and field combinations. To the extreme right will be seen a portable analyzer. The top drawers accommodate our small replacement parts—the large drawers the heavier parts. All tools are in the center drawer."

THE DAY'S WORK

Writes Merrill Lindley of Indianapolis, Ind., whose photograph appears in Figure 3, surrounded with his public-address equipment: "When replacing bolts in out-of-the-way places in receiver cabinets, put a piece of tape over the end of a screwdriver of the correct size, and insert this into the head of the bolt. This provides a convenient extension for working into tight corners, and will hold until the bolt is started when it can be easily removed. This will save many cuss words." (*Mr. Lindley's business card is shown in Figure 4. In reference to his P. A. system, the output consists of two 50's in straight Class A, incorporated in a rebuilt theater amplifier installed in a suitcase. A crystal mike, turntable, a 2-tube electronic mixer and two 12-inch auditorium speakers complete the layout which has been heard over distances as great as two miles. Mr. Lindley has a library of 300 phonograph records.*)

PHONE DR. 2277-R

LOUDSPEAKER MICROPHONE SYSTEMS
FOR ANY OCCASION

MERRILL LINDLEY 2659 NAPOLEON ST.

Figure 4. A business card with the wording chosen so as to make sense to the average layman.

A.F. Transformer Troubles

"When the primary coil of the input push-pull transformer in a Steinite 421 (Model 21) is found to be open, a temporary repair can be made by utilizing the half of the coil through which continuity can be had. The primary of this transformer is center-tapped. Incidentally, check the 1 mfd. condenser in the cathode circuit of the first audio tube, for it may be short-circuited.

"The push-pull input transformers on the Edison 7-R also have the habit of developing open primaries. A temporary repair can be effected by the expedient shown in Figure 5. A 50,000-ohm resistor is shunted across the primary, and the plate of the first audio-frequency tube is coupled to the 45 tube grids by means of a .01 mfd. condenser.

"Trouble with a Dayfan Model 5066. Complaint little or no reception. Check for a defective speaker condenser."—James L. Hoard, Providence, R. I.

Somewhat similar stunts can be used in cases of—

Figure 3. A portable P. A. layout constructed around a theater amplifier.

I.F. Transformer Troubles

E. P. Hufnagel, of Pequannock, N. J., sends us the diagrams of Figures 6 and 7 showing how temporary repairs can be effected when one winding of an intermediate-frequency transformer becomes open. When the primary is open (Figure 6), the lower side of the primary trimming condenser is disconnected from B-plus and connected to the grid side of the secondary trimming condenser. The plate circuit is completed with a 50,000-ohm resistor or a radio-frequency choke. The secondary circuit is tuned in the usual way, while the primary trimmer functions as a coupling condenser.

When the secondary is "shot," disconnect the low side of the secondary trimming condenser and connect it to the plate side of the primary trimming condenser. Again this condenser will operate as a coupling capacitor. Connect a .5-megohm resistor across the open coil, thus completing the secondary circuit. The trimmer function as a coupling condenser should be adjusted for maximum capacity.

SERVICE SALES PROMOTION

The wording on the business card shown in Figure 4 was chosen only after due deliberation and study of similar cards. Most similar efforts referred to "amplifiers" and "public-address systems," terms with which the layman is not necessarily familiar. However, almost everyone knows what a loudspeaker or a microphone is, and these words therefore appear on Mr. Lindley's card. *Talking the language of your prospective customers is always good sales psychology!*

Getting Word-of-Mouth Recommendations

A personal recommendation is invariably the best advertisement in the world. Appreciating this fact, Richard Verbrugghe, of Detroit, Mich., distributes receivers on a free loan basis, to neighboring shops, on condition that he be permitted to display a small sign on top of the receiver, and that the proprietor recommend him for radio service work. The shop owners are

always glad to comply and co-operate—the recommendation coming easy as the free use of the radio is usually highly appreciated.

Mr. Verbrugghe finds barber shop and beauty parlors his best bets. He has four receivers out working for him in this manner, and he finds the investment well worth while! In addition, we'd suggest gas filling stations, small restaurants, cigar stores and soda fountains.

Service Notes

Your Service Editor has just returned from the yearly Convention and Show held by the Institute of Radio Service Men at the Hotel Pennsylvania, New York City. It was the finest turnout of its kind we have ever attended. The significant facts were the increased respect of the manufacturers for the serviceman and the technological progress of the radio expert. The I. R. S. M. is to be congratulated upon its achievement which should set an example for local organizations.

Figure 5. A temporary repair when an open develops in the primary of an amplifying transformer.

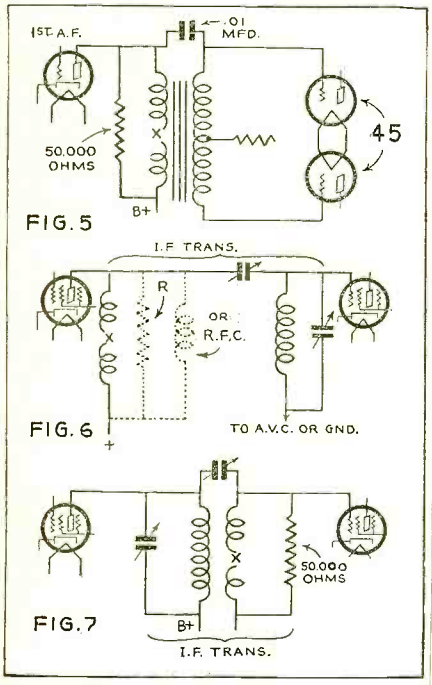


Figure 6. The above circuit may save the day when the primary of an i.f. transformer burns out.

Figure 7. An open secondary can also be repaired temporarily, the secondary trimmer being used as a coupling condenser.

5-10-20 Meter Superheterodyne

(*Continued from page 343*)

Lining Up Amplifiers

If you haven't done it before, you can now line up the harmonic amplifiers for 31,896 kc. Figure 24 shows the way the r.f. output of V9 is connected through a switch (4) and a tapped choke, and through a little transmission line (low impedance) to the input of the 1-10 section. As the 910-kc. signal is mixed in D3 with a 31,896-kc. carrier, the resultant frequency appearing in the plate circuit of V9, is

30,986 kc., which you tune in on the 1-10 section with super-regeneration, thus using quadruple detection and super-regeneration with its attendant automatic a.v.c. action and noise suppression.

If you want to "Super-Het" the 1-10 section, taking any input from one meter to 10 meters, put the proper antenna on the input posts of the 1-10 receiver (Refer to Figures 25, 26 and 27).

Link Coupling Cords

Two link coupling cords are made of ordinary single, shielded, single-conductor cord with tips at one end and midget clips at the other. Arrange the grid connection for the 955 acorn tube so you can clip it "on or off" as desired. For super-heting a 10-meter signal for example, clip one transmission line from T26 to the antenna "X" and "Y" in Figure 26, and the other transmission line from T26 to the antenna input terminals of T2. Then with the high-frequency oscillator and high-frequency, detector-mixer D4, adjust these two circuits as shown in Figures 25 and 27 to give a beat frequency in the 20-meter band and take the audio from V6 (D1) using switches in position "B" as shown in Figure 18.

As a precaution, I would suggest to anyone building this laboratory model receiver, that they stick quite closely to quality parts as indicated throughout this description. Cheap parts of unknown merit may only lead to grief.

The finished receiver lives up to my best expectations. While complicated, it is really easy to operate and there are no finicky adjustments. It makes operating on phone in the crowded bands a real pleasure. If you want a beat oscillator, just let the V5 oscillate weakly for c.w. reception, or to check modulation on phone signals.

On the very first tests after receiver was properly lined-up, we received R9, almost noise-free signals on phone from 200-watt stations 6,000 miles away, using one foot of wire as an antenna. It seems to be a honey.—Frank H. Jones, *Radio CO6OM.*

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933 Of RADIO NEWS & SHORT WAVE RADIO, published monthly at Dunellen, N. J., for October 1, 1936.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Lee Ellmaker, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the RADIO NEWS & SHORT WAVE RADIO, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Teck Publications, Inc., 461 Eighth Ave., N. Y. C.; Editor, L. M. Cockaday, 461 Eighth Ave., N. Y. C.; Managing Editor, None; Business Manager, Lee Ellmaker, 461 Eighth Ave., N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Lee Ellmaker, 461 Eighth Ave., N. Y. C.; Teck Publications, Inc., 461 Eighth Ave., N. Y. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

LEE ELLMAKER, Business Manager.

Sworn to and subscribed before me this 9th day of October, 1936.

(SEAL) EDYTHE E. TOMPKINS.

Notary Public,
Bronx County Clerk's No. 41,
Register's No. 25T38.
New York County Clerk's No. 234,
Register's No. 8T133.
Commission expires March 30, 1938.

ADVERTISERS' IDEX

Movie Dial

(*Continued from page 379*)

neglected, a twist of the wave-band switching control to the lower wavelength ranges and the tuning simplicity of the new dial will be appreciated by all, especially those newly initiated to the short-waves, as the call letters of the principal short-wave stations of the world appear on the screen. The dial also flashes the ship lanes, police and aeronautical ranges, etc., on the screen in colored letters. This dial is standard equipment on several alternating current and battery-operated models and on a 32-volt power-plant receiver for the farm.

Other developments included in the new models are: a volume indicator to aid in selecting the volume best suited to your ear, a tone control providing any desired tone from rich bass to a brilliant treble, variable selectivity, cathode-ray tuning indicator, etc.

What's New in Radio

(*Continued from page 369*)

tended, is 61½ inches high. It is sturdily constructed and designed to be easily and quickly raised or lowered.

Well-Planned Condenser Replacement Cabinet

This new Aerovox condenser replacement cabinet, made available to jobbers, is a real sales aid. It tells the serviceman quickly and easily just what replacement condensers he needs for any given radio receiver and by a handy system of reordering, the jobber always knows just

what items are required to keep his stock balanced so as to meet instantly every replacement requirement. The cabinet is made of heavy gauge steel, finished in yellow and black sliding doors at the rear of the cabinet permit easy access to shelves stocked with the units in general demand. The shelves are labeled alphabetically according to set names, facilitating prompt locating of any desired unit.

Printed by Art Color Printing Company, Dunellen, New Jersey, U. S. A.

WHAT A "RADIO NEWS LISTENING POST" SAYS OF *the World's Only Truly Custom Built Radio!*

EARL G. DeHAVEN
SUNSET LISTENING POST OF RADIO NEWS

Los Angeles,

August 31

To Radio News Readers

Gentlemen:

Having had the extreme good fortune to see and hear the final laboratory tests made on the new MASTERPIECE V while a guest of Mr. Silver in Chicago, the thought uppermost in my mind EVERY MOMENT while homeward bound was: "My kingdom (not for a horse) but for my own MASTERPIECE V". I never have wanted to get my hands on anything so much as I wanted to get them on the controls of the GREATEST radio instrument that engineering and craftsmanship has ever given to the world.

As man to man, when you read the literature describing the new 1937 Silver MASTERPIECE V, remember this: Here is ONE radio, and the ONLY ONE that actually can be expected to deliver MORE than its creator claims. Need I say more? The MASTERPIECE V will prove - TO YOU, the truth of EVERY STATEMENT made concerning it.

Never in all the time I have been a DXer have I thrilled to European reception as I have since tuning them in from this continent on my own MASTERPIECE V! The Olympic Games were heard here DIRECT via DJB on 15.2 Mc. MUCH BETTER than on the network broadcasts fed to LOS ANGELES STATIONS. The German stations made all other signals seem insignificant by comparison. With the MV I played DJB so loud they could be heard a FULL BLOCK AWAY using (get this!) a 21 inch SHOE LACE with a small wire run the length of it! A REAL "Shoestring catch" if there ever was one! Then I repeated the same feat on JVN, Tokyo, Japan -- making a "Shoestring catch" of the baseball game from Meiji Shrine Stadium. Of the Daventry stations, GSE on 15. 14 Mc. was the best during the past month, being almost equal to Germany's DJB. In like manner, TPA-3 - the French station on 11. 8 Mc. comes roaring in at 9:55 P. M. each night. The new Czecho-Slovakian station OLR on 15. 2 Mc. has made itself known with a mighty force here in the late afternoons and early evenings on test programs.

If you hear a MASTERPIECE V you'll "never be the same" until you OWN ONE.

Earl G. DeHaven

Earl G. DeHaven

You CAN OWN A MASTERPIECE!

No longer is it a fact that "only the millionaires" can own a MASTERPIECE. NOW, all you need is $34 to have a MASTERPIECE built especially to your specifications, for operation in your home. The balance can be arranged in easy monthly payments.

And each MASTERPIECE is guaranteed for 5 years and delivered to your home on approval! Either you are wildly enthusiastic about your MASTERPIECE or please don't buy it. One or the other — with no strings attached.

Write for full FREE details.

McMURDO SILVER

MASTERPIECE

CHICAGO STUDIO—2900 SOUTH MICHIGAN BOULEVARD
NEW YORK DEMONSTRATIONS—63 CORTLAND STREET

"THE WORLD'S ONLY TRULY CUSTOM-BUILT RADIO"

MAIL THIS COUPON

McMURDO SILVER CORP.,
2900 S. Michigan Blvd., Chicago, Ill., U. S. A.

Please rush me full FREE details on your custom-built radio.

Name .....

Address .....

SAVE UP TO 50% at Factory Prices!

You'll Be Excited over MIDWEST'S DIAL-A-MATIC Tuning and Exclusive ELECTRIK SAVER!

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Only $49.95 COMPLETE WITH GIANT THEATRE-SONIC SPEAKER (LESS TUBES)

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Once again, Midwest demonstrates its leadership by offering this amazingly beautiful, bigger, better, more powerful, 16-tube, 5-band world-wide radio — a startling achievement that makes the whole world your radio playground. Out-performs $150 radios on point - for - point comparison. Powerful Triple - Twin Tubes (two tubes in one) give 20-tube results.

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MY MIDWEST NOT ONLY MEETS BUT SURPASSES MY MOST CRITICAL STANDARDS.
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