

# All-Wave Radio

25  
CENTS

JUNE

1938



**RECORDING**  
As You Like It

**The "Streamliner"**  
As Built by W2QA

**AWR 5-10-20**  
C.W.-Fone Xmtr

**High-Power-Fone**  
With Relay Control

OFFICIAL ORGAN  
RADIO SIGNAL SURVEY LEAGUE

# TELEVISION

**THE DAWN OF A NEW ERA  
IN RADIO ACHIEVEMENT**

We've done it! Practical Home Television is here to stay! For nearly a decade, each time a forward step has been taken in the laboratory, the results have been flashed across news headlines from Coast to Coast.

The public has read of these developments with avid interest and suspense. It has anticipated the day when the turn of a knob on a reliable television receiver would bring vivid, thrilling television to the home. At last that day has arrived and it is with pardonable pride that we announce the birth of the CSI Triplet . . . three new time-proven television receivers.

This announcement, with all it implies of years of patient engineering and experimentation, marks the Dawn of a New Era in Radio History. The owner of the CSI Receiver will be spared the "crystal set" and other stages of development which marked the progress of radio in the early Nineteen Twenties.

True, much remains to be accomplished. Even those closely identified with the radio industry are not yet aware of the tremendous strides made in the preparation and improvement of telecasting. Extensive plans are now under way by broadcasters to match the progress made in the field of reception.

At the moment, television broadcasts are being made from 18 points in the United States. Within a 50 mile radius of any of the cities listed in the adjoining column, the marvels of CSI Television become immediately available.

CSI Receivers have anticipated not only today's television requirements, but also have been conceived to reduce to a minimum the factor of obsolescence which was earlier regarded as the great barrier facing a manufacturer. CSI has looked to the future!



CSI Television Receivers are available in 3 models ranging in price from \$125 to \$250 to the consumer. They are presented in a table model with a 3-inch screen and 2 consoles with a 5-inch screen. The 441-line images are as clearly defined as the movies you see in your local theatre.

## Jobbers! Dealers!

Do not overlook this sensational opportunity for dealers and jobbers who wish to profit by the overwhelming interest in this new field of Radio activity. The installation of a CSI Television Receiver will bring the crowds into your store.

If you have your establishment in any of the Telecast areas listed in the column below, you are invited to write to win our glory. Our new illustrated booklet, "Facts about Television" will be an amazing revelation of the progress and profit possibilities in Television today. There



is no coupon to clip. Just make your request on your letterhead and complete information, including trade discounts, will be forwarded at once. Simply address Dept. A.W.S.

## LOCATION OF TELECASTING STATIONS IN THE U. S. A.

New York City  
Los Angeles  
Springfield, Pa.  
Kansas City, Mo.  
Boston, Mass.  
Milwaukee, Wis.  
Manhattan, Kans.  
Philadelphia  
West Lafayette, Ind.  
Long Beach City, N. C.  
Lansing, N. J.  
Jackson, Mich.  
Iowa City, Iowa  
Minneapolis, Minn.

Good Reception has been reported within a fifty-mile radius of all of the above points.

# COMMUNICATING SYSTEMS, INC.

130 West 56th Street

New York, N. Y.

Handsome Bond Stationery  
For Members of the R.S.S.L.

## MEMBER STATIONERY

Every member will be proud to use this handsome R.S.S.L. Members' Stationery for his radio correspondence. Printed in blue ink on 8½ x 11 white bond paper, it bears the Radio Signal Survey League's official emblem.

Use of this official stationery will give prestige and dignity to your request for veries.

100 Sheets 50c • 250 Sheets \$1.00

### • QSL CARDS •

In order that members may retain the individuality of their QSL Cards and



at the same time indicate their association with the R.S.S.L., a Matrix ("Mat") has been prepared from which a metal cast can be readily made of the R.S.S.L. emblem at low cost. "Mats" can be had for either "Negative" (left) or "Positive" (right)

type emblem. They are practically indestructible and are familiar to almost all printers. Be sure to specify "negative" or "positive." Above illustrations are actual size! "MATS" 25c Each Postpaid.

### • REPORT FORM BLANKS •

New in principle, these Report Form blanks have been specially designed for the recording of information essential in carrying on the work of the R.S.S.L. Printed in green ink on white bond paper, 8½x11, records can be made in either pencil or ink—each sheet covering a full week's report.

\$1.00 Per Pad (100 blanks) • Postpaid  
(50 blanks—50c; 1 dozen report forms—15c)



### • METALETTE R.S.S.L. SEALS •

Are gummed on one side. Blue embossed on Silver. Same size as this illustration. They have the handsome appearance of real metal. Can be used on stationery, letterheads, QSL cards, etc.

25 Seals 15c • Postpaid



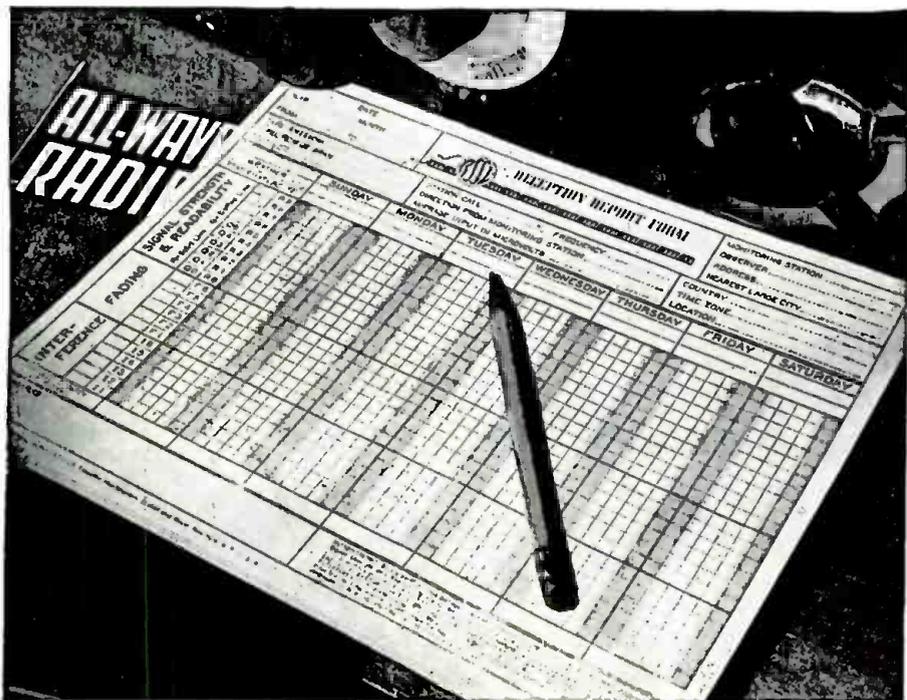
**IMPORTANT:** Above supplies may be purchased by R.S.S.L. members **ONLY!** Be sure to give your Monitoring Station number with order. No orders sent C.O.D. Be sure to enclose check, stamps or M.O. with order.

## New Members Wanted!

You are eligible to be a member of the R. S. S. L. No special equipment required. No fees or dues. If you have a sincere desire to assist in the work for the improvement of radio reception and transmission, you can be an active member. See the R. S. S. L. News on page 312 of this issue. Take your part in this interesting work. Just mail a 3c stamp to cover postage and we'll mail application blank and full details, including samples of our membership metalette seal, report form blank, etc. Use coupon below or copy on your own letterhead.

### RADIO SIGNAL SURVEY LEAGUE

16 East 43 Street New York, N. Y.



**F** for a three cent stamp—Complete details on joining the Radio Signal Survey League, Application Blank, etc. Without any obligation, send to—

**R** Name .....

**E** Street .....

**E** City ..... State .....

# All-Wave Radio

COPYRIGHT 1938 BY ALL-WAVE RADIO  
101 WEST 31st ST. NEW YORK, N. Y.

EDITED BY M. L. MUHLEMAN

VOL. 4, NO. 5 JUNE, 1938

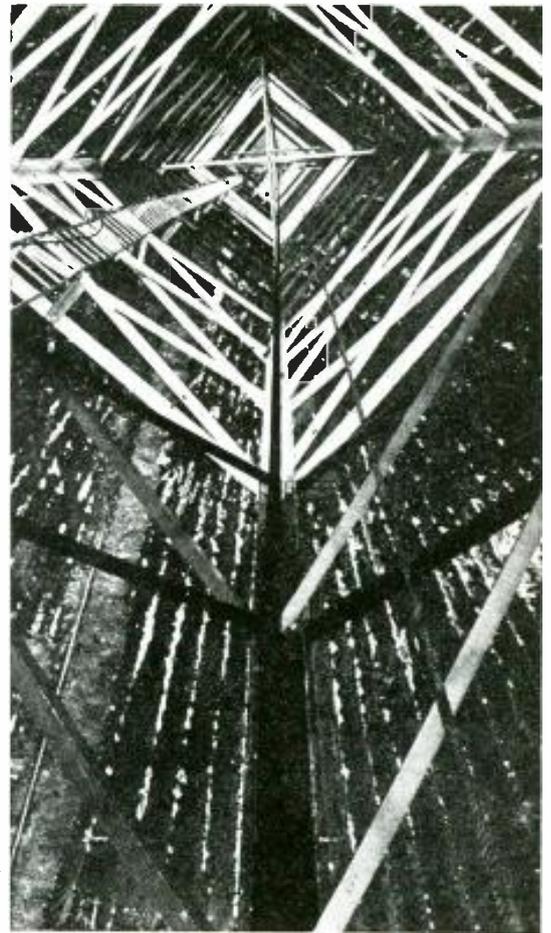
## COVER ILLUSTRATION

**CANDID RECORDING—THE LATEST FAD. WITH EQUIPMENT OF THE SORT ILLUSTRATED RECORDINGS CAN BE MADE BY MICROPHONE OR FROM THE OUTPUT OF A RADIO RECEIVER, ON EITHER ALUMINUM OR ACETATE RECORDS.**

## CONTENTS

BUILDING THE "STREAMLINER".....	By Ray L. Morehouse, W2QA ..	286
NOW IT'S RECORDING .....	By G. S. Granger .....	290
THE AWR 5-10-20 CRYSTAL-CONTROLLED TRANSMITTER By Chester Watzel, W2AIF, and Willard Bohlen, W2CPA		292
HAMFEST .....	By W8QMR (W4FCP) .....	297
MODERN RACK AND PANEL C. W. & FONE TRANSMITTER, PART I By Alvin Abrams, W2DTT .....		298
THE CIRCUIT COURT .....	By The Circuit Judge .....	302
GLOBE GIRDLING .....	By J. B. L. Hinds .....	304
CHANNEL ECHOES .....	By Zeh Bouck .....	309
ULTRA-HIGH .....	By Perry Ferrell, Jr .....	310
NEW U H F STATIONS .....	By Perry Ferrell, Jr .....	311
R S S L NEWS .....	By Lyman F. Barry, Director .....	312
NIGHT-OWL HOOTS .....	By Ray LaRocque .....	314
SHORT-WAVE BROADCAST STATION LIST—	By J. B. L. Hinds .....	316
ON THE MARKET .....		322
INDEX TO ADVERTISERS .....		338

OFFICIAL ORGAN OF THE RADIO SIGNAL SURVEY LEAGUE



Six hundred and twenty-five feet straight down—through the steel skeleton of WGY's new vertical antenna. The snow-filled trenches of its grounding system show up like spokes in a giant wheel. Fourteen miles of copper wire form these spokes.

**PUBLISHED MONTHLY** by All-Wave Radio, 101 West 31st St., New York, N. Y. Entered as second-class matter August 27, 1935, at the Post Office, New York, New York, under the Act of March 3, 1879. Additional entry as second-class matter, at East Stroudsburg, Pa., August 27, 1936.

**SUBSCRIPTIONS:** Yearly subscription rate: \$2.50 in the United States and Canada; \$3.00 in foreign countries. Single copy price, 25 cents. Four weeks' notice is required for a change of address. In requesting a change, kindly give both the new and the old address.

**NEWSSTAND COPIES:** ALL-WAVE RADIO is distributed by the American News Company who make every effort to supply copies at all points where there is a demand. If you have had difficulty in obtaining ALL-WAVE RADIO where you reside communicate with our Circulation Department who will see to it that your local newsstand is supplied with copies.

**MANUSCRIPTS:** All manuscripts, except those definitely contracted for, are submitted at the author's risk and cannot be returned unless accompanied by sufficient postage. However the editors are always on the lookout for new material, and readers are invited to submit manuscripts for consideration. Notification of the acceptance or rejection of a manuscript is given within three weeks after receipt.

# You Can Receive this DX Citation



OFFICIAL CITATION ISSUED TO S. W. BROADCAST DXERS.  
(APPROXIMATELY 1/9 ACTUAL SIZE—COLOR BLUE)

THIS is a rare opportunity to establish verified proof of your DX exploits. The perfect answer to the individual who shrugs his shoulders or scoffs at your reception of DX. And any radio enthusiast knows how difficult it is to get real DX when a visitor is present.

## Handsome Certificates

THESE beautifully engraved citations are printed in blue, brown or green according to the classification, and after receiving the First Degree you may subsequently obtain the 2nd and 3rd and even higher degree citations. Measuring 8½ x 11", they are printed on a high grade, heavy bond paper excellent for framing. An award that means something. They are issued free of charge to successful applicants on payment of 25c to cover postage and mailing costs.

## Get Details Before Mailing Veries

Send for information sheet giving full details before you mail in your verifications and request for citation. Clip the coupon below or just send 3c stamp with your name and address.

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

"Be It Hereby Known That—

... (Your Name Here) ...

has submitted proof in the form of accredited verifications of the successful reception of radiophone transmission in the

*Short Wave Broadcast Band  
1st Degree, etc. etc. . . .*"

as shown in reduced facsimile cut.

Citations are issued for—

- Short Wave Broadcast Band
- Standard Broadcast Band
- Amateur Phone Band

## The Requirements

Space permits only a rough outline of the requirements. In general, if you successfully receive one verification of short wave or amateur phone signals from each of the six continents of the world, you qualify for First Degree; or, in the case of Broadcast Bands, reception from any four of the six continents gives you this rating. Second and Third (and higher) Degree citations may be earned by receiving additional verifications.

## If You Have Foreign Veries . . .

. . . then you are probably eligible for a citation. It is necessary to submit the actual verification cards or letters for approval by the Directors of the R.S.S.L. and they will be promptly returned.

Citations may be secured by anyone who qualifies, whether or not he is a member of the R.S.S.L.



**RADIO  
SIGNAL  
SURVEY LEAGUE,**

16 East 43 St., New York

Send full details of DX citations

Name .....

Street .....

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

# BUILDING - and how! -

## The "STREAMLINER"

... or up in (and finally on)  
the air with a honey

By RAY L. MOREHOUSE • W2QA



W2QA's "Streamliner" complete—ready to go. Neat but not haughty  
—a rig designed to go places on its own.

**B**ACK in the "good old days," when radio was "wireless," a very upsophisticated young man walked into the corner drug store to buy a "glass syringe." Good old "Pop," the proprietor, slid his glasses an inch further down his nose and with a couple of —"tsk-tsk's"—and a "shame-on-you" look on his face, handed out the article in question. Not one whit abashed, our hero hurried home to file the end off the glass tube so that a pointed length of

solder rod just protruded through the glass tip. A Mason jar, a wooden cover and with a hole to fit the tube, and—presto!—a weird and awesome device, known as an electrolytic interrupter, was complete. That is, after a weight on the rod to feed it to the  $H_2SO_4$  in the jar was provided and an electrode for the sulphuric acid brought through the wooden cover. This fearful mechanism plus a Wm. B. Duck one-inch spark coil with the vibrator screwed down and a

couple of coils of wire provided the first "ether-buster," (and many a headache for the family cat).

### Through the Years

Much water has flowed under many bridges since those grand times when yards of solder rod flowed through the prophylactic tube in the interests of hours of "CQ de RM." The thrill of the first signal heard with the aid of a single slide tuner and the galena with only one "good spot"—the ecstasy of making the first contact with one of the boys "in town" (2 miles away)—ah, who can forget those youthful memories.

Later, the war, Navy Radio—at long last—peace—a commercial ticket and the pleasure of operating and getting paid to see the world—not through a port hole.

Memories of the first passenger boat job, KFY, O. B. Hanson, chief operator, now chief engineer NBC. Then radio broadcasting and our hero trying his hand as a Cortlandt Street "engineer." \$15.00 to wire up a neutrodyne—laugh that off, you service hounds. Later, settling down a little—again the bug bites and another W2 is reborn—this time with 50 watts of bottled static and an m.g. set. Then more labor with the first low-loss air condenser manufacturer—too busy for "ham" radio for years—until now—a severe recurrence of that fatal itch to "get back on the air."



Perturbed author (right) just emerging from considerable haywire; and very unhappy, having just discovered no way to break h.v. to the T-40 for neutralizing. W2KPX laying on the heavy advice.

## Up in the Air

We scratch our head and walk around in a fog of manuals, handbooks and "how to get on the air for umpteen dollars without going into a financial decline."

Much free advice, "build your own and make it the way you want it," etc. Failing to take kindly to the idea of designing a set and making it work, our laziness dictates someone else should have the headache and we throw a sop to our creative urge by deciding to buy a drilled kit, but one we can assemble and wire. "A screw driver and a pair of pliers and a soldering iron—all the tools required." A tricky name, in keeping with the modern trend, 5-10 and 20 meters, the very ham bands we have decided on; and then the fatal meeting, face to face with our tongue hanging out, with a silver voiced he-siren extolling the virtues of a "Streamliner"—and we are hooked.

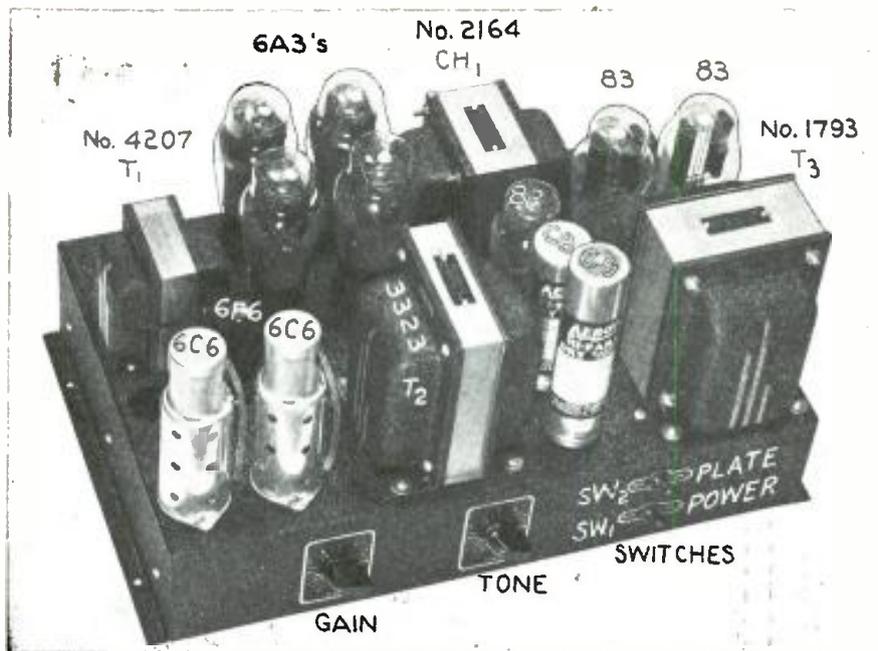
Comes the day when many boxes and packages arrived. Much feverish unwrapping of pretty crackle finish panels and a half a ton of transformers. Friend wife, "how much did that cost—so that's why I can't have a new coat"—and so on, far into the night.

Home bright and early from the office. Down in the cellar—instruction booklet which says, "do it on your kitchen table" neglected to provide means of convincing the Mrs. to that effect. Glory be, swell sockets already in the holes on the chassis—boy, this will be duck soup.

We read the instructions some more. Book says start on the exciter unit. Be-



Top and bottom views of the exciter chassis. The T-40 shown replaces the original T-20. Note Ward Leonard keying relay mounted between the 6L6G tubes. Neutralizing condenser. Cy. has a bakelite extension shaft.



The Stentorian Modulator, as fashioned by General Transformer Corp. It's a 30-watt, high-gain job with four 6A3 tubes in push-pull parallel in the output with a 6F6 driver. There are two resistance-coupled stages using 6C6 tubes.

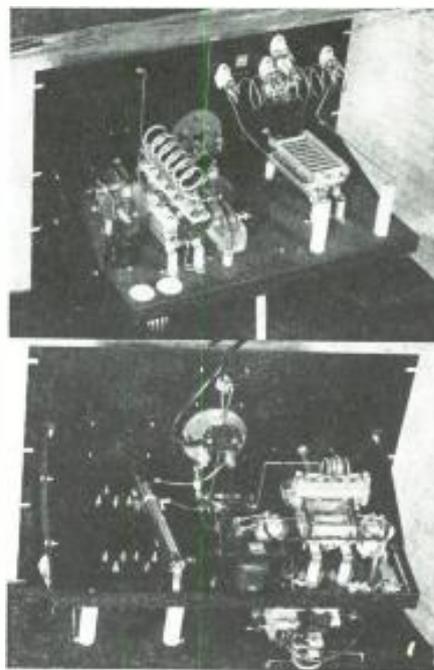
ing perverse by nature, we decide to do the modulator first. That looks hardest—leave the easy part for the last. Heavy reading on the instruction book. Why in blazes don't those guys cross-index the sockets on the schematic diagram with the photographs. Mount all the transformers, put one million resistors on a strip and mount same. Begin to wire. Discover resistance strip reversed because we thought mike input socket was the 110 v. power socket. Remove leads, put resistance panel in reverse and proceed with extreme caution. Red flares on the track every 200 feet is our motto from now on. This has to work the first time—or else!

Where is the guy who wrote that instruction book! Howinel can we tell whether that is the output socket or the first-pre-amp. Time out for heavy study of the pictures. Thank goodness for the pictures, with the pretty  $C_1$ - $R_4$ - $CH_2$  retouching. That's what we call first aid to the addlepat.

But how come no reference numbers on the photo to identify sockets. Everything else on the picture nicely marked but do your own guessing about sockets. We get magnifying glass and try to trace wires on photo to indentifiable parts in view. No soap—two hours shot and still no wires on sockets—time out to dash off hot letter to the manufacturer: Two days later—receive three letters from manufacturer—Sales Manager says sweet things and states referring to Sales Engineering Dept. who will write at once—letter from Sales Engineering Dept.—says referring to Chief Engineer and disclaiming any responsibility. Swell letter from Chief Engineer who infers we could figure it out for ourselves if we weren't moronic—remem-

bers to put in post script answering our question, so all's well that ends well.

Considerable elapsed time during which all wires are finally in place as per pretty colored pencil lines all over schematic diagram indicating wires soldered in, one by one, as done. We know we must be done because none of schematic shows through colored lines. Place tubes in sockets, wire up plugs to cables and put loudspeaker across output terminals of  $T_2$ . We used 7500-ohm terminals of output transformer because coupling transformer to our Jensen dynamic was presumed to have about

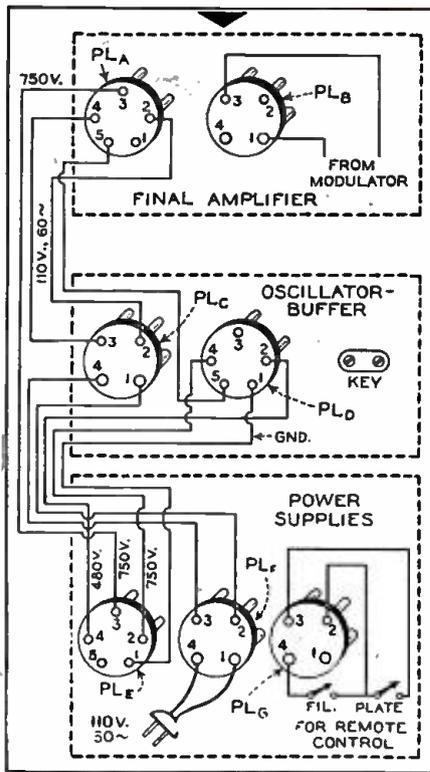


Top and bottom views of the final amplifier chassis. Plate tank circuit (5 meters) and antenna matching network are shown in top view; grid circuit in bottom view.

that input impedance. We forgot we had approximately 500-ohm line between two transformers. Hooked up old double-button carbon mike to mike input plug, turned gain control back (we hoped) and with one foot on cellar stairs, and a stance somewhat suggestive of small boy lighting "cannon-cracker" we push power switch to "On" with long curtain pole. Result—loud roar not unlike papa clam calling his mate.

Creep up close, and note filaments and heaters show no signs of life. Investigation shows 110 v. line wired to No. 2 and No. 3 prongs on line input socket which 60 cycles find very embarrassing since they are coming in on Nos. 1 and 4 of plug. We make mental note while changing same to write another dirty letter to Chief Engineer about his instruction book with further reference to unmarket socket terminals on photo.

Bravely throw switch in with left foot, with Pyrene in one hand and bucket of sand in other—terrific noise—reminiscent of advertisements of early American period a.c. radio sets with high power audio systems which were shyly admitted to have "slight residual hum." Wife clatters down cellar stairs to see



Interconnection circuit. Cable plugs shown as viewed from inside shell or top. The PLa plug goes into the SOa socket, etc.

what the coal man is shoveling in. Disturbed to discover 'twas only papa, "fooling with that radio—etc., etc."

Remove various and sundry leads from condensers, etc., move plate wires, space grid leads, change tubes; still that gawd awful hum. Finally, discover a bypass on 6F6 which drops hum about 50% (by ear). Consult expert who says, "it should be there—fooling yourself—just dropping overall gain and cutting out lows, etc." We decide to leave it off anyway, just to be obliging.

Mike gets a "hello—one, two, three four." Result like Bell Lab. speech inverter for private transatlantic radio-phone conversation.

More investigation discloses one mike button shot. Next day—to shylock with papa's turnip. Proceeds to previously mentioned unspeakable he-siren, proprietor of local gyperie or Ham Shoppe, in exchange for nice, shiny, V-1 Electro-Voice velocity. Home on the 5:15 and to the cellar. Cable in new acquisition and heave switches—glory be, hum down and broadcast announcer voice booms out from speaker across the cellar. Much loud "calling all cars" etc., until plaster falling from ceiling indicates friend wife receiving uncomplimentary comment from neighbors. We solder back all leads, etc., and note they are just where we had 'em in first place. Make mental note to refrain from telling Chief Engineer of manufacturer—let him think we're still in trouble, and that it was all his fault.

**Next—R. F. Sections**

Now tough part is done, many friendly hams offer services. Shoo them all away. The r.f. will be cold turkey, etc. Good-bye please. Ghost writer for Chief Engineer of manufacturer says exciter unit is next and after parts are assembled on chassis and panel we start on a still hunt for "heavy silver wire" for r.f. bus wires, ground bus leads, etc. Find same worth \$12.00 a foot.

Write very nasty letter to Chief Engineer of manufacturer to inquire what is so different about 5, 10 and 20 meters that r.f. can't chase itself around on the skin of ordinary garden variety or tinned copper bus wire. Receive letter from C. E. of manufacturer saying, "that's what I meant, you dope." Beastly familiar that guy.

All wires finally on, just about finished wiring up dual 750-v. power supplies, when get facetious letter from C. E. of mfr. stating that he has just found out how to keep plate meter jacks cold and ground frame of same to metal panel. Enclosing sketch of same, he suggests wiring as per, since recent unfortunate electrocution of his stooge via hot jack and panel indicates same highly advisable. Time out to write snappy note to C. E.

(Continued on page 324)

**Power Supply**

**AEROVOX**

- 4—1005 oil-filled, 2 mfd., 1000 v. (C21, C22, C23, C24)

**AMERICAN RADIO HARDWARE**

- 1—93 green jewel pilot
- 1—93 red jewel pilot

**AMPHENOL**

- 2—PM4 4-prong plugs
- 1—PM5 5-prong plug

**GENERAL TRANSFORMER**

- 1—20440 chassis, drilled, japanned, and sockets installed
- 2—1416 fil. transformers, 2.5 v., 5.25 amps. (T4, T6)
- 2—2820 power trans., 550 or 750 v., d.c., 200 ma. (T5, T7)

- 2—2157 swinging chokes, 250 ma. (CH1, CH3)
- 2—2158 filter chokes, 8 h. (CH2, CH4)

**GORDON**

- 2—278 "Off-On" plates
- 1—"Filament Voltage" plate
- 1—"Plate Voltage" plate
- 3—132 double tie block strips
- 3—905 3/4" rubber grommets
- 9—911 1/2" rubber grommets

**MAZDA**

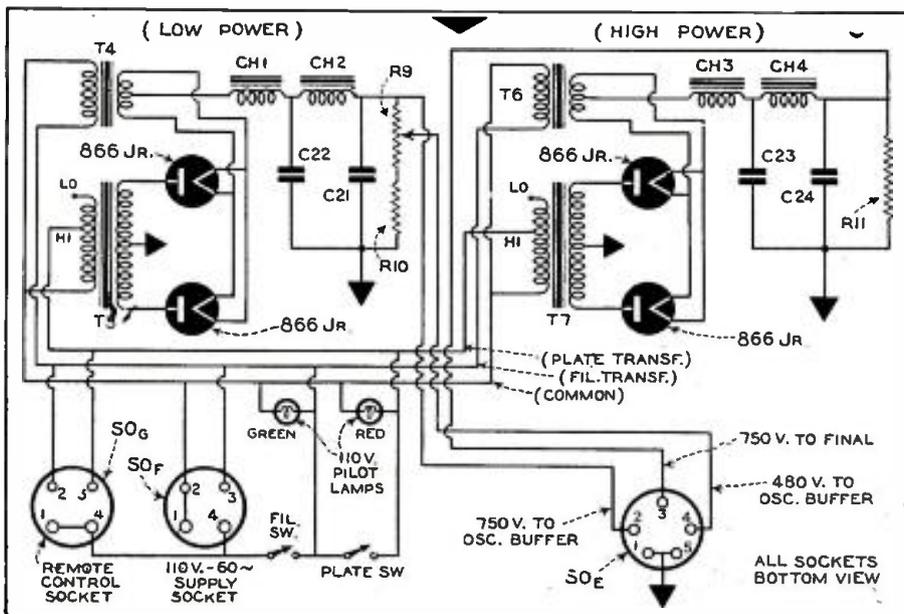
- 2—S-6 candelabra 110-v., 6-watt pilot lights

**OHMITE**

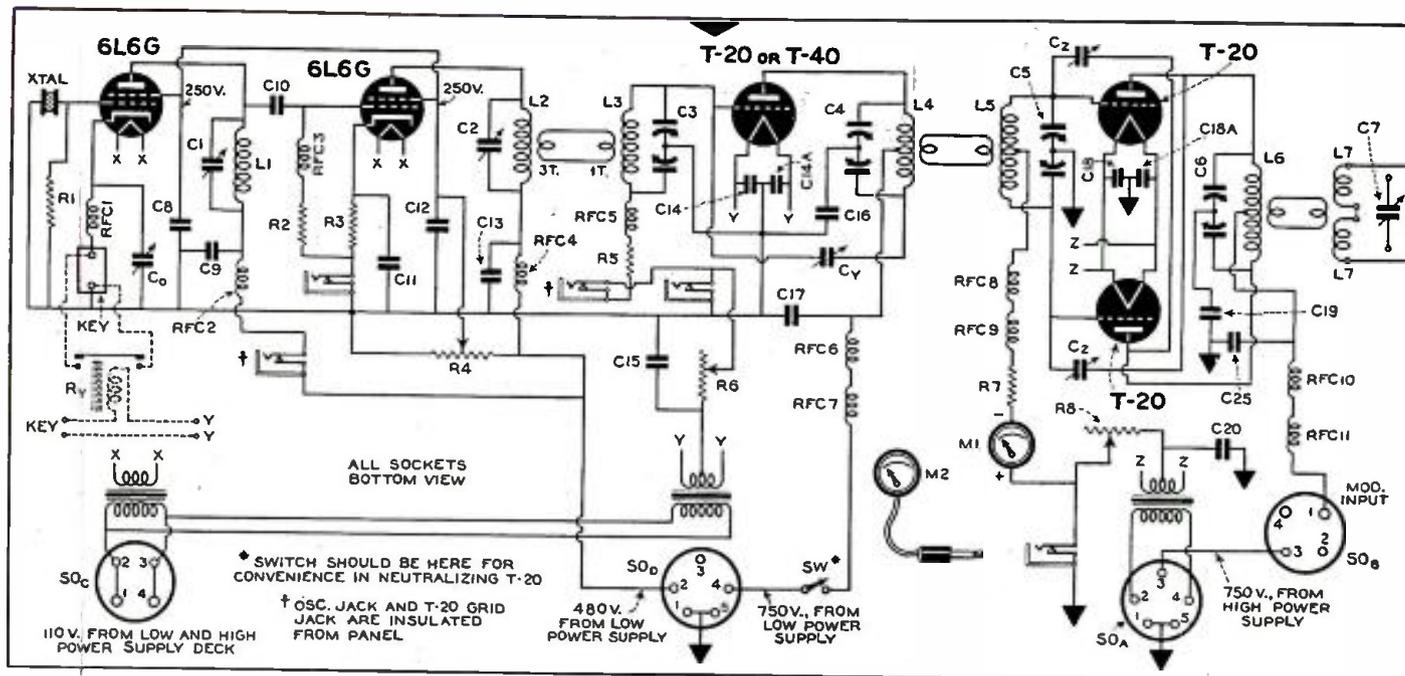
- 1—0963 2500 ohms, 100 watts (R9)
- 1—0219 25,000 ohms, 25 watts (R10)
- 1—0418 25,000 ohms, 50 watts (R11)

**TAYLOR**

- 4—866 Jr. rectifier tubes



Circuit of the dual power supply, showing modified arrangement which permits control of r.f. tube filaments by main filament switch. Pin numbers on sockets correspond with those in circuit above.



Schematic diagram of the "Streamliner" oscillator, buffer and final amplifier as used at W2QA.

### Exciter Unit

#### AEROVOX

- 6—type 1450 .001 mfd., 1000 v. (C8, C9, C12, C13, C14, C17)
- 1—type 1450 .0001 mfd., 1000 v. (C10)
- 1—type 684 0.1 mfd., 600 v. paper (C11)
- 1—type 284 1.0 mfd., 200 v. paper (C15)
- 1—type 1456 .001 mfd., 2500 v. (C16)

#### AMERICAN RADIO HARDWARE

- 1—2-foot 3/4" bakelite rod No. 1237C

#### AMPHENOL

- 1—PM4 4-prong plug
- 1—PM5 5-prong plug

#### BLILEY

- 1—type B5 40-meter xtal

#### CARDWELL

- 2—MR50BS variables, 50 mmfd. (C1, C2)
- 1—MR150BD variable, 150 mmfd. per section (C3)
- 1—MR50BD variable, 50 mmfd. per section (C4)
- 1—ZR50AS variable, 50 mmfd. (C6)
- 1—NA6NS neutralizer, 6 mmfd. (C7)
- 3—type A 3/4"-to-1/4" shaft couplings
- 3—ASB 1/4" panel bushings

#### CENTRALAB

- 1—type 514 resistor 50,000 ohms, 1 watt (R1)

#### COTO-COIL

- 4—type C145 dials (2 Buf. Pl., 1 Osc. Pl., 1 Grid)

#### GENERAL TRANSFORMER

- 1—20441 chassis, drilled, Japanned, and sockets installed
- 1—1052 fil. transformer, 6.3 v., 3 amps. (T1)
- 1—8008 fil. transformer, 7.5 v., 3.25 amps. (T2)

#### GORDON

- 1—"Crystal Osc. Plate" plate
- 1—"2nd Buffer Grid" plate
- 1—"2nd Buffer Plate" plate
- 1—"1st Buffer Plate" plate
- 2—286 small bar knobs
- 1—132 double tie-block strips
- 3—905 3/8" rubber grommets

#### NATIONAL

- 6—type R-100 r.f. chokes (RFC1, 2, 3, 4, 5, and 7)
- 1—XR4 coil form (1 for each band) (L1)
- 2—XR5 coil forms (1 for each band) (L2, L3)
- 1—PB5 coil plug and XB5 socket (1 for each band) (L4)
- 11—GS1 Steatite stand-off insulators
- 1—type 12 large grid clip

#### OHMITE

- 1—Brown Devil 2500 ohms, 10 watts (R2)
- 1—Brown Devil 1000 ohms, 25 watts (R3)
- 1—0587 40,000 ohms, 50 watts (R4)
- 1—Brown Devil 2500 ohms, 10 watts (R5)
- 1—0375 1000 ohms, 25 watts, variable (R6)
- 1—Z1 5-meter r.f. choke (RFC6)

#### SYLVANIA

- 2—type 6L6G tubes

#### TAYLOR

- 1—type T-20 tube

#### YAXLEY

- 4—702 closed-circuit jacks

### Final and Antenna Stage

#### AEROVOX

- 2—1450 .001 mfd., 1000 v. (C18)
- 1—1456 .001 mfd., 2500 v. (C19)
- 1—284 1.0 mfd., 200 v. (C20)



Rear view of complete "Streamliner" without modulator, all set for 5 meters. Antenna matching gadget not used on 5.

#### AMERICAN RADIO HARDWARE

- 1—1-foot bakelite rod, No. 1237C

#### AMPHENOL

- 1—PM5 5-prong plug
- 1—PM4 4-prong plug

#### CARDWELL

- 1—MR50BD variable, 50 mmfd. per section (C5)
- 1—NP35ND variable, 35 mmfd. per section (C6)
- 1—MG35NS variable, 35 mmfd. (C7)
- 2—NA6NS neutralizers, 6 mmfd. (C2)
- 3—type A 3/4"-to-1/4" shaft couplings
- 3—type ASB 1/4" panel bushings

#### COTO-COIL

- 1—10BTVL 10-meter coil (additional coils for other bands) (L6)
- 3—C145 dials (1 Grid, 1 Plate, 1 Ant.)
- 1—6BTLM coil mounting

#### GENERAL TRANSFORMER

- 1—20442 chassis, drilled, Japanned, and sockets installed
- 1—8008 fil. transformer, 7.5 v., 3.25 amps. (T3)

#### GORDON

- 2—286 small bar knobs
- 5—132 double tie block strips
- 4—905 3/8" rubber grommets
- 1—"Pwr. Amp. Grid" plate
- 1—"Pwr. Amp. Plate" plate

#### JOHNSON

- 6—22J plug-type standoff insulators
- 12—75C banana plugs (additional plugs for other hands)
- 6—74 banana jacks

#### NATIONAL

- 2—R-100 r.f. chokes (RFC9, 11)
- 1—PB5 coil plug and XB5 socket (one for each band) (L5)
- 14—GS1 Steatite standoff insulators
- 2—GS3 antenna posts
- 2—12 large grid clips
- 1—type A tuning chart frame

#### OHMITE

- 1—Brown Devil, 2500 ohms, 10 watts (R7)
- 1—0372 500 ohms, 25 watts (R8) (see text)
- 2—Z1 5-meter r.f. chokes (RFC8, 10)

#### TAYLOR

- 2—type T-20 tubes

#### TRIPLET

- 1—326 meter, 0-50 ma., d.c. (M1)
- 1—326 meter, 0-250 ma., d.c. (M2)

#### YAXLEY

- 1—75 phone plug
- 1—702 closed-circuit jack

#### Miscellaneous

- 2—antenna coils, air wound (L7)

# NOW It's RECORDING

## A Fad As Entrancing As Candid Photography...And As Practical

By G. S. GRANGER

**Fig. 1. Two 12-inch acetate records, one carrying an "off-the-air" recording of Charlie McCarthy, and the other a blank. This recording was made from the inside to the outside of the disc. Presto Recorder, packed for transportation, in foreground.**

"cutting head" which is an elaboration of a magnetic pickup operating in reverse; and a geared feed system which guides the cutting head over the surface of the record blank. Electrical sound is fed to the cutting head and this in turn actuates the cutting needle or stylus. With the motor turned on and the record blank rotating, the cutting stylus carves a thin groove in the blank surface of the disc and simultaneously records the sound in the wall of this continuous, spiral groove.

The record blanks, which are also called "discs" or "platters," are made in various forms. One type, available in both wax and aluminum, is pre-grooved, and may therefore be used on a machine without a cutter feed screw. Though the equipment required is less costly, the recordings are not on a par with the present-day conception of tonal quality. The blank types, which are grooved as the recording is made, are available in aluminum and cellulose-coated form, the latter being the aluminum discs on which is flowed a loaded acetate. Two discs of this type, one a blank and the other carrying a recording, are shown in Fig. 1.

### The Records

The aluminum and acetate blanks are available in five sizes; i.e., 6" 8", 10", 12" and 16" diameters. All may be cut on both sides. The playing time (each

**SOME** months back we were assigned to the task of playing around with recording and playback equipment to determine its practicality in the hands of a person unversed in the mysteries of professional transcription work. It was a perfect assignment because our mind was as blank as an uncut record when we commenced the making of test discs.

It struck us at the beginning that there is a similarity between recording and photography; with the majority of the population of the United States dashing around with small cameras and shooting practically everything in sight for the sake of posterity or something, it seemed creditable that a lot of people married to radio might find it keen sport, if nothing else, to make permanent records of sound in its myriad and entrancing forms. We even went so far as to figure that a whale of a batch of people would be recording their heads off right now had they known that the process, as we learned, is about as simple as playing a record on a phonograph.

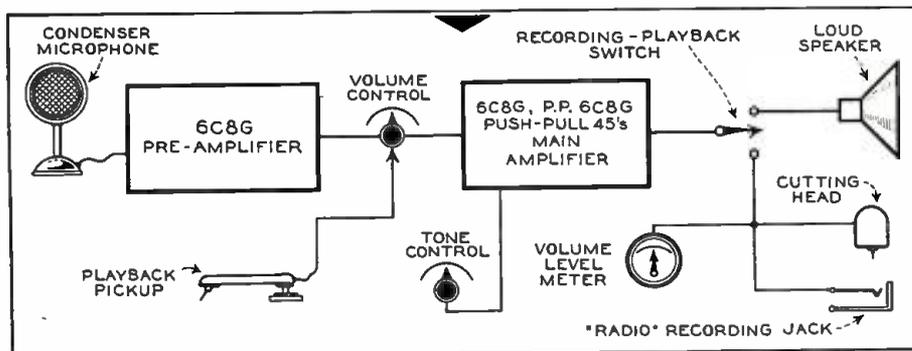
We carried our weighty problem to the Presto people who make little recorders, medium-sized recorders and big recorders—the kind the professionals use for transcription work. We asked foolish questions, requested all available literature, and asked for the loan of a unit with the necessary needles and record blanks to get us off to a good start. They were terrifically nice about it all, but embarrassed us no end by insisting that we make a record of our own voice right on the spot. We collapsed with mike fright after the first fluttery sen-

tence, and nearly swooned when we heard the playback. We sounded just like Betty Lou.

### What It's All About

After recovering from the shock of hearing our voice thrown back at us, we trotted home with the things and stuff, which included one Presto Model J-5 Junior Recorder, a batch of Presto Green Seal 6-, 10- and 12-inch records, a package each of steel cutting needles and playback needles, and a can of "Disclube" which does special things to the finished product.

First we tackled the literature, which provided us with a fair amount of academic information that we are passing on just in case you're not up on these things. To begin with, a recorder—any recorder for that matter—consists essentially of a heavy-duty, constant speed motor, a weighted turntable which is rotated in one manner or another by the motor; a



**Fig. 2. Block diagram of Presto Junior Recorder. Note that the same volume control is used for both recording and playback. A switch in the output circuit permits feeding a.i. into the loudspeaker for playback, or into the cutting head for recording. A jack is provided for "off-the-air" recording.**

side) for the 6" disc is 1½ minutes, for the 8" disc 2½ minutes, for the 10" disc 3½ minutes, while the 12" records have a playing time of 5 minutes for each side. The 16" discs cannot be used on the ordinary recording machine. The smaller records are cut at the standard phonograph motor speed of 78 r.p.m. whereas the 16" records are designed for cutting at a speed of 33 1/3 r.p.m. At this speed, each side of a 16" record has a playing time of 15 minutes. The more expensive recording machines, with larger turntable and dual-speed mechanism will handle any of the sizes given above at either 78 or 33 1/3 r.p.m.

Generally speaking, the aluminum blanks are suitable only for voice recording, but for this service they are excellent. The acetate discs are by far the best and have a much lower scratch level than both the aluminum and commercial records. If the recordings are made with care, there is no noticeable needle scratch or other forms of background noise.

The frequency range of an aluminum recording is restricted whereas the range that can be put on an acetate blank is governed only by the overall frequency range of the equipment employed in mak-



Fig. 4. Presto Recorder set up at station W2KR where a recording of the signals from VR6AY, Pitcairn Island, was made.

ing the recording. The fidelity is therefore dependent upon the characteristics of the microphone (or radio receiver in the case of an off-the-air recording), the amplifier, and the cutting head. With moderate-priced equipment, the upper limit is approximately the same as the average radio receiver—4500 cycles or so, with a possibility of 6000 cycles (which few people seem able to appreciate when it is present) if the cutting head is particularly good. That's as much if not more than the average person desires.

### The Machine

The Presto Junior Recorder we borrowed is decidedly more impressive than the skeleton recorder we outlined previously. It is extremely compact, and portable, as you can see from the photo of Fig. 1 which shows one of these units closed up for transportation. It has a rim-drive synchronous motor, a 12"



Fig. 3. The recorder in operation. Note how the shavings wind around the spindle on the turntable hub as the cutting head works toward the outside of the record. All you have to do is talk.

weighted turntable, a husky cutting head geared to a worm drive on the turntable shaft, a magnetic pickup for playback, and in the front of the case a complete four-stage audio amplifier and dynamic loudspeaker. A condenser microphone is supplied with the unit for direct recording purposes. A special cable is also included for making connection to the output of any radio receiver so that program recordings can be made without any fuss and bother. The instrument panel carries a volume level meter, volume control, tone control, on-off switch, and a second toggle switch for changing from the recording position to the playback position.

The general circuit scheme of this recorder is shown in the block diagram of Fig. 2. The condenser microphone is connected to a preamplifier using the first triode section of a 6C8G tube. The volume control is between this stage and the second triode section of the same tube. A second 6C8G, with its two triodes connected in push-pull, serves as a driver for the push-pull power amplifier employing type 45 tubes. Resistance coupling is used throughout.

The playback pickup is connected to the lower end of the volume control potentiometer which has a center tap to ground. When the knob is turned to the left of this mid-position it controls the phonograph volume; when turned to the right of the mid-position it controls the recording volume level when the microphone is in use.

The tone control is in the plate circuit of the second a.f. amplifier stage.

The output of the amplifier can be

switched to either the loudspeaker or the cutting head—to the loudspeaker when playing back a record and to the cutting head when making direct recordings with the microphone. A jack is provided for direct connection between the output of a radio receiver and the cutting head for off-the-air recordings.

The volume level meter functions at all times recordings are being made, irrespective of whether it is from a radio or through the medium of the microphone. Its purpose is to prevent overcutting of the record on strong signal peaks. A red line on the meter scale indicates the proper level and it is only necessary to adjust the volume control on the recorder, or on the radio receiver, as the case may be, so that the meter needle hovers near the red line for average volume peaks. The adjustment is not at all critical.

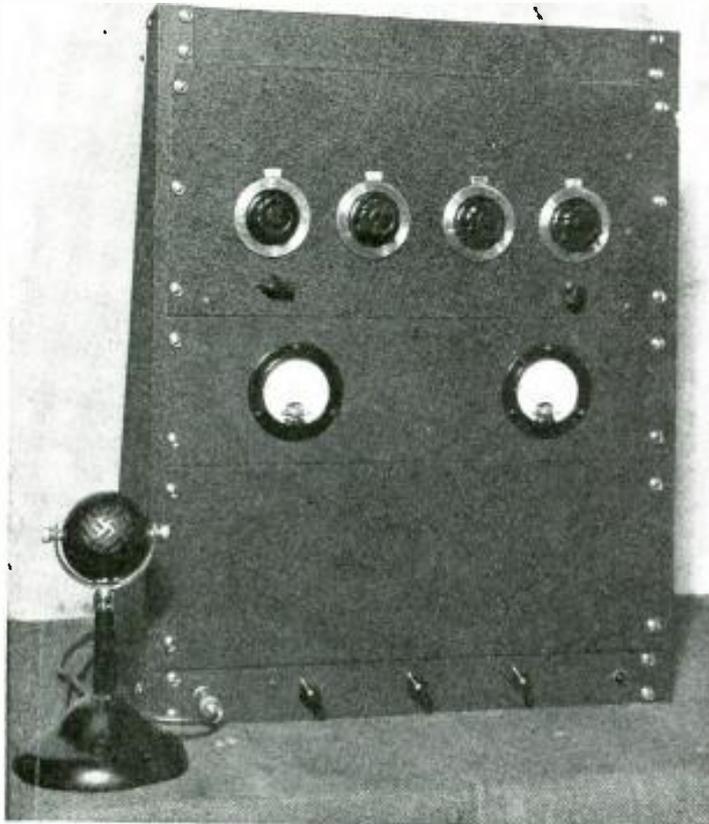
(Continued on page 330)



Fig. 5. Special machine for radio recording only, or for use in conjunction with external amplifier and microphone.

## Xtal Control And E. C. O.

By CHESTER WATZEL • W2AIF



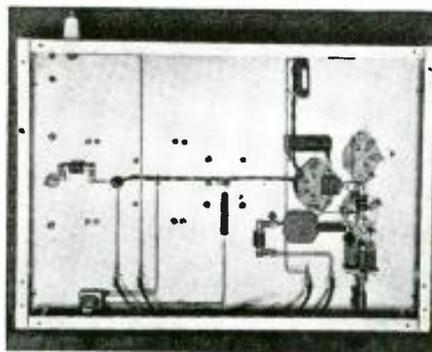
Front view of the completed crystal-controlled 5-10-20 meter transmitter with dynamic microphone. Modulator at bottom and r.f. section at top.

**T**HE amateur bands used for practical communication purposes range from 5 to 160 meters. It is difficult to design and build a transmitter which will work efficiently over this range. Consequently it is general practice for the amateur to employ two separate r.f. sections, namely, a single-stage, self-excited oscillator for 5 meters, and a multi-stage crystal-controlled r.f. section for the lower frequency bands. The 10-meter band is usually taken care of by the low frequency transmitter. This often entails a loss of efficiency on 10 meters, since the gap between this band and 160 meters is usually wider than can be bridged efficiently with a single transmitter.

### Best Dividing Line

The dividing line in amateur transmitters should come, not between 5 and 10 meters as in the past, but rather between 20 and 40 meters. This divides the six amateur communication bands evenly between two transmitters, three bands for each. Then each of the transmitters can be designed to cover its range of frequencies efficiently. It is not necessary, for instance, to make critical adjustments on a 160-meter transmitter so that a few dozen watts or so of 10-meter output can be obtained. Power supplies and audio systems will work equally well with r.f. systems working on any frequency and can be easily switched between them.

This article covers a crystal-controlled transmitter for the 5-, 10- and 20-meter bands. Crystal control on 5 meters at one time meant using a long string of frequency-multiplying stages from a low frequency crystal, excess driving power for "hard to drive" transmitting tubes and inefficient tank circuits due to high minimum capacity of standard transmitting condensers. Fortunately, this has been changed within comparatively recent months. Now 10-meter crystals are available, at reasonable prices, which have as high an output and are as reliable in operation as the more familiar low-frequency crystals. A variety of low-C "easy-to-drive" transmitting tubes are offered by several manufacturers, these being also easy on the pocketbook. The coil and condenser manufacturers



Under-chassis view of the r.f. section showing location of condensers and r.f. chokes.

have also brought out components designed specifically for this work. This means that the average amateur can build an ultra-high-frequency transmitter with the same ease and efficiency of operation as his old transmitter, simply by employing components designed for this particular work.

### Tubes and Crystals

Either 20- or 40-meter crystals may be employed for 20-meter operation, with straight-through operation with the former crystal and doubling but once with the latter. Similarly, a 20-meter crystal permits straight-through operation for 20 and will reach 10 with a single doubler stage. Either of these two types of crystal works well in standard circuits and with standard tubes.

The new 10-meter crystals also work well with standard crystal oscillator circuits but require the correct tube types for this high frequency, just as the correct high-frequency tubes must be employed in the final and other r.f. stages. Among the several types satisfactory for this work are the RK-34 and RK-25, these two tubes, according to Bliley, furnishing the highest 5-meter output of any types when used with their 10-meter crystals.

The RK-34 is of the dual triode type and is used in what is commonly known as the "Jones" circuit. One section of the tube is employed as a straight crystal oscillator and the other as a doubler to 5 meters. The RK-25 is employed in the Tritet circuit to produce 5-meter output from a 10-meter crystal. Either circuit will give the same output on 5 meters, about  $3\frac{1}{2}$  watts, with about the same number of parts being necessary for either tube.

In developing the AWR Mobile Transmitter, described in the July 1937 issue of ALL-WAVE RADIO, it was found that the RK-25 worked excellently in a self-excited, electron-coupled circuit. With the grid circuit tuned to 10 meters, several watts of 5-meter output could be secured. The frequency stability was far better than originally expected, a pure d.c. note being obtained which did not shift even when the RK-25 was di-

# 5-10-20

## Optional On All Bands

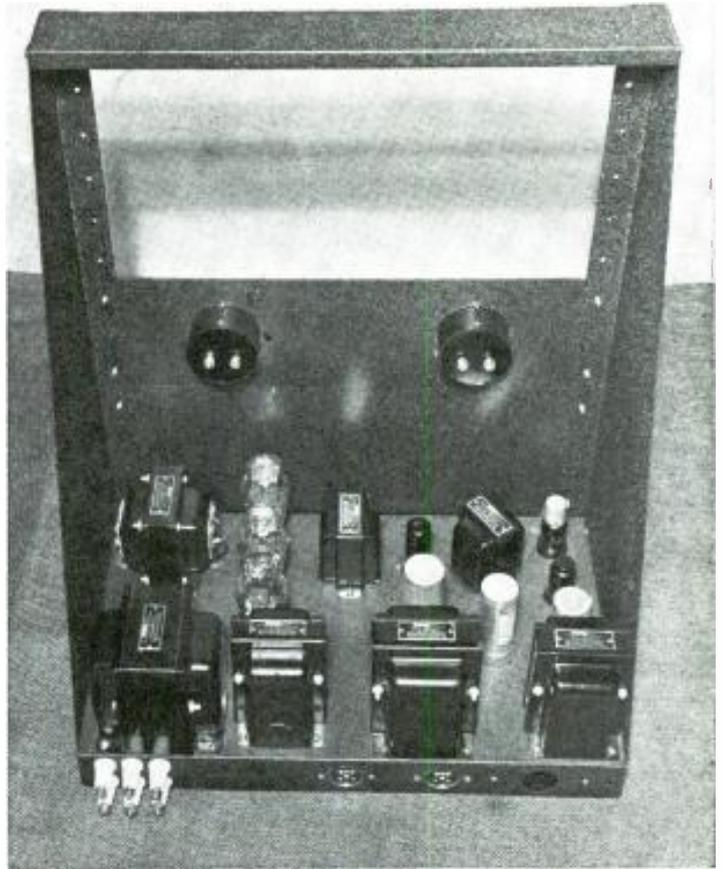
and WILLARD BOHLEN • W2CPA

rectly modulated. So it was decided to use the RK-25 in the Tritet circuit for crystal operation on 5 meters, it being possible to shift to the self-excited, electron-coupled circuit merely by using a grid coil in place of the cathode coil. In this way we would have the ultra-stability of crystal control with optional shift to a very stable self-excited oscillator tunable to any place in the 5-meter band.

### Low and High Power

Original plans for the transmitter called for an output in the neighborhood of 100 watts or so on all three bands, 100-per cent modulated. For this purpose the new RK-11s and RK-12s were chosen. The RK-11s are high-frequency tubes taking a maximum input of 750 volts and 100 ma. per tube, while the RK-12s are zero bias Class B tubes giving an audio output of 100 watts at this same voltage. Using a pair of the former tubes in push-pull permits of an in-

Rear view of the completed transmitter with r.f. section removed to give a better view of the modulator chassis. Note transformer at 45-degree angle.



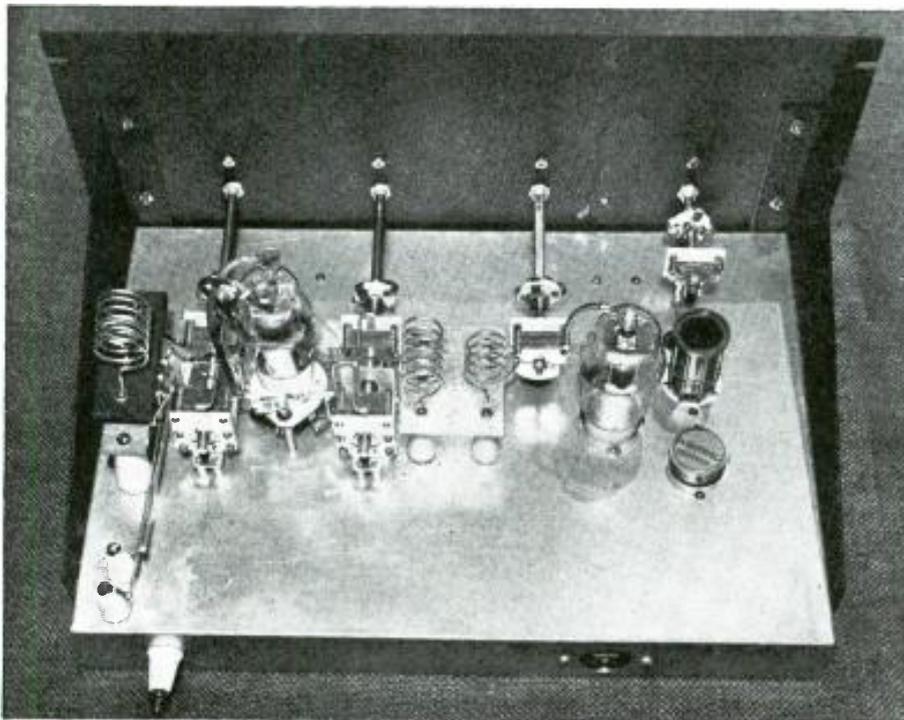
put to the final amplifier of 150 watts with more than enough audio to fully modulate this input.

As a buffer stage between the RK-25 oscillator and the push-pull RK-11s an RK-34, used in a push-pull circuit, at 400 volts, was chosen. For audio drivers

to the RK-12 Class B stage self-bias 2A3s were picked. It was then found that the 2A3s, modulating the RK-34 buffer stage, formed an excellent low-powered phone transmitter. A single 400-volt supply could be utilized for both the low power r.f. and audio sections. This combination would permit of full modulation of an input of 30 watts to the RK-34. The result would be a crystal-controlled carrier of 15 or more watts. Any 5-meter operator knows the efficacy of a signal such as this on the band. Even on 10 meters this power is adequate for some good phone DX, although the signal would get rather lost in the shuffle on the high-powered 20-meter phone band.

### The Low-Power Rig

The transmitter was accordingly laid out in two sections. That described in this first article comprises a complete long-powered phone for any of the three bands. A two-section rack holds the common 400-volt power supply and complete audio system, up to and including the push-pull 2A3 stage, on the lower deck. The upper deck contains the RK-25 combination oscillator, as described, as well as the push-pull RK-34 buffer-final. The center panel contains the meters. This low-powered transmitter unit is complete in itself so that it is only necessary to connect the a.c. line, the antenna, and plug in a high quality crystal or dynamic microphone in order to go on the air.



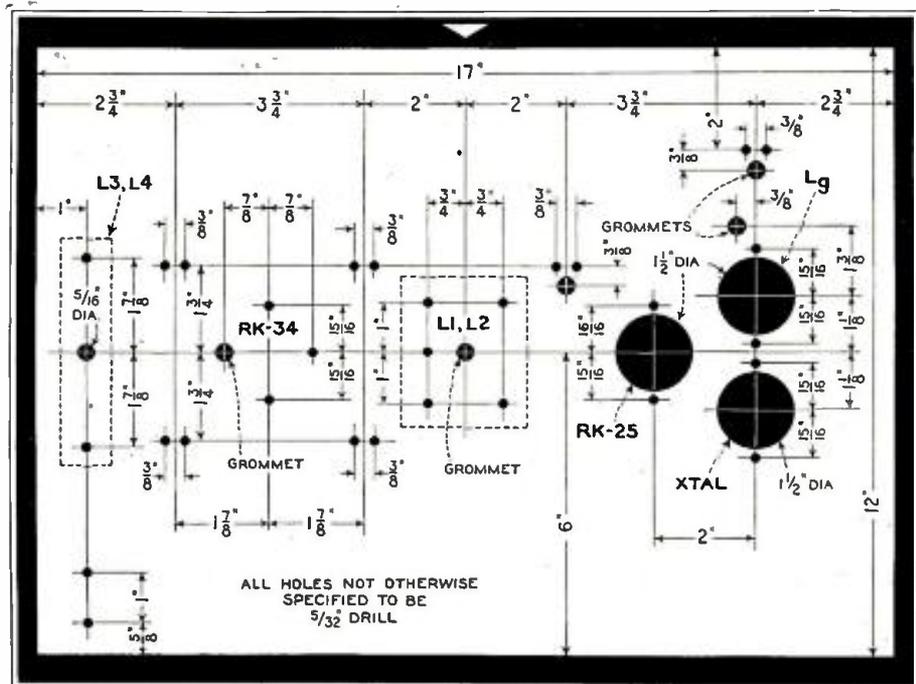
Chassis view of the complete r.f. section showing details of coil mountings and relation of components.

The 100-watt high power unit, to be described next month, is similar in layout to the low-power unit. The same rack and layout of panels and chassis will be utilized. The RK-12 modulator stage and common 750-volt supply will occupy the bottom deck. The push-pull RK-11 final amplifier will occupy the top deck with the meter panel in between.

Before going ahead with the low-power section it was necessary to devise a simple method of interconnecting the low- and high-power sections. This would permit an amateur to build the low-power unit first, use it as long as desired, and later add high power without performing a major operation. Or to change back to low power at any time without first digging out the tool box.

Fig. 2 illustrates how this is done. The plates of the 2A3s are not connected directly to the transformer T2, but rather to a pair of feedthrough insulators, (4) and (6), mounted on the back edge of the lower chassis. Plate voltage is brought out to (5). (1) and (3) go to the modulation transformer primary, (2) going to the "hot" side of the secondary. When operating on low power phone (4) is tied to (1) and (6) to (3), as indicated by the dotted lines. This connects the plates of the 2A3s to the primary of the transformer. (2) is then run up to the high-voltage feedthrough insulator on the r.f. chassis directly above. The plates of the 2A3s are then perfectly matched to the load of the RK-34 amplifier stage, the 5000-ohm tap on the secondary being employed as indicated.

When changing to high power it is necessary to work the plates of the 2A3s into the grid load of the RK-12 modulators, rather than the r.f. load of the RK-34. A separate transformer is used for this purpose, mounted in the high-power



Constructional details of chassis for r.f. section.

unit. The jumpers across (1) and (4), and (3) and (6) are then removed, while the plate lead to the RK-34 is changed from (2) to (7). This takes the modulation transformer, T2, entirely out of circuit. Posts (4), (5) and (6) are then run over to corresponding posts on the high-power unit. In this way the 2A3s may be changed from modulators of the RK-34 to drivers of the RK-12s with a few simple changes on the back of the chassis. Post (7) is not shown on the rear view photo, it being installed after this photo was taken. The sketch of the rear of the transmitter in Fig. 2 indicates its proper position.

Simultaneous control of the filament and plate voltages of both the low- and high-power units is accomplished by tak-

ing the a.c. voltages for the high-power unit from socket S1 in Fig. 2. Connections are such that filament switch SW2 and plate switch SW3 will then also control the high-power unit. It will be noticed that a separate filament transformer, T4, is employed. This greatly simplifies the switching procedure, as taking filament voltages from the plate transformer makes it necessary to switch the plate voltage in the secondary d.c. circuit.

Also note that the plate voltage for the audio section is taken from a different position in the filter than the plate voltage for the r.f. section. The latter is taken from directly after the first choke, T6, while the former is taken after the second choke, T7. This helps to isolate the two sections.

### The R. F. Section

The r.f. section of the low-power unit is diagrammed in Fig. 1. The circuits for both stages are standard. Coil socket L is so arranged that plugging in the proper coil automatically changes the circuit from crystal control to self-excitation. With a cathode coil of the type Lc plugged into socket L and a crystal into the crystal socket, the oscillator is crystal controlled. C and C1, in parallel, tune the cathode coil.

For self-excited operation, a type Lg coil is plugged into socket L and the crystal removed. C and C1 then tune the oscillator to any desired frequency. C1, which is of 100 mmfd. maximum capacity is used as the padding capacity while the 15 mmfd. condenser, C, is used for band-spread. A vernier dial on C, which can be read to one-tenth of a division, makes accurate logging and frequency setting possible.

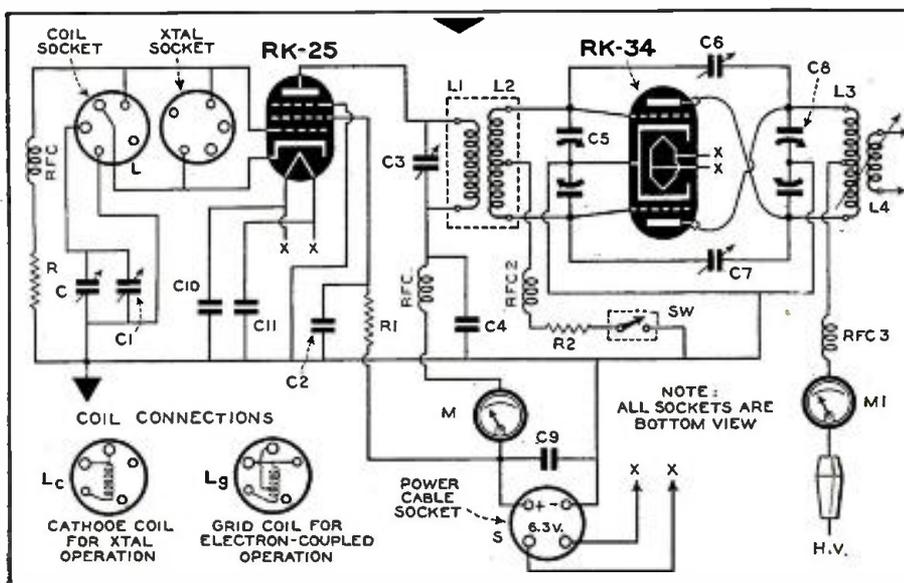


Fig. 1. Schematic diagram of r.f. section: also coil connections.

The RK-25 is inductively coupled to the push-pull grid circuit of the RK-34. Inductive coupling has all the advantages of link coupling without the bothersome links. The close proximity of the two stages makes inductive coupling most practical for our purpose.

The circuit of the RK-34 is of the ordinary push-pull type, cross neutralized. The difference in design of this low-power section for the ultra-high frequencies and the lower frequency bands lies not in the circuit but rather in the actual components employed, as mentioned previously, and their placement and wiring. We will describe the present set-up carefully so that results may be duplicated by the constructor.

Four dials and two knobs are shown on the panel. The left hand dial tunes the band-spread condenser, C, while the other dials, in order, control C3, C5 and C8. The bar knob under the left-hand dial controls the padding condenser, C1. The knob under the right hand dial controls switch, SW, in the grid circuit of the RK-34. This switch is turned off when neutralizing the RK-34.

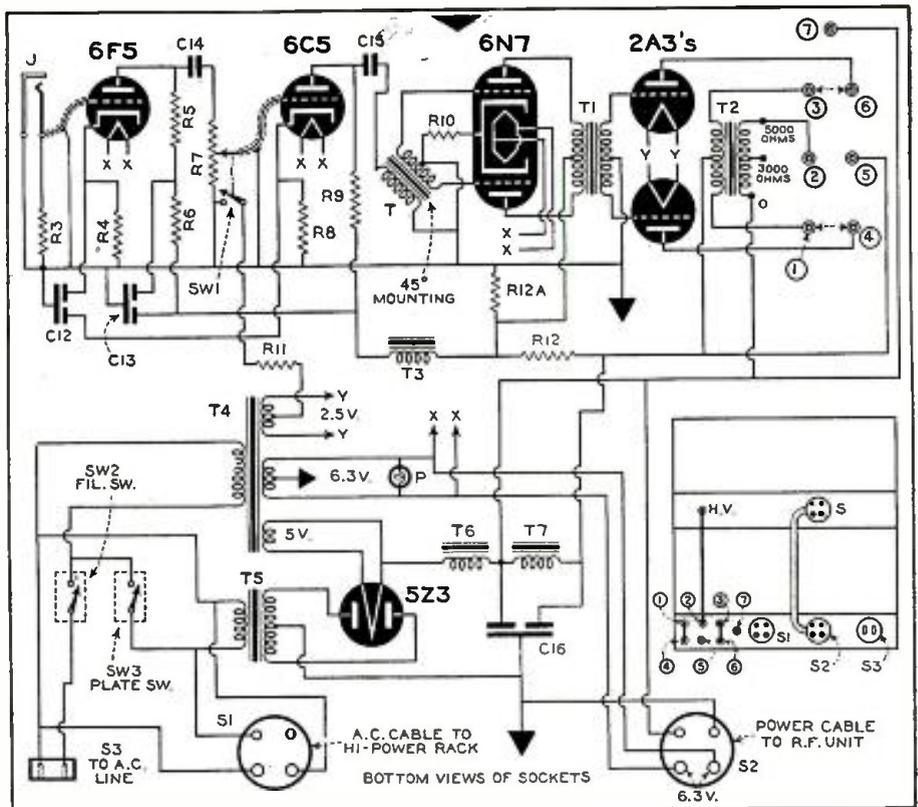
Looking at the rear view photo of the r.f. chassis, the line-up starts from the right hand side. The positions of the RK-25, crystal, coil L and band-spread condenser C are clearly shown. This condenser is mounted and controlled in the same manner as the other tuning condensers. Flexible Cardwell type A couplings isolate the rotor from the shafts which extend through Yaxley type UB241 panel bushings. Cardwell mounting brackets hold the condensers in an "upside-down" position. Note that C5 and C8 are held by both front and rear brackets. All these brackets are, in turn, mounted a half-inch above the chassis with Cardwell type BHP bushings, two to a bracket. The bottom holes in the brackets are redrilled and retapped for 6/32 bolts. Long 6/32 bolts then extend up through the chassis and the bushings and then screw into the brackets. If it is not desired to re-tap the brackets, 4/32 long bolts may be used instead.

The padding condenser is mounted underneath the chassis, directly under C, as shown in the photo. A Cardwell bracket holds this condenser to the underside of the chassis, no bushings being necessary. The holes in this bracket are drilled to clear 6/32 so that the same bolts that hold C1 down also hold this bracket. Another flexible coupling, shaft and bushings are used to control C1.

Wire the crystal socket, socket L and condensers C and C1 with stiff bus, with as short leads as possible. A pair of grommets under C permit direct connections between the two parallel condensers.

### Coils and Mountings

Between the two tubes are grouped V3, L1, L2 and C5, in the same order.



### BIRNBACH

- 1—type 458 feedthru standoff insulator
- 5—type 431J jacktype cone standoff insulators
- 8—type 478 feedthru standoff insulators
- 6—type 430 cone standoff insulators
- 2—type 432 cone standoff insulators
- 5—type 403 jacks
- 10—type 401 banana plugs (10 for each band)
- 1—type 382 100-foot coil black No. 18 slip-back wire
- 1—type 1493 100-foot coil No. 12 solid tinned wire
- 1— $\frac{1}{4}$  lb. spool No. 24 disc magnet wire
- 1—type 425 25-foot coil black, stranded, rubber covered wire
- 3 ft. of 6-conductor battery cable

### BLILEY

- 1—type HF2 10-meter xtal for 5 meters
- 1—type HF2 10-meter, or B5 20-meter xtal for 10 meters
- 1—type HF2 20-meter, or B5 20-meter xtal for 20 meters, or B5 or BC3 40-meter xtal

### BUD

- 2—No. 595 coil forms, 5-prong (2 for each band)
- 2—No. 955 Isotex 5-prong sockets
- 2—No. 958 Isotex large 7-prong sockets
- 6—No. 113 4-prong wafer sockets
- 3—No. 499 S. P. S. T. rotary toggle switches
- 4—No. 920 r.f. chokes (RFC, RFC1, RFC2, RFC3)
- 3—No. 390 octal wafer sockets
- 4—No. 163  $2\frac{3}{4}$ " tuning dials
- 5—No. 579 bakelite bar knobs, black
- 2—No. 290 4-prong cable plugs

### CORNELL-DUBILIER

- 3—type 9-6D2 .002 mfd. mica (C2, C4, C9)
- 3—type DT-4S1 .01 mfd. paper, 400 v. (C10, C11, C14)
- 1—type KR288 dual 8-8 mfd. electrolytic 250 v. (C12)
- 1—type KR588 dual 8-8 mfd. electrolytic 450 v. (C13)
- 1—type DT-4P1 .1 mfd. paper, 400 v. (C15)
- 1—type PE-B6808 dual 8-8 mfd. paper, 600 v. (C16)

### IRC

- 1—25,000 ohms, 1 watt carbon (R)
- 1—5,000 ohms, 2 watts carbon (R2)
- 1—5 megohms,  $\frac{1}{2}$  watt carbon (R3)
- 1—6,000 ohms,  $\frac{1}{2}$  watt carbon (R4)
- 1—500,000 ohms,  $\frac{1}{2}$  watt carbon (R5)
- 2—100,000 ohms,  $\frac{1}{2}$  watt carbons (R6, R9)
- 1—5,000 ohms,  $\frac{1}{2}$  watt carbon (R8)
- 1—2,000 ohms,  $\frac{1}{2}$  watt carbon (R10)

### CARDWELL

- 1—type ZR15AS 15 mmfd. Trimair with mount. brack. (C)
- 1—type ZU100AS 100 mmfd. Trimair with mount. brack. (C1)
- 1—type ZR50AS 50 mmfd. Trimair with mount. brack. (C2)
- 2—type EU75AD dual 75 mmfd. Trimair with

- mount. bracks. (C5, C8)
- 5—type A flexible couplings
- 20—type BHP hexagonal posts

### PAR-METAL

- 1—type 3604  $8\frac{1}{4}$ " x 19" steel panel
- 1—type 3603 7" x 19" steel panel
- 1—type 3677  $5\frac{1}{4}$ " x 19" aluminum panel, or 1 type MP-33 meter panel (see text)
- 1—type TR-2520 rack
- 1—type C-4516 12" x 2" x 17" cadmium-plated chassis
- 1—type CP-4516 bottom plate for above chassis
- 1—type SB-711 pair of brackets

### RAYTHEON

- 1—type RK-25
- 1—type RK-34
- 1—type 6F5
- 1—type 6C5
- 1—type 6N7
- 1—type 5Z3
- 2—type 2A3

### THORDARSON

- 1—type T-57A41 interstage transformer, 1 plate to 2 grids (T)
- 1—type T-58A70 driver transformer, 2 plates to 2 grids (T1)
- 1—type T-72MO2 modulation transformer to r.f. load (T2)
- 1—type T-79F84 filament trans., 2.5 v., 5v., 6.3 v. (T4)
- 1—type T-13C27 filter choke, 40 ma. 10 h. (T3)
- 1—type T-84P60 plate transformer, 515-0-515 v. (T5)
- 1—type T-75C51 filter choke, 250 ma. 12.9 h. (T6)
- 1—type T-74C29 filter choke, 150 ma. 10 h. (T7)

### TRANSDUCER

- 1—type MK-35 dynamic microphone
- 1—desk stand for above

### WARD LEONARD

- 1—type 507-453 15,000 ohms, 25 watts (R1)
- 1—type 507-192 750 ohms, 40 watts (R11)
- 1—type 507-412 10,000 ohms, 10 watts (R12)

### YAXLEY

- 1—type A-1 jack (J)
- 1—type N potentiometer (R7)
- 1—type 6-9 volume control switch (SW1)
- 1—type 310G pilot light bracket (P)
- 1—type 171 pilot light bulb (P)
- 5—type UB241 panel bushings

### TRIPLETT

- 1—0-100 ma., d.c., 3-inch bakelite case meter (M)
- 1—0-150 ma., d.c., 3-inch bakelite case meter (M1)

### MISCELLANEOUS

- 1—metal tube type shield for 6F5
- 1—a.c. outlet

Note particularly the mounting of L1 and L2. Five jack-type cone insulators, No. 431J are grouped between C3 and C5 to support the two coils. Because of the close proximity of these two coils, it is possible to mount them on a common base. Victron is suitable for this base, although a different insulating medium was employed. The coupling between the coils may be varied by mounting them a bit above their common plug-in base and bending their leads. It was found that the degree of coupling was satisfactory with the coils directly above their mounting insulators. Type 401 banana plugs are utilized, five to a coil set.

C8 and L3 of the RK-34 plate tank circuit are mounted at the extreme left of the chassis (rear view). Two type 432 cone standoff insulators support a Victron strip which in turn supports five type 403 jacks. This jack strip then takes the plate coil, which is air-wound and mounted on a strip of Victron. Five type 401 banana plugs are necessary for each coil.

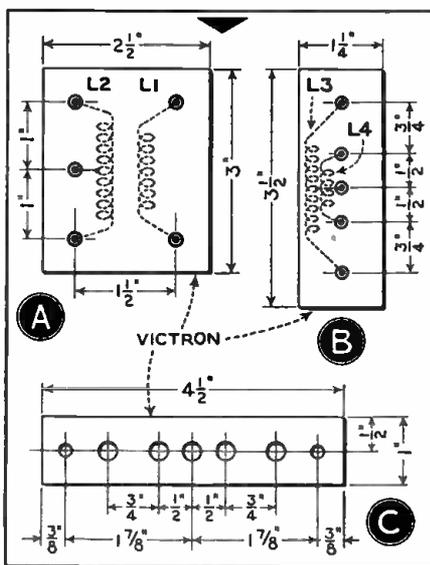
A pair of type 430 cone standoff insulators mounted at the left rear corner of the chassis connect to the link jacks on the previously mentioned jack strip. The center jack of the strip connects to a type 458 feedthru insulator placed in the chassis directly beneath this jack.

Extreme care should be taken that the leads in the RK-34 stage are not only as short as possible but that the leads on the two sides of the push-pull circuit are absolutely symmetrical. It will be noticed that the socket for the RK-34 is mounted an inch above the chassis. Four of the type BHP posts, together with a pair of long 6/32 bolts will do the trick. The RK-25 socket, incidentally, should be mounted a half-inch below the chassis with a pair of the same posts.

The common ground lead for this stage is wired in first. The rotor lugs of the tuning condensers, which should face upward, are first connected with short pieces of bus. The cathode prong of the tube socket, which should face the grid tuning condenser, is then connected to a lug held under the head of a bolt which should be mounted in the chassis directly under the cathode prong. This bolt constitutes the common ground point for the entire stage. Separate buses then run up to the rotor jumper buses. The one to the plate rotor jumper should run under the socket, between the heater prongs, and then up. If these directions are followed a perfectly symmetrical ground system will result. The wires to the heater prongs run down through a grommet in the chassis directly under them.

### Neutralizing Connections

The neutralizing condensers are of the 3-30 mmfd. mica compression type with



Details of coil mountings. (A) is base for L1-L2. (B) is base for L3-L4 which plugs into (C) on which are mounted jacks for banana plugs.

isolantite insulation. Cross neutralization is necessary, i.e., each condenser connected from the grid of one section of the RK-34 to the plate of the other section. This is a little difficult to accomplish in such a compact layout. We have therefore used the dodge of crossing the plate leads themselves. This is indicated in the diagram. By crossing the plate leads it is possible to connect the neutralizing condensers, C6 and C7, directly between the stator connection lugs of the tuning condensers on the same side of the circuit. The rear view photo shows clearly the position of one of these condensers. One lug of each of the neutralizing condensers solders to the corresponding stator lug on the plate condenser. A short piece of bus completes the connection to the grid stator lug.

The meters are mounted on a center panel, which is 5 1/4 inches in height.

Meter panels are available in this height already drilled for either three or five meters in either the 2-inch or 3-inch size. As only two meters are employed in the low-power unit, a blank panel was drilled. This is of aluminum, since steel panels are too difficult to drill for large size holes. An alternate meter panel of the ready-drilled type with three meter holes is listed in the legend for those who wish to avoid drilling these holes. The extra hole may be filled by an additional meter, which could well be placed in the grid circuit of the RK-34, or covered in some other fashion.

Connections to the meters are brought to four type 430 small cone standoff insulators which are screwed under the r.f. chassis in pairs above the meters. Flexible leads of rubber-covered wire are then run down to the meters. An alternate plan would be to use 431J jack-type insulators and plug the meter leads into them. Type 401 banana plugs could be mounted on small pieces of insulating material in pairs.

The r.f. unit was built on a standard chassis, fastened to the panel with brackets. The meter panel, of course, requires no chassis or brackets. In building the audio-power section, we employed a dodge which saves the cost of an extra chassis and simplifies the construction considerably. The type TR-2520 rack consists of two sides, a top cross piece and a bottom pan, these parts being shipped knocked-down and assembled with a few bolts. This bottom pan is constructed in similar fashion to a chassis, with sides, back and front edges. The audio-power section is accordingly mounted directly on it. The controls are mounted on the front edge. As the lower panel does not extend down over this front edge it is not necessary to drill the lower panel at all. It is merely bolted to the rack

(Continued on page 326)

### COIL DATA

Coil	Symbol	Turns	Length	Wire	Cath. Turns	Inside Dia
A	Lg	5	3/4"	22 dsc.	1 1/2	*1 1/8"
B	Lc	2 1/4	1/2"	24 dsc.	—	*1 1/8"
C	Lc	4	3/8"	24 dsc.	—	*1 1/8"
D	L1	5	1 1/8"	12 tin.	—	3/4"
E	L1	10	1 1/2"	12 tin.	—	3/4"
F	L2	6	1 3/4"	12 tin.	—	3/4"
G	L2	12	2 1/4"	12 tin.	—	3/4"
H	L3	6	1 1/2"	12 tin.	—	1"
I	L3	12	2 1/4"	12 tin.	—	1"
J	L4	3	(No. 18 pushback wound inside L3)			
K	L4	3	(No. 18 pushback wound inside L3)			

\* Bud No. 595 5-prong coil forms.

Band	Coil for use at				Crystal	Coils D to K inclusive are air wound on plug-in supporting base. Barker & Williamson Inductors listed.
	L	L1-L2	L3-L4			
5 Meters	A	D - F	H - J		None	
10 Meters	B	D - F	H - J		10 meter	
10 Meters	B	E - G	I - K		10 meter	
20 Meters	C	E - G	I - K		20 meter	

# Hamfest

By W8QMR (W4FCP) ex-2PI • LU4S

OUR characterization of the 160-meter fone band as the "backyard of amateur radio" has elicited some comment. The impression seems to be that just because we're a c.w. man we can't see the fone op. The fone adherents point out the undisputable fact that speech is a more natural form of communication, and with simple logic ask the question of why should anyone waste ten minutes sending in code what can be said with spoken words in thirty seconds.

Well now, that's the thing that's puzzled us most—why a fone op takes ten minutes to say what a code man can get across in thirty seconds.

♦  
 "W8QMR, ETC., ETC. SIR: Your remarks concerning the 160-meter fone band display a degree of narrow-mindedness equaled only by your apparent conceit in the fact that you can copy thirteen words per minute—or was it only ten words when you took the exam? I should like to point out to you that all fone operators took a similar code examination. In other words, the only difference between the code man and the fone man is the fact that the fone man knows more about radio. Yours truly—  
*Pro Bono Fono.*"

♦  
 "DEAR QMR: Thought you might be interested. Just heard the following on the 160 fone band—"Calling the station that I think just called CQ. Calling

## THE LOVE OF MIKE . . . AUTOGRAPH HUNTERS ATTENTION . . . QS-ODE



Fig. 2. A ham station of 15 years ago—W2RK, and about the most prominent in the Second District.

the station that I think just called CQ. At least that's what it sounded like. Come back on fone.' 73, Wilbur W. Cashwell, W4EFK."

♦  
 W4DVO, SCM FOR E. FLA., was working W9ZGB the other night, and the latter, after the usual preliminaries, gave his QTH as Emporia, Kansas, whereupon DVO remarked that Emporia owed its place on the map to William Allen White. "You're telling me!"

sez W(N)9ZGB with a couple of HIs—"I've been working for him over twenty years." Just to prove it, ZGB sent through the QSL shown in Fig. 1. Something tells us that ZGB is going to be a popular station with the autograph hunters.

♦  
 JUST TO SHOW that "Channel Echoes" doesn't cop all the Old Timers photos, Dave Talley, W2PF, WLNA, sends us Fig. 2, showing 2RK as it appeared in 1922. Note the old Grebe CR3, the Magnavox speaker, the Western Electric and Baldwin fones. 2PI worked Kenneth Hewlitt (RK) plenty in the old spark days.

♦  
 WE HAVE ON HAND a flock of QSL cards. Wish we had room for all of them. We can't reproduce the very handsome card of W8NQS, Edison Institute Radio Club of Dearborn, Michigan, because two of the illustrations are half tones. However, here is the card (Fig. 3) of W8QBW-W8QDK (conservative but different) and that of W2KUG (Fig. 4) contributing a touch of humor. The call letters of the latter are in red, and the rest blue on a white card. Writes Jennie Lathrop—"The reason we had these made was to discourage other

(Continued on page 335)

**EMPORIA, KANSAS 527 UNION ST.**

RADIO W4DVO UR CW SIGS WKD Jan 11 1938 AT 11:35 P. M. CST

3.5 MC. UR SIGS RST 589x QRM fone QRN —

**N9ZGB**

Xmit: Fr 6L6G (parallel) xtal osc 20 watts input. Revr: 58-56 blooper

Remarks: *Many tubes for fr good on es u sure had nice sig for 2nd class in 1st Fla ca 46th state h(on 80)*

Pse QSL Tnx Vy 73 es C U Agn *Musty*

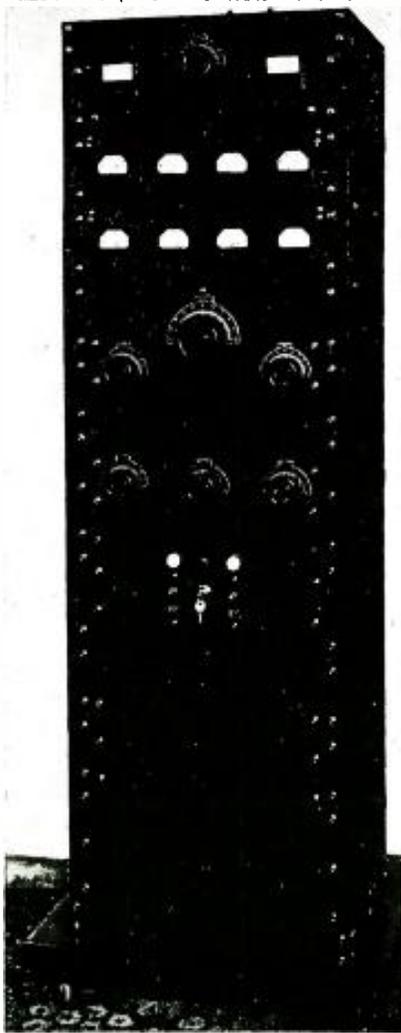
USNCR ARRL **ARTHUR W. AUSGRAVE**

Fig. 1. An autograph on a QSL card. We predict unusual popularity for N9ZGB.

# MODERN RACK & PANEL

## All Band, Relay-Controlled Rig.

### PART I



Front view of the completed rack and panel c.w. and phone transmitter. The wooden base has casters.

**F**OR the ham who wants a rig better than the usual run-of-the-mill transmitter, and yet not too expensive, we recommend the job illustrated in the accompanying photos. This transmitter provides 380 watts on c.w. and 280 watts on phone—plenty of power to get you places on any band. It combines frequency stability, simplicity in band changing from

20 to 160 meters, interlocking filament and plate control and overload protection. The transmitter also features a high-gain, distortionless pre-amplifier with an oscilloscope for modulation monitoring, and a magic-eye carrier-shift indicator.

The following description and technical notes on operation will be of interest not only to the amateur wishing to duplicate the design, but to the casual reader as well, who may find some particular unit worthy of addition to his present equipment.

#### Division of Units

The transmitter is divided into seven units, any one of which may be easily removed from the enclosed relay rack for test or repair. The bottom deck, which is the relay-rack base, carries both the final amplifier power supply and the control system. The latter includes a time delay relay, keying relay, and filament and plate relays. These are grouped together in the schematic diagram under the heading "Control Circuits." The chassis directly above the final power supply carries the modulator and the power supply for the speech amplifier. The exciter power supply and the rectifier filter system of the modulator power supply are on the third shelf, which also contains the filament and plate start-stop switches, SW3 and SW5. The exciter unit and final amplifier are located on the fourth and fifth deck respectively. The top deck carries the antenna-matching network.

When designing the transmitter, it was found that it would be impossible, because of space limitations, to include the monitor and speech amplifier in the main rack. However, it is far more convenient and more to the point to have this equipment at the operating position where it is within easy reach and view. As a result, these units were built into a separate metal cabinet along with a duplicate set of start-stop controls for remote operation. This equipment will be covered in the second installment of this article, to appear next month.

#### The Exciter Unit

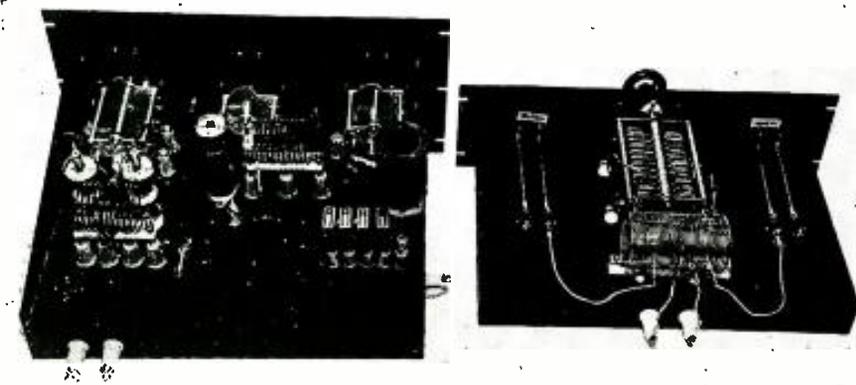
The exciter unit comprises a 6F6 pentode oscillator tuned to the crystal frequency and capacitively coupled to a 6L6G neutralized amplifier, doubler or quadrupler. The 6L6G is in turn capacitively coupled to a pair of 807s in parallel which are link-coupled to the HF-200 single-ended final.

A Pierce oscillator was originally tried for the exciter, but failed to provide sufficient excitation for the 6L6G when doubling or quadrupling. However, the Pierce oscillator can be used to advantage if 40- and 20-meter crystals are available for straight-through operation.

The plate supply for the 6F6 oscillator is obtained from the exciter power supply voltage divider, R9, and the screen voltage through a 15,000-ohm dropping resistor. The plate supply for the 6L6G doubler is obtained from a 2500-ohm series resistor, R8, with a 15,000-ohm resistor in series with it. The 807 driver plate voltage is the full exciter power supply voltage, with the screen tapped to the voltage divider.

#### Exciter Adjustments

The procedure in neutralizing is standard and will therefore not be dealt with in great detail. Both the B plus switch, SW7, and the 807 B plus switch, SW8, should be opened, and it is recommended that a 0-10 ma. milliammeter be connected between chassis ground and the low side of the bias resistor. The oscillator tuning condenser may then be adjusted until maximum deflection is indicated on the grid meter. When the stage is properly neutralized, no variation in grid current will occur when the doubler tuning condenser, C11, is rotated.

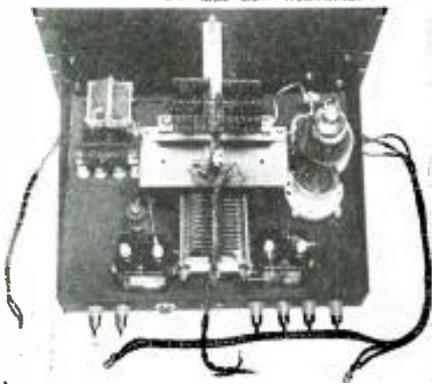


Rear-of-chassis views of the exciter unit with its plug-in coils and bank of crystals, and the antenna-matching network.

# C. W. & FONE TRANSMITTER

## 380 Watts C. W., 280 Watts Fone

By ALVIN ABRAMS • W2DTT



The final amplifier stage with its HF-200 tube and associated components.

When the stage is neutralized, the meter may be removed from the circuit and the bias resistor grounded permanently, after noting the setting of the neutralizing condenser.

If it is found that after neutralizing, r.f. is not completely eliminated, stray capacities between various parts of the amplifier circuit tending to upset the voltage balance may be responsible. The remedy for this—which should be taken care of at the outset—is the use of short, widely spaced connections.

The 807 stage normally does not require neutralization when the circuit connections are such that the input and output circuits are sufficiently isolated. In a breadboard type construction, the components can be arranged so as to provide optimum wiring conditions. However, in cabinet type construction, some sacrifices usually must be made to provide uniformity of appearance, and it was found that the 807 stage would oscillate by itself. A neutralizing condenser was therefore found necessary to nullify the grid-to-plate capacity.

The neutralizing procedure in this case is the same as for the 6L6G, except that a grid meter, M4, is permanently connected in the grid circuit for convenience and for a check on driving power.

A screen potential of 250 volts is recommended for Class C operation and the screen current must not exceed 18 mils. The screen voltage supply is obtained from the exciter power supply voltage divider and can be adjusted to the correct point.

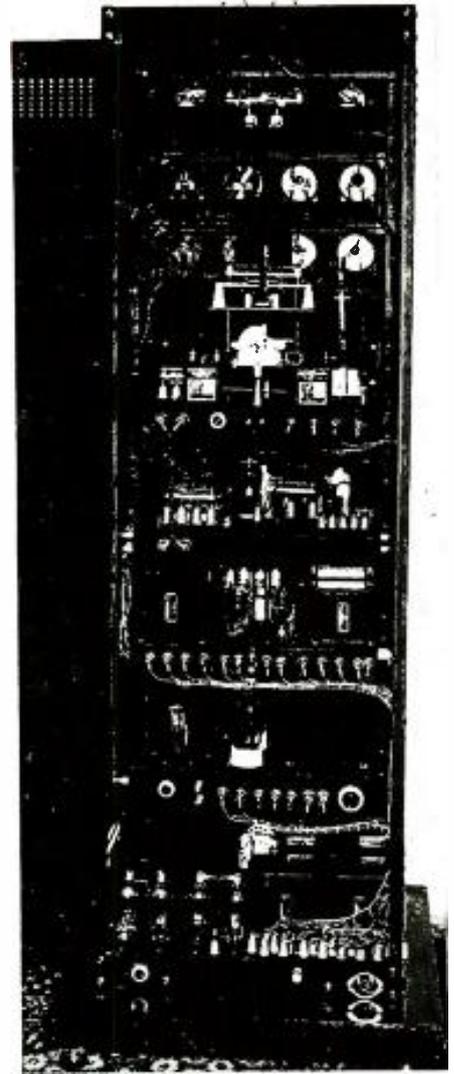
### The Final Amplifier

An Amperex HF-200 was selected for the final stage because of its conservative rating and its high ratio of transconductance to interelectrode capacitance. The author also liked the new method of channel support which holds the tube elements securely in place, providing freedom from change in characteristics.

The Barker & Williamson variable link plate coil, L5, is mounted above the plate tuning condenser, with the neutralizing condenser on one side of the panel and the grid tuning condenser on the other side. An alternative arrangement is to place the plate tank circuit on one side, the neutralizing condenser and tube in the middle and the grid tank circuit on the other side.

When operated at a plate potential of 2000 volts, the maximum plate current is 200 mils and the output is close to 300 watts. The d.c. grid current for phone operation should be 50 mils. This input is permissible for a frequency limit of 30 megacycles.

When neutralizing has been effected in the final stage, the next step in tuning up is to adjust the grid current. The driver tank condenser should be adjusted to minimum plate current and the final amplifier grid condenser adjusted for maximum grid current. If the final grid or driver plate current is too high when loaded, the excitation to the driver should be reduced in order to provide the correct operating conditions. The driver plate current should not exceed 200 mils.



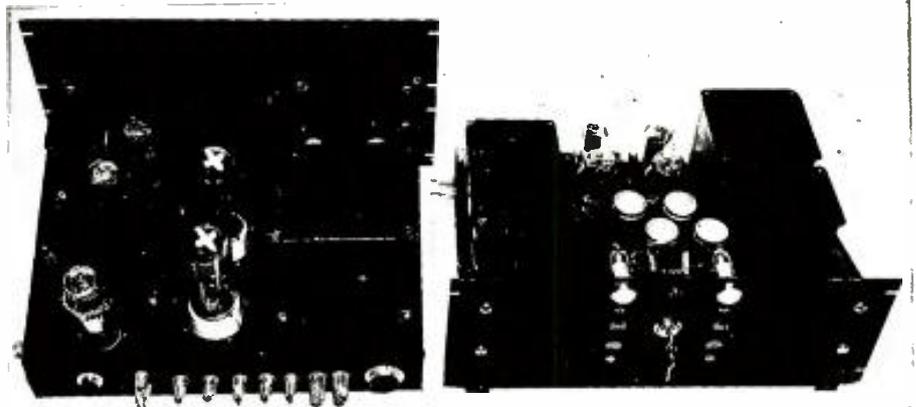
Rear view of the completed job with door open. Note removable cable connections between chassis.

The procedure in adjusting the antenna network, L6-C30, is as follows:

1) Adjust the swinging link of L5 to the lowest degree of coupling.

2) Set the antenna tuning condenser C30 at its maximum value and adjust the plate tuning condenser C24 for minimum final amplifier plate current.

3) Tune the antenna condenser



The modulator chassis with its ZB-120 tubes in push-pull and the final amplifier power supply. This latter chassis also carries the control relays.

through scale and note the position of maximum loading.

4) Tap the feeders on the antenna coil L6 to the turns that provide maximum loading at the condenser setting referred to in 3), or tune for maximum antenna current with a plate current not in excess of 200 mils.

5) Adjust the loading with the variable link and after each resetting of the link, repeat the procedure outlined in 2). When the impedance match between feeders and final tank has been reached, the setting of the final amplifier plate condenser will be approximately the same loaded and unloaded.

## Exciter-Buffer-Doubler

### AMERICAN RADIO HARDWARE

- 1—1305 Mycalex 5-prong socket
- 10—74 jack-top feedthru insulators
- 14—71 feedthru insulators
- 7—73 feedthru insulators

### AMPHENOL

- 2—Steatite octal sockets

### BARKER & WILLIAMSON

- 1—160BT doubler coil (L2)
- 1—80BT doubler coil (L2)
- 1—40BT doubler coil (L2)
- 1—20BT doubler coil (L2)
- 1—Model "B" Turret (L3)
- 1—160BTL buffer coil (L3)
- 1—40BTL buffer coil (L3)
- 1—20BTL buffer coil (L3)

### CARDWELL

- 2—MR150BS variable, 150 mmfd. (C10, C11)
- 1—MR260BD variable, 260 mmfd. (C12)
- 2—ZR10AS neutralizers, 10 mmfd. (C13, C13A)

### COTO-COIL

- 3—CI45 control wheels marked "Osc. Plate," "Doubler Plate," "Buffer Plate"

### HAMMARLUND

- 5—CHX r.f. chokes (RFC1, 2, 3, 4, 5)

### IRC

- 2—BT-1 50,000 ohms, 1 watt (R4, R5)
- 1—BT-2 15,000 ohms, 2 watts (R6)

- 1—BT-1 50,000 ohms, 2 watts (R7)
- 1—EPA 2500 ohms, 50 watts (R8)
- 1—HAA 50,000 ohms, 100 watts (R9)

### PAR-METAL

- 1—No. 3604 steel rack panel 8 3/4" high
- 1—No. 15212 steel chassis, 13" x 17" x 2"
- 1—No. SB-713 pair 13" brackets

### RCA RADIOTRON

- 1—6F6 tube
- 1—6L6G tube
- 2—807 tubes

### SOLAR

- 3—MP-4141 .01 mfd., 400 v. (C14, C15, C16)
- 2—MP-4135 .01 mfd., 600 v. (C17, C18)
- 1—XM6-26 .006 mfd., 600 v. (C19)
- 1—XM6-31 .0001 mfd., 600 v. (C20)
- 2—XM6-11 .01 mfd., 600 v. (C21, C22)

### TRIPLETT

- 1—327S illuminated meter, 0-50 ma., d.c. (M1)
- 1—327S illuminated meter, 0-100 ma., d.c. (M2)
- 1—327S illuminated meter, 0-200 ma., d.c. (M3)
- 1—327S illuminated meter, 0-25 ma., d.c. (M4)

### WHOLESALE RADIO SERVICE

- 3—13192 crystal holders
- 4—13053 type C knobs
- 2—13502 Trutest 80-meter X-cut crystals
- 1—13503 Trutest 160-meter X-cut crystal
- 2—12838 rotary switches (S7, S8)
- 1—12898 single-pole, 7-position switch (S9)

## Final Amplifier

### AMERICAN RADIO HARDWARE

- 2—No. 13 cone-type insulators, 2" high
- 10—No. 73 feedthru insulators, 1 3/4" high
- 7—No. 10 cone-type insulators, 3/4" high
- 2—No. 1350 r.f. chokes (RFC6, RFC7)

### AMPEREX

- 1—HF-200 tube

### AMPHENOL

- 1—SP-PC4F 4-prong socket

### BARKER & WILLIAMSON

- 1—160BL grid coil (L4)
- 1—80BL grid coil (L4)
- 1—40BL grid coil (L4)
- 1—20BL grid coil (L4)
- 1—type TV base assembly (L4)

- 1—160HDVL plate coil (L5)
- 1—80TVL plate coil (L5)
- 1—40TVL plate coil (L5)
- 1—20TVL plate coil (L5)

### CARDWELL

- 1—MO165BS variable, 165 mmfd. (C23)
- 1—XP325KD variable, 325 mmfd. (C24)
- 1—NA10NS neutralizer, 10 mmfd. (C25)
- 1—type A coupling

### COTO-COIL

- 2—CI45 control wheels marked "Neutralize," "Final Grid"
- 1—CI40 control wheels marked "Pwr. Amp. Plate"

### COMMUNICATION PRODUCTS

- 1—No. 12899 50-watt socket

### IRC

- 1—ESA 7500 ohms, 80 watts (R10)

### PAR-METAL

- 1—3605 steel rack panel, 10 1/2" high
- 1—15212 steel chassis, 13" x 17" x 2"
- 1—SB-713 pair 13" brackets

### SOLAR

- 1—XM12-22 .002 mfd., 1200 v. (C26)
- 2—MP-4141 .01 mfd., 400 v. (C27, C28)

### TRIPLETT

- 1—327S illuminated meter, 0-100 ma., d.c. (M5)
- 1—327S illuminated meter, 0-500 ma., d.c. (M7)
- 1—327S illuminated meter, 0-250 ma., d.c. (M8)
- 1—331 illuminated meter, 0-15 v., a.c. (M6)

## Antenna Unit

### BARKER & WILLIAMSON

- 1—TA antenna coil (L6)

### CARDWELL

- 1—XP165KS variable, 165 mmfd. (C30)
- 1—type A coupling

### JOHNSON

- 2—17025 metal base standoff insulators

### PAR-METAL

- 1—3602 steel rack panel 5 1/2" high
- 1—B-4516 steel chassis, 12" x 17" x 2"

### TRIPLETT

- 2—346 meters, 0-5 r.f. amps. (M9, M10)

## Speech Amplifier Power Supply and Modulator

### AMERICAN RADIO HARDWARE

- 2—No. 73 feedthru insulators 1 3/4" high
- 3—No. 1304 Mycalex 4-prong sockets
- 8—No. 72 feedthru insulators 1 1/4" high

### AMPEREX

- 2—ZB-120 tubes

### AMPHENOL

- 1—SP-PC3F 3-prong plug
- 1—PO6F 6-prong female receptacle

### COMMUNICATION PRODUCTS

- 2—K12899 50-watt sockets

### IRC

- 1—ABA 750 ohms, 10 watts (R2)
- 1—ESA 40,000 ohms, 80 watts (R3)

### KENYON

- 1—T-244 power transformer (T6)
- 2—T-154 filter chokes (T7, T8)
- 1—T-3 p.p. input transformer (T9)
- 1—T-259 p.p. input transformer (T10)
- 1—T-465 p.p. output transformer (T11)

### PAR-METAL

- 1—3605 steel rack panel 10 1/2" high
- 1—15213 steel chassis, heavy duty
- 1—SB-713 pair 13" brackets

## The Modulator

The 500-ohm input to the modulator terminates in a push-pull transformer feeding a pair of 6A3s operated Class AB. These serve to drive a pair of low-distortion, zero-bias ZB-120s operating at a plate potential of 1100 volts de-

### RCA RADIOTRON

- 1—type 80 rectifier
- 2—type 6A3 amplifiers

### SOLAR

- 2—DE908 electrolytics, 8 mfd., 500 v. (C3, C4)

## Modulator and Exciter Power Supplies

### ALLEN-BRADLEY

- 2—N1010 Start-Stop switches

### AMERICAN RADIO HARDWARE

- 4—No. 1304 Mycalex 4-prong sockets
- 15—No. 72 feedthru insulators
- 8—No. 74 jack-top feedthru insulators

### IRC

- 1—HAA 100,000 ohms, 100 watts (R4)

### KENYON

- 1—T-355 fil. bridge transformer (T12)
- 1—T-514 swinging choke (T13)
- 1—T-160 output choke (T14)
- 1—246 power transformer (T15)
- 1—T-151 filter choke (T16)
- 1—T-164 filter choke (T17)

### PAR-METAL

- 1—3603 steel rack panel 7" high
- 1—15212 steel chassis 13" x 17" x 2"
- 1—SB-713 pair 13" brackets

### RCA RADIOTRON

- 4—type 83 rectifiers

### SOLAR

- 3—XC151 inverted can, 1 mfd., 1500 v. (C5, C6, C7)
- 2—XC12 inverted can, 2 mfd., 1000 v. (C8, C9)

## Final Power Supply

### AMERICAN RADIO HARDWARE

- 4—No. 1304 Mycalex 4-prong sockets
- 4—No. 17777 Mycalex standoff insulators
- 8—No. 10 cone-type insulators 3/4" high
- 30—No. 72 feedthru insulators 1 1/4" high

### AMPEREX

- 4—type 866 rectifiers

### AMPHENOL

- 1—SP-PC3F 3-prong socket

### COMMUNICATION PRODUCTS

- 1—K12897 double-pole, 6-position switch (S1)
- 1—K12898 single-pole, 7-position switch (S2)

### GUARDIAN ELECTRIC

- 1—T100 time delay relay (RX1)
- 2—Type E, No. 3 contacts, Series 30 stud mounting, 100 ohms, double-pole, single throw relays (RX2, RX3)
- 1—Series L overload relay (RX4)
- 1—K100 keying relay (RX5)

### IRC

- 1—HOA 100,000 ohms, 200 watts (R1)

### KENYON

- 1—T-375 fil. bridge transformer (T1)
- 1—T-362 filament transformer (T2)
- 1—T-659 power transformer (T3)
- 2—T-176 filter chokes (T4, T5)

### PAR-METAL

- 1—3604 steel rack panel 8 3/4" high
- 1—ER-205 Type H enclosed relay rack, 66 1/2" x 21" x 15 1/4" (bottom serves as chassis for Final power supply)
- 2—MP-43 meter panels

### SOLAR

- 2—X-302 2 mfd., 3000 v. (C1, C2)

### WHOLESALE RADIO SERVICE

- 1—15923 1/4" shaft coupling

rived from a bridge rectifier power supply.

The maximum signal power output is 220 watts which is sufficient to cover the small transfer loss and to provide a surplus of available modulating power. The approximate driving power is 5 watts, which indicates the high power gain of these tubes operated Class B.

The maximum signal d.c. plate current should be 300 mils with a plate-to-plate effective load resistance of 8000 ohms.

**COIL AND FREQUENCY OPERATING DATA**

Band	6F6-Osc.	6L6G Bf.	807 Driver	HF-200 Grid	HF-200 Plate
160 Coils	160 (1)	160 160B	160 160BL	160 160BL	160 160HDVL
80 Coils	80 (2)	80 80B	80 80BL	80 80BL	80 80HDVL
40 Coils	40 (2)	40 40B	40 40BL	40 40BL	40 40HDVL
20 Coils	80 (2)	20 20B	20 20BL	20 20BL	20 *20HDVL

- (1) 35 turns No. 18 dsc on 2 1/4" form.
- (2) 20 turns No. 18 dsc on 2 1/4" form.
- \* For 20-meter operation, remove 2 turns from 20HDVL coil.

**The Power Supplies**

The plate supply for the HF-200 is 2000 volts when used as a modulated r.f. power amplifier. On c.w. the plate supply can be increased to 2500 volts. As previously mentioned, the plate potential for the ZB-120s is 1100 volts. It can therefore be seen that because of the wide difference in the final and modulator voltages, when the transmitter is operated on phone, the use of two power supplies would be required. However, in an arrangement suggested by Ralph Kenyon, a single power transformer is used

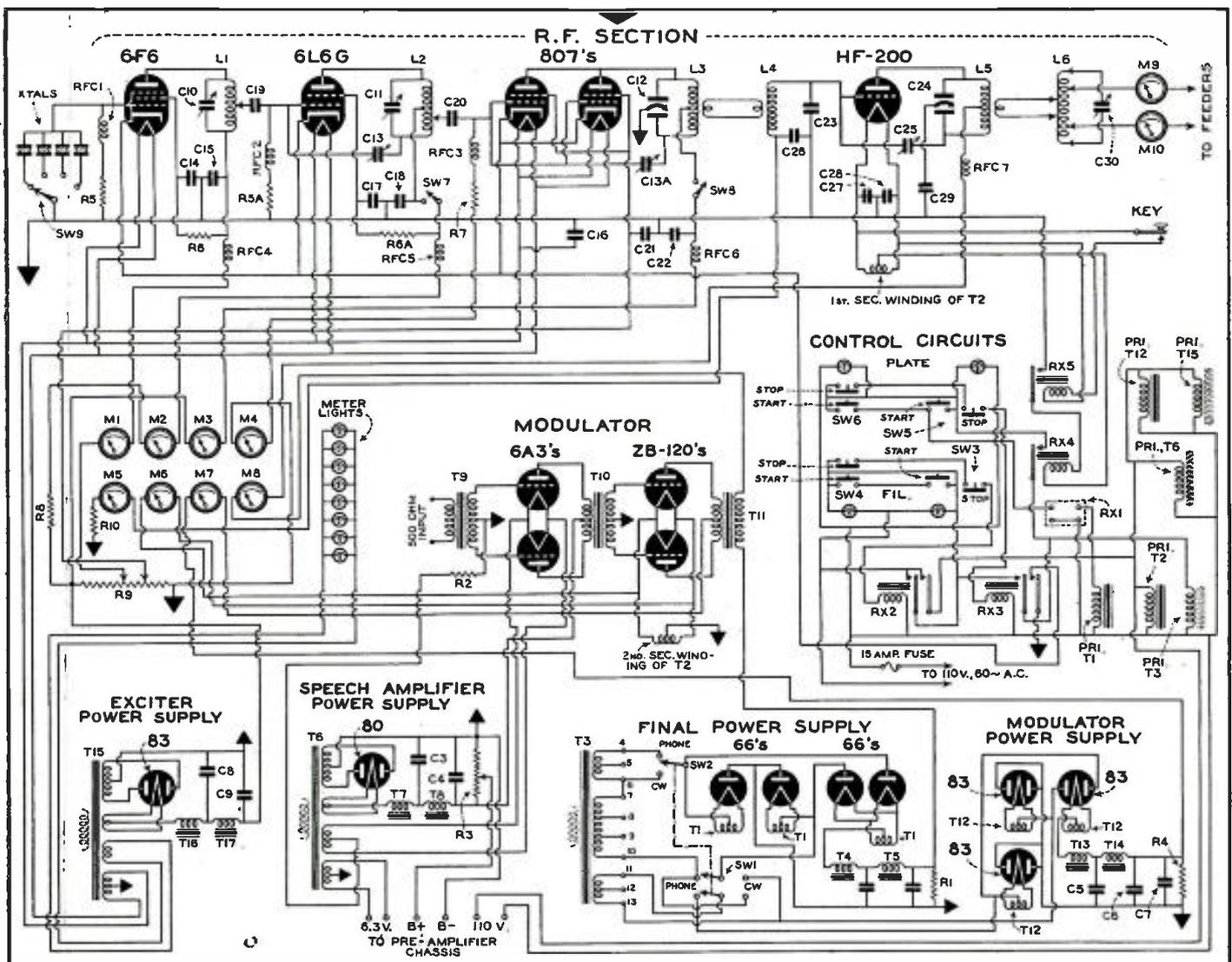
with two separate rectifier and filter systems. This method reduces the overall cost of the combined supplies.

A Kenyon type T-659 transformer is used. There are three separate secondaries, two of 1140 volts and one of 1040 volts. A triple pole, double throw switch is so connected to the windings that in the phone position the final amplifier d.c. plate voltage is 2000 and the modulator plate voltage close to 1100. With the switch in the c.w. position, the final amplifier plate voltage is

boosted to 2500 and the transformer is disconnected from the modulator rectifier filter system.

A triple pole, double throw knife switch may be used for this purpose, or a more elaborate construction may be used. The author ganged a Communication Products two-pole, six-position switch and a single-pole, seven position switch, using 1/4"-to-1/4" Isolantite coupling for the purpose. The spacing between contacts on both switches is 1/8".

*(Continued on page 321)*



Complete schematic diagram of the rack and panel transmitter with the exception of speech amplifier unit. Parts list on opposite page.

# The Circuit Court

By THE CIRCUIT JUDGE

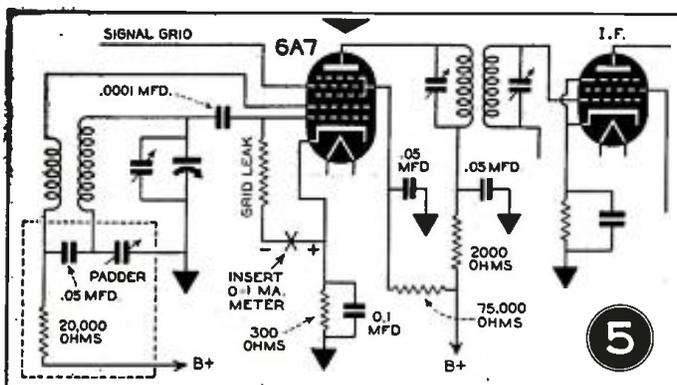
SHORT-WAVE RECEPTION in most all-wave receivers is divided into two bands. On the lower frequency band, the lowest frequency is approximately 1500 kc. where oscillator performance is good with most circuits and tubes. However, on the higher frequency short-wave band, the low-frequency end of the band is at approximately 6 megacycles where a great many short-wave broadcast stations operate. Often, reception at 6 megacycles is not as good as at a higher frequency in the same band on the receiver because of inadequate coupling in the oscillator circuit or because the 6A7 oscillator is weak.

Fig. 5 shows a typical oscillator circuit. The grid leak is indicated and the point is marked X where the connection between the grid leak and the cathode can be broken to measure grid leak current. A 0-1 m.a. meter inserted at this point should read not less than 100 microamperes (0.1 m.a.) when the set is tuned to 6 megacycles. If several 6A7 tubes are available, the tube which gives the highest grid leak current will usually bring in signals better than lower reading tubes.

If the grid-leak current is low and changing tubes does not help, the tickler coil bypass arrangement shown within the dotted lines can be tried. This set-up bypasses the plate coil to ground through the padder condenser and improves performance at the low-frequency end of the tuning range. If the receiver is an a.c.-d.c. set, the 20,000-ohm resistor in series with the tickler should be replaced with a 2.5-mh. radio-frequency choke.

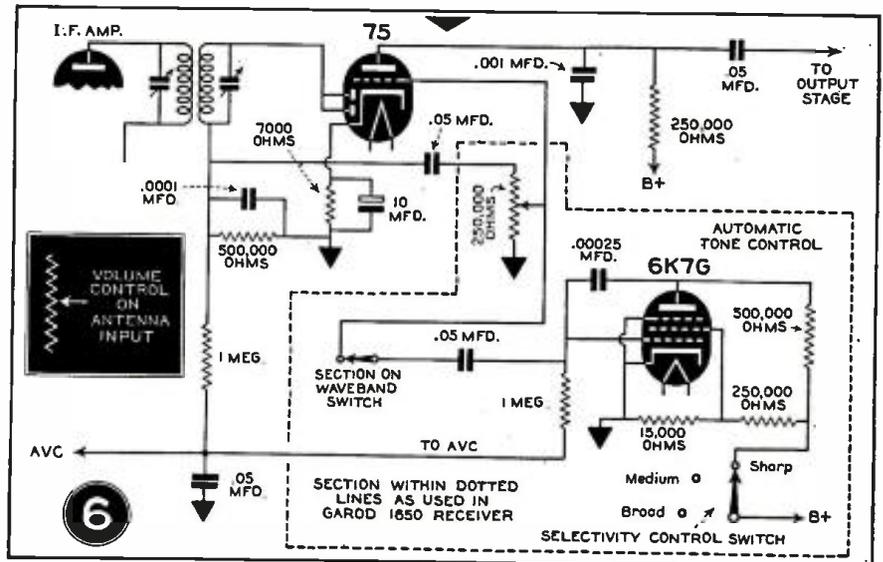
## AUTOMATIC TONE CONTROL—FIG. 6.

FIG. 6 SHOWS THE arrangement for automatic tone control as used in the Model



Showing the manner in which the performance of the high-frequency oscillator in a superhet can be checked.

## OSCILLATOR CHECK . . . AUTOMATIC TONE CONTROL . . . DISTORTION LIMITER



Automatic Tone Control Circuit.

1650 Garod receiver. For the convenience of the experimenter, the tone control is shown within dotted lines while external to this are conventional circuit elements to which the tone control might be connected.

This automatic tone control operates as a variable capacity from the grid of the first amplifier tube (in this case a type 75, triode section) to ground. With low volume the shunting effect on high frequencies is greatest so that the bass response is brought up. At high volume levels, where the a.v.c. voltage in the set is appreciable, the shunting effect is small and high frequencies are passed along into the final amplifier. Since this automatic control is operated by changes in the a.v.c. voltage, it will work best when most of the manual gain or volume control is in the r.f. end of the set,

preferably in the antenna circuit.

The automatic feature is gained through the variation in input capacity of a 6K7G with changes in bias. It will be noted that a .00025-mfd. condenser is connected between control grid and plate of the 6K7G. This added condenser raises the grid-plate capacity and the range available through changes in the bias. The input capacity of a 6K7G connected as in Fig. 6 is a function of the grid bias and mutual conductance of the tube. With a high negative bias, obtained when the a.v.c. voltage is considerable, the input capacity of the 6K7G is small. With a low bias voltage the input capacity is large enough to be an effective shunt for high audio frequencies. The method shown is one of the simplest for automatic tone correction.

## AUDIO DISTORTION LIMITER—FIG. 7

A SIMPLE DISTORTION LIMITER for the radio receiver or power amplifier is shown in Fig. 7. This circuit arrangement is from a paper by M. L. Levy of the Radio Development Laboratory of Stromberg-Carlson Telephone Mfg. Company, published in *Electronics* (March, 1938).

Essentially the system is capable of automatic gain control operating to limit the amplification of the first tube in the amplifier to an upper limit which reaches,

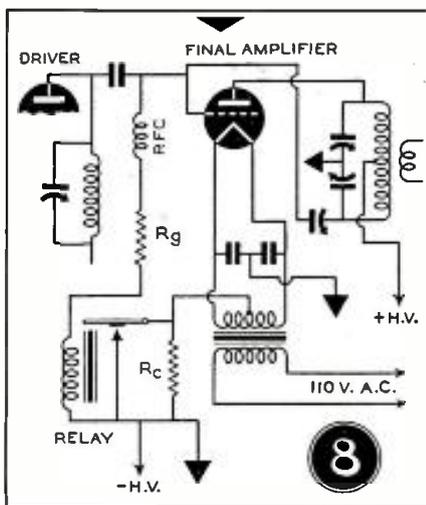
but does not exceed, the normal full output of the final stage with low distortion.

If the audio input signal from a receiver detector or other source is raised by advancing the volume control, a point will be reached where the speaker volume no longer increases with further advance of the volume control. At the same time the quality of reproduction remains good. Without a distortion limiter, advancing the volume control raises output volume to full rated power with normal distortion. Beyond this setting of the volume control, loudness increases but the signal contains more and more harmonic distortion as the stages ahead of the final amplifier overload. The principal advantage of the distortion limiter, then, is to preserve audio quality under conditions of signal input which go above the signal necessary to drive the final amplifier to full rated output.

In explanation of the operation of this circuit, the variable gain is automatically secured by the use of a 6K7 variable-mu tube as the first amplifier. It will be noted that the 6K7 is connected as a triode to minimize distortion. Also, with the triode connection (screen connected to plate) the normal gain of the stage is reduced to about eight, a suitable value for an amplifier of this type. The normal bias voltage for the 6K7 triode-connected stage is set at -3 volts. This bias is applied through a resistance network part of which is in the diode circuit of the 6Q7 limiter tube.

Careful examination of the connections to the 6Q7 will show that the triode part of the tube is connected as a straight amplifier. The cathode is grounded, the grid is connected to one of the 6L6 tubes at its control grid which is biased to -25 volts, and the plate is fed through a 0.25 meg. resistor from the 250-volt receiver supply. Observe that the 6Q7 control grid is biased (by virtue of its direct connection to the 6L6 control grid) to -25 volts. With this negative bias no plate current will flow in the 6Q7, and, in fact, the plate current will remain at cut-off until the negative grid bias is reduced to approximately -7 volts. So long as there is no plate current the limiter tube does not function. Now, if the volume control is advanced far enough to provide a peak voltage of 21 volts on each 6L6 control grid and on the 6Q7 control grid, on positive swings of the signal voltage the +21-volt value of the signal peak will be within 4 volts of balancing out the -25 volt bias on the 6Q7. At the +21-volt signal peak, the effective bias on the 6Q7 is only -4 volts and plate current flows for a brief time (time while 6Q7 bias is less than -7 volts). For signals having a peak value above 21 volts, the 6Q7 becomes more active as an amplifier.

The plate of the 6Q7 feeds, through a



Bias Control For Class C Final.

coupling condenser, the 6Q7 diodes. Positive half cycles of the signal applied to the diodes are rectified and produce a pulsating d.c. in the diode circuit. This current flows in the direction of the arrows, passing through a 1-megohm resistor which is in the grid return of the 6K7 first amplifier. In going through this resistor, the current causes a voltage to develop across the 1-megohm resistor, increasing the bias on the 6K7 and reducing its gain. Increasing the input signal with the volume control simply increases the automatic addition of negative bias to the 6K7 control grid and there is no increase in either volume or distortion.

"A.B.C." FOR CLASS C FINAL—FIG. 8

A FOOL-PROOF BIAS CONTROL for the transmitter is described by H. D. McCuiston, W7AYG. It makes possible the use of grid-leak bias with the advantage of full protection through cathode bias in case excitation fails. At the same time, the cathode bias, which has some objectionable features, is shorted out so long as excitation is present.

In Fig. 8 it will be noted that the grid-leak current is passed through the winding of a simple single pole, single throw relay. With current present, the relay contacts are closed, thus shorting out the cathode bias resistor. If the excitation fails, the relay contacts open and permit the cathode bias resistor to develop a safe negative control grid potential.

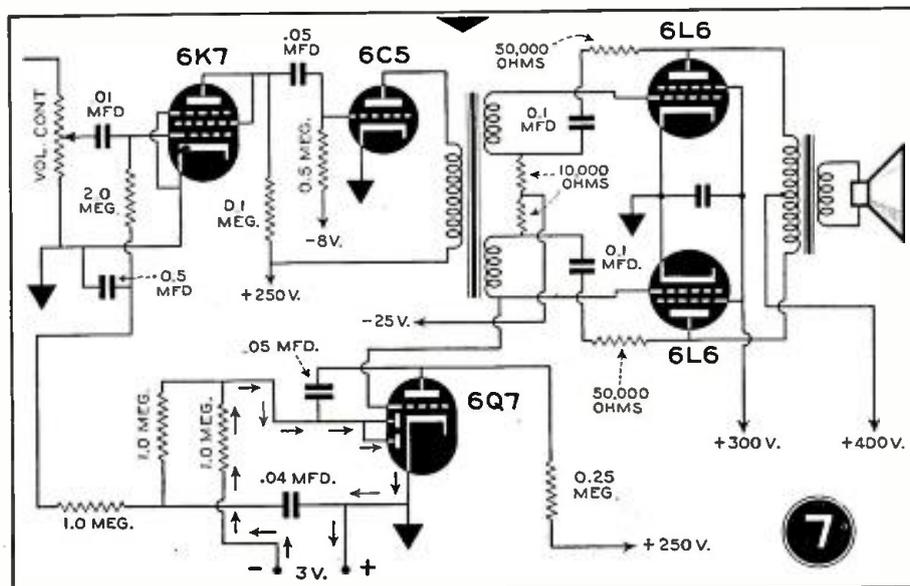
The grid leak should be the usual value which would be chosen for any particular tube, or tubes if the amplifier stage is a push-pull or parallel combination. The cathode bias resistor will be adequate in most cases if the total plate current could develop 100 volts across the resistor in passing through it. Simply divide 100 by the plate current in amperes (or 100,000 by the plate current in milliamperes) to obtain the proper resistance value. To find out what wattage resistor one should use, multiply the plate current in amperes by 100 (or multiply the plate current in milliamperes by 0.1). This holds good for triodes. With pentodes and beam tubes, the plate current must have the screen current added to it since both currents flow to the negative side via the filament center tap.

The selection of the relay will depend upon the normal grid leak current. If the grid leak current is normally 20 ma., a suitable relay would be Ward Leonard 507-539. For a normal grid leak current of 80 ma., the proper type would be Ward Leonard 507-538.

ELIMINATION OF R.F. FEEDBACK—FIG. 9

THE FEEDBACK PROBLEM in the amateur station can be solved in numerous ways. Since the trouble is most severe where a high-gain amplifier is used ahead of the modulator, it is logical to construct the pre-amplifier with every precaution against the entrance of r.f. energy into the audio system. First, of course, every

(Continued on page 326)



Audio Distortion Limiter Circuit.

# Globe Girddling

By J. B. L. HINDS

**K**WU, 15355 kc., Dixon, California, heard calling Japan at 5:30 p.m.

KKZ, 13690 kc., Bolinas, California, relays evening programs to Hawaii.

GBU, 9950 kc., Rugby, England, heard testing with New York between 11:15 and 11:30 p.m.

CMA5, 15505 kc., Havana, Cuba, heard relaying a program of N.B.C. at 11:30 p.m.

OZ2EA, 3582 kc., Copenhagen, Denmark, reported heard broadcasting program in early evening.

GBB, 13585 kc., Rugby, England, relays occasional afternoon musical programs to Canada through CGA3, 13285 kc.

WMI, 6470 kc. and 11370 kc., Lorain, Ohio, heard testing and transmitting weather reports, which it is understood are given daily at 11 a.m. and 10 p.m. For further information and address of station see page 523, October, 1937 ALL-WAVE RADIO.

WOO, 12840 kc., Ocean Gate, N. J., heard 3 p.m. contacting ICEJ, 13330 kc., Steamer Rex.

YSD, 7894 kc., San Salvador, El Salvador, heard at 5:15 p.m. calling HPH, 10670 kc., Panama City, Panama.

ZFB, 10055 kc., Hamilton, Bermuda, heard calling WOO, 9870 kc., Lawrenceville, New Jersey, for exchange of traffic at 8:48 a.m.

INDIA SET-UP . . . BAGDAD STATIONS . . . CZECH RADIOPHONES . . . PARIS SKEDS  
MYSTERY STATION "RX" . . . TGWB ON 49 . . . STARTZ HOME . . . MEX. SITUATION.

## South Africa

ZRH, 9523 kc., Roberts Heights, is not being used at present and the broadcasts formerly transmitted between 11:45 p.m. and 12:45 a.m. and other hours heretofore shown, are now being broadcast by ZRH on 6007 kc. or 49.94 meters. ZRK, 9606 kc., Klipheuvcl, is still carrying these programs as usual. The Chief Engineer of these stations states these changes were made to take care of certain local conditions which have arisen. He also reports the power of ZRJ, 6007 kc. and 6097.6 kc. increased from 200 to 500 watts and that of ZRD, 6147.5 kc., Durban, South Africa, from 10 to 70 watts, and shortly a further increase to 200 watts.

ZRH, 6007 kc., has already been reported heard by several listeners in the United States on the broadcast from 11:45 p.m. to 12:45 a.m. and also heard by the writer with good signal strength.

ZNB, 5900 kc., Mafeking, Bechuana-land Protectorate Government, South Africa, is again broadcasting musical programs and has been reinstated in station lists. The new address and time schedule are also shown. ZNB, in addition to the broadcast of programs, is used in governmental radiophone service

## NEW STATIONS

KC.	Meters	Call	Location
17765	16.88	TPB3	Paris, France
15130	19.83	TPB6	Paris, France
11885	25.24	TPB7	Paris, France
9590	31.28	VUD2	New Delhi, India
9570	31.35	TPB11	Paris, France
9550	31.41	VUB2	Bombay, India
6025	49.79	RW96	Moscow, U.S.S.R.
6007	49.94	ZRJ	Maraisburg, So. Africa
5900	50.84	ZNB	Mafeking, So. Africa
4995	60.06	VUD2	New Delhi, India
3305	90.77	VUB2	Bombay, India

## STATION CHANGES

New Frequency	New Call	Old Call	Old Frequency
15220	PCJ2	PCJ	15220
11900		TPA3	11885
9740		COCQ	9750
9590	PCJ1	PCJ	9590
9490		OAX5C	9580
9437		COCH	9428
7400		YDA	6040
6147.5		ZRD	6150

## STATIONS DELETED

KC.	Meters	Call	Reason
11895	25.22	XEXR	Not in service
11880	25.25	XEXA	Not in service
11796	25.43	OAX5A	Not in service
10370	28.93	EAJ43	Not in service
7030	42.67	EA9AH	Not in service
7010	42.80	XEME	Not in service
6580	45.59	Radio Guardia	Not in service
6240	48.98	Civil H18Q	Not on short waves
6200	48.39	XEXS	Not in service

## NON-AUTHENTIC STATIONS

Frequency	Call	Location
17760	PZL	Dutch Guiana (Jan.)
15170		Peru (Feb.)
12000	"Rancho Grande"	Peru (May)
11850	CB1185	Chile (Apr.)
11800	CB1180	Chile (Apr.)
9950	COCU	Cuba (Jan.)
9690	LRA	Argentina (June)
9565	HP5S	Panama (May, '37)
9530	LKC	Norway (May)
7410	HCJB4	Ecuador (Apr.)
6120	HP5Z	Panama (June, '37)
5835	YV5RR	Venezuela (Nov.)
(49 m.)	TGWB	Guatemala (June)

THE VOICE OF MANCHOUKUO  
M. T. T. SERVICE



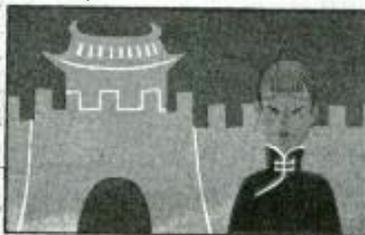
Mr. Hinds.

We are pleased to verify your report concerning the following program from our short-wave station:

J'DY 9925 kc (30.2m), 10 kw on Feb. 20, 1937.

Japanese music,  
News in Japanese  
News in English.  
Yours sincerely,

Station JDY, Dairen



A beautiful three-color veri from JDY, Manchoukuo, "Chapan."

with ZND, ZNC and ZNF, all on 5900 kc. and located at Tsane, Maun and Ghanzi, respectively, and each operating locally with 40 watts power. It is extremely doubtful whether these stations would be heard in America.

## Far East Stations

VUD2, New Delhi, and VUB2, Bombay, India, mentioned in "Last-Minute Flashes" in May issue, now state they are broadcasting on 9590 kc. and 9550 kc., respectively. The Controller of Broadcasting, All India Radio, has forwarded a list of stations and it is noted that frequencies of the above stations have been changed from 9575 and 9565

kc., respectively, as originally reported and the complete time on the air for these stations is now shown in station lists.

VUD2, New Delhi, also transmits on 4995 kc., from 6:30 a.m. to 11:30 a.m., and VUB2, Bombay, on 3305 kc. from 7 a.m. to 11:30 a.m. All four transmitters employ 10 kw. power.

While frequencies on medium waves are listed for stations at New Delhi, Bombay, Calcutta, Lahore and Peshawar, no other short-wave frequencies appear in the list received, although assigned frequencies are shown in Berne lists on 15290, 15160, 11870 and 6085 kc., for stations at New Delhi, Calcutta, Bombay and Madras. One report has been received of an Indian station being already heard on 6085 kc.

Information from a reliable source is that tests are being made and that the facilities at Bombay are about complete and that efforts were being concentrated on the preparation of the Madras short-wave station, soon to be on the air, the building to house the transmitter having been completed.

The radiophone service at Kirkee, India, is also being extended and it is hoped that the additional frequencies in use will be secured and added to the next complete station list.

JZJ, 11800 kc., JZI, 9535 kc., and JVP, 7510 kc., are still carrying the Japanese Overseas Programs. JZJ is best heard between 7 and 7:30 a.m.

A letter from the Chief Engineer of The Broadcasting Corporation of Japan, calls attention to the two new experimental broadcasts for the eastern district of United States and requesting information as to reception conditions, from a technical point of view as well as our opinion of the programs themselves. We have suggested to them that many more reports might be sent if cooperation was extended in the way of suitable veri cards instead of the form letter verification now being used.

JDY, 9925 kc., Dairen, Manchukuo, relays the program of JQAK, Dairen, and employs 10 kw. power in its daily transmissions, consisting of music and news in Japanese from 7 to 7:25 a.m., music and news in Chinese from 7:25 to 7:45 a.m. and news in English 7:45 to 8 a.m.

JVS, 6990 kc., radiophone station at Nazaki, Japan, reported heard broadcasting musical program about 7 a.m.

ZBW3, 9525 kc., Hong Kong, China, reported by listener on West Coast as broadcasting native music on Monday mornings, and other days, recordings, news and re-broadcasts from Daventry.

YDA, 6040 kc., Batavia, N.E.I., has been changed in lists to 7400 kc. No report of the station being heard on the first mentioned frequency was ever re-



Neat two-color veri from CB1170. Santiago. Chile.

ceived and it would seem to have picked out a poor location.

PMH, 6720 kc., Bandoeng, Java, reported being heard about 7:15 a.m. with good signal strength.

XYO, 6007 kc., Rangoon, Burma, reported heard in Eastern United States about 8:30 a.m. R. Simpson, Australia, states this station now opens its daily programs at 7:30 a.m.

Afghanistan advises that there is no intention at the present time of constructing short-wave broadcast transmitters. All the new equipment installed

and being used at Kabul, Herat and other points in that country is for commercial telephone and telegraph. There are some 18 frequencies assigned as A-3 stations (voice) to Afghanistan.

YIK, YIJ, YIH, YIG, YIF, YIE and YID, are the calls and 18730, 14490, 13410, 8135, 6705, 6135 and 4470 kc. are the frequencies of new stations to be located at Baghdad, Iraq. It is assumed all are in radio telephone service, but definite information will be given later.

### Europeans

RW96, 6025 kc., Moscow, announced as 49.79 meters, is heard often on broadcasts simultaneously with RAN, 9600 or 9565 kc., from 7 to 9:15 p.m. and often simultaneously with RNE on English transmissions from 10:15 to 11:15 p.m., RNE, 12000 kc., being on the latter broadcasts daily of late and also on broadcasts from 4 to 5 p.m. on Sundays, Mondays and Fridays in addition to the Sunday morning broadcasts.

RKI, 15040 kc. (as shown in lists), is broadcasting simultaneously with RAN from 7 to 9:15 p.m. in place of RKI, 7540 kc.

It would seem the frequency of RKI should be 15080 kc. if on 19.89 meters as stated. Possibly Moscow has frequencies on both as it is noted from assignments in Berne lists that RW96 has frequencies on 49 band at 6010, 6015, 6020 and 6030 kc. As stated before in this section, no station appears in Berne lists as RV59, 6000 kc., although many verifications have been issued on reports for this call and frequency.

The Moscow program schedules are not reliable from the fact that after printed they are changed over in pencil

### LAST-MINUTE FLASHES

CB1180, Sociedad Nacional de Agricultura, Santiago, Chile, on the air on 11780 kc. to avoid interference with COGF re-broadcasting CB57 on 570 kc. Daily 7 to 9 a.m., 11 a.m. to 2 p.m., and 4 to 11:30 p.m. except Sunday when on air at 8 a.m. Address, Casilla 40-D.

Japanese Overseas programs daily on JZJ, 11800 kc., 12:30-1:30 a.m., 7-7:30 a.m., 8-9:30 a.m., 2:30-4 p.m., 4:30-5:30 p.m. and 6-6:30 p.m. JZI, 9535 kc., 2:30-4 p.m. and 4:30-5:30 p.m. daily. JVP, 7510 kc., dropped.

SPW, 13635 kc., and SPD, 11535 kc., Warsaw, Poland, on daily June 1 to September 30, 1938, from 6 to 9 p.m.

W4XB, 6040 kc., Miami, Florida, now on air daily 1 to 3 p.m., and 9 p.m. to 12 a.m.

W3XAU, 6060 kc., Philadelphia, Pa., on air Tuesday, Friday and Sunday 12 noon to 11 p.m., Wednesday 12 noon to 9 p.m.

W3XAU, 9590 kc., Monday, Thursday and Saturday, 12 noon to 12 a.m. Tuesday, Friday and Sunday, 11 p.m. to 12 a.m. Wednesday, 9 p.m. to 12 a.m.

HISC, 6660 kc., La Vega, Dom. Rep., is being heard near 6654 kc.

HJ3ABX, 6013 kc., Bogota, Colombia, reported moved to 5990 kc.

HI2D, 6900 kc., Ciudad Trujillo, reported heard near 6198 kc.

Finland being heard in England on 31.68 meters or about 9470 kc., between 10 and 11 p.m., E.S.T. Station operated by Finnish Broadcasting Company, Helsinki.

TGWA, 15170 kc., Guatemala City, week days 12:45 to 1:45 p.m. Sundays 12:45 to 5:15 p.m. 9685 kc., week days 10 to 11:30 p.m., Sundays 7 to 11 p.m.

and it is difficult to know the exact frequencies in use unless heard. These advance schedules, of course, only list the English programs and it has not yet been possible to secure listings of time on the air in other languages, although endeavors have been made to secure them.

Czechoslovakia has improved its radiophone service and now has some nine frequencies. We are following the matter with a view to securing definite advice so they may be included in our complete lists. Many other countries have installed new radiophones and all have been contacted for the purpose of securing the necessary information as to calls, locations, service, etc., for insertion in next complete list.

OLR4A, 11840 kc., OLR4B, 11760 kc., OLR5B, 15320 kc. and OLR5A, 15230 kc., are now carrying the transmissions for North America.

Only such broadcasts are now being sent to listeners and others in United States, so time schedules as shown may not be correct in all particulars. Steps have been taken to secure complete listings of broadcasts to all countries so our lists will reflect all transmissions as is done with program listings from England and others. It is our desire to list all programs as all are usually received here regardless of whether directed to us or not.

SPW, 13635 kc. and SPD, 11535 kc., Warsaw, Poland, are now coming into the United States with much stronger and clearer signals and with excellent programs which should be enjoyed by many.

PCJ1, 9590 kc., Hilversum, Holland, according to the official program schedule sent out, has changed to Tuesday night

on the broadcast to North and South America, running from 7 to 10:15 p.m. and only broadcasting on Wednesday night from 7:15 to 8:15 p.m. for the Western hemisphere.

PCJ, 9590 kc., with friend, Edward Startz, back in Holland announcing, braved the chance of being "shot at sunrise" by rendering "The Music Goes Round and Round" upon his first broadcast back home—and after the former threat from United States when he played it after outlawed here. And you who know Edward Startz, would expect him to do this and it came over fine as did his entire program; in fact, much better than usual. But his Wednesday night program is longer than he advertises in his scheduled program.

TPB3, 17765 kc., TPB6, 15130 kc., TPB7, 11885 kc., TPB11, 9570 kc., TPA2, 15243 kc., TPA3, 11900 kc., and TPA4, 11718 kc., are the frequencies and calls being used in the transmissions of French programs and as listed in the revised schedules being sent out by the station from Paris. The complete time on the air for each frequency is shown in station list. Although no official advice has been received, some say that station is now known as "Radio Mondial" instead of "Radio Coloniale," as heretofore. They are to be congratulated upon the excellent output of the present broadcasts, which are coming into the United States with a decided improvement in volume and clarity. It is assumed that the TPA calls now being used will be changed and that additional frequencies than those given above will be used to care for the seasonal changes. It will be noted that the call TPA3 for 11885 kc. has been changed to TPB7, and a new frequency of 11900 kc. assigned to

### JUNE ACE REPORTERS

Willis E. Blanchard, W3E1, Bangor, Me.  
 James Bortner, W5J36, York, Pa.  
 Robert M. Bissell, W29C4, Tacoma, Wash.  
 Ed Bell, Columbia, S. C.  
 William Bell, Monroe, La.  
 H. C. Chesnut, Plattsburg, N. Y.  
 L. M. Clark, Snyder, N. Y.  
 Robert M. Cain, Little Rock, Ark.  
 E. G. Collister, W4G3, Northport, N. Y.  
 Edward Davis, W4H151, Brooklyn, N. Y.  
 William Doniger, W4H116, Cedarhurst, N. Y.  
 H. J. DuMoulin, W10P1, Birmingham, Ala.  
 Winfield A. Darr, W15K3, Kansas City, Mo.  
 William Fearnley, Palm Beach, Fla.  
 Joseph Fucetola, W4H135, New York, N. Y.  
 Albert Fisher, W3E15, Laconia, N. H.  
 Helmut Giese, W12G4, Port Washington, Wis.  
 C. F. Horton, W3780, Athol, Mass.  
 C. T. Hearn, Bristol, England.  
 G. L. Harris, W4F17, North Adams, Mass.  
 Herman Harjes, Jackson Heights, N. Y.  
 Robert Jones, W8J3, Coshocton, Ohio.  
 C. F. Keirstead, W3F5, Framingham, Mass.  
 F. J. Lendzioszek, W4F19, Easthampton, Mass.  
 Matthew E. Leshner, W3F32, Lawrence, Mass.  
 Leroy F. Nice, Souderton, Pa.  
 H. W. Newell, W3F26, Lowell, Mass.  
 R. B. Oxrieder, W6H5, State College, Pa.  
 H. Orlaw, VE3-29A7, Vancouver, B. C., Canada.  
 J. E. Owens, W29C2, Tacoma, Wash.  
 Anthony L. Okolish, Barberton, Ohio.  
 Albert Pickering, W3F74, West Medway, Mass.  
 J. F. Pichler, W22N4, Santa Fe, N. M.  
 Theodore C. Smith, W5F8, Ogdensburg, N. Y.  
 George Swanson, W4H99, Englewood, N. J.  
 Dow B. Summers, W15J1, Unionville, Mo.  
 T. D. Smith, W17R1, Burnet, Texas.  
 Frank W. Stockbridge, Westboro, Mass.  
 Ray Shaffar, W14H6, Waterloo, Iowa.  
 Luther Schnake, W411H41, Des Plaines, Ill.  
 Frank Sekach, W9G18, Chicago, Ill.  
 John W. Sherman, W7T5, Tampa, Fla.  
 George C. Starry, W7J12, Derry, Pa.  
 J. T. Satterthwaite, W9H1, Toledo, Ohio.  
 R. Simpson, VK3, Concord West, Australia.  
 A. C. Tarr, W29B4, Seattle, Wash.  
 Alfonso Velasco, Mexico City, Mexico.  
 Charles Walter, W4H247, Philadelphia, Pa.  
 Kenneth White, W5H17, Palmerton, Pa.  
 Mr. and Mrs. R. E. Weikal, W17L1, Pratt, Kansas.  
 LeRoy Waite, W4F1, Ballston Spa, N. Y.  
 C. M. Whelan, W16S4, Memphis, Tenn.  
 Edward Walpole, W3J14, Alameda, Calif.  
 Nicholas Woyton, Syracuse, N. Y.  
 Howard Wilson, Jr., Ithaca, N. Y.

TPA3. The changes are all reflected under the captions "New Stations" and "Station Changes."

I2RO, 11810 and 9635 kc., and IRF, 9830 kc., are still being used in the transmission of Rome programs, although it is noted the schedule is not exactly being followed as to time shown.

Radio Nacional, Salamanca, Spain, advises that headquarters are now at Burgos, Spain, and it is assumed that the broadcasts are coming from there. Advice is that the broadcasts to North America are from 8 to 9 p.m., E.S.T. No broadcast on Sunday. The programs are closed with the playing of the Spanish National Anthem. Studios located at Burgos. Programs relayed to North America by the "El Tablero" station, EHZ, 10370 kc., in Tenerife. EAJ43, 10370 kc., has therefore been removed from lists.

"Radio Nacional" advises while International Reply Coupons are not requested, they will be, however, gratefully received.

**"RADIO BARQUISIMETO"**

6465 KILOCICLOS

PROPIEDAD DE AMILCAR Y RAFAEL ANGEL SEGURA

**Y. V. 3 R. D.**

BARQUISIMETO - VENEZUELA - SUR AMERICA

<p>TRASMISOR SITUADO EN EL LUGAR DENOMINADO LA GRANJA</p>	<p>OFICINA Y ESTUDIOS AVENIDA BELLA VISTA 3 3 5</p>
---	---

TIP. EL HERALDO BAROTO. 277

Black and red on white card—veri from YV3RD.

EAQ, 9860 kc., and EAR, 9480 kc., Madrid, Spain, are carrying the Spanish government broadcasts, between 6:30 and 9 p.m. While the reason is not exactly understood, EAQ and COCM, 9833 kc., Havana, seem to conflict considerably. EAQ appears to transmit between 9860 and 9870 kc.

CSW, 11840, 11040 and 9940 kc., does not appear to be working according to schedule or frequency. Station being heard near 9740 kc., and occasionally on late at night. Any information regarding situation will be appreciated.

### South America

CXA2, 6000 kc., Montevideo, Uruguay, reported heard with good signal at 6 p.m.

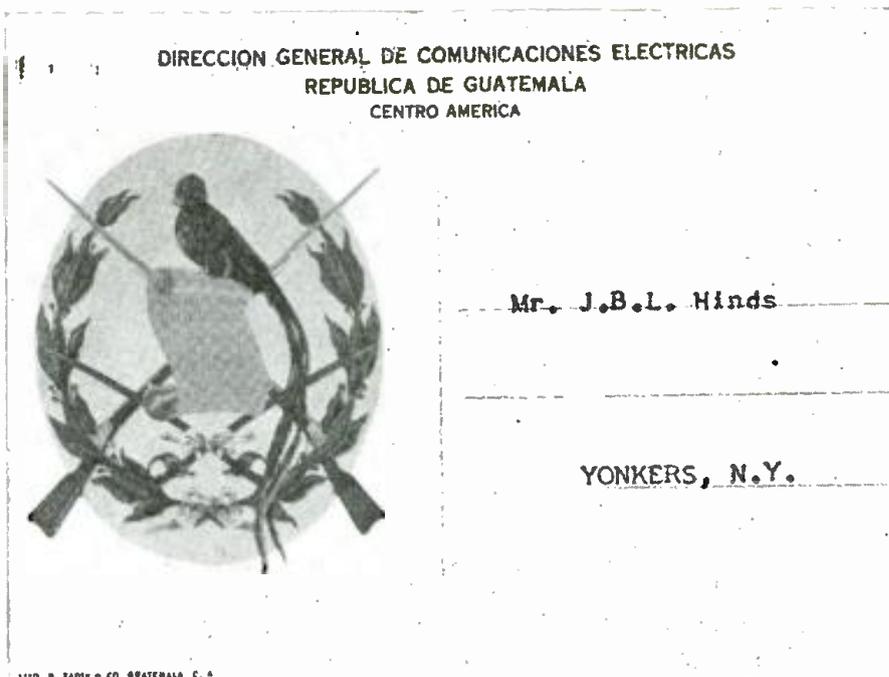
CXA4, 6125 kc., Montevideo, Uruguay, advises that on account of its official organization and connection it does not verify by card but that they acknowledge by letter each communication received. Station apparently operated by government agency.

CB1170, 11700 kc., Santiago, Chile, is sending out their very attractive veri cards.

OAX5C, 9580 kc., Ica, Peru, has been changed to 9490 kc., near where it is heard quite often. It is not on 9580 kc. and while no official advice has been received, it is thought best to show in list tentatively where heard.

Radio Rancho Grande, 12000 kc., Trujillo, Peru, appears to be off the air at this writing.

LRA, 9690 kc., Buenos Aires, Argentina, is a new station being heard daily with good signal strength and broadcasting from 7 to 9 p.m. As other details are not available it will be shown in the non-authenticated block.



Another beauty in three colors—the standard verification card for the stations in Guatemala, this one being issued on TGQA.

PSH, 10220 kc., Rio de Janeiro, Brazil, is being heard between 6 and 7 p.m. and not from 6 to 9 p.m. as shown in list.

LRX, 9660 kc., Buenos Aires, Argentina, reported heard as late as 1:15 a.m. broadcasting program material, although from advice just received from the station no change has been made in schedule as shown in station list.

HJ1ABP, 9616 kc., Cartagena, Colombia, in answer to request for information as to whether they had changed schedule and in line with our comment about station interfering with ZRK, 9606 kc., when on late, advises the pro-

gram which we happened to hear, when the interference was noted, was a special 30-hour program, transmitted in honor of their two years of continued service—in other words, a birthday party. We extend our hearty congratulations with the wish that they will enjoy many such events. Excellent programs are transmitted and they are deserving of much praise for their efforts.

HJ1ABP requests that listeners who have rendered reports be a little patient and all reports will be answered. Many reports are received and the handling force is small. International Reply Coupon should accompany each correct report.

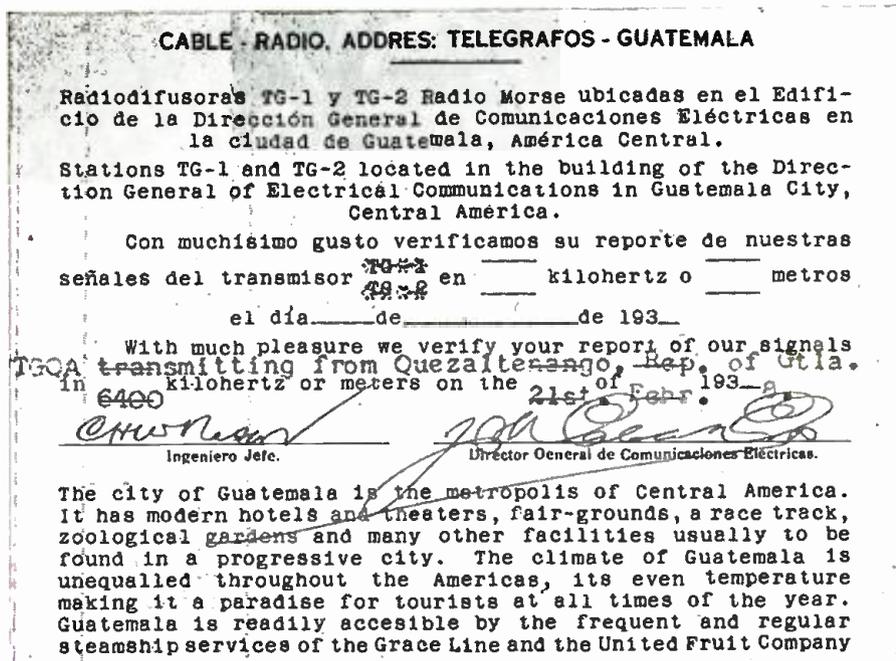
Radio Cartagena broadcasts with 350-watt Western Electric equipment made in the United States. All programs broadcast are put through their 100-watt sound system installed on main central plaza in Cartagena, being amplified for the benefit of the public.

HJ4ABU, 8650 kc., Medellin, Colombia, is known as "Emisora Universidad de Antioquia" and operates daily from 7 to 10 p.m. Verification cards will be forwarded to listeners as promptly as possible after receipt. Dr. Clodomiro Ramirez, Rector of University; Dr. Jose J. Sierra C., Director of station; Dr. Hugo Jimenez A., Tecnico; Dr. Dario Ramirez, Spanish announcer, and Dr. Vincente Uriba, English announcer.

HJ3ABD, 4841 kc., Bogota, Colombia, reported heard as late as 10:30 p.m. on a Thursday, indicating they do broadcast later than 3 p.m. as shown in list.

HJ1ABB, 4780 kc., Barranquilla, Colombia, is back on the air and on frequency.

HJ2ABJ, 4660 kc., Santa Marta, Colombia, reported heard near 4750 kc.



Reverse side of the card shown above. The design in the background is pale blue.

RADIOEMISORA

# H18J

"LA VOZ DE LA PROVINCIA"

LA VEGA REAL- REP. DOM.

*Al Sr. J. B. R. Hands.  
Yonkers, N.Y. USA*  
Distinguido Sr.

Tenemos el honor de informarle, haber recibido su valioso reporte de fecha... January 28, 1933

el cual hemos agradecido muchísimo enviándole nuestra tarjeta de verificación.

En espera de sus nuevos y valiosos reportes, le saluda atentamente,

*Antonio Batista C.*  
Director

*Veri from H18J, Dominican Republic. Call letters in red.*

HJ1ABE, 4860 kc., Cartagena, Colombia, may be on 4800 kc. as several listeners advise. We hope to know definitely before the next issue. Speaking of these 62-meter stations, it might be interesting to tune in on them more often. You may be surprised to find that they are coming in much better than you supposed and with less interference than at many points on higher frequencies.

YV1RG, 6230 kc., Valera, Venezuela, is reported as having its license renewed but on the frequency of 6345 kc. Reports from listeners would be appreciated.

YV3RD, 6465 kc., Barquisimeto, Venezuela, has a change in time schedule in this issue.

YV3RA, 5880 kc., Barquisimeto, Venezuela, back on the air near 5895 kc. and YV3RB, 9565 kc., is silent. The operating company apparently is to use the first frequency for a time.

YV2RA, 5755 kc., is now broadcasting between 5743 and 5745 kc. and getting out with a much improved signal.

HC1VT, 6575 kc., Ambato, Ecuador, reported as on the air daily and signing off at 10:15 p.m. as listed. The last report from station was that it was on the air Monday, Wednesday and Friday from 8 to 10:15 p.m.

HC2CW, 8404 kc., Guayaquil, Ecuador, reported heard on 9220, 9235 and 9260 kc. No further advice received from station.

HCETC, 6975 kc., Quito, Ecuador, still being heard near 9355 kc. according to reports, but no advice from station as to change.

HC2ET, 4600 kc., Guayaquil, Ecuador, reported heard by several close to its frequency.

### Mystery Station

In "Last Minute Flashes" in April you were asked to identify the station broadcasting records nightly on 9900 kc. Just after this the unknown disappeared.

It can now be found between 10 and 11 p.m. on 10480 or 10490 kc. The operator is quite insistent in his desire to let us know they are broadcasting on "full signal strength of 72 watts" but apparently not anxious to disclose his location. Call sounds like "RX" and the gentleman speaks good English, too.

### Central Americans

TGWA, 15170 kc. and 9685 kc., Guatemala City, Guatemala, is now being used on broadcasts from Guatemala City, the first frequency used during the day time and the latter on evening programs.

TGWB, a new transmitter of 1000 watts power will soon be heard on the 49-meter band, and relaying the programs of "Radio Nacional TGW," according to advice received from the station. The exact frequency was not given. TGWA broadcasts concerts dedicated to the United States on Wednesdays and Sundays from 10 to 11:30 p.m. TGQA, 6400 kc. Quezaltenango, Guatemala, has settled down to its frequency.

TG2, 6190 kc., Guatemala City, is transmitting off frequency between 6217 and 6222 kc.

TG9AA, Guatemala City, the first amateur station authorized by the government has been reported heard on 18450 kc. and 28342 kc. Station operated by Mr. James B. McElroy of station TGW, who advises he is only on 28342 kc.—the 10-meter band—and regularly broadcasts on Mondays, Wednesdays and Fridays, beginning at 6 p.m. He does, however, broadcast frequently at other periods during the week.

The unknown station mentioned in May as being heard nightly close to 7445 kc. may be TI2RS, Radio Athena, which is carried in lists on 6900 kc. and located at San Jose, Costa Rica. Another listener reports hearing a Costa Rican with call TILC on 7450 kc, which calls itself "Radio Daisy." The writer

will say there are a number of "daisies" with low power and no inclination to stay in one place, which are roaming around the spectrum and who keep the fans on their toes trying to identify. If they would but stay in one place, the chances of identifying might be increased. The laws in some countries are none too stringent.

### Mexicans

XEWW, 9500 kc. and 15160 kc., are broadcasting the daily programs of that station from 8:55 a.m. to 1 p.m. If not found on one frequency tune to the other. The frequency of 6080 kc. is not at present in use although assigned. Transmitter is an R.C.A. job. Station operated by Cadena Radiodifusora Mexicana, S. A., operated by long-wave station XEW and relayed by XEWW. Signal used is a four-note chime tuned F.C.A.F. The call is given followed by the distinguishing sub-title—"This is the Voice of Latin America from Mexico." Sr. Emilio Azcarraga is General Manager of the station.

XEXR, 11895 kc., XEXA 11880 kc. and XEXS, 6200 kc., Mexico City, and XEME, 7010 kc., Merida, Yucatan, Mexico, have suspended activities, according to advice from Director General of Communications and accordingly have been dropped from lists.

XEBF, 6090 kc., Jalapa, Mexico, is being heard close to its frequency.

XETA, 11760 kc., Monterrey, Mexico, has change of time in this issue.

XEYU, 9600 kc., Mexico City, has a much improved signal and transmitting some worth-while program material.

XEFT, 9550 kc., Vera Cruz, is not being heard in the United States to any great extent since W2XAD came on the air on same frequency. According to reports from Mexico the order is reversed.

### Cubans

COCM, 9833 kc., Havana, Cuba, is on the air daily from 8 a.m. to 1 a.m. Opening and closing theme "One—BC" March. Music by remote control every evening from the Cabaret Eden Concert of Havana. Announcements in English and Spanish. Senors Mario de Luna, Gabriel Tremble, Jose Agueros and Manuel Acebal, announcers. Dr. Rodolfo Garcia Navarro, Director. Station verifies all correct reports.

International Reply Coupons or postage stamps appreciated. Studios are located at No. 1216—23rd Street, Vedado.

COCQ, 9750 kc., Havana, Cuba, has changed frequency to 9740 kc., although not exactly settled at present.

COCH, 9428 kc., Havana, Cuba, has moved to 9437 kc. where it has been assigned.

COKG, 8935 kc., Santiago, Cuba, is still assigned to 6200 kc., although carry-

*(Continued on page 334)*

# Channel Echoes

By ZEH BOUCK

**W**E devoted a recent Saturday and Sunday listening in on Mexican stations—long and short-wave. Quite a reek-end. We are therefore inclined to credit William T. Scott with the radiodor of the month—and he gets a free subscription over his protest that he doesn't want it. Writes Bill (W6POI) of 711 So. Main Street, Fall Brook, Calif.

"This stench coming up from the south side of the Mexican border can no longer go unmentioned. I know that you have given ole Doc Brinkley and Baker hell from time to time, but that's just a drop in the bucket. I refer to the whole picture of Mexican radio—the broadcast stations, hams and government (?) services. The situation is such that the odors you have been commenting upon are mere whiffs of a Jockey Club compared to the outhouse zephyr which continually blows across the border.

"Every quack pill roller who would be jailed for his efforts in any civilized country is allowed to rave unchecked in Mexico. Oil stock which would not pass the scrutiny of any securities commission in this country is sold here by the ream via Mex radio. Dream books, fortune telling charts and all that bunk is peddled by the hour."

[The matter of advertising across international borders was on the Cairo agenda. Just what was done about it, we haven't as yet learned. Anyhow we can't do much in the way of a national protest until we sweep out our own Augean Stable. For instance, quacks of all kinds are tolerated and even encouraged in the State of Florida—from palmists to fake medicos with electrical gadgets (off-springs of a radio mated with a static machine) which will diagnose and cure all sorts of diseases. You simply can't stop people from buying gold bricks.]

Stench sleuth Scott continues: "As a matter of technical criticism their broadcasting stations are full of harmonics and overmodulate consistently. The splatter from some of them covers 50 kc. on my Super Pro with the selectivity control on maximum! I have heard their harmonics on our aviation bands with S9 signals! As for the hams! Did you ever hear one of those fone stations which nightly clut-

## MEICANA . . . HITTING HITLER . . . ROCKEY POINT.

ter up the 40-meter c.w. band? I mean when the senor gets full of *tequila* [innocent looking fire water distilled from molten cacti] and he and his lady friend start singing a duet. And the commercial stations are just as bad. The other night I was having a little rag chew with W7GMV up in Seattle, when some Mex boat starts calling Mexico D. F. right in the middle of the 40-meter band! [Probably a harmonic from the 2400-meter maritime mobile band.] He kept it up for hours, repeating his QTH [location] and he must have been hitting the high-spots for his QTH was always different! I thought I could read some sour fists, but this bird was too much for me. And the note! 7GMV said it was raw a.c., but I can throw out all my filters and not begin to sound like that.

"Were you ever in a real Mex town? I mean where they throw it out of the window for the dogs to eat? [Si me amigo—from Vera Cruz to Campeche.] Well that stench is nothing compared with the combination of radiodors they dish up south of the Rio Grande!"

RUNNERS UP ARE as follows: Donald C. Hamilton, who, incidentally, checks with Bill Scott. "I should like to nominate XENT as a radiodor. Last night its owner was bemoaning the fact that CKY, Winnipeg, Canada, sometimes interferes with his very fine programs. He then requested all his listeners to write to the Canadian Radio Commission asking to have CKY's frequency changed. I don't know a whole lot about CKY, but they can't possibly dish out anything quite so fetid as does XENT. Maybe the

next revolution will catch up with Dr. Brinkley."

Sleuth Hamilton disagrees with us concerning Jack Benny, whom he considers to be the best radio comedian. However, he admits "that's saying practically nothing."

H. L. Ray (RSSL VE24A7), Edmonton, Alberta, Canada, nominates Rinso's "Big Sister" program—Rinso that makes the wash—or is it teeth—four shades less dingy.

Geordie Robertson, also of Canada (RSSL VE4ZB), tosses the well-merited garlic at Cecil B. deMille and the Lux Radio Theater of the Air. Without perhaps realizing it, Fellow sufferer Robertson suggests a fairly sure cure for radiodors. If the stars on our better programs—those with real names and justified reputations, such as deMille, George Arliss, Leslie Howard, Burns and Allen (whom we consider the best comedy team on the air)—would simply refuse to spout the insipid, inartistic, asinine, incredible, inane, vacuous, vapid, moronic puerilities written for them into the script, we'd still have the stars—along with better and more palatable programs which would sell more toothpaste, cigarettes, soap and cosmetics for the sponsors.

Guy Lombardo and his Rockettes, who swear they eat Bond bread and nothing but Bond bread in order to preserve their trim lines, provide an excellent example of such stupidity, and are considered radiodoriferous by L. Wolford of the Canal Zone.

Former prize-winner, Warren H. Stark, salutes (in the classic manner) WISN, Milwaukee "who is driving  
(Continued on page 333)

Fig. 1. Zeh Bouck's portable-mobile QSL card used during his recent vacation (?) in Florida. The art work was done by W9EKK.



# Ultra-High

By PERRY FERRELL, Jr.

**B**EGINNING this month we shall endeavor to give you readers an accurate listing of all new u.h.f. stations, whether they are broadcast, experimental, television, forestry or police. Lists of this kind are by no means new, but we believe ours needs a little explanation.

## Key to Station List

In the column headed "Frequency" the word "Gen. Re.," etc., mean that the station has the choice of the following frequencies:

General Broadcast—

31.6, 35.6, 38.6 or 41.0 mc.

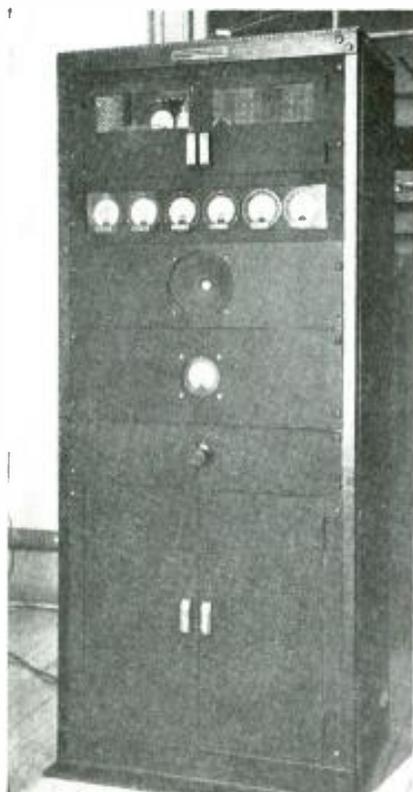
General Police—

30.1, 33.1, 37.1 or 40.1 mc.

General Relay—

31.1, 34.6, 37.6 or 40.6 mc.

Listing them this way saves space and also serves to familiarize the reader with the fact that many stations are allotted these four frequencies and are apt to change from one to another on short notice.



W8XAL, Victor, N. Y., operating on 31.6  
Front view of the 100-watt transmitter at  
mc. Studio is at Rochester.

## AEROVOICE ON U.H.F. . . . NMF ON 31 MC . . . SUPER DX . . . W3XIR BROADCASTING

Now in the "Power" column, the numerals to the left of the slanting line (if there happens to be one) indicate the power output. If there is a slanting line it means that the station is portable-mobile. The numeral to the right of the slanting line indicates the radio district in which the unit is licensed to operate. Thus, 10/4 would mean that a station of ten watts power is operating portable in the fourth call area. In the same manner, a station marked with a small "a" means that it is a special unit and can operate anywhere in the United States. When the number and slanting line are left out entirely you may assume that the station is fixed at the location given.

## Keeping Up With The F.C.C.

In keeping up with the F.C.C., we find that Cleveland, Ohio, is going to take advantage of u.h.f. for a non-commercial educational broadcast station. Cleveland's Board of Education has been granted a construction permit to operate such a station on 41.5 mc. with 500 watts power. . . . The Farnsworth Television Corporation, of Springfield, Pa., has been granted a license to cover the construction of a new station. . . . W6XPA, 30.1 mc., the police broadcaster heard regularly on the east coast, will increase power to 250 watts shortly. . . . A little late, but well worth knowing—Edwin H. Armstrong, New York City, was allotted special temporary authority to test his new broadcast equipment on 43.7 mc. with 2,000 watts power. Call W2XMN.

The cities with large police car forces are expanding more than ever, as St. Louis is adding 15 and Kansas City is adding 12. . . . The New Jersey Forest Fire Service will put 18 mobile units in service soon. They will operate on 39.0 mc. with 10 watts power. . . . Maryland and Massachusetts are going to work too. Maryland puts in a portable and a fixed while Massachusetts adds two fixed. The Mass. stations will be at Harvard and Sharon, each with 25 watts on 38.6 mc.

Aerovoice, Inc., will carry on a program of research in connection with the use of u.h.f. equipment on airplanes. They have licenses for several units on 31.6, 35.6 and 41.0 mc. Power 50 watts.



View of station W8XEK, Erie Police Department, Erie, Penna. Transmitter operates on 37.1 mc.

The City of New York Marine Fire Department will conduct tests up till July 18th, on the feasibility of two-way communication between their fire boats and land mobile units. All tests on 35.6 mc. through the Fire Boat Tender Captain Connell. . . . On the other hand, the New York Police Dept. is putting two-way units in boats and airplanes. These latter ones will be on 33.1 mc. with 50 and 15 watts output respectively.

W3XKA is dropping its request for renewal of license. . . . We wonder in passing what the F.C.C. will do when

## LAST-MINUTE FLASHES

Clyde Criswell sends word that W3XEX was heard testing on 26.05 mc.

Harold B. Klein, in a late letter, says that W9XUP is testing its new equipment and has an R9 plus-plus signal. So loud that at times it blanketed W6XKG on the same frequency (W6XKG is a local). Harold's kilocycle bisector tells that W9XUP is 4 kc. to the low end and about the same for W9XUY on 31.6 mc. Oh well, "All the better to hear you by" (apologies to Little Red Riding Hood).

W2XBS, the N. B. C. television transmitter, is operating on the following sked: Tuesday, Wednesday and Thursday, 2 to 3 p.m. Tuesdays and Thursdays, 7 to 8 p.m. Larry Weber, who sent the above, also advises watching 31.1 mc. for W10XV, the N. B. C. mobile unit. W10XV is used in nearly every parade, convention, etc. W2XF on 40.6 mc. is the other end of this broadcast pickup circuit.

The Denver Mint station, mentioned last month is on 35.6 mc.

W3XIR is officially on 41.0 mc. and verifies with a very neat card.

W6XRE, that lonely broadcaster way up there on 120.0 mc., is back on the air. Those near Los Angeles watch for it on weekdays, 9 p.m. to 1 a.m., and Sundays, 11 a.m. to 3 a.m.

all the three-letter calls run out. They are certainly nearing the end of the rope.

### Colombian Veri

Our verification of HJA-3, Barranquilla, Colombia, has just arrived. It is remembered that your writer seemingly was first to hear them in the U. S., when we logged them at 4:15 p.m., March 15th. The information contained in their letter was very meager, but did tell us that all reception reports would be appreciated and correct ones acknowledged. The Barranquilla Telephone Company, who owns and operates both HJA-3, 35.0 mc., and HJA-5, 38.0 mc., Santa Marta, is experimenting in these channels with the intention of installing a commercial phone circuit. (Barranquilla and Santa Marta are separated by body of water 50 miles wide and each station is atop high cliffs, which bound the bay.) At this writing HJA-5 is temporarily off the air as power facilities in Santa Marta are very poor. In all probability gasoline engines will be the final resort. During the summer months neither station has much chance of being heard in the States, but conditions may change so that they will. Be on the watch.

Harold B. Clien, Los Angeles, Calif., sends dope and data on W9XUY. This station operates on 31.6 mc. with 100 watts radiated by a Collins 150B using a "J" type antenna, about eleven stories above ground. They say the most probable reason for their not getting more reports from the east coast is because a larger building shadows them in that direction. W9XUY verifies all reports with a very nice card, which we will reproduce here soon. Address: Central States Broadcasting Co., Omaha, Nebr. . . . Harold C. uses a Breting 14 and has heard 13 broadcast stations and has verified 11 of them. Very FB. . . . One of the better catches was W4XBW, who verified!! Address: W4XBW, c/o WOD Brdcstg. Corp., Chattanooga, Tenn.

### Hot DX Reports

Joe Carlin of Gadsden, Ala., using a Raco, sends along a fine report. Besides hearing HJA-3, Joe has picked up 14 stations on 33.1 mc. in the last several weeks and his list of DX amateurs will stand among the best of them. Some of his better catches are: YN3BG, SU1CH, ZL4AO, ZL3BJ, HR4AF, CT1ZA and K5DG. Joe also reports W10XFQ on 31.1 mc. and W6XMV, 35.0 mc., temporarily located at Oakland, Calif.

Walt Welch up at Lynn, Mass., reports W4XCE, 30.1; W4XG, 30.1; W1XCE, 33.1; W1XAX, 33.1, and W9XKC 33.1 mc. Also W10XCY and W10XCZ on 31.1 and 33.1 mc. Both

(Continued on page 332)

## NEW U.H.F. STATIONS

Call	Location	Broadcast	Frequency	Power
W2XSN	P. F. Godley, Montclair, N. J.		41.8 mc.	1000
<b>Relay Broadcast</b>				
W4XGO	Isle of Dreams, Miami, Fla.		Gen. Re.	2/4
W5XHU	WDSU, Inc., Ardmore, Okla.		Gen. Re.	2/5
W5XO	Carter Pub., Ft. Worth, Tex.		Gen. Re.	10/5
W8XRZ	WJR, Inc., Detroit, Mich.		Gen. Re.	150/8
W9XMK	Peoria Brdcstg., Peoria, Ill.		Gen. Re.	50/9
W10XIO & W10XIQ	Yankee Network, Boston, Mass.		Gen. Re.	10/a
<b>Forestry Service</b>				
W1XQA to W1XQF	Mass. Dept. of Conservation		Gen. Br.	/1
W3XMP	Maryland Dept., Brandywine		Gen. Br.	25
W3XMQ	Maryland Dept.		Gen. Br.	10/3
<b>Police Broadcast</b>				
W1XLI	Boston, Mass.		Gen. Po.	10/1
W2XSI & W2XSJ	New York City Police Dept.		33.1 mc.	10/2
W2XSK	Rockland County, N. Y.		Gen. Po.	50
W2XOZ	Lakewood, N. J.		Gen. Po.	10/2
W2XPS	Lakewood, N. J.		Gen. Po.	50
W2XQG	Hempstead, N. Y.		40.1 mc.	50
W2XQH, I, J, K, L, M	Hempstead, N. Y.		40.1 mc.	15/2
W2XRX	Haverstraw, N. Y.		Gen. Po.	10
W2XSL	New York City Police Dept.		Gen. Po.	15/2
W2XSM	Englewood, N. J.		Gen. Po.	10/2
W2XSO	White Plains, N. Y.		Gen. Po.	25
W2XSP to W2XSS	White Plains, N. Y.		Gen. Po.	5/2
W2XSY	Elwood, N. J.		Gen. Po.	/2
W3XLJ to W3XLN	Wilmington, Del.		Gen. Po.	15/3
W3XMC	Bound Brook, N. J.		33.1, 37.1 mc.	15
W3XMD	Bound Brook, N. J.		33.1, 37.1 mc.	12/3
W3XML	Staunton, Va.		Gen. Po.	25
W3XMM to W3XMO	Camden, N. J.		Gen. Po.	15/3
W4XGD	Sanford, Fla.		Gen. Po.	25
W4XGG & W4XGH	Wilmington, N. C.		33.1 mc.	5/4
W4XGP to W4XGT	Tampa, Fla.		30.1 mc.	16/4
W4XGU to W4XGV	Miami, Fla.		30.1, 33.1 mc.	15/4
W5XEL, M, N, O, P	Wichita Falls, Tex.		Gen. Po.	8/5
W5XFA to W5XFT	Austin, Texas		Gen. Po.	10/5
W6XUA	Las Vegas, Nev.		30.1 mc.	20/6
W6XUP	National City, Cal.		Gen. Po.	10/6
W6XUQ & W6XUR	Alameda County, Cal.		37.1 mc.	20/6
W6XUX & W6XUY	Long Beach, Cal.		Gen. Po.	10/6
W6XXA to W6XXL	Los Angeles, Cal. County		Gen. Po.	15/6
W6XXZ	Watsonville, Cal.		Gen. Po.	10/6
W6XYF & W6XYG	Los Angeles, Cal. Red Cross		Gen. Po.	15/7
W7XDU & W7XDX	Portland, Ore.		Gen. Po.	15/7
W7XDW & W7XDX	Multnomah County, Ore.		30.1 mc.	15/7
W7XDY	Pierce County, Ore.		33.1, 37.1 mc.	5/7
W7XEG to W7XEJ	Butte, Mont.		40.1 mc.	5/7
W8XPS	Wayne County, Mich.		33.1 mc.	25/8
W8XQX	Royal Oak, Mich.		30.1 mc.	15/8
W8XRC	Oneonta, N. Y.		30.1 mc.	10/8
W8XRE	Ottawa Hills, Ohio		Gen. Po.	15
W8XRF	Ottawa Hills, Ohio		Gen. Po.	12/8
W8XRR	Midland, Mich.		Gen. Po.	15
W8XRS	Wierton, West Va.		33.1 mc.	5
W8XRT to W8XRW	Wierton, West Va.		33.1 mc.	5/8
W8XRX & W8XRY	Fremont, Ohio		30.1 mc.	15/8
W8XSD	Indian Hill, Ohio		33.1, 37.1 mc.	50
W8XSE & W8XSF	Indian Hill, Ohio		33.1, 37.1 mc.	15/8

# RADIO SIGNAL SURVEY LEAGUE NEWS

**T**HE final reports on CMGF-COGF Matanzas, Cuba, have just finished coming in. On regulation report blanks, on postals, in letters, they form a huge pile on the desk of the Director. Some were made carefully, with the skilled pen of a radio engineer; others were drawn more crudely. All indicated a real interest on the part of the members in cooperating to secure worth-while results. And the results were secured. They showed beyond the shadow of a doubt, for instance, that a heterodyne on COGF, set up by the short-wave signals from DJO Berlin, Germany, was not only almost blotting out reception of the Cuban signals but in turn was making it impossible to receive signals from DJO in the American and presumably the South American area also.

There were various other factors that prevented reception of signals, such as local broadcast QRM, lack of a sensitive receiver, poor location, etc. However, the vast majority of those reporting were able to pick up the signals successfully on the short-wave spectrum. It is only natural that the interference caused by broadcast stations in this country should drown out the 1,120 kilocycle signals except in very favorable locations.

One disappointing feature of the survey was the dearth of reports from foreign countries. Possibly this is due to the necessity of going to press so shortly after the completion of the survey and perhaps in our next issue we will be able to report that our many British members were not only "hearers" of the R.S.S.L. doctrines, but "doers" also. In an attempt to overcome

## CUBAN SURVEY RESULTS . . . R.S.S.L. WHO'S WHO . . . NEW EXPEDITION ANNOUNCED.

this difficulty, arrangements are now being made to transmit via amateur radio advance news of R.S.S.L. surveys to countries throughout the world where our members wish to participate and promptly send in their results and observations. Full details will be published as soon as data is available.

### Interesting Reports

To continue with the detailed report of the CMGF-COGF survey, perhaps the most interesting thing was the varied circumstances surrounding reception. Roy E. Dement, W19P2, down at Plainview, Texas, reports his weather consists of frequent sandstorms. CMGF cannot be heard, while COGF comes in after sundown. H. L. Ray, VE24A7, up in Edmonton, Alberta, Canada, reports the same thing—CMGF impossible due to heavy QRM, while COGF came through quite well at times but was drowned out by being so nearly on the same frequency as DJO, Berlin. Incidentally, Mr. Ray tells us the xyl says if he doesn't stop tuning the set so COGF heterodynes against DJO she will . . . oh well, we can't blame her. There really ought to be some sort of prize for long suffering yls and xyls when the om has been bitten by the DX bug—the RSSL bug or otherwise. The only cure seems to be to inoculate them also. Incidentally, we had one honest-to-goodness survey report on COGF from an xyl this week; Mrs. Mildred Merritt (W7J18). L. E. McNamara,

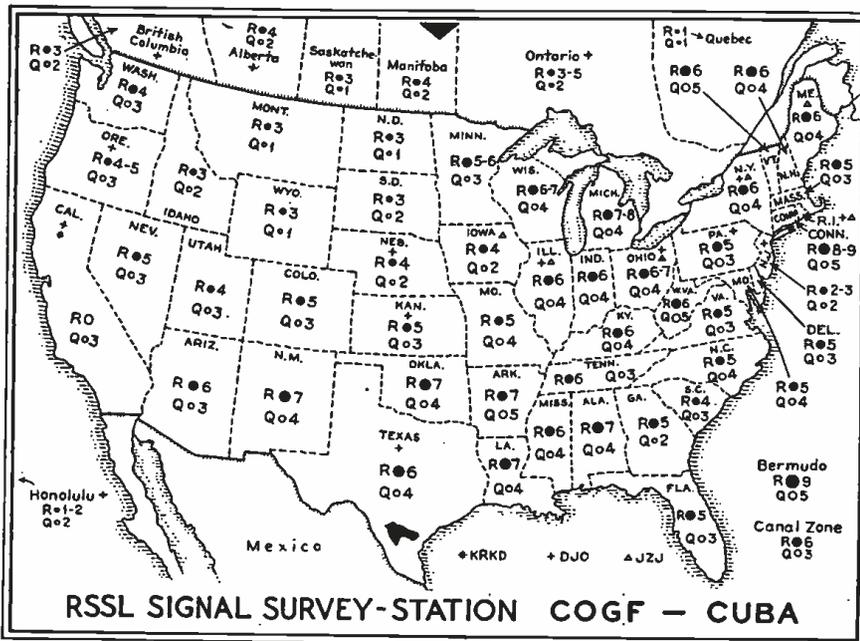


Monitoring Station W9J6, owned and operated by T. G. Brawley, Greenville, Ohio. Note large maps on left wall.

W29M37, out in Los Angeles, reports it was impossible to pick up COGF there although other Cuban stations, such as COCO, came in well. Harold Miller, W16J6, at Omaha, Neb., reports that he could catch the announcement COGF but that DJO heterodyned out all the other signals. Matthew E. Leshner, W3F32, at Lawrence, Mass., reported picking up the signals of COGF for three days out of four but states "general reception conditions through the four days poor due to QRM from DJO."

Theodore C. Smith, W5F8, at Ogdensburg, N. Y., in a series of careful observations of COGF, reports the usual heterodyne from DJO but notes that on March 21st, the day after the official survey ended, DJO had moved up a few kilocycles and the reception of COGF was very good; R-8, with negligible fading. Douglas Worcester, KH1, Honolulu, Hawaii, reports that the broadcast of Chancellor Hitler's speech over DJO drowned out COGF which formerly came in R-5-7, but now averages R-2. Even from points as close as the Canal Zone, DJO blocked reception of COGF. J. D. Gallivan, K521, at Balboa, reports that Sunday COGF's signals were completely masked and that on other days were only R-6.

In this entire summary, perhaps there has been an unintentional attitude of con-



Map showing level and readability of signals from COGF, Matanzas, Cuba. Averaged results are also given for Honolulu, Bermuda and the Canal Zone. Symbols indicate QRM from ERKD, DJO or JZ1.

sidering that DJO was interfering with the signals of COGF, while it is just as logical to infer that COGF was blocking the reception of DJO. QRM is rarely a one-sided affair and both stations will doubtless arrange to adjust their transmitters so as to avoid this mutual interference. Complete reports are being sent to COGF and a copy of this issue of AWR will be mailed to DJO for its information. A few monitoring stations reported some interference from local broadcast stations; one or two mentioned and a few spoke of W1XAL as affecting reception of COGF, from points even as far west as California and British Columbia. The accompanying map-chart shows the average coverage based on the R.S.S.L. survey with indications of signal strength for the various states.

#### MacGregor Expedition Survey

With the close of this survey on May 31st, another chapter in the history of the R.S.S.L. draws to a close. For the first time, a really worthwhile job of monitoring the signals has been done. Reports have been received from almost every corner of the United States. Although good reports were received from Canada, the reports of R. S. S. L. members from outside the United States and Canada were definitely disappointing. Although W10X-AB lay off Greenland and on a great circle distance was relatively close to England, at the time of going to press only a few reports have been received from the many members of the League situated in the British Isles. Such lack of cooperation makes it exceedingly difficult for the League to accomplish its aim of recording reception of particular signals over widespread areas. In the future, it is hoped that overseas members will make up in activity for their lack of numerical strength and that survey reports from overseas points will be sufficient in number to permit a truly world-wide picture of the reception of the signals.

It is unnecessary to devote space to a description of the equipment used by the MacGregor expedition as this has already been covered in previous issues of AWR. The messages themselves consisted largely of traffic connected with the expedition and with personal messages to families of the officers and crew. Usually on phone, they often conveyed vivid pictures of snow and ice, the ship frozen in at Reindeer Bay, and the life of the Eskimos.

Now for the survey proper—on the whole, it was indicative of the fact that on a clear channel, such signals can be depended on to come through regularly. A vast number of important messages were handled and the effective contact with this

Expedition day after day is a real tribute to amateur radio.

So many monitoring stations reported that it is impossible to make any attempt to give credit to each. The survey shows definitely that the League is able to do a splendid job when each member does his part. Specially complete and detailed reports were received from Roy E. Dement, W19P2, Plainview, Texas, and from Harry F. Deibert, W5H12, Walnutport, Penna.

The call letters OX2QY were used in the early months, but later superseded by W10XAB on which later transmissions were made. Most of the R.S.S.L. stations that received W10XAB reported signal strengths in the neighborhood of R7 with little fading. Interference from amateur c.w. stations was noted by many, but this QRM was not serious. A number of monitoring stations reported they could not pick up W10XAB at all. Some of this was due to poor location and local factors, or lack of a sensitive receiver, but from the graph of reception conditions, it seems to have been mostly a question of skip effects. The large number of reports of "non-reception" of W10XAB indicate that members of the League are on their toes and monitoring stations are sending in reports, even though they have not actually picked up the desired signals.

#### Another Expedition

Members of the Radio Signal Survey League will have an opportunity to do their part in cooperating with a very interesting scientific expedition to north-east Greenland. Mr. Jess Tillier, one of the members of this expedition, has joined the R.S.S.L. and expressed the desire to have members send in reception reports of his radio transmissions.

The name and QRA of the expedition is NORSK FRANSK POLAR EKSPEDISJON 1938, Willy Knutsen Og Comte Gaston Micard, Svalbardkontoret, Oslo, Norway.

About the first of July, Mr. Tillier, who is an aviator and radio operator himself, will, with Mr. Aamodt who will act as radio operator, take a small fishing boat to north-east Greenland where they will land at Danmarkshavn. From there they will proceed north by boat as far as the ice permits and will eventually establish their main base at Ingolfs-fjord located at 80°30' north latitude, 17° west longitude.

An advance base still further north will be established on the edge of Peary Land at about 82°10' north latitude and 29° west longitude.

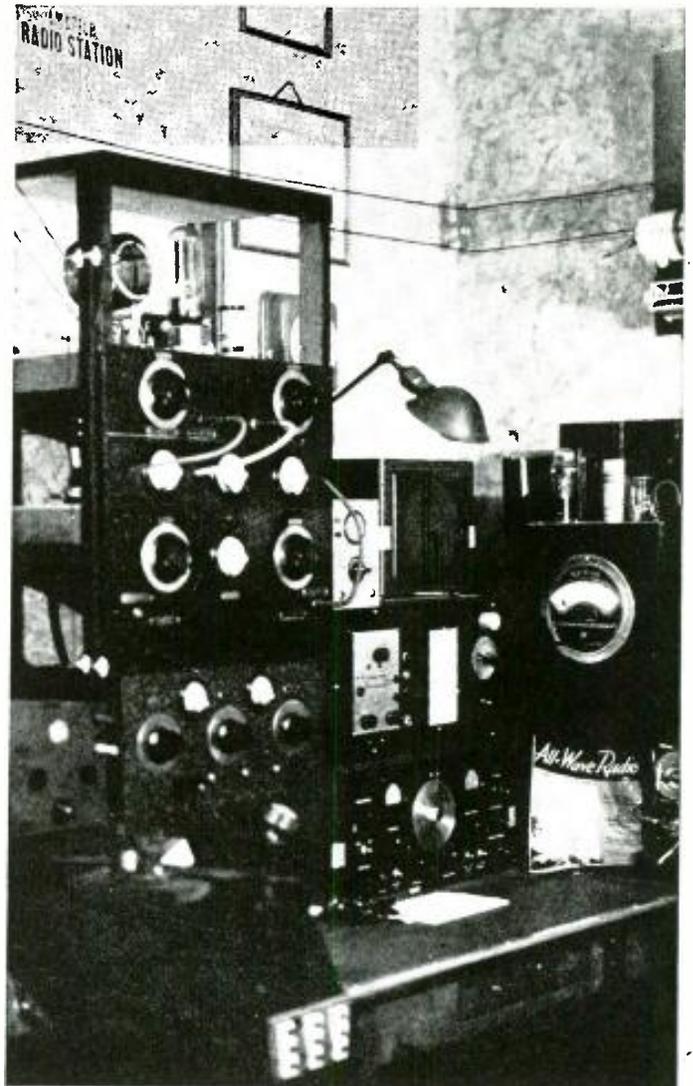
All these camps will use short-wave radio for "inter-communication" and the expe-

(Continued on page 337)



Right: Amateur station W8QQZ, owned and operated by Carl Soendlin, Logan, West Virginia, a member of the R.S.S.L.

Left: Monitoring Station G10, owned and operated by G. R. Diaper, Sudbury, Suffolk, England.



# Night-Owl Hoots

By RAY LA ROCQUE

**A**FTER six months of constant DXing under all types of conditions, contestants in our 1937-38 competition have completed activity and now await their awards. It is with great pleasure that we'll announce on these pages next month, the winning contestants and teams. Congratulations to the new champion, to the winning team and to every other award winner. All are deserving of their reward. Others may have tried equally as hard, but unfortunately in a contest of this kind everyone cannot be a winner so we offer our felicitations to the contestants who fought till the end in spite of adverse luck or faulty equipment. Except for information on individual reports (which have been mailed to the stations) we're still willing to furnish you with any scores for the weekly periods during the past two months if you supply us with a 3c stamp.

## Future Plans

The work and pleasures of the contest being terminated, it now becomes fitting to reveal our plans for the coming season. The response to contests in the past two seasons has been comparatively small, and those who have taken part have found it difficult to remain

**DX CONTEST FINALS . . . CERTIFICATE AWARDS . . . OMAHA (WOW) FLOOD TESTS  
VERI MIXUP . . . CKY ANNIVERSARY . . . WGN'S NEW TOWERS . . . NEW AUSSIE?**

at the dials throughout the period of the contest. In both cases there were far fewer contestants at the finish than the total number of original entries. It is because of this and because the R.S.S.L. activities offer a better means for competitive DX that we do not propose a repetition of our championship contest next season.

The contest has meant much work on our part as well as on the part of the participants. We feel that we will be able to give you a bigger and better Night Owl Hoots when we have lessened our burden in this manner. Night Owl Hoots next season will not be void of competitive activity, however. Readers will be offered an opportunity to obtain credits for material on new stations and station changes. There will be no winners and no losers. You will merely get what you earn and earn what you get. In other words we're planning to issue some sort of a certificate to everyone attaining a specified quota of credits.

Should you desire any written proof of your DX accomplishments next season, we know of no more fitting way to

## STATION CHANGES, U.S.A.

### New Stations

WHLS	Port Huron, Mich.		
KWJB	Globe, Ariz.		
	Aurora, Illinois	250 w.	Daytime
	Atchison, Kansas	100 w.	Daytime
	Endicott, N. Y.	100 w.	Unlimited
	Holyoke, Mass.	500 w.	Unlimited
	San Jose, Calif.	250 w.	Daytime
	St. Louis, Mo.	1000 w.	Unlimited

### Power

KIT	(1250)	250 to 500 w.
WAWZ	(1350)	500 to 1000 w.

### Hours

WAPI	(1140)	From sharing with KVOO to unlimited
KVOO	(1140)	From sharing with WAPI to unlimited

## STATION CHANGES, FOREIGN

CA90	Tocopilla, Chile	900 kc.	100 w.
CB96	Coquimbo, Chile	960 kc.	200 w.
CB111	Vina del Mar, Chile	1110 kc.	100 w.
CC133	Chillan, Chile	1330 kc.	100 w.
CX50	Montevideo, Uruguay	1530 kc.	300 w.
CW19	Rocha, Uruguay	1340 kc.	50 w.
CW47	San Jose, Uruguay	1460 kc.	100 w.
XEBP	Durango, Mex. (IDA)	1150 kc.	250 w.
XEME	Merida, Mex. (IDA)	1240 kc.	50 w.
2VB	Newellmouth, N. Z.	760 kc.	1000 w.
2VN	Nelson, N. Z.	940 kc.	175 w.
2ZH	Napier, N. Z.	820 kc.	65 w.
2ZP	Wairoa, N. Z.	900 kc.	105 w.
2ZM	Gisborne, N. Z.	1150 kc.	15 w.
3ZB	Christchurch, N. Z.	1430 kc.	1000 w.
3ZK	Greymouth, N. Z.	940 kc.	175 w.
4YZ	Invercargill, N. Z.	680 kc.	100 w.
4ZB	Dunedin, N. Z.	1220 kc.	1000 w.
7DY	Derby, Australia	1400 kc.	

### Frequency

EAJ43	1490 to 1500 kc.
IZB	1070 to 1090 kc.
IZM	1260 to 1250 kc.

### Power

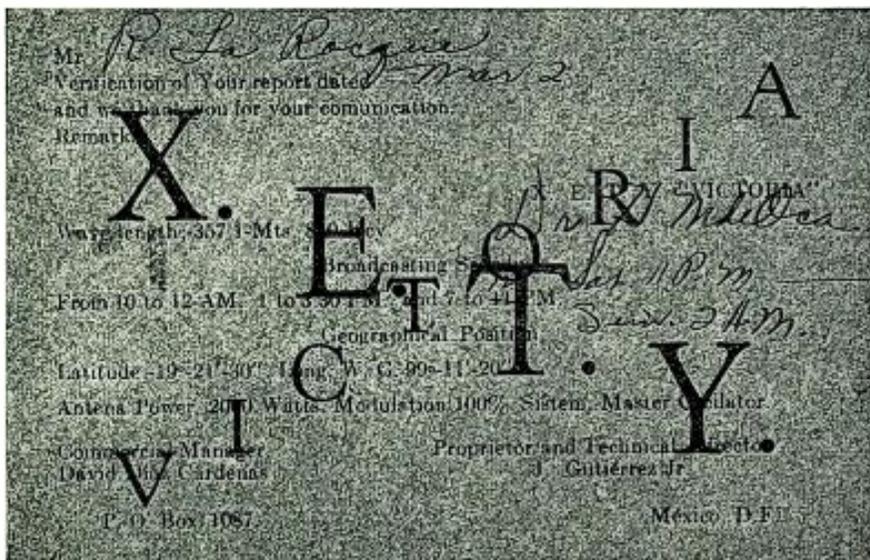
CC127 (1270)	100
CC64 (640)	1000-100
CB138 (1380)	150-5000
CMBF (770)	1000-5000
CMCF (810)	600-5000
CX6 (650)	5000-10800
CX12 (770)	10000-1000
EAJ43 (1500)	8000-100
LR3 (950)	31000-120000
LR10 (790)	10250-19250
LT5 (1080)	500-5000
LT9 (1200)	500-1000
LV1 (730)	1000-5000
LV2 (960)	1000-2000
LV5 (1120)	500-6000

### Call Letters

CW-19 to CW-19A (1340 kc.)

### Delete

CB-144D (1440)	4ZM (1010)
CA-96 (960)	4YO (1140)
CW-47A (1460)	2ZO (1400)
CX-2 (570)	2ZL (1240)



An old-time veri—XETV—fine business in their time, but gone with the wind these many years.

obtain it than by applying for ALL-WAVE RADIO DX Reception Citations. Their beauty and the achievements they represent will enhance the appearance as well as add to the prestige of your listening post. Your contest reports have been useful to the stations in the past. May we urge former contestants to continue supplying stations with valuable reports by taking active part in every R.S.S.L. survey.

### With the Night Owls

**Anthony C. Tarr, (W29B4)** Seattle, Wash.: "Do you know what Aussie is on 1060? According to the last NZDXR bulletin 2BH moved from that frequency to 860, which leaves 1060 vacant. I have a report on an Aussie on that channel if I can find the place to send it." And still another letter from Tony with the following: "I received a very friendly letter and two beautiful cards from the chief engineer of JBCK (850 kc.) and he wants me to tell all DXers that he is pleased to receive reports on the transmissions of JBCK and will acknowledge same."

**Richard Wright, (W11H6)**, Chicago, Ill.: "My vacation starts around June 10 and lasts till around Sept. 27 so that any reports received on WGN during that period will have to be delayed until I return."

**E. W. Watson**, Christchurch, New Zealand: "New stations are scheduled to be erected soon relaying national programs. Information will be sent you as soon as possible." Eric is also responsible for the latest changes in Australian and New Zealand Broadcasting stations in this month's list.

**Eugene ("DX") Castagnoli**, Los Angeles, Calif.: "I have learned to write Spanish quite well and I would like to know if it would be possible to arrange some club or group of international DXers or Night Owls. I think it would be quite a lot of fun communicating with each other in various languages." We suggest that anyone interested in Eugene's idea write to him at 5033 W. 20th St., Los Angeles, Calif.

**Harold J. Miller (W16J6)**, Omaha, Nebraska: "On its fifteenth anniversary celebration, our local WOW put on quite a demonstration with its 100-watt mobile unit. We have a lake on the north side of town about six miles from the main part of town where the studios are located. It was assumed that the 'heart of the city' was flooded. The announcers first spoke from the studios then got in a car and drove out to Carter Lake and put two pack transmitters in boats stationed at each end of the lake. A transcription was made of the activities at the lake and rushed back to town and played over the station. All this within the period of one-half hour, and after darkness had descended upon Omaha."

San Salvador - Republic of El Salvador - C.A.

January 20th, 1932.

500 watts - 684 Kc

Chief Engineer of RUS,  
"YSIFM"

Veri from RUS, another old-timer, since replaced by YSS.

### Veri News and New Veries

"Unique" is the word for it! We're speaking of the veri Joe Lippincott received from Klagenfurt, Austria. It was postmarked just two days before Herr Hitler took the Austrians under his wing! Joe easily can claim to have the last BCB veri out of Austria, if not the last all-wave veri out of that country. Besides a verification the letter also contained about 15 varieties of Austrian stamps. . . . Hal Miller is responsible for following information on veries: KXYZ, WNAX, KXBY, KPO, KMA verify with a postal card, black print on buff. WPAD, WJBK, WAPO, WIND, WJAG replied and verified by letter. . . . The chief's veries this month are more or less of a domestic nature. Perhaps the best in the way of beauty is from WPRA. It's a picture postal in colors showing an archway of flaming red flamboyants lining Military Road in Puerto Rico. The veri message is on the reverse side of card. . . . WKAT is a letter—a tiger cat yeowling into a mike constitutes the letterhead. . . . CMHJ's veri is of the photographic type—the card shows a photo of Hanabanilla Falls just outside the city of Cienfuegos. The verification message is handwritten by Enrique Hidalgo on the reverse side of card. . . . CHSJ is a folding card. The outside back cover is a picture of the Admiralty Hotel which houses the station. Inside is a picture of Studio A and a map of North America showing the location of St. John, N. B. . . . CKCK refuses to verify—selection named does not check. Our first refusal of the season, but at least they replied! . . . "Dust on the Moon" was the only selection we were able to identify due to weak signals and according to CKCK there were no foreign particles on Luna that night. . . . WMFO is a printed postal black on buff with call

in 1/2-inch letters. . . . Very nice personal letters are the verifications from WNBC, WNBX, WPRO, WCSH, WFBM, and WJRD. CKY is a card—black printing on buff with a circular "Manitoba Calling" enclosed under the same cover. The booklet contains pictures and information about CKY-CKX. . . . WFIL verified on a noonday broadcast with a printed government postal. WHEB's veri is typed on a government post card, Speaking of veries, we had occasion to stop in at Carl Horton's in Athol, Mass., on the way home from a Mohawk Chapter meeting and Carl opened a suitcase brimful of veries dating back to the days when radio was young. The hour was 2 a.m. and much as we were tempted to sit down and dig into them we were forced to be on our way—but take it from us, there were some verifications in that trunk! . . . Others would like to know what you are receiving in the way of new and interesting veries. The chief will use all material of brief descriptive nature pertaining to verifications.

### Kilocycling Around

Here's a little information that ought to assist you in identifying those weak stations on the FCC monitoring tests!—Dick Wright supplies us with the following list of key words used by the stations in identifying their calls: Adam, Boston, Chicago, Denver, Edward, Frank, George, Henry, Idaho, John, King, Lincoln, Mary, New York, Ocean, Peter, Queen, Robert, Sugar, Tom or Thomas, Union, William, X-Ray, Young, Zero.

CKY in commemoration of its fifteenth anniversary this year is issuing to anyone sending them fifteen cents a brochure titled "A Tour of CKY's Studios." . . . Mort Blender is back at WCOP and Curt Keirstead reports that

(Continued on page 329)

# SHORT-WAVE BROADCAST STATION LIST

Frequencies (upper numerals) expressed in megacycles. Change decimal to comma to read in kilocycles. *Italic numerals are wavelength in meters.* Star ★ indicates station does not verify. Diamond ♦ indicates station not in use. All schedules given in E.S.T. Abbreviations: O—Opening; C—Closing; I—Interval; S—Signal; I.R.C.—International Reply Coupon.

41.000 7.32	W2XHG	New York, N. Y. National Broadcasting Co., 30 Rockefeller Plaza. Daily 9 a.m.-12 midnight.	18.480 16.23	HBH	Geneva, Switzerland. Information Section, League of Nations. Sundays, 10:45-11:30 a.m.	15.243 19.68	TPA-2	Paris, France. Minister des Postes, Boulevard Haussmann, 98, Biv. I: Three tones F in Morse. O-C: La Marseillaise; S: chimes ¼ hours. Daily 5-10 a.m.
41.000 7.32	W2XOY	Albany, N. Y. Address: General Electric Co., 1 River Road, Schenectady, N. Y. Mon., Wed., Fri., 8-9 p.m.; Sat., 3-5 p.m.	17.800 16.85	TGWA	Guatemala City, Guatemala, C. A. Radiodifusora Nacional, TGWA. O-C: Simple Melody, Marimba, repeated three times. (See 15.170-11.760-9.685 mc.) Irregular.	15.230 19.70	OLR5A	Prague, Czechoslovakia. (See 21.450 mc.) Daily ex. Sun., 6:30-7:30 a.m., 9:10-9:50 a.m. Mon., Tues., Thurs., Fri., 6:55-9:55 p.m. Sun., 6:15-7:45 a.m., 7:15-8:55 p.m.
41.000 7.32	W8XWJ	Detroit, Mich. 4465 Penobscot Bldg. Weekdays 9 a.m.-11 p.m.; Sundays, 10 a.m.-5 p.m.	17.790 11.86 ★	GSG	Daventry, England. (See 26.100 mc.) Daily 12-2:15 a.m., 5:45 a.m.-12 noon, 12:20-4 p.m.	15.220 19.71	PCJ2	Hilversum, Holland. Philips Radio. Tues., 2-4:30 a.m.; Wed., 9:30-11 a.m.
38.650 7.76	W2XDG	New York, N. Y. (See 41.000 mc.) Daily 9 a.m.-12 midnight.	17.785 16.87	JZL	Nazaki, Japan. (See 21.520 mc.) Irregular.	15.210 19.72	W8XK	Pittsburgh, Pa. (See 21.540 mc.) Daily 9 a.m.-7 p.m.
31.600 9.4 ★	W1XKA	Boston, Mass. (See W1XK, 9.570 mc.) Daily 7 a.m.-1 a.m.	17.780 16.87	W3XAL	New York, N. Y. 30 Rockefeller Plaza. Sun., 8-11:20 a.m., 11:20 a.m.-4:40 p.m., 5-8 p.m. Weekdays, 8 a.m.-4 p.m., 4:20-8 p.m. Begins Wed. 8:30 a.m., Sat. 7 a.m.	15.200 19.74	DJB	Zeesen, Germany. (See 17.760 mc.) Daily 12:05 a.m.-11 a.m.; 11:10 a.m.-12:25 p.m.; 4:50-10:45 p.m. Sunday, 8-9 a.m.
31.600 9.4 ★	W1XKB	Springfield, Mass. Hotel Kimball, Westinghouse Electric & Mfg. Co. Weekdays 6 a.m.-1 a.m.; Sundays, 8 a.m.-1 a.m.	17.780 16.87 ♦	W9XAA	Chicago, Ill. 666 Lake Shore Drive. S: 3 chimes each 15 minutes. O: Star Spangled Banner.	15.190 19.75	ZBW-4	Hong Kong, China. (See 9.525 mc.)
31.600 9.4	W8XKA	Pittsburgh, Pa. (See W8XK, 21.540 mc.) Daily 10 a.m.-1 a.m.	17.770 16.88	PHI	Hilversum, Holland. Philips Radio. Call: Seven languages. I: Metronome 80 beats per minute. C: National Anthem—Wilhelmus. Sun., 6:25-9:30 a.m.; Mon. to Fri. (exc. Wed.), 7:25-9:30 a.m.	15.180 19.76 ★	GSO	Daventry, England. (See 26.100 mc.) Daily 12-2:15 a.m., 4:15-6 p.m.
31.600 9.4	W3XKA	Philadelphia, Pa. 1622 Chestnut St. Daily 10 a.m.-11 p.m.	17.765 16.88	TPB3	Paris, France. (See 15.243 mc.) Daily 8:30-10 a.m.	15.170 19.78	TGWA	Guatemala City, Guatemala. (See 17.800-11.760-9.685 mc.) Sun., 10:30 a.m.-5:30 p.m.; Weekdays 7:50-8:30 a.m., 12:45-4:15 p.m.
31.600 9.4	W2XDV	New York, N. Y. (See 21.520 mc.) Weekdays, 6-10 p.m.; Sat. & Sun., 3-5 p.m., 6-10 p.m.	17.760 16.89	DJE	Berlin, Germany. German Short Wave Station, Broadcasting House. I: 9 musical notes. Folk Song. C: National Horst-Wessel Lied and Deutschlandlied. Daily 12:05 a.m.-5:50 a.m.; 6-8 a.m.; 8:10-10 a.m. Sunday only, 11:10 a.m.-12:25 p.m.	15.160 19.79	OLR5C	Prague, Czechoslovakia. (See 21.450 mc.) Irregular.
26.550 11.30 ★	GSS	Daventry, England. (See 26.100 mc.) Irregular.	17.755 16.89	DJE	Hong Kong, China. (See 9.525 mc.)	15.160 19.79	XEWW	Mexico, D. F. (See 9.500 mc.) Daily 8:55 a.m.-1 a.m. (15.160 or 9.500 mc.)
26.450 11.34	DJV	Zeesen, Germany. (Exp.) (See 17.760 mc.) Irregular.	17.760 16.89	DJE	Berlin, Germany. German Short Wave Station, Broadcasting House. I: 9 musical notes. Folk Song. C: National Horst-Wessel Lied and Deutschlandlied. Daily 12:05 a.m.-5:50 a.m.; 6-8 a.m.; 8:10-10 a.m. Sunday only, 11:10 a.m.-12:25 p.m.	15.160 19.79	JZK	Nazaki, Japan. (See 21.520 mc.) Irregular.
26.400 11.36 ★	GSR	Daventry, England. (See 26.100 mc.) Irregular.	15.370 19.52	HAS-3	Budapest, Hungary. Director Radio, Hungarian Post, Gyali St., 22. O: Musical Box Melody; O: Bells ringing; C: Lord Bless the Hungarian (national anthem). Sunday, 9-10 a.m.	15.155 19.80	SM5SX	Stockholm, Sweden. Royal Technical University. Weekdays 11 a.m.-5 p.m.; Sunday 9 a.m.-5 p.m.
26.100 11.49 ★♦	GSK	Daventry, England. British Broadcasting Corp., Broadcasting House, London W1. Big Ben strikes the hour according to arrangement program. C: God Save the King. I: Bow Bells.	17.760 16.89	W2XE	Wayne, N. J. (See 21.520 mc.) Irregular.	15.150 19.80	YDC	Bandoeng, Java. Address, N. I. R. O. M., Kohingsplein West 5, Batavia, Java, N. E. I. Weekdays 4:30-10:30 a.m. (Sat. 11:30 a.m.), 6-7:30 p.m., 10:30 p.m.-2 a.m. Sunday 4:30-10:30 a.m., 7:30 p.m.-2 a.m.
25.950 11.56	W6XKG	Los Angeles, Calif. 1417 So. Figueroa St. Continuously 24 hours each day.	17.755 16.90 ♦	ZBW-5	Hong Kong, China. (See 9.525 mc.)	15.140 19.82 ★	GSF	Daventry, England. (See 26.100 mc.) Daily 12-2:15 a.m., 5:45 a.m.-12 noon, 4:15-6 p.m.
25.950 11.56	DJU	Zeesen, Germany. (Exp.) (See 17.760 mc.) Irregular.	15.340 19.56	DJR	Zeesen, Germany. (See 17.760 mc.) Daily 8-9 a.m.; 4:50-10:45 p.m.	15.130 19.83	TPB6	Paris, France. (See 15.243 mc.) Daily 6-8:15 p.m.
25.850 11.61	DJT	Zeesen, Germany. (Exp.) (See 17.760 mc.) Irregular.	15.330 19.56	W2XAD	Schenectady, N. Y. General Electric Co., 1 River Road. O: Spark Discharge. C: Star Spangled Banner. Daily 12:30-7 p.m. Specials irregular.	15.130 19.83	W1XAL	Boston, Mass. (See 21.460 mc.) Irregular.
25.750 11.65 ★	GSO	Daventry, England. (See 26.100 mc.) Irregular.	15.320 19.58	OLR5B	Prague, Czechoslovakia. (See 21.450 mc.) Daily ex. Sun., 6:30-7:30 a.m., 9:10-9:50 a.m.; Mon., Tues., Thurs., Fri., 6:55-9:55 p.m. Sun., 6:15-7:45 a.m., 7:15-8:55 p.m.	15.121 19.84	HVJ	Vatican City, Vatican. Stazione Radio HVJ, Citta del Vaticano. I: Clock ticks 5 m. S: Bells. C: (spoken) Laudetur Jesus Christus. Weekdays 10:30-10:45 a.m.
21.550 13.92 ★♦	GST	Daventry, England. (See 26.100 mc.)	15.310 19.60 ★	GSP	Daventry, England. (See 26.100 mc.) Daily 1:45-4 p.m., 6:20-8:30 p.m.	15.110 19.85	DJL	Zeesen, Germany. (See 17.760 mc.) Daily 12-2 a.m.; 8-9 a.m.; 10:40 a.m.-4:25 p.m. Sunday only 6-8 a.m.
21.540 13.92	W8XK	Pittsburgh, Pa. Grant Bldg. O-C: Stars and Stripes Forever. Weekdays, 6:45-9 a.m. Daventry, England. (See 26.100 mc.) Daily 5:45-10:30 a.m.	15.300 19.61	YDB	Soerabaja, Java. Daily 7:30 p.m.-2 a.m. (See 15.150 mc.)	15.040 19.95	RKI	Moscow, U.S.S.R. Radio Centre, Solianka 12. Call: "This is Moscow Calling." O-C: Internationale. Daily 7-9:15 p.m. No I.R.C. required.
21.530 13.93 ★	GSJ	Daventry, England. (See 26.100 mc.) Daily 5:45-10:30 a.m.	15.290 19.62	LRU	Buenos Aires, Argentina, S. A. Radio El Mundo, Maipu, 555. O-C: Spanish only. Daily 7-9 a.m.	14.970 20.04	LZA	Sofia, Bulgaria. Director General, Telegraphs and Telephones. O: Racherutza (Bulgarian Folk Dance). C: National Anthem and Hymn of His Majesty the King. Weekdays 5-6:30 a.m.; 12:2-4:5 p.m.; Sundays 12 a.m.-4 p.m.
21.520 13.94	W2XE	New York, N. Y. 485 Madison Avenue. C: Star Spangled Banner. Mon. to Fri., 7:30-10 a.m.; Sat.-Sun., 8 a.m.-1 p.m.	15.280 19.63	H13X	Ciudad Trujillo, Dom. Rep. W. I. J. R. Saladin, Director of Radio Communications. S: Bells. Weekdays 12:10-1:10 p.m.; Sundays, 7:40-10:40 a.m.	14.935 20.09	PSE	Rio de Janeiro, Brazil. (P) U.S.A., Europe. Broadcasts German program 4-4:10 p.m. Wednesdays. (See 21.080 mc.)
21.520 13.94 ♦	JZM	Tokyo, Japan. Overseas Section, The Broadcasting Corp. of Japan. O-C: Kimigayo National Anthem. Musical chimes follow. (See 11.800-9.535-7.510 mc.)	15.280 19.63	DJQ	Zeesen, Germany. (See 17.760 mc.) Daily 12:05-5:50 a.m., 6-8 a.m., 8:10-10 a.m., 4:50-10:45 p.m. Sunday, 11:10 a.m.-12:25 p.m.	14.600 20.55	JVH	Nazaki, Japan. (See 21.520 mc.) Phones Europe, B.C. irreg.
21.500 13.95	W2XAD	Schenectady, N. Y. (See 15.330 mc.) Daily 8 a.m.-12 noon.	15.270 19.64	W2XE	Wayne, N. J. (See 21.520 mc.) Mon. to Fri., 1-6 p.m.; Sat. & Sun., 2:30-6 p.m.	14.535 20.64	HBJ	Geneva, Switzerland. (E) (See 18.480-7.797 mc.) League, Sun., 1:45-2:30 p.m.; Mon., 1:30-1:45 a.m.; Swis, Mon., 6:45-8:15 p.m.
21.470 13.97 ★	GSH	Daventry, England. (See 26.100 mc.) Daily 5:45 a.m.-12 noon.	15.260 19.66 ★♦	GSI	Daventry, England. (See 26.100 mc.) Daily 9:20-11:20 p.m.	14.010 21.41	VK5DI	Adelaide, South Australia. Box 392, G.P.O. O-C: "Laugh Australian Kookaburra bird." Sat. 10:30-11 p.m.; 11:30 p.m.-12 a.m.
21.460 13.98	W1XAL	Boston, Mass. World Wide Broadcasting Corp., University Club. O: News, Blaze Away. C: Star Spangled Banner. Irregular. 10 cents for veri.	15.250 19.67	W1XAL	Boston, Mass. (See 21.460 mc.) Sun., 10-11 a.m.; Mon. to Fri. inc., 12:30-2 p.m.; specials irregular.			
21.450 13.99	OLR6A	Praha (Prague), Czechoslovakia. Radiojournal, Praha XII Fochova Ty. 16. O-C: Melody New World Symphony and Cathedral chimes. I: 9 note trumpet call, repeated. Irregular. (See 6.010-6.030-9.550-15.230-15.320 mc.)						
21.450 13.99	DJS	Zeesen, Germany. (Exp.) (See 17.760 mc.) Daily 12:05 a.m.-11 a.m.						
19.020 15.77	HS8PJ	Bangkok, Siam. Superintending Engineer, Post and Telegraph Dept., Technical Section. O: 3 chimes, English Mondays, 8:10 a.m.						

13.635 SPW 22.00	Warsaw, Poland. Polskie Radio 5, Mazowiecka St. I: Melody/chime. O: The Haunted Castle. C: Polish National Anthem. Mon. to Fri. 6-8 p.m., Sat. and Sun. 6-9 p.m.	11.800 COGF 25.42	Matanzas, Cuba. General Betancourt 51 (Playa). O-C: Vals Diana. Weekdays 1-4 p.m., 6-10 p.m. Sun. 9-10 p.m.	11.000 PLP 27.27	Bandoeng, Java, N.E.I. J. Sanders, Chief Engr., Java Wireless Stations. Weekdays 4:30-10:30 a.m. (Sat. 11:30 a.m.); 6-7:30 p.m. 10:30 p.m.-2 a.m.; Sunday 4:30-10:30 a.m.; 7:30 p.m.-2 a.m.
12.235 TFJ 24.52	Reykjavik, Iceland. Icelandic State Broadcasting Service, P. O. Box 547. First half English. C: Icelandic National Orchestra and chorus voices. Sundays 1:40-2:30 p.m.	11.800 DJO 25.42	Zeesen, Germany. (See 17.760 mc.) 7:15-10:50 p.m.	10.740 JVM 27.93	Nazaki, Japan. (See 21.520 mc.) 4:30-7:30 a.m. Irregular.
12.000 RNE 25.00	Moscow, U.S.S.R. (See RKI, 15.040 mc.) Daily 10:15-11:15 p.m.; Sun. 6-7 a.m., 10-11 a.m.; Wed. 6:30-7:30 a.m. Sun., Mon., Fri., 4-5 p.m. No I.R.C. required.	11.790 W1XAL 25.43	Boston, Mass. (See 21.460 mc.) Mon. to Fri., 3:15-5:30 p.m.; Sat., 5-5:30 p.m.; Sun., 12-5:30 p.m.	10.670 CEC 28.12	Santiago, Chile, S. A. Cia Internacional de Radio, Casilla 16-D. Daily exc. Sat. and Sun. 7-7:20 p.m. (See CED, 10:230 mc.)
11.960 HI2X 25.08	Ciudad Trujillo, Dom. Rep. (See 15.280 mc.) Tues. and Fri. 8:10-10:10 p.m. Sunday 7:40-10:40 a.m.	11.780 DJF 25.47	Zeesen, Germany. (Exp.) Irregular. (See 17.760 mc.)	10.660 JVN 28.14	Nazaki, Japan. (See 21.520 mc.) Daily 1:40-2:30 a.m., 3-7:45 a.m.
11.900 TPA3 25.21	Paris, France. (See 15.243 mc.) Daily 1-4 a.m., 10:15 a.m.-5 p.m.	11.770 DJD 25.49	Zeesen, Germany. (See 17.760 mc.) Daily 10:40 a.m.-4:25 p.m., 4:50-10:45 p.m.	10.600 ZIK2 28.30	Belize, British Honduras, C.A. Government Radio Station ZIK2. Wireless Branch, Post Office. Tues., Thurs., Sat. 8:45-9 p.m.
11.900 CD1190 25.21	Valdivia, Chile. Casilla 642. Daily 10 a.m.-1 p.m., 3-6 p.m., 7-10 p.m.	11.760 TGWA 25.50	Guatemala City, Guatemala, C. A. (See 17.800-15.170-9.685 mc.) Irregular. No I.R.C. necessary.	10.370 EHZ 28.93	Tablero, Tenerife, C. I. Daily 3-4:30 p.m., 5-7 p.m., 7:45-8:45 p.m., 9-10 p.m.
11.900 XEWI 25.21	Mexico, D. F. P. O. Box 2874. S: 2 strokes gong. O-C: May Angels Guard Thee. Daily 7:30 p.m.-12 a.m.; Sundays 12:30-2 p.m.	11.760 XETA 25.50	Monterrey, Mexico. Apartado 203. Weekdays 1-3 p.m.; Sundays, 1:30-3 p.m.	10.350 LSX 28.93	Buenos Aires, Argentina, S.A. Transradio Internacional, San Martin, 329. S.A. C: San Lorenzo March. Irregular 5-8 p.m.
11.900 OLR4D 25.21	Prague, Czechoslovakia. (See 21.450 mc.) Irregular.	11.760 OLR4B 25.50	Prague, Czechoslovakia. (See 21.450 mc.) Daily ex. Sun., 9:55-10:50 a.m.; Sun., Wed., Sat. News 5-5:15 p.m. Mon., Tues., Thurs., Sat., 6:55-9:55 p.m. Sun., 7:15-8:55 p.m.	10.330 ORK 29.04	Bruxelles, Belgium. Director de Communications. I: Carillon, O: Towards The Future. C: Brabanconne. Daily 1:30-3 p.m.
11.895 HP5I 25.22	Aguadulce, Panama, C. A. Emisora HP5I, English—beginning and closing I: three notes gong, thrice (9) ea. 30 mins. O-C: El Tambor de la Algeria. Daily 7:30-9:30 p.m. Veri cards free.	11.750 GSD 25.53	Daventry, England. (See 26.100 mc.) Daily 12-2:15 a.m., 10:45 a.m.-12 noon; 12:20-4 p.m.; 4:15-6 p.m.; 6:20-8:30 p.m.; 9:20-11:20 p.m.	10.260 PMN 29.24	Bandoeng, Java, D.E.I. (See PLP, 11.000 mc.) Weekdays 5:30-11:30 a.m.; 6-7:30 p.m.; 10:30 p.m.-2 a.m.; Sundays 5:30-11:30 a.m.; 7:30 p.m.-2 a.m.
11.885 TPB7 25.24	Paris, France. (See 15.243 mc.) Daily 8:30-11 p.m.	11.740 HP5L 25.55	David, Chiriqui, Panama, C.A. Apartado 139. Daily 4-7 p.m.	10.230 CED 29.33	Antofagasta, Chile. (See CEC 10.670 mc.) Sat. and Sun. 7-7:20 p.m.
11.880 XEUZ 25.25	Mexico, D. F. F. J. Stavoli, Chief Eng'r, Radio Nacional. (See 6.130 mc.) S: 5 bells (chimes). O-C: Marcha Dragona. Daily 10 a.m.-1 p.m.; 7 p.m.-2 a.m. Dx 1-2 a.m.	11.730 PHI 25.57	Hilversum, Holland. (See 17.770 mc.) Irregular.	10.220 PSH 29.35	Rio de Janeiro, Brazil, S.A. Cia Radio Internacional do Brazil. Caixa Postal 709. IRC or 5c. Stamps any country. Daily 6-7 p.m.
11.875 OLR4C 25.26	Prague, Czechoslovakia. (See 21.450 mc.) Irregular.	11.730 W1XAL 25.57	Boston, Mass. (See 21.460 mc.) Mon. to Fri. inc., 8-10 p.m. Specials irreg.	10.135 CQN 29.60	Macao (Portuguese), China. Chief of Radio Station CQN, Post Office Bldg. O: Maria de Fonte. C: National—A Portuguese. Mon. and Fri. 7-8:30 a.m.
11.870 W8XK 25.26	Pittsburgh, Pa. (See 21.540 mc.) Daily 7-11 p.m.	11.720 CJRX 25.60	Winnipeg, Manitoba, Canada. Royal Alexandra Hotel. Weekdays 6 p.m.-12 a.m. Sundays 5-10 p.m.	9.973 COBC 30.09	Havana, Cuba. Apartado 132. O-C: Tu (You), Habanera. S: none. Daily 6:55 a.m.-12 midnight. IRC or 10c coin.
11.860 GSE 25.29	Daventry, England. (See 26.100 mc.)	11.718 TPA-4 25.60	Paris, France. (See 15.243 mc.) Daily 6-8:15 p.m., 8:30-11 p.m.	9.940 CSW3 30.18	Lisbon, Portugal. (See 11.840-11.040 mc.) Daily 6-8 p.m.
11.855 DJP 25.31	Zeesen, Germany. (Exp.) (See 17.760 mc.) Irregular.	11.718 CR7BH 25.60	Lourenco Marques, Portuguese East Africa. (See CR7AA, 6.137 mc.) Weekdays 4:30-6:30 a.m.; 9:30-11 a.m.; 12:30-4 p.m. Sundays, 5-7 a.m.; 10 a.m.-12:30 p.m.; 2-4 p.m.	9.925 JDY 30.23	Dairen, Kwantung Le a s e d Territory. Dairen Broadcasting Station, Shotokugai 3. Daily 7-8 a.m., English 7:45-8 a.m.
11.840 CSW4 25.34	Lisbon, Portugal. Emisora Nacional, Rua do Quelhas, No. 2. (See 11.040-9.940 mc.) O-C: A Portuguesa—National Anthem. Daily 1-2:10 p.m.	11.710 YSM 25.62	San Salvador, El Salvador, C. A. Director of Comunicaciones. O-C: Bird singing before first and last announcement. Daily 1-2:30 p.m. No IRC required.	9.860 EAQ 30.43	Madrid, Spain. Calle 'Medinaceli, 6. O: La Verbena de la Paloma. C: Himno de Riego or Good Night Melody. (See EAR 9.480 mc.) Irregular.
11.840 OLR4A 25.34	Prague, Czechoslovakia. (See 21.450 mc.) Daily ex. Sun. 9:55-10:50 a.m.; Sun., Wed., Sat., News 5-5:15 p.m. Mon., Tues., Thurs., Fri., 6:55-9:55 p.m. Sun. 7:15-8:55 p.m.	11.710 Philco 25.62	Saigon, Indo-China. 211-213D Rue Catinat. Daily 6:30-9:30 a.m. News in French, 9-9:10 a.m.	9.833 COCM 30.51	Havana, Cuba. Apartado 33. O-C: "One-BC" March. English and Spanish. I.R.C. or stamps. Daily 8 a.m.-1 a.m.
11.840 KZRM 25.34	Manila, P. I. Erlanger and Galinger, Inc., Insular Life Bldg. (See 9.570) Weekdays 5-9 a.m. Sat. to 10 a.m., 4:30-6 p.m., Sun. 4-10 a.m.	11.710 XEWB 25.62	Guadalajara, Jal., Mexico. Juarez 289. Daily 7-11 p.m.	9.830 IRF 30.52	Rome, Italy. (See 11.810-9.635 mc.) Daily 12:10-1 p.m., 6-7:25 p.m., 7:30-9 p.m.
11.830 W2XE 25.36	Wayne, N. J. (See 21.520 mc.) Daily 6:30-11 p.m.	11.710 VK9MI 25.62	Sydney, Australia. M. V. Kanimbla, McIllwraith and McEachern, Bridge St. Irregular 7-7:30 a.m.	9.740 COCQ 30.80	Havana, Cuba. Calle 25, No. 445. Weekdays 6:55 a.m.-1 a.m.; Sundays 6:55 a.m.-12:01 a.m.
11.830 W9XAA 25.36	Chicago, Ill. (See 17.780 mc.) Week days 9 a.m.-6 p.m., Sun 9-11 a.m., 1-5:30 p.m.	11.705 SBP 25.63	Motala, Sweden. Chief Engineer. Mon. to Fri. 1:20-2 a.m., 6-9 a.m., 11 a.m.-1:30 p.m.; Sat., 1:20-2 a.m., 6 a.m.-1:30 p.m.; Sun., 3 a.m.-1:30 p.m.	9.700 30.93	Fort de France, Martinique, F.W.I. Radio Martinique, P. O. Box 136. O-C: "La Marseillaise." Daily 11:15 a.m.-12:25 p.m.; 6-8 p.m.
11.820 XEBR 25.38	Hermosillo, Con. Mexico. Apartado 68. O-C: Over The Waves. Daily 1-4 p.m.; 9 p.m.-12 a.m.	11.700 HP5A 25.64	Panama City, Panama, C. A. P. O. Box 954. O-C: "Anvil Chorus." Daily 11:45 a.m.-1 p.m., 6-10 p.m.; Sundays—open at 10 a.m.; Thurs., Fri., Sat.—open at 5 p.m.	9.685 TGWA 30.98	Guatemala City, Guatemala, C.A. (See 17.800-15.170-11.760 mc.) Sundays, 7 p.m.-12:15 a.m. Weekdays 7:30 p.m.-12 a.m. No I.R.C. necessary.
11.820 GSN 25.38	Daventry, England. (See 26.100 mc.)	11.700 CB1170 25.64	Santiago, Chile, S. A. Radio Otto Becker, Casilla 706. Daily 10 a.m.-2 p.m.; 4-11 p.m. Anglo American hour 6-6:45 p.m. Tues., Thurs., Sat.—English.	9.670 TI4NRH 31.02	Heredia, Costa Rica, C.A. Apartado 40. S: Bugles O-C: March of the Wooden Soldiers. Tues., Thurs., Sat. 9-10 p.m.; Sundays 7-8 a.m. (May—daily 9-11 p.m.)
11.810 I2RO-4 25.40	Rome, Italy. 5 Via Montello. O: Bells of Rome. C: Italian Royal March and Giovinezza. I: bird call—black cap bird. (See 9.635-9.830 mc.) 5-8:45 a.m., 10 a.m.-2:55 p.m., 6-7:25 p.m.	11.570 HH2T 25.93	Port-au-Prince, Haiti, W. I. Societe Haitienne Radiodiffusion, P. O. Box 103. S: 4 tones gong 1-3-2-4, English and French O-C: The Swan. Special programs, irregular.	9.666 CR6AA 31.04	Lobito, Angola, Portuguese West Africa. Caixa Postal 103. I: 3 notes on piano; A-C-B. Portuguese, French and English. Wed. and Sat. 2:45-4:30 p.m.
11.805 OZG 25.41	Copenhagen, Denmark. The Danish State Broadcasting Service. (See 9.520 mc.) O: One gong stroke. C: There is a Winsome Land. Irregular.	11.535 SPD 26.01	Warsaw, Poland. (See 13.635 kc.) Mon. to Fri. 6-8 p.m.; Sat. and Sun. 6-9 p.m.	9.660 LRX 31.06	Buenos Aires, Argentina, S.A. (See LRU, 15.290 mc.) Daily 9:30 a.m.-11:30 p.m.
11.801 OER-3 25.42	Wien, Austria. Osterr. Radioverkehrs A.G., Johannesgasse 4h, Wien 1, Austria; Call: "Hier Radio Wien." I: Metronome—60 beats per min. Weekdays 9 a.m.-5 p.m. Sat. to 6 p.m.	11.435 COCK 26.23	Havana, Cuba. P. O. Box 32. S: 5 bells. English each ½ hr. O-C: Pajarillo Barranqueno. Daily 8 a.m.-1 a.m.	9.650 CS2WA 31.09	Lisbon, Portugal. Antonio Augusto de Aguiar, 144. I: Cookoo, 3 times. C: A Portuguesa (national anthem). Tues., Thurs., Sat., 4-7 p.m.
11.800 JZJ 25.42	Nazaki, Japan. (See 21.520 mc.) Daily 12:30-1:30 a.m., 7-7:30 a.m., 8-9:30 a.m., 4:30-5:30 p.m., 6-6:30 p.m.	11.402 HBO 26.31	Geneva, Switzerland. (See 18.480-7.797 mc.) League—Sun. 7:45 p.m. Mon. 1-1:15 a.m. Swiss—Mon. 6:45-8:15 p.m.		
		11.260 HIN 26.64	Ciudad Trujillo, Dom. Rep., W. I. (See 6.243 mc.) Daily ex. Sunday 11:40 a.m.-1:40 p.m., 7:10-9:50 p.m.		
		11.040 CSW2 27.17	Lisbon, Portugal. (See 11.840-9.940 mc.) Daily 2:10-6 p.m.		

9.045 31.10	HH3W	Port-au-Prince, Haiti, W. I. P. O. Box A117. S: 4 chime notes and siren each 15 min. before announcements. Daily exc. Sunday, 1-2 p.m.; 7-8:30 p.m.	9.565 31.36	YV3RB	Barquisimeto, Venezuela, S. A. Sr. Arturo Ramos Maggi, Prop. Daily 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.	9.500 31.58	XEWW	Mexico, D. F. Cadena Radio-difusora Mexicana, Calle Ayuntamiento, 54. S: 4 note chime tuned F.C.A.F. Daily 8:55 a.m.-1 a.m. (9.500 or 15.160 mc.)
9.640 31.12	CXA8	Colonia, Uruguay, S. A. Director, Radio Belgrano, Belgrano 1841, Buenos Aires, Argentina. Daily 6 p.m.-11 p.m.	9.562 31.38	OAX4T	Lima, Peru, S. A. Radio Nacional, Peruvian Government, Av. Petit Thouars 447. 7-8 a.m.; 11:30 a.m.-1:30 p.m.	9.490 31.61	OAX5C	Ica, Peru, S. A. Radio Universal, Avenida San Luis. Weekdays 11:30 a.m.-4:30 p.m., 7-11:30 p.m.
9.635 31.13	I2RO-3	Rome, Italy. 2:55-5:55 p.m., 7:30-9 p.m. (See 11.810-9.830 mc.)	9.560 31.38	DJA	Zeesen, Germany. (See 17.760 mc.) Daily 12:05 a.m.-11 a.m.; 4:50-10:45 p.m.	9.480 31.65	EAR	Madrid, Spain. English daily, 7:30-8 p.m., 8:30-9 p.m. (See EAQ 8.860 mc.)
9.630 31.15	HJ7ABD	Bucaramanga, Colombia, S. A. Daily 12-1 p.m., 6-11 p.m.	9.550 31.41	VUB2	Bombay, India. (See VUD2-9.590 mc.) Daily 9:10:30 p.m., 1-3:30 a.m.	9.473 31.67	PJC1	Willemstad, Curacao, N.W.I. Irregular. (See 5.929 mc.)
9.616 31.20	HJ1ABP	Cartagena, Colombia, S. A. P. O. Box 37. O-C: Under the Double Eagle. Weekdays 9 a.m.-1:30 p.m., 4:30-10 p.m. Sun. 4:30-9 p.m.	9.550 31.41	XEFT	Veracruz, Mexico. Av. Independencia 28. S: Chimes, bugle calls or cuckoo horn. English at closing. O-C: Vals Poetico. Weekdays 10:30 a.m.-4:30 p.m.; 7:30 p.m.-12:30 a.m.; Sundays 9 p.m.-12:30 a.m.	9.450 31.75	"Radio Fort de France"	Fort de France, Martinique. F.W.I. Edouard Boullanger Fils. Daily 11:30 a.m.-12:30 p.m.; 6:15-7:15 p.m.; 8-9 p.m.
9.610 31.20	YDB	Soerabaja, Java, N. E. I. (See 15.150 mc.) Weekdays 4:30-10:30 a.m. (Sat. to 11:30 a.m.), 6-7:30 p.m., 10:30 p.m.-2 a.m. Sundays 4:30-10:30 a.m., 7:30 p.m.-2 a.m.	9.550 31.41	W2XAD	Schenectady, N. Y. (See 15.330 mc.) Daily 7:30 p.m.-12 a.m. Specials Irregular.	9.440 31.78	HCODA	Guayaquil, Ecuador, S. A. Apartado 704. Daily exc. Sunday 8-11 p.m. Veri-5c U. S. postage.
9.606 31.23	ZRK	Klipheuvell, South Africa. (See 6.097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m.; 3:20-7:20 a.m.; 9-11:45 a.m. Sundays 3:30-4:30 a.m. or 4-5 a.m.; 8-11:40 a.m.	9.550 31.41	H15E	Ciudad Trujillo, Dom. Rep., W. I. Sr. H. Chavez. Irregular.	9.437 31.79	COCH	Havana, Cuba. P. O. Box 41. English each 15 mins. S: chimes 15 m. 2 blows gong adv. O-C: Organ; Maria My Own. Daily 8 a.m.-12 a.m.
9.600 31.25	XEYU	Mexico City, Mexico. Justo Sierra No. 16. Daily 3:30-4:30 p.m., 8 p.m.-12 a.m.	9.550 31.41	OLR3A	Prague, Czechoslovakia. (See 21.450 mc.) Daily 12:55-4:40 p.m. Mon., Tues., Thurs., Fri. 8-10:35 p.m. English news 9:45 p.m.	9.350 32.09	HS8PJ	Bangkok, Siam. (See 19.020 mc.) Thursday 8-10 a.m.
9.600 31.25	RAN	Moscow, U.S.S.R. (See RKI, 15.040 mc.) Daily 7-9:15 p.m.	9.545 31.44	HH2R	Port-au-Prince, Haiti, W. I. (See HH2T, 11.570 mc.) Special programs irregular.	9.345 32.10	HLB	Geneva, Switzerland. (See 18.480 mc.) Irregular.
9.600 31.25	CB960	Santiago, Chile, S. A. Casilla 1342. O: Babes in Toyland. C: Somewhere a Voice Is Calling (organ). Daily 10:30 a.m.-1 p.m.; 8:30-11 p.m.	9.540 31.45	VPD-2	Suva, Fiji Islands. Amalgamated Wireless, Ltd. C: God Save the King. Daily 5:30-7:00 a.m. No signals.	9.340 32.12	OAX4J	Lima, Peru. Radio Internacional, Casilla 1166. S: 3 chimes gong. C: "Whistler and His Dog"—Veri slow. Daily 12 noon-12 a.m.
9.595 31.27	HBL	Geneva, Switzerland. (See 18.450 mc.) Irregular.	9.540 31.45	DJN	Zeesen, Germany. (See 17.760 mc.) Daily 4:50-10:45 p.m.	9.300 32.26	YNGU	Managua, Nicaragua, C. A. Apartado 295. Weekdays 12-2 p.m.; 5-6 p.m. Sun. 11 a.m.-12 noon. Veri-5c U. S. Postage.
9.595 31.27	YNLF	Managua, Nicaragua, C. A. Calle 15 de Set No. 206. Daily 8-9 a.m.; 1-3 p.m.; 6:30-10:30 p.m. Veri-5c U. S. postage.	9.535 31.46	JZI	Nazaki, Japan. (See 21.520 mc.) Daily 2:30-4 p.m. 4:30-5:30 p.m.	9.290 32.29	HIG	Ciudad Trujillo, Dom. Rep., W. I. Av. Jose Trujillo No. 20. O-C: National Anthem. Daily 7:10-8:40 a.m., 12:40-2:10 p.m., 8:10-9:40 p.m.
9.590 31.28	VK6ME	Perth, West Australia. Address, Amalgamated Wireless, Ltd., 47 York St., Sydney, Australia. Daily exc. Sun., 6-8 a.m.	9.530 31.48	W2XAF	Schenectady, N. Y. (See W2XAD 15.330 mc.) Daily 4 p.m.-12 a.m.; specials irregular.	9.200 32.61	COBX	Havana, Cuba. San Miguel No. 194. Daily 11 a.m.-12 midnight.
9.590 31.28	VUD2	New Delhi, India. Controller of Broadcasting, All India Radio. Daily 9:30 p.m.-12 a.m., 2-4 a.m.	9.530 31.48	LKJ-1	Oslo, Norway. Ministere du Commerce, Administrateur des Telegraphes. I: Piano motif Grieg's Sigurd Jorsalfar. C: National—Yes, We Love This Country. Daily 5-8 a.m.; 11 a.m.-5 p.m.	9.163 32.74	HC1GQ	Quito, Ecuador, S. A. Guayaquil and Quito Ry. Co., P. O. Box 159. Veri cards free. C: Blue Danube. Mon., Wed., Sat., 9:30-11:30 p.m.
9.590 31.28	W2XE	Wayne, N. J. (See 21.520 mc.)	9.525 31.49	ZBW-3	Hong Kong, China. Hong Kong Broadcasting Committee, P. O. Box 200. I-O-C: none. Weekdays 11:30 p.m.-1:15 a.m., Mon.-Thurs., 4-10 a.m., Tues., Wed., Fri., 3-10 a.m., Sat., 3-11 a.m., Sun. 9 p.m.-1:30 a.m., 3-9:30 a.m.	9.125 32.88	HAT-4	Budapest, Hungary. (See HAS-3, 15.370 mc.) Sun. and Wed., 7-8 p.m.; Sat., 6-7 p.m.
9.590 31.28	W3XAU	Philadelphia, Pa. 1622 Chestnut St. Daily 12 noon-8 p.m., 11 p.m.-12 a.m.	9.524 31.50	FIQA	Tananarive, Madagascar. (See 6.000 mc.) Daily 12:30-12:45 a.m.; 3:30-4:30 a.m.; 10-11 a.m. simultaneously on 6.000 mc.	9.100 32.97	COCA	Havana, Cuba. Galiano No. 102. Daily 8 a.m.-12 a.m.
9.590 31.28	VK2ME	Sydney, Australia. Amalgamated Wireless, Ltd., 47 York St. Clock strikes at hour, chimes 3/4 hr. I: Kookaburra bird call. C: God Save The King. Sunday 12-2 a.m., 5-9 a.m., 11:30 a.m.-1:30 p.m.	9.520 31.51	ZRH	Roberts Heights, South Africa. (See 6.097.5 mc.) Irregular.	9.030 33.32	COBZ	Havana, Cuba. P. O. Box 866. S: 4 chimes. O-C: Record, "Popular Melodies." 7:45 a.m.-12:30 a.m. Sat. to 2 a.m.
9.590 31.28	HP5J	Panama City, Panama, C. A. Apartado 867. News 6:30 p.m. O: Blackhorse Troop March. C: Discipline Honor and Abregacion. Weekdays 12-2 p.m.; 5-10:30 p.m. Sundays 10:30 a.m.-2 p.m.; 8-10 p.m.	9.520 31.51	OZF	Copenhagen, Denmark. (See 11.805 mc.) Daily 2-6 p.m.	8.935 33.55	COKG	Santiago, Cuba. Apartado 137. O-C: La Conga. S: 3 strokes on gong. Daily 7:55 a.m.-12 midnight.
9.590 31.28	PCJ1	Hilversum, Holland. (See 15.220 mc.) Sunday, 12:20-12:35 p.m., 2-3 p.m., 7:15-8:15 p.m., 8:25-9:25 p.m. Mon. 8:15-9:45 p.m. Tues. 1:45-2 p.m., 2:10-3:40 p.m., 7-8:30 p.m., 8:45-10:15 p.m. Wed. 7:15-8:15 p.m.	9.520 31.51	YSH	San Salvador, El Salvador, C.A. (See 11.710 mc.) Irregular.	8.831 33.97	HCJBI	Quito, Ecuador, S. A. Casilla 691. O: March Patria. I: 4 blows on gong. C: Ecuadorian National Anthem. Daily exc. Mon., 7:30-8:45 a.m., 11:30 a.m.-2:30 p.m., 5-10 p.m. (to 7 p.m. on 4.107 mc.; after 7 p.m. on 4.107 and 8.831 mc.). Veri-5c U. S. Postage.
9.580 31.32	GSC	Daventry, England. (See 26.100 mc.) Daily 6:20-8:30 p.m., 9:20-11:20 p.m.	9.520 31.51	XEDQ	Guadalajara, Jal., Mexico. Apartado 107. O-C: Mexican Dance—Jarabe Tapatio. Daily 12-4 p.m., 8 p.m.-12 a.m. Occasional DX Sunday 2-4 a.m.	8.795 34.13	HKV	Bogota, Colombia, S. A. Ministerio de Guerra, Military Service. Mon. and Thurs. news 7-7:30 p.m.
9.580 31.32	VLR	Melbourne, Australia. Australian Broadcasting Commission. G. P. O. Box 1686. O: Recording song, Australian Lyre Bird. C: God Save The King. S-3 notes, gong; time signals and P. O. chimes. Sun. 3-7:40 a.m. Weekdays 9:35 p.m.-2 to 2:30 a.m.; 3:30-8:30 a.m.; Sat. to 9 a.m.	9.510 31.55	HJ6ABH	Armenia, Colombia, S. A. O-C: The Spanish Soldiers. S: Blows on Marimba. News 7-10 p.m. Weekdays 8-11 a.m.; 6-10 p.m. Sundays 7-10 p.m.	8.665 34.62	COJK	Camaguey, Cuba. Finlay No. 3, Altos. S: 3 tone gong, each 1/4 hr. English Ann., each 1/2 hr. O: "Allegiance March." C: None. Weekdays 10:30 a.m.-12:30 p.m., 7-10:30 p.m.; Sat. 11 p.m.; Sun. 10 a.m.-12:30 p.m.
9.570 31.35	W1XK	Boston, Mass. Hotel Bradford. Westinghouse Electric and Mfg. Co. O-C: Stars and Stripes Forever. Weekdays 6 a.m.-1 a.m. Sun. 8 a.m.-1 a.m.	9.510 31.55	HJU	Buenaventura, Colombia, S.A. O-C: Palmira, English each 5 mins. Mon., Wed., Fri. 12-2 p.m.; 8-11 p.m.	8.580 34.97	YN1PR	Managua, Nicaragua, C. A. A. Mejewsky, Gerente. Daily 1-2:30 p.m.; 7:30-10:30 p.m. Veri-5c U. S. Postage.
9.570 31.35	TPB11	Paris, France. (See 15.243 mc.) Daily 1-4 a.m., 10:15-5 p.m.	9.510 31.55	HS8PJ	Bangkok, Siam. (See 9.350-19.020 mc.) Mon. and Thurs. 8-10 a.m.	8.404 35.70	HC2CW	Guayaquil, Ecuador, S. A. Casilla 1166. O-C: Sangre Equatoriana. Weekdays 11:30 a.m.-12:30 p.m., 7-11 p.m. Sun. 3-5 p.m. Veri-5c U. S. Postage.
9.570 31.35	KZRM	Manila, P. I. (See 11.840 mc.) Weekdays 5-9 a.m. Sat. to 10 a.m., 4:30-6 p.m. Sun. 4-10 a.m.	9.504 31.57	OLR3B	Prague, Czechoslovakia. (See 21.450 mc.) Irregular.	8.784 38.00	YSD	San Salvador, El Salvador, C. A. (See 11.710 mc.) Daily 7-11 p.m.
			9.501 31.58	PRF5	Rio de Janeiro, Brazil, S. A. P. O. Box 709. I: Three-note gong. C: Brazilian National Anthem. (See PSE 14.935 mc.) Daily exc. Sun. 4:45-5:45 p.m.	8.780 38.12	HC1RB	Quito, Ecuador, S. A., Correos Calda, 146. Daily 8:30-11 p.m.

- 7.854 HC2JSB Guayaquil, Ecuador, S. A. P. O. Box 805. S: Gong. O-C: El Corcovado (Carioca fox). Daily 11 a.m.-2 p.m.; 4-11 p.m. Veri—5c U. S. Postage.
- 7.797 HBP Geneva, Switzerland. Radio Suisse, S. A., 12, Quai de la Poste. (E) No opening or closing selection. Irregular. (See 14.535-11.402 mc.)
- 7.550 TI8WS Puntarenas, Costa Rica, C. A. Apartado 75. Weekdays 5-7 p.m., 8:30-10 p.m. Sun. 4-5 p.m.
- 7.540 RKI Moscow, U.S.S.R. (See 15.040 mc.) Irregular.
- 7.510 JVP Nazaki, Japan. (See 21.520 mc.) 3-7:30 a.m. Irregular. Overseas, daily 2:30-4 p.m.
- 7.380 XECR Mexico, D. F. Departamento Autonomo de Publicidad. Sun. 7-8 p.m. No signals or O-C selection.
- 7.211 EA8AB Santa Cruz, Tenerife, C. I. Radio Club Tenerife, Apartado 225. O-C: Lady of Spain. English on Saturdays only. Mon., Wed., Fri., Sat., 3:15-4:15 p.m.
- 7.200 YNAM Managua, Nicaragua, C. A. A. Majewsky, Gerente. Daily 7-10 p.m. Veri—5c U. S. Postage.
- 7.177 CR6AA Lobito, Portuguese West Africa. (See 9.666 mc.) Wed. and Sat. 2:45-4:30 p.m.
- 7.100 FO8AA Papeete, Tahiti. Radio Club Oceanien, Alfred T. Poria, Pres. Tues. and Fri., 11 p.m.-1 a.m.
- 7.400 YDA Batavia, N. E. I. (See 15.150 mc.) Daily 7:30 p.m.-2 a.m.
- 6.975 HCETC Quito, Ecuador, S. A. Apartado 134. Sat. and Mon. 7:45-9 p.m. Veri—5c U. S. postage. Veri slow.
- 6.900 HI2D Ciudad Trujillo, Dom. Rep., W. I. Associated via Dominicana. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m.; 4:40-8:40 p.m.
- 6.900 TI2RS San Jose, Costa Rica, C. A. Sr. Rogelia Sotela, Prop. Daily ex. Sun. 9:30-11 p.m.
- 6.850 TIOW Port Limon, Costa Rica, C. A. P. O. Box 45. Weekdays 10-11:30 p.m.; Sun. 2-3 p.m.
- 6.814 HIH San Pedro de Macoris, Dom. Rep., W. I. Daily 12:10-1:40 p.m., 7:40-9 p.m. Sun. 5:10-6:40 p.m. DX 2:40-3:40 a.m.
- 6.800 HI7P Ciudad Trujillo, Dom. Rep., W. I. Calle Jose Reyes No. 25. Weekdays 12:40-1:40 p.m.; 6:40-8:40 p.m.; Sun. 9:40-10:40 a.m.
- 6.788 PZH Paramaribo (Surinam), Dutch Guiana, S. A. Weekdays 2:45-4:45, 5:45-9:45 p.m. Sun. 9:45-11:45 a.m. Veri slow.
- 6.750 JVT Nazaki, Japan. (See 21.520 mc.) 2-2:30 a.m.; 4:30-9 a.m. Irregular.
- 6.720 PMH Bandoeng, Java, D. E. I. (See PLP, 11,000 mc.) Weekdays 4:30-11 or 11:30 a.m., Sundays 4:30-11 or 11:30 a.m., 9:30 p.m.-1:30 a.m.
- 6.690 TIEP San Jose, Costa Rica, C. A. Apartado 257. Daily 7-11 p.m.
- 6.675 HBQ Geneva, Switzerland. (See 18.480 mc.) League — Sun. 1:45-2:30 p.m.
- 6.668 HC2RL Guayaquil, Ecuador, S. A. P. O. Box 759. O-C: Ecuadorian National Anthem. English each 15 mins. Sunday 5:45-7:45 p.m.; Tues. 9:15-11:15 p.m. Veri—5c U. S. postage.
- 6.660 HI5G La Vega, Dom. Rep., W. I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m., 4:40-8:40 p.m.
- 6.630 HIT Ciudad Trujillo, Dom. Rep. Apartado 1105. O-C: Anchors Aweigh. English. Daily exc. Sun. 12:10-1:40 p.m.; 6:10-8:40 p.m. DX 1st Sat. 11:10 p.m.-1:10 a.m.
- 6.618 El Prado Riobamba, Ecuador, S. A. Apartado 98. English each 15 mins. O: Bugle call. Thursday 9:15-11:15 p.m. Veri—U. S. postage.
- 6.610 YNLG Managua, Nicaragua. 5a Calle No. 207. O: "General Marcelo Caraveo" March. Opening with bugle call thrice. Morning and afternoon broadcasts "Till We Meet Again." C: "Good Night Ladies." Weekdays 8-9 a.m.; 1-3 p.m.; 6-10 p.m. Sundays 10 a.m.-1 p.m.; 8:30-11 p.m. Veri—5c U. S. postage.
- 6.600 HI6H Ciudad Trujillo, Dom. Rep., W. I. Irregular.
- 6.575 HC1VT Ambato, Ecuador, S. A. Mon., Wed., Fri., 8-10:15 p.m. Veri—U. S. postage.
- 6.565 HI5P Puerto Plata, Dom. Rep., W. I. Daily 5-9 p.m.
- 6.555 HI4D Ciudad Trujillo, Dom. Rep., W. I. Mon. & Sat. 11:55 a.m.-1:40 p.m., 4:40-7:40 p.m.
- 6.550 TIRCC San Jose, Costa Rica, C. A. Apartado 1064. S: 4 notes on gong. O-C: The Lost Chord—Organ. Tue., Thur., Sat., 6-7 p.m. Religious, Sundays 10 a.m.-7 and 8 p.m.; Thurs. 8 p.m.
- 6.545 YV6RB Ciudad Bolivar, Venezuela, S. A. Apartado 34. Daily 7-10 p.m.; Sun. 3-6 p.m.
- 6.535 YN1GG Managua, Nicaragua, C. A. Daily 6-10 p.m.; Veri—5c U. S. postage.
- 6.520 YV4RB Valencia, Venezuela, S. A. C: Bugle call, taps and off. Daily 11 a.m.-1:30 p.m.; 5:30-9:30 p.m.
- 6.500 HIL Ciudad Trujillo, Dom. Rep., W. I. Apartado 623. Daily 12:10-1:40 p.m., 5:40-7:40 p.m.
- 6.500 YV1RM Maracaibo, Venezuela, S. A. Daily 6-9:30 p.m.
- 6.480 EDR-4 Palma de Mallorca, Balearic Islands, Radio Poste. Daily 4:30-5:15 p.m.
- 6.480 HI1L Santiago de los Caballeros, Dom. Rep., W. I. Radioemisor Nacional "El Diario." Apartado 356. I: Xylophone note O-C: Dominican National Anthem. Weekdays 7-8:30 a.m., 12-2 p.m., 5:30-9:30 p.m.
- 6.465 YV3RD Barquisimeto, Venezuela, S. A. Radio Barquisimeto, Avda. Bella Vista No. 335. Daily 10:30 a.m.-1:30 p.m.; 4:30-9:30 p.m.
- 6.450 HI4V San Francisco de Macoris, Dom. Rep., W. I. Mella No. 25. S: 4 strokes on gong. O-C: National Anthem. Daily 2:40-4:40 p.m., 7:10-9:10 p.m.
- 6.420 HI1S Santiago de los Caballeros, Dom. Rep., W. I. P. O. Box 112. Daily 11:40 a.m.-1:40 p.m.; 5:40-7:40 p.m.
- 6.420 YV6RC Ciudad Bolivar, Venezuela, S. A. Daily 10:30 a.m.-1:30 p.m.; 4:30-9:30 p.m.
- 6.410 TIPG San Jose, Costa Rica, C. A. Apartado 225. O-C: Parade of the Wooden Soldiers. Daily 7-9:30 a.m.; 12-2 p.m.; 4-11:30 p.m.
- 6.400 TGQA Quezaltenango, Guatemala, C. A. (Address—See TG2, 6,190 mc.) O-C: Waltz—Xelaju S: Chimes. Daily 9-11 p.m., Sat. to 1 a.m., Sun. 12 noon-3 p.m.
- 6.400 YV5RH Caracas, Venezuela, S. A. Apartado 1931. Weekdays 11 a.m.-1:30 p.m.; 4:30-9:30 p.m.; Sun. 9:30 a.m.-1:30 p.m.; 5-7:30 p.m.
- 6.383 VP2LO St. Kitts, B.W.I. P. O. Box 88. No chimes or signals. O: "Rule Britannia." C: "God Save the King." Daily 4-4:45 p.m. Sundays and holidays in addition 10-10:45 a.m.
- 6.383 HI8J La Vega, Dom. Rep., W. I. Daily 5-8 p.m.
- 6.375 YV5RF Caracas, Venezuela, S. A. Apartado 983. C: Organ; Blue Danube. Daily 6:30-7:30 a.m.; 10:30 a.m.-1:30 p.m.; 4:30-10:30 p.m.
- 6.360 YV1RH Maracaibo, Venezuela, S. A. P. O. Box 261. O: Jealousie. C: Er Weicht der Sonne Nicht—march. Weekdays 5:30-7 a.m.; 10:30 a.m.-1:30 p.m.; 4:30-10:30 p.m. English 10-10:30 p.m. Sunday 8:30 a.m.-2:30 p.m.
- 6.351 HRP1 San Pedro Sula, Honduras, C. A. Sr. Joaquin Mendoza, Director. O: March—Boy Scouts. C: National Anthem Honduras. S: gongs. Daily 12-2 p.m.; 8-10 p.m. Veri—5c U. S. postage.
- 6.340 HI1X Ciudad Trujillo, Dom. Rep., W. I. (See 15.280 mc.) Tues. and Fri. 8:10-10:10 p.m.; Sun. 7:40-10:40 a.m.
- 6.330 COCW Havana, Cuba. Apartado 130. Daily 7 a.m.-12 midnight.
- 6.315 HIZ Ciudad Trujillo, Dom. Rep. W. I. Apartado 1092 and 771. Weekdays 11:10 a.m.-2:10 p.m.; 4:40-9:40 p.m. Sundays 11:40 a.m.-2:40 p.m.
- 6.300 YV4RD Maracay, Venezuela, S. A. Sr. Luis Croquer, Prop. Weekdays 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.
- 6.280 COHB Sancti-Spiritus, Santa Clara, Cuba. P. O. Box 85. Weekdays 9-10 a.m., 12-10 p.m. Sun. 10 a.m.-10 p.m.
- 6.280 HIG Ciudad Trujillo, Dom. Rep., W. I. Daily 7:10-8:40 a.m., 12:40-2:10 p.m., 8:10-9:40 p.m. (See 9.290 mc.)
- 6.275 OAX4G Lima, Peru, S. A. Avda. Abancay, 915-923, or P. O. Box 2234. C: Good Night Sweetheart. Daily 7-11 p.m.
- 6.270 YV5RP Caracas, Venezuela, S. A. P. O. Box 508. Daily 6-11:45 p.m.
- 6.250 YV5RJ Caracas, Venezuela, S. A. Sr. Edmundo Suegart, Prop. P. O. Box 1008. Daily 5:30-9:30 p.m.
- 6.243 HIN Ciudad Trujillo, Dom. Rep., W. I. Carlo Arzobispo Merino No. 97. English each 15 mins. (See 11.260 mc.) Weekdays 11:40 a.m.-2:40 p.m.; 7:10-9:10 p.m. Sun. 11:10 a.m.-3:40 p.m. Veri slow.
- 6.235 HRD La Ceiba, Honduras, C. A. Sr. Tuilo Castaneda, Director. English on the hour. O: Solo Tuyo. C: Intermezzo No. 1 Piano 10:58 p.m. Good Night Melody. No signals. Daily exc. Sun. 8-11 p.m.
- 6.230 YV1RG Valera, Venezuela, S. A. Radio Valera. S: 1 bell O-C: Local March. Daily 11 a.m.-12:30 p.m.; 5:30-9:30 p.m.
- 6.210 YV1RI Coro, Venezuela, S. A. Radio Coro. S: 4 marimba tones. Spanish Ann. each 15 m. O-C: March—The Three Colors. Daily 7:30-9:30 p.m.
- 6.190 TG2 Guatemala City, Guatemala, C. A. Director General of Electrical Communications. O-C: The Flower of the Coffee—Marimba. S: chimes "G" octave 3, pause 2 sec. 3 more. Weekdays 6-11 p.m. Sat. to 1 a.m. Sunday 7 a.m.-9 p.m. No IRC required.
- 6.182 HI1A Santiago de los Caballeros, Dom. Rep., W. I. P. O. Box 423. I: Gong. C: Anchors Aweigh. Daily 6:40 a.m.-4:40 p.m.; Thurs. and Sundays, 7:40-9:40 p.m. Band concerts.
- 6.160 VPB Colombo, Ceylon. Radio Club of Ceylon and So. India. P. O. Box 282. S: Time on hour, 6 pips. I: Bow Bells, infrequently. Daily 6:30-11:30 a.m. Sat. 12:30 p.m.
- 6.158 YV5RD Caracas, Venezuela, S. A. Radio Venezuela. I: 5 strokes of bell. O-C: Triunfo Aereo. Weekdays 6:30-7:30 a.m.; 10:30 a.m.-1:30 p.m.; 3:30-10 p.m. Sun. 8:30 a.m.-10:30 p.m.
- 6.150 OAX1A Chiclayo, Peru, S. A. Sr. J. Carlos Montjoy D., Casilla No. 9. O: Anclas Arriba. C: Good Night Melody. Daily 8-11 p.m.
- 6.150 CJRO Winnipeg, Manitoba, Canada (See CJRX, 11,720 mc.) Weekdays 6 p.m.-12 a.m. Sundays 5-10 p.m.
- 6.150 HI5N Moca, Dom. Rep., W. I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m.; 4:40-8:40 p.m.
- 6.1475 ZRD Durban, South Africa. (See 6.097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m.; 3:30-7:30 a.m.; 9 a.m.-3:45 p.m.; Sat. to 4 p.m.. Sun. 8-11:30 a.m., 12 noon-3:20 p.m.
- 6.145 HJ4ABE Medellin, Colombia, S. A. 1: Morse-letter "M." S: 4 chimes. Daily 9:30 a.m.-1 p.m.; 5-11:30 p.m.
- 6.140 W8XK Pittsburgh, Pa. (See 21.540 mc.) Daily 11 p.m.-1 a.m.
- 6.140 ZEB Bulawayo, Rhodesia, South Africa. (See ZEC, 5,800 mc. for address.) Sun. 3-5 a.m.; Tues. and Thurs. 1:15-3:15 p.m.

- 6.137 CR7AA 48.88 Lourenco Marques, Portuguese East Africa. P. O. Box 594. O: A Maria de Fonte. C: A Portuguesa. Weekdays 12:15-1 a.m.; 4:30-6:30 a.m.; 9:30-11 a.m.; 12:30-4 p.m. Sundays 5-7 a.m.; 10 a.m.-12:30 p.m.; 2-4 p.m.
- 6.133 XEXA 48.91 Mexico, D. F. Secretaria de Educacion Publica. O-C: March of the Toys. Weekdays 8:30-11 a.m.; 2:30-4:30 p.m.; 7 p.m.-12 a.m. Sunday 7 p.m.-12 a.m.
- 6.130 VP3BG 48.94 Georgetown, British Guiana, S. A. Crystal Broadcasting Co., Philharmonic Bldg. O: Serenade. C: Good Night My Love and God Save the King. Mon., Wed., Fri., 3:45 p.m., 4:45-7:45 p.m.; Tues., Thurs., Sat., 10:15-11:15 a.m., 3-7:45 p.m.; Sun. 6:45-8:45 a.m., 10:30-1:45 a.m., 4-6:15 p.m.
- 6.130 XEUZ 48.94 Mexico, D. F. (See 11.880 mc.) Daily 10 a.m.-1 p.m.; 7 p.m.-2 a.m. DX 1-2 a.m.
- 6.130 ZGE 48.94 Kuala Lumpur, Malay States, S. S. Sun., Tues., Fri., 6:40-8:40 a.m.
- 6.130 LKJ1 48.94 Jeloy, Norway. (See 9.530 mc.) Daily 11 a.m.-5 p.m.
- 6.130 COCD 48.94 Havana, Cuba. P. O. Box 2294. English each 15 mins. O: In a Clock Store. C: Good Night. Weekdays 9 a.m.-1 a.m. Sundays 10 a.m.-8 p.m. (DX 1-3 a.m.)
- 6.130 VE9HX 48.94 Halifax, N. S., Canada. P. O. Box 998. O-C: Oh Canada. Chimes 15 min. period. Veri, 10c coin. Sun. 12 noon-11:15 p.m. Mon. to Fri. 7 a.m.-11:15 p.m. News, Sat., 8-8:15 a.m., 11:35 a.m.-11:15 p.m.
- 6.125 CXA4 48.98 Montevideo, Uruguay, S. A. Mercedes 823. Daily 10:30 a.m.-12:30 p.m.; 3:30-9:30 p.m.
- 6.122 OAX6A 49.00 Arequipa, Peru, S. A. Munoz Najar 141. Casilla 293. O: La Marcha de los Marineros. C: Nacional del Peru. Daily 7-11 p.m.
- 6.122 HP5H 49.00 Panama City, Panama, C. A. Apartado 1045. Daily 10 a.m.-1 p.m., 5-11 p.m.; English hour 10-11 p.m.; Sundays 8 a.m.-2 p.m.
- 6.120 W2XE 49.02 Wayne, N. J. (See 21.520 a.m.) Daily 11:30 p.m.-12:30 a.m.
- 6.115 OLR2C 49.06 Prague, Czechoslovakia. (See 21.450 mc.) Irregular.
- 6.110 GSL 49.10 Daventry, England. (See 26.100 mc.) Irregular.
- 6.110 XEGW 49.10 Mexico, D. F. Enrique Arzamendi, Gen'l Mgr. O-C: Vail a dolid Atrec-march. Daily exc. Mondays 11 a.m.-4 p.m.; 7 p.m.-12 a.m. Mondays 9 a.m.-4 p.m.
- 6.109 VUC 49.10 Calcutta, India. 1 Garstin Place. S: none. C: God Save the King. Daily 8 a.m.-12:30 p.m. 11 p.m.-12:30 a.m.
- 6.105.1 HJ6ABB 49.14 Manizales, Colombia, S. A. Apartado 175. Daily 11 a.m.-1 p.m.; 5-8 p.m. Veri slow.
- 6.105 HI3C 49.14 La Romana, Dom. Rep., W.I. Sr. Roberto Palli B., Director. Week days 12:10-2:10 p.m., 6:10-10:40 p.m. Sun. 12:10-2:40 p.m.
- 6.100 YUA 49.18 Belgrade, Yugoslavia. Director, Bureau Central de Presse. S: Short tune on flute. O-C: National Anthem. Daily 12:45 a.m.-8:30 a.m., 1-6 p.m.
- 6.100 W9XF 49.18 Chicago, Ill. 20 N. Wacker Drive. O-C: Star Spangled Banner. Daily 6-9:05 p.m.-1:05-2 a.m.
- 6.100 W3XAL 49.18 Bound Brook, N. J. (See 17.780 mc.) Daily 8:25 p.m.-12 a.m.
- 6.097.5 ZRJ 49.20 Johannesburg, South Africa. African Broadcasting Co., Inc., P. O. Box 4559. Physical session. O: Bugles-Reveille. C: Cook House. I. chimes. C: God Save the King. Weekdays 11:45 p.m.-12:45 a.m.; 3:15-7:30 a.m.; 9-11:30 a.m. (8:30-11:30 a.m. Sat.) Sunday 3:30-4:30 a.m. or 4-5 a.m., 8-11:30 a.m.
- 6.097.5 ZRK 49.20 Klipheval, South Africa. Weekdays 12 noon-4 p.m. Sundays 12 noon-3:20 p.m.
- 6.095 JZH 49.22 Nazaki, Japan. (See 21.520 mc.) Irregular.
- 6.090 ZBW2 49.26 Hong Kong, China. (See 9.525 mc.)
- 6.090 XEBF 49.26 Jalapa, Mexico. Insurgentes 34. Daily 7-11 p.m.
- 6.085.7 HJ5ABD 49.30 Cali, Colombia, S.A. Daily 11 a.m.-2 p.m.; 6-11 p.m.
- 6.082 VQ7LO 49.33 Nairobi, Kenya Colony, Africa. P. O. Box 777. English used. C: God Save the King. Time signal 6 pips on hour. Daily exc. Sunday 5:30-6 a.m. Daily 11:15 a.m.-2:15 p.m. Tues. and Thurs. 8:15-9:15 a.m.
- 6.082 OAX4Z 49.32 Lima, Peru. (See OAX4T, 9.562 mc.) Daily 7 p.m.-12:30 a.m.
- 6.080 W9XAA 49.34 Chicago, Ill. (See 17.780 mc.) Weekdays 7-8:30 a.m., 8-11 p.m., Sun. 11 a.m.-1 p.m., 8-11 p.m.
- 6.080 ZHJ 49.34 Penang, S.S. Penang Wireless Society Headquarters, 40 Perak Road. O: Chimes, Vocal song, "Land of Hope and Glory." C: "God Save the King." Weekdays 6:40-8:40 a.m.
- 6.080 VE9CS 49.34 Vancouver, B.C., Canada. 743 Davie St. O: O Canada. C: God Save the King. S: 3 strokes gong. Sun. 12 noon-1:30 a.m. Mon., Thurs., Sat. 9:30 a.m.-8:30 p.m. Tues., Wed., Fri. 9:30 a.m.-2:30 a.m.
- 6.080 HP5F 49.34 Colon, Panama, C.A. Hotel Carlton. Weekdays 11 a.m.-1 p.m.; 7-10 p.m.; Sun. 10:45-11:30 a.m. 7:10 p.m.
- 6.080 XEWW 49.34 Mexico, D. F. Irregular. (See 9.500 mc.)
- 6.079 DJM 49.35 Zeesen, Germany. (See 17.760 mc.) Irregular.
- 6.075 XECU 49.38 Guadalajara, Jal., Mexico. Hidalgo 579. O-C: Ojos Tapatious. I: Train in motion. Daily 9-11 a.m.; 1-4 p.m.; 8-11 p.m. or 12 a.m.
- 6.072 OER-2 49.41 Wien, Austria. (Alternates days with 11.801 mc.) Weekdays 9 a.m.-5 p.m. Sat. to 6 p.m.
- 6.070.5 HJ3ABF 49.42 Bogota, Colombia, S.A. Apartado 317. C: Good Night Sweetheart. Daily 11 a.m.-2 p.m. 6-11 p.m. Veri slow.
- 6.070 YV1RD 49.42 Maracaibo, Venezuela, S.A. P. O. Box 100. Daily 8 p.m.-12 a.m.
- 6.070 VP3MR 49.42 Georgetown, Demerara, British Guiana, S.A. Luckie's Chambers, Fogarty's Bldg. S: Time signals, studio clock. O: The Bond of Friendship. C: Ted Lewis' Goodnight Melody and God Save the King. Veries-I.R.C. required. Weekdays 4:15-8:15 p.m. Sundays 7:45-10:45 a.m.
- 6.070 CFRX 49.42 Toronto, Ont., Canada. 37 Bloor St., West. Week days 7:30 a.m.-12 midnight. Sunday 10:30 a.m.-12 midnight.
- 6.065 XEXR 49.46 Mexico, D.F. Departamento Autonomo de Propaganda y Publicidad. Daily 6-11:30 p.m.
- 6.065 SBO 49.46 Motala, Sweden. (See 11.705 mc.) Daily 1:30-5 p.m.
- 6.060 W8XAL 49.50 Cincinnati, Ohio. Crosley Radio Corp. Daily 6 a.m.-7 p.m., 10 p.m.-2 a.m.
- 6.060 W3XAU 49.50 Philadelphia, Pa. (See 9.590 mc.) Daily 8-11 p.m. Silent 7-8 p.m., Sun., Wed.
- 6.054.3 HJ6ABR 49.53 Pereira, Caldas, Colombia, S. A. No English. Official March-El Hombre Payaso. C: Overture-Chorus Voices. No signals. Daily 9:30 a.m.-12 noon; 6:15-10 p.m.
- 6.050 GSA 49.59 Daventry, England. (See 26.100 mc.) Irregular.
- 6.045 XETW 49.62 Tampico, Mexico. Madero 204 -Oriente. S: chimes. O-C: Cavalry March. Weekdays 10 a.m.-10 p.m., Sundays 10 a.m.-4 p.m. No IRC.
- 6.042.3 HJ1ABG 49.65 Barranquilla, Colombia, S. A. Apartado 674. S: 1 gong with chimes ea. ¼ hr. O-C: National Anthem and "Los Cadetes" March. Daily 11 a.m.-11 p.m.; Sat. to 1 a.m. Sun. 11 a.m.-9 p.m. IRC preferred.
- 6.040 W4XB 49.67 Miami, Florida. News Tower. 7 p.m.-12 a.m. and variable day hours.
- 6.040 W1XAL 49.67 Boston, Mass. (See 21.460 mc.) Mon. to Fri., 6-7:45 p.m. Specials irreg.
- 6.030 OLR2B 49.75 Prague, Czechoslovakia. (See 21.450 mc.) Mon., Tues., Thurs., Fri., 4:40-5 p.m.
- 6.030 HP5B 49.75 Panama City, Panama, C. A. P. O. Box 910. English and Spanish O-C: March, Panama. No signals or bells. Daily 11:30 a.m.-1 p.m.; 5-10 p.m.
- 6.030 VE9CA 49.75 Calgary, Alberta, Canada. Toronto General Trust Bldg. C: Lights Out. S: None. Weekdays 9 a.m.-1 a.m. Thurs. to 2 a.m. Sun. 12 noon-12:30 a.m.
- 6.025 RW96 49.79 Moscow, U.S.S.R. (See RKI-15.040 mc.) Irregular 7-9:15 p.m., 10:15-11:15 p.m.
- 6.020 DJC 49.83 Zeesen, Germany. (See 17.760 mc.) Daily 10:40 a.m.-4:25 p.m.
- 6.020 XEUW 49.83 Veracruz, Mexico. Av. Independencia 98. S: Marimba. O: March Victoria. C: La Golondrina. Daily 8 a.m.-12 midnight.
- 6.015 HI3U 49.88 Santiago de los Caballeros, Dom. Rep., W. I. Apartado 23. O-C: Organ, Marie My Own. Weekdays 7:10-8:40 a.m.; 10:40 a.m.-1:40 p.m.; 4:40-9:40 p.m. Sun. 10:40 a.m.-1:40 p.m. only.
- 6.015 XEWI 49.88 Mexico, D. F. (See 11.900 mc.) Irregular.
- 6.013 HJ3ABX 49.89 Bogota, Colombia, S. A. Apartado 26-65. Weekdays 10:30 a.m.-2 p.m.; 5:30-11:30 p.m.; Sundays 12-1:30 p.m.; 6-11 p.m.
- 6.010 PRA8 49.92 Recife City, Pernambuco, Brazil, S. A. Avenida Cruz Cabuga N. 394. O: Studio clock strikes hour. National Anthem 4 p.m. C: Rocking song, Cancao de Ninar preceded by National Anthem. 9 p.m. Weekdays, 9 a.m.-12 noon; 1-3 p.m.; 4-9 p.m. Sundays 9 a.m.-12 noon; 3-9 p.m. and later.
- 6.010 VK9MI 49.92 Sydney, Australia. M. V. Kaminbla. (See 11.710 mc.) Irregular 7-7:30 a.m.
- 6.010 COCO 49.92 Havana, Cuba. P. O. Box 98. English and Cuban. Daily 8 a.m.-10 p.m.
- 6.010 CJCX 49.92 Sydney, N. S., Canada. Eastern Broadcasters, Ltd., Radio Bldg. Irregular.
- 6.010 OLR2A 49.92 Prague, Czechoslovakia. (See 21.450 mc.) Mon., Tues., Thurs., Fri., 4:40-5 p.m.
- 6.007 ZRH 49.94 Roberts Heights, South Africa. (See ZRJ, 6.097.5 mc.) Weekdays 10 a.m.-3:30 p.m., 11:45 p.m.-12:45 a.m., 5-7:30 a.m. Sundays 3:30-4:30 a.m. or 4-5 a.m., 10:30 a.m.-12 noon, 12:15-3:15 p.m.
- 6.007 ZRJ 49.94 Maraisburg, So. Africa. (See ZRJ-6.097.5 mc.) Sun. 3:30-4:30 p.m.
- 6.007 XYO 49.94 Rangoon, Burma. Burma Independent Wireless. C: God Save the King. Daily 7:30-9:40 a.m.
- 6.005 HP5K 49.96 Colon, Panama, C. A. P. O. Box 33. S: 3 chimes, each 15 min. O-C: Merry Widow Waltz. Daily exc. Sun. 7-9 a.m.; 11:30 a.m.-1 p.m.; 6-11 p.m. Sun. 10 a.m.-12 a.m.
- 6.005 CFCX 49.96 Montreal, Que., Canada. P. O. Box 1690. Weekdays 7:44 a.m.-1 a.m. Sundays 9 a.m.-11:15 p.m.
- 6.005 VE9DN 49.96 Montreal, Que., Canada. (See CFCX, 6.005 mc.) Sat. 11 p.m.-12 a.m. Fall, winter and spring.
- 6.000 CXA2 50.00 Montevideo, Uruguay, S. A. Comp. de Radio Publicidad Continental, Juan Carlos Gomez 1431. O: Voluntary Trumpeter. C: Good Night Melody. Daily 10:30 a.m.-10:30 p.m.
- 6.000 XEBT 50.00 Mexico, D. F. P. O. Box 79-44. I: 3 blasts on cuckoo horn. Siren near closing. O: Las Mananitas. C: Liebestraum. Daily 10 a.m.-12:15 a.m.
- 6.000 HJ1ABC 50.00 Quibdo, Colombia, S.A. Sr. Rafael Valencia Ibanez. Quibdo, Colombia, S.A. O-C: March, Relator S: 2 blows Chinese Gong. Sunday 3-5 p.m. Wed., Sat. 5-6 p.m. Daily 6-9 p.m.
- 6.000 FIQA 50.00 Tananarive, Madagascar. Director of Posts and Telegraphs. Daily 12:30-12:45 a.m.; 3:30-4:30 a.m.; 10-11 a.m.

6.000 RV59 50.00	Moscow, U.S.S.R. (See RKI, 15.040 mc.) No. IRC required. Irregular.	5.850 YV1RB 51.28	Maracaibo, Venezuela, S.A. P. O. Box 37. English and Spanish. O-C: Strike Up the Band. Weekdays 5:30-8:30 a.m.; 10:30 a.m.-1:30 p.m.; 3:30-10:30 p.m. exc. Tues., Thurs., Sat. to 9:30 a.m. Sundays 7:30 a.m.-2 p.m.; 3:30-4:30 p.m.; 5:30-9:30 p.m.	4.900' HJ3ABH 61.22	Bogota, Colombia, S. A. Apartado 565. I: 3 chime notes. Weekdays 11:30 a.m.-2 p.m., 6-11 p.m. Sunday 12 p.m., 4-11 p.m.
5.977 CS2WD 50.19	Lisbon, Portugal. Rua Capelo, 5. O-C: Our Lady of Fatima. I: none. Daily 2:30-4:30 p.m. Sundays and Thursday 6-7 a.m.	5.830 TIGPH 51.46	San Jose, Costa Rica, C.A. Apartado 800. C: Good Night Melody (Ted Lewis). Weekdays 8-11 p.m.	4.880 HJ4ABP 61.48	Medellin, Colombia, S. A. Emisora Claridad. Daily 8 a.m.-11 p.m.
5.970 OAX4P 50.25	Huancayo, Peru, S.A. Cuzco 25. Daily 12-1 p.m., 9 p.m.-12:30 a.m.	5.813 TIGPH-2 51.61	San Jose, Costa Rica, C.A. Apartado 800. C: Good Night Melody. Daily 7-11 p.m.	4.860 HJ1ABE 61.73	Cartagena, Colombia, S. A. Apartado 31. O: Organ—Song of the Islands. English each hour clock strikes the hour. C: Alohe Oe. Weekdays 7 a.m.-1:45 p.m., 4-11:30 p.m. Sundays, 9 a.m.-3 p.m.
5.969 HVJ 50.26	Vatican City. (See 15.121 mc.) 2-2:15 p.m. Sun. 5-5:30 a.m.	5.800 YV5RC 51.72	Caracas, Venezuela, S.A. P. O. Box 2009. I: 4 chimes. O-C: Official IBC March. Bugles, whistles before closing. S: 4 chimes, ea. 15 mins. Sundays 8:30-11:30 a.m., 3:30-9:30 p.m. Weekdays 7-8 a.m., 10:30 a.m.-1:30 p.m., 3:45-10:30 p.m.	4.841 HJ3ABD 61.97	Bogota, Colombia, S. A. Apartado 509. O: Pari Ti Rio Rita. C: Rio Rita and National Anthem. Weekdays 9 a.m.-2 p.m., 6 p.m.-12 a.m., Tues. and Thurs. to 3 p.m. Wed. and Fri. begin 5:30 p.m.
5.955 HJN 50.35	Bogota, Colombia, S.A. Minister of Education Nacional. Daily 11 a.m.-2 p.m.; 5-10:30 p.m.	5.800 ZEC 51.72	Salisbury, Rhodesia, South Africa. P. O. Box 792. Sun., 3-5 a.m.; Tues. and Fri. 1:15-3:15 p.m.	4.820 HJ7ABB 62.24	Bucaramanga, Colombia, S. A. Santander Broadcasting. P. O. Box 37. Daily 6-10:30 p.m.
5.940 TG2X 50.51	Guatemala City, Guatemala, C.A. De la Policia Nacional. Daily 4-6 p.m. Mon., Thurs., Sat. 10-11:30 p.m. Sundays 1-2 p.m. No. I.R.C. required.	5.780 OAX4D 51.90	Lima, Peru, S.A. All American Cables, Ltd., Casilla 2336. Signs on and off Morse code. No signals. English and Spanish. Wed., Sat. 9-11:30 p.m.	4.790 HJ2ABC 62.63	Cucuta, Colombia, S. A. Sr. Pompilio Sanchez, Prop. Daily 11 a.m.-12 noon, 6:30-9 p.m.
5.930 YV1RL 50.59	Maracaibo, Venezuela, S.A. P. O. 247. Weekdays 11 a.m.-1 p.m.; 4:30-9:30 p.m. Sun. 8:30 a.m.; 2:30 p.m.	5.758 YNOP 52.10	Managua, Nicaragua, C. A. Radio Bayer. Weekdays 8:30-10:30 p.m. Veri—5c U. S. postage.	4.780 HJ1ABB 62.76	Barranquilla, Colombia, S. A. Apartado 715. I: 3 chimes. S: 1 chime between advertisements. C: La Golondrina 7-9 a.m., 11-1 p.m., 5:30-10 p.m.
5.929 PJC1 50.60	Willemstad, Curacao, N.W.I. Curacaoische Radio Vereeniging. O: Electrical gong, 4 strokes and repeat 5 mins. O-C: National anthem. Weekdays 6:36-8:36 p.m. Sun. 10:36 a.m.-12:36 p.m.	5.755 YV2RA 52.13	San Cristobal, Venezuela. Apartado 37. English occasional and at closing. S: 6 strokes gong. O-C: March, El Capitan. Weekdays 11:30 a.m.-12:30 p.m.; 5:30-9 p.m. Sun. 5:30-10 p.m.	4.740 HJ6ABC 63.29	Ibague, Colombia, S. A. Daily 6-11 p.m.
5.910 YV4RH 50.76	Valencia, Venezuela, S. A. Daily 8-11:30 p.m.	5.725 HC1PM 52.40	Quito, Ecuador, S. A. P. O. Box 664. O-C: La Marcha de Aida. Saturdays 9-11 p.m.	4.660 HJ2ABJ 64.38	Santa Marta, Colombia, S. A. Daily 11:30 a.m.-2 p.m.; 5:30-10:30 p.m.
5.910 HH2S 50.76	Port-au-Prince, Haiti, W.I. (See 11.570 mc.) Daily 7-10 p.m.	5.713 TGS 52.51	Guatemala City, Guatemala, C. A. Casa de Presidencial. Sun., Wed., Fri., 6-8 p.m. No IRC necessary.	4.600 HC2ET 65.22	Guayaquil, Ecuador, S. A. P. O. Box 824. I: 12 chimes. Wed. and Sat. 9:15-10:45 p.m. Veri—5c U. S. postage.
5.905 TILS 50.80	San Jose, Costa Rica, C.A. P. O. Box No. 3. S: none. O: Washington and Lee Swing. C: Adios Mi Chapparrita. Weekdays 12-3 p.m.; 6-11 p.m. Sundays irregular.	5.146 PMY 58.30	Bandoeng, Java, N. E. I. Bandoeng Radio Society, Nilmy Bldg. O: March, Le Rene Passe. C: On chimes, Good Night and National Anthem. Sun. 6:30 p.m.-1:30 a.m., 4-10:30 a.m. Mon. to Fri., 5:30 p.m.-2:30 a.m., 4-10:30 a.m. Sat., 5:30 p.m.-2 a.m., 4-11:30 a.m.	4.273 RV15 70.21	Khbarovsk, U.S.S.R. Radio Committee. English, 2 a.m., EST and at announcements. Daily exc. 6th, 12-18-24-30th 3 p.m.-8 a.m. On 6-12-18-24-30th 7:10 p.m.-8 a.m. English programs start at 2 a.m. No IRC necessary.
5.900 ZNB 50.84	Mafeking, South Africa. Director of Public Works, P. O. Box 106. Weekdays 6-7 a.m., 1-2:30 p.m. Sundays 1-2:30 p.m.	4.995 VUD2 60.06	New Delhi, India. (See VUD2—9.590 mc.) Daily 6:30-11:30 a.m.	4.107 HCJB-2 73.05	Quito, Ecuador, S. A. (See 8.831 mc.)
5.885 HI9B 50.98	Santiago de los Caballeros, Dom. Rep., W.I. P. O. Box 95. O-C: Piano Solo—Vals Evocation. Weekdays 11:40 a.m.-2:10 p.m., 4:40-7:40 p.m. Sundays 12:40-2:40 p.m.			4.002 CT2AJ 75.00	Ponta Delgada, Island of St. Michael, Azores. Wed. and Sat., 5-7 p.m.
5.880 YV3RA 51.02	Barquisimeto, Venezuela. (See YV3RB, 9.565 mc.) Daily 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.			3.305 VUB2 90.77	Bombay, India. (See VUD2—9.590 mc.) Daily 7-11:30 a.m.
5.875 HRN 51.11	Tegucigalpa, Honduras, C.A. C: Good Night Melody (Ted Lewis). Daily 7-10 p.m. Veri—10c U. S. cash. Veri slow.			3.040 YDA 93.68	Batavia, Java, N. E. I. (See 15.150 mc.) Weekdays 4:30-10:30 a.m. (Sat. 11:30 a.m.) 6-7:30 p.m., 10:30 p.m.-2 a.m. Sun. 4:30-10:30 a.m., 7:30 p.m.-2 a.m.
5.865 HI1J 51.15	San Pedro de Macoris, Dom. Rep., W.I. Apartado 204. O-C: Waltz, Sweet Remembrance. English very seldom. S: none. Daily 11:40 a.m.-1:40 p.m.; 5:40-9:40 p.m.				

## RELAY RACK RIG

(Continued from page 301)

and since the end contacts only are required, the effective air gap is approximately  $\frac{5}{8}$ ". If the switch is properly insulated above ground, this method will be as reliable as the knife-type switch, with the added convenience of permitting front-of-panel operation.

Bridge rectification, using four 866s, comprises the rectifier for the final amplifier power supply, and three 83s similarly connected are used in the modulator power supply.

The power supplies for the exciter and speech amplifier are of standard design and should prove highly satisfactory if the recommended parts are used.

(Continued on page 330)

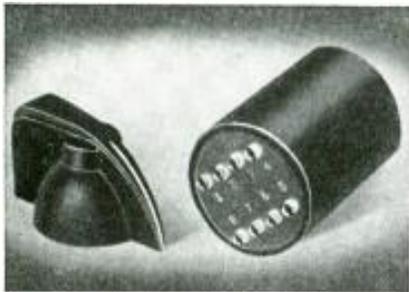
The base of the relay rack which is used as the chassis for the final amplifier power supply and the relay control system. Note connecting cables leading to the upper decks.



# ON THE MARKET

## U. T. C. "OUNCER" UNITS

UNITED TRANSFORMER CORP. of 72 Spring Street, New York City, announces their new "Ouncer" series of audio transformer components. These "Ouncer" units represent the acme in compact transformer development, weighing approximately one ounce and having dimensions 7/8" diameter by

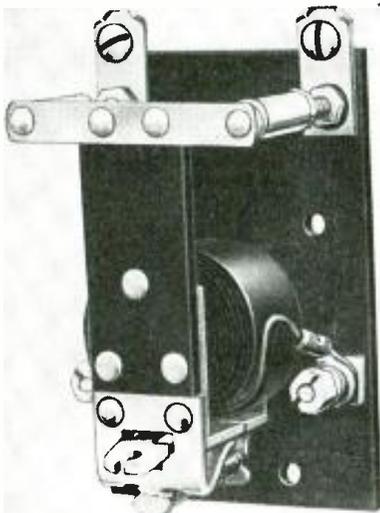


1-3/16" overall. These transformers have high-fidelity characteristics and are available for all types of service, including input, interstage, output, mixing, etc. The minute dimensions of these units make them especially suitable for hearing aid, aircraft, portable and concealed service applications. ALL-WAVE RADIO.

## HIGH-VOLTAGE KEYING RELAY

NEW GRID-CONTROLLED rectifier tubes for high powered, one kw. or more stations, have necessitated the development of this new Ward Leonard 507-516 Keying Relay.

These relays have single pole, normally open, double-break contacts. The base and cross arm are of bakelite. Silver-to-silver contacts are insulated for 5000 volts to ground. The relay operates on 6 to 8 coil volts, d.c.



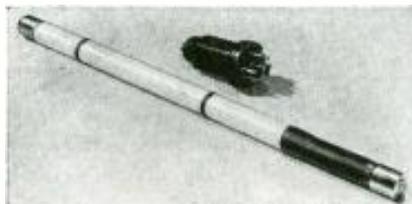
The armature design, light in weight, provides speed in keying up to 50 words per minute. ALL-WAVE RADIO.

## NEW MODULATION INDICATOR

AN ITEM RECENTLY placed on the market by Acoustic Consultants, RKO Building, New York City, promises to eradicate the prevailing fault of over-modulation. Known as the Modulite, the device is used to indicate instantly a fault previously detectable only by means of elaborate and expensive equipment.

Modulite is a 1/2" glass tube, 12" long, lined with a fluoroscopic material identical to that in a cathode-ray tube, and filled with inert gases and mercury. The bombardment of positive ions and the presence of ultra-violet resulting from ionization of the mercury, cause the lining material to fluoresce, the rise and fall of the glow indicating relative modulation.

The Modulite is divided into three parts by black bands circumscribing the tube. The carrier is adjusted, with no modulation, until the green glow is even with the lower band. When transmitting, the glow rises with the voice's modulation, fluctuating between the lower and higher bands while modulation rises no higher than the 100% designated by the F. C. C.



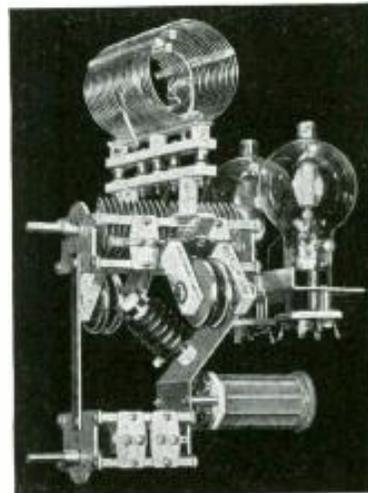
Over-modulation is instantaneously detectable by a red glow inside the tube above the higher band, and is thus easily correctable by the ham.

The Modulite is easily attached by clips to the frame of a transmitter. The lower terminal is connected to the modulated r.f. stage and the upper terminal is grounded to the frame. By means of a small variable condenser in series with the tube and r.f. coil, the glow is set at the proper "no modulation" level, i.e., the lower hand. ALL-WAVE RADIO.

## UNIT CONSTRUCTION IN HAM TRANSMITTERS

MECHANICAL ARRANGEMENT of amateur transmitters has always presented quite a problem. First, we had the bread-board layout and that was followed by the now popular chassis method of construction. Neither of these arrangements is completely satisfactory. They are both great space users and prevent the construction of compact apparatus.

With proper mechanical construction, many present evils may be overcome. However, all amateurs do not have available the tools and machinery necessary to make the fancy brackets and oddly shaped pieces of metal which are necessary for modern type construction. Then too,



there are many amateurs who are not mechanically inclined and find it difficult to do a really neat job in building their transmitters. All of these constructional difficulties have been eliminated by the Hammarlund Manufacturing Company, Inc.

The unit shown in the accompanying photograph is a push-pull radio frequency power amplifier designed to use any of the popular triode tubes having ratings of from 100 to 300 watts output per pair.

Much time has been spent in the design and arrangement of this unit. All parts associated with the amplifier proper, are joined together with brackets of various shapes. This hardware is available in kit form and the only tools necessary for assembling and wiring are a screw-driver and soldering iron. When finished, it is a self-supporting unit which can be bolted to a panel with the mounting screws furnished with the variable condenser; no chassis is necessary.

Mounted on the two side bars of the large variable condenser, an "MTC-100-B", are two brackets which support the plug-in plate coil and the two "N-10" neutralizing condensers. The lower condenser, ("MTC-100-C") for tuning the grid circuit, is fastened to the large condenser with an angular shaped back plate. At the top of this plate we find another horizontal bracket which serves as the mounting for the two tubes. At the lower edge of the back plate is mounted the plug-in grid coil. This plate is also drilled for mounting the radio-frequency choke (CH-500) and the two filament by-pass condensers together with the grid biasing resistor. All brackets are completely drilled and machined and have a silver-like finish.

The entire arrangement is constructed so as to permit direct and short wiring leads. The tubes shown in the unit are RCA 808's. However, as mentioned before, any of the popular triodes may be used, depending entirely upon power output desired. Overall dimensions are 13" high, 8 1/2" wide, and 8" deep. ALL-WAVE RADIO.

### G. T. C. PEE WEE TRANSMITTER

A LOW-POWER TRANSMITTER, supplied in kit form for the amateur newcomer, is announced by General Transformer Corp., 1250 W. Van Buren St., Chicago. It is called Pee Wee. The kit contains all of the parts required for building the unit—tubes, crystal, coil form—even the hook-up wire and solder. Both the power and the r.f. portion are mounted on a single Battleship Gray chassis.



This little unit allows the new amateur to go on the air with an economical crystal-controlled transmitter that goes together with minimum effort—the entire unit assembles and wires in a couple of hours. Its usefulness is not limited to the 25 watts input. Working three bands with one crystal and all five bands from 160 to 10 meters with two crystals, the Pee Wee forms a flexible exciter unit for a 100-watt stage when added power is desired. ALL-WAVE RADIO.

### ECONOMICAL FREQUENCY STANDARD

A SMALL, PORTABLE, economical frequency standard for most laboratory checking and calibration purposes where extreme accuracy is not required, is announced by Ferris Instrument Corp., Boonton, N. J. The Ferris Model 33 Calibrator contains three crystal-controlled oscillators having fundamental frequencies of 100, 1,000 and 10,000 kilocycles, and arranged to generate harmonics which are usable up to about the 30th or 40th of each crystal fundamental. In addition, there is a multivibrator controlled by the 100 kc. oscillator, giving fundamentals of 50, 25, 20 and 10 kc., the harmonics of these being usable up to about 3,000 kc. so as to provide finer subdivisions of the main frequency intervals.

The frequencies generated in the Calibrator can be picked up by an external receiver, as in receiver calibration, or will produce beats against any externally-generated frequency such as that coming from



a signal generator or oscillator which is to be checked or calibrated. For this latter purpose a self-contained detector and audio amplifier is provided, so that no additional equipment other than a pair of earphones is required for this use.

The three crystals are of the low-drift type, ground and adjusted to an accuracy of .01 per cent, or 100 cycles per megacycle. Temperature drifts will not cause variations greater than about this amount, so that the total possible error under any normal condition will not exceed about .02 per cent, or considerably greater precision than is ever required for ordinary calibrating purposes. ALL-WAVE RADIO.

### ABOUT CERAMIC CASED MICA CAPACITORS

A RECENT BULLETIN from the Cornell-Dubilier Electric Corporation cites the advantages of a mica-ceramic casing combination for high voltage use.

Referring specifically to the Cornell-Dubilier type 86 unit, illustrated here, we were informed: 1) that by the use of mica, the loss of power flowing through the capacitor is 1/20th that of ordinary flint glass dielectric capacitors; 2) that ceramic casing insulates condenser from interfering ground capacity, as with metal cased



capacitor; 3) that ceramic casing prevents field absorption, hence lower r.f. resistance; 4) that Cornell-Dubilier's internal mica assemblies eliminate all corona effects; 5) that capacity remains constant at high frequencies and at temperatures that would materially damage glass dielectric condensers.

The Cornell-Dubilier type 86 mica capacitors are recommended for amateur plate blocking, grid and tank condenser applications. ALL-WAVE RADIO.

### TRANSDUCER MIKE MATCHING CHART

TRANSDUCER CORPORATION announces from their New York Headquarters this month the completion of a chart showing the decibel equivalent of volts and watts for matching microphones, amplifiers and loudspeakers.

The new Transducer chart provides the answer to a problem which frequently confronts the sound engineer who has to select the proper impedance and transformer ratio or the proper input tube when matching microphone equipment, the output of which is given in decibels, to amplifiers, the gain of which is given in decibels but with the input voltage given in volts.

Now, by a quick reading on the chart

he can determine the voltage corresponding to a certain decibel output of the microphone across a given load.

For example: A microphone with —50 db. output across a 500-ohm load will give 5.2 millivolts, while across a 50,000-ohm load it will give 52 millivolts. The Transducer chart also gives similar data for matching a loudspeaker to an amplifier and is very useful insofar as it gives the relations between decibels and power.

The chart is unique in that this information has never before been adapted to a quick reference method. It is recommended for use by sound engineers and students as a time saver.

A copy of the Transducer chart, suitable for framing, is being provided, free of charge, to purchasers of Transducer Bullet microphones or may be had by writing Transducer Corporation at 30 Rockefeller Plaza, New York City. ALL-WAVE RADIO.

### AEROVOX "HASH" CONDENSER

STILL ANOTHER addition to its already extensive line of auto-radio condensers is announced by Aerovox Corporation, 70 Washington St., Brooklyn, N. Y. It is the "hash" or generator noise-suppressing condenser—a metal-can paper job with grounded bottom bracket and top terminal lug, intended for mounting and connections directly on the car generator. The standard capacity is .5 mfd., but other capacities will be made available if called for. The voltage rating is 100, although the condenser is subjected to little over 6 volts in normal service. The new condenser is Type 1122. ALL-WAVE RADIO.

### 6L6 NEUTRALIZING CONDENSER

BUD RADIO, INC. have just announced a new Neutralizing Condenser of miniature size for the smaller type beam-power tubes such as the 6L6, 6V6, RK-39, 807, etc. Small and compact and easy to adjust. Heavy aluminum plates are 1" in diameter and



highly polished. Edges are rounded and buffed. A knurled nut locks the movable plate in place. Heavy solder lugs are used. Tripod-mounting base. Capacity range is .5 to 9 mmfd. This Condenser is designated as Cat. No. 890. ALL-WAVE RADIO.

### C-D CATALOG FLYER

CORNELL-DUBILIER catalog flyer No. 154-A lists two new C-D products, the type BR "Beavers," tiny etched-foil dry electrolytic filter capacitors, and the type 2R silver-plated mica capacitors, exceptional units with unusually stable frequency characteristics.

Address requests to Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey. ALL-WAVE RADIO.

# THE STREAMLINER

(Continued from page 289)

O. M. agreeing that *his* electrocution would be a boon to mankind—but to delay it in case we have any trouble.

Rewired as per circuit diagram, at great expense and loss of sleep and then finished up power supplies. Decided to finish up r.f. units so proceeded to assemble and wire up final amplifier which was somewhat uneventfully accomplished with only minor disasters. Learned that porcelain midget stand-offs used for jack blocks for universal antenna matching unit, were unfriendly to flat metal panels unless fibre washers used under same as well as under holding nuts. This idea penetrated the fog after four out of five cracked in mounting.

It so happened that we had two fan type milliammeters of excellent make which we decided to use at  $M_1$  and  $M_2$ , since both were 0-25 m.a. We spent half an evening finding a proper value of shunt to make  $M_2$  read 10 times the scale, or 250 m.a. full scale. Since it is an extremely low value we don't recommend repeating such a procedure. Get the meters specified and you'll have no troubles. The bakelite discs showing in the rear view were necessary to permit mounting the special meters we had in the large holes provided for the specified units. The Ward-Leonard keying relay seen on the rear view, toward rear of exciter was on hand and is run from the filament transformer of the T-20 second buffer. It is not necessary unless keying leads are very long. We thought the key leads which ran under our operating table right over the stentorian modulator, were carrying some r.f. close to the latter, so having the relay, we put it in.

But all this is ahead of our story. In due course, having completed the wiring of the final amplifier we find that the only thing which stands in our way for the big tryout is a total lack of plug-in coils which we are to wind. We note the numerous sizes of coil diameters and run around our cellar workshop in

		EXCITER			
		14 MC.	28 MC.	56 MC.	
		7 MC.	14 MC.	14 MC.	
	BAND	D	A	A	
	CRYSTAL FREQ.	18	6	—	
L1	Coil No.	22 dsc	22 dsc	—	
6L6G	No. of turns	XR4	XR4	—	
Osc.	Wire size	1½"	1½"	—	
	Coil Form				
	Winding length				
	Coil No.	E	B	B	
	No. of turns	10	3	—	
L2	Wire size	16 tin.	16 tin.	—	
6L6G	Coil form	XR5	XR5	—	
1st Buf.	Winding length	1½"	1½"	—	
	Link turns	1	1	—	
	Coil No.	F	C	C	
L3	No. of turns	8	4	—	
2nd Buf.	Wire size	16 tin.	16 tin.	—	
T-40	Coil form	XR5	XR5	—	
Grid	Winding length	1½"	1½"	—	
	Link turns	2	1	—	
	Coil No.	M	J	G	
L4	No. of turns	18	8	6	
2nd Buf.	Wire size	10 en.	10 en.	10 en.	
T-40	Coil form	PB5	PB5	PB5	
Plate	Winding length	2½"	2½"	2½"	
	Inside dia.	1 7/16"	1 7/16"	11/16"	
	Link turns	1	1	3	
		FINAL AMPLIFIER			
	Coil No.	N	K	H	
L5	No. of turns	14	8	4	
P.P. T-20	Wire size	10 en.	10 en.	10 en.	
Grid	Coil form	PB5	PB5	PB5	
	Winding length	2½"	2½"	1½"	
	Inside dia.	1 7/16"	1 3/16"	11/16"	
	Link turns	1	1	1	
	Coil No.	P	L	I	
L6	No. of turns	10	6	6	
P.P. T-20	Wire size	14	14	*3/16"	
Plate	Coil form	20BTVL	10BTVL	—	
	Winding length	4½"	4½"	4½"	
	Inside dia.	2¾"	2¾"	1½"	
	Link turns	3	3	4	

\* Copper tubing.

search of similar sized round gadgets to wind on. Since four sizes were used, respectively, the leg of a chair, a chunk of curtain pole, a screw driver handle, and, as we remember, in one extreme case, our thumb, we write another vitriolic epistle to the Chief Engineer depicting the terrors of a certain hot place where he should spend his future, on account of using so many winding form sizes. He thanks us for our cheery

greeting and suggests that if he tried to explain it we couldn't understand it anyway, but there *is* such a thing as "form factor." We don't speak that country so good so we ignore the insinuation, if any. (But one of these days we're going to Chicago and get even with that wise cracker).

We find that using wire sizes specified require drilling out the National mounting plugs until they are a mere hollow shell of their former selves. However, by pushing link coil and tank coil terminals in at same time you end up with a swell looking job. Too swell, in fact, if you should want to change link turns to another value, which *can* happen—here—and did. More about that later.

Having neglected to make up the cables connecting the three decks together we finally solve that enigma by reading the pictures and circuit diagrams, and consulting a Ouija Board and the Chief Engineer's horoscope. (The stooge is out of it by this time—it's become a private war between the C. E. and us).

(Continued on page 325)

TABLE I

### DIAL SETTINGS AND PLATE CURRENT READINGS

(Output—50 watts. Frequency—57 mc.)

Stage	Dial Setting	$I_p$ in ma. Full Load	$I_p$ in ma. Key Up	$I_p$ in ma. Key Down
6L6 Osc.	30	50	0	50
6L6 Buf.	34	*98	*50	*98
T-40 Buf. Grid	48	9	0	9.5
T-40 Buf. Plate	72	150	23	145
T-20 Final Grids	42	35	0	38
T-20 Final Plates	28	205	52	70
Ep—Final		730 v.	840 v.	800 v.

\* Plate, screen and grid current combined.

Eventually comes the dawn of a new day and we are ready to blow the works. We see some voltages marked on the schematic and remember we have a Precision 840 Multimeter which tells all, when it comes to reading voltages AC and DC as well as resistance values and AC and DC mils, to say nothing of DB. If the darn thing could only cook, we'd marry it. We are astounded to note that the tubes light up when filament switch is thrown. In fact the r.f. tubes light up when it is thrown to "Off" as well as on. We study circuit diagram and find that's what is apparently supposed to happen. Time out to write C. E. and ask him whyin!—etc. More later about that also.

Nice going on the power pack though. Plenty of volts. We set the taps on variable resistors about the way shown in photos in instruction book and throw plate voltage "on" switch with the curtain pole, which has become one of our handiest tools, apparently. By metering the crystal oscillator plate circuit we note that we can dip it and make it hold fine. Lamp and loop show nice oscillations taking place. Discover pretty blue lights in 6L6 buffer and rush to meter that. Approximately a million mils there but locate the resonant point and keep her steady with plenty of gas showing in the plug-in coil.

On to the T-20 buffer grid. Nice and hot there too. That link coupling is ok.—first time we ever tried it on a rig of our own. Put in plate coil of T-20 buffer—and find she is a long way from neutralization. Discover no way to break plate circuit to same, because plate current jack moved from B-lead to cathode resistor circuit. Time out to install switch in B-leads as indicated in schematic. Hurray, we can "neut." her ok.—at least that's what the meter says when plugged into 2nd buffer grid jack. Not a wobble of the needle when plate tank is resonated. Make all voltage adjustments indicated in instructions and find that by plenty of tinkering with the variable resistors we get about what voltages he says we should. Since he doesn't say what the current values are we hope they are right and make note to tabulate same and pass 'em on to C. E. in hopes he will find something wrong with them—in which case we will mail him flowers—concealing a time bomb.

Well, looks like all hunky-dory with exciter with both 40-meter crystal and 20-meter crystal working FB, coils resonating with condensers set at reasonable scale values and plenty of gas in plate tank of T-20.

So up we go to the final. Pretty fair neutralization achieved there on 20 meters with fair drive indicated by grid meter in final. Very important that meter. Swell for indication of neutralization and tells you all about your drive coming

up from 2nd buffer. Ok on 10 also—boy, what a field that 10-meter final lays down.

But what's the matter on 5? No drive arriving to grid circuit of final from 2nd buffer. Just can't get more than 3 or 4 mils. Hours of struggle—no soap. Consider calling in those helpful hams, but remember we chased them, because we were on the "easy" part now. Finally pocket our pride and send out an SOS (by ordinary telephone). Hams arrive with full complement of razzberries. "Looks swell don't it, but what's the matter with your output—why, my long lines—etc., etc." Finally, one says to twist the spaced link line between link on 2nd buffer plate and link on final grid coil—and starts to do it. We break his wrist and point out that the Good Book says twisted link lines n.g. on 5 meters. After we get his wrist in splints, martyr to cause of science explains something about reactance we don't savvy and twist link anahoo. Grid mils go up to 10—we hand one armed martyr a stiff drink and take a long one to revive ourselves. Fortified against further paradox, we meekly get him rubber covered wire which he quickly twists into a link line with 2 turns on each end which he jams into each coil (T-20 buffer plate and push-pull T-20 grid, respectively) at which rectified grid current takes balloon ascension and levels off at 25 mils. Hot stuff showing now in plate tank of final and we're ready to go on the air. Wounded missionary not satisfied however, and slides  $R_8$  (we made it variable) down to 200 ohms and grid meter pointer winds around the pin. (25 mil. meter in our case) Hot dawg, that's something! Some soup now in plate tank of final. Visiting marconi bursts three buttons off vest and calls for another tall one—and gets it—with bottle thrown in, plus 12 cents in stamps and two Washington Street car tokens. All we have is not too much.

Remove then the jumper we have used to short 1 and 3 on "modulator input" socket on final chassis and plug in cable from modulator. Crank up the modulator and dummy lamp load across link terminals of final brightens right up when we talk into the Electro-Voice. Boy, she's modulating, and how. Unfurl the 5-meter "hiss-box" and give a listen—sweet potato!—sounds just like the golden voiced tenor—and twice as nasty. We are made!

### On the Air!

At this point, if doing it were as easy as talking about it, we would have given ourselves 20 minutes to be on the air and make first contact, given an antenna. We had the antenna, a 5-meter, half-wave vertical, delta matched to a non-resonant line. (Boy, are we technical). This was a throwback to our original

## It POUNDS Into Service Problems Like a Ton of Bricks



### The Second Edition MALLORY-YAXLEY Radio Service Encyclopedia

Radio amateurs and experimenters will welcome this great book because of its simple exposition of the principles of 1938 radio receiver design. No bunk—but complete information written so you can understand it. Twice the information contained in the First Edition . . . 17,000 receivers analyzed (5000 more than the First Edition) . . . the right answer to every service problem . . . in one book . . . on one page . . . on one line.

### All that's New . . . Automatic Tuning, for example

All the dope on Automatic Tuning . . . with over 100 illustrations . . . schematics . . . trouble-shooting charts . . . for every system. The low down on Audio Degeneration . . . the inside on Alignment . . . complete new Tube Charts . . . covering every type and make. Mallory-Yaxley spent thousands of dollars to make this Second Edition the greatest time saver a radio service man ever had. But the cost to you is so low you'll pay for it with the time you save on one job. Sign off on lost time and low profits today. See your distributor. His supply is limited.

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



interesting experiences with a unity-coupled oscillator in which a 6E6 was the entire r.f. works, modulated with an audio system big enough to fill up WJZ's carrier envelope, compared to the size of the pee-wee oscillator.

However, we had plenty of fun with this simple little rig and a desire to supplement some antenna height we couldn't achieve, with more substantial input power, and a really good audio system inspired our choice of the 5, 10 and 20 meter "Streamliner." We digress, however.

Comparing our antenna with the one shown in the master-mind's instruction book we note that his 5-meter doublet has all the characteristics of ours except we made ours the hard way and use a 7 ft. 8 inch, 3/4" diameter, brass tube, mounted vertically on a 2 x 4 on the chimney, instead of his easy way of using approximately the same length horizontal wire. So-o-o-, we note the thousand-and-one methods of coupling the feeders to the tank coil and try 999 of them before we discover that the simple way seemed best, viz., to tie the non-resonant (we hope) lines right on to the link coil of the 5-meter final tank. We are of the opinion, however, that our 7 ft. 8 inch pipe resonates at a frequency lower than that of the resultant harmonic frequency of our 20-meter crystal because we found that it was possible to load up the p-p T-20's in the final to 200 m.a. by using 4 link turns around the final tank coil. Looser coupling than this would probably give as heavy loading, if our antenna came nearer resonance to our frequency of 56.8 mc.

Ours is undoubtedly a brute-force method of getting the gas to the sky wire and so to the "gang" (as well as the neighbors) but we can't complain as to the results. For the very limited time of operation, and with local conditions known, our 5-meter Streamliner results leave nothing to be desired. Working out of the Second District for the first time on 5, W1KQK gave us a 5-8 to 9 with "best quality I've heard on the 5-meter band." The old Stentorian, apparently sans any hum, is doing her stuff aided and abetted by the Electro-Voice velocity which appears to have much less of the "barrel-like" quality generally associated with ribbon mikes. And all the local boys within a 30-mile radius, with whom a QSO was a somewhat uncertain affair with the modulated 6E6, now believe that W2QA has a kw. on 5 and the pleasure of consistent 100% QSO's, with swell reports on signal strength and broadcast quality make up for the small headaches somewhat facetiously referred to in earlier paragraphs.

### Peace Reigns

The C. E. of the kit manufacturer and ourselves are now at peace with

the world—all is forgotten and forgiven—and just between us girls—it was a whale of a lot of fun putting the rig together, "discovering" the "bugs" which generally weren't there at all if we'd known what we were doing. Even the Missus thinks it's pretty, and we don't think it's half bad for a decrepit old fossil just about entering his dotage.

When we finish up our 5, 10 and 20-meter converter, we'll know more about what this chummy little rig can do on 10 and 20. But, the petrol is in them that 10- and 20-meter tanks, fellows, and I'll be seein' you on those bands as soon as a receiver, fit to go with a darned swell transmitter, rears its pretty head up the cellar stairs and justifies its right to take a reserved seat on our operating table alongside our triumph. (You notice it's *ours*, now and it's performing like a major—when we were having our lumps, it was the Chief Engineer's, bless his slip-stick).

## THE CIRCUIT COURT

(Continued from page 303)

possible correction should be made to the transmitter and antenna system so that the r.f. energy will go where it belongs instead of coursing through all the apparatus in the station.

Fig. 9 shows the circuit of a satisfactory pre-amplifier. The tube is a metal 6N7 which, due to its excellent shielding, works without picking up energy from external fields. Individual Mal-lory bias cells permit the grounding of the cathode system in the 6N7, which is advisable for the elimination of hum as well as r.f. energy. The most effective agents for elimination of r.f., however, are the 2.5-millihenry r.f. chokes. One is located as near the first grid terminal as possible and is connected in series with the shielded microphone lead. The other r.f. choke is connected in the feed to the primary of the output transformer. In this position, it was found to be much more effective than a choke in each leg

of the 200-ohm output line. The "B" supply must be by-passed with a non-inductive paper condenser regardless of the amount of electrolytic condenser capacity across the circuit.

## AWR 5-10-20

(Continued from page 296)

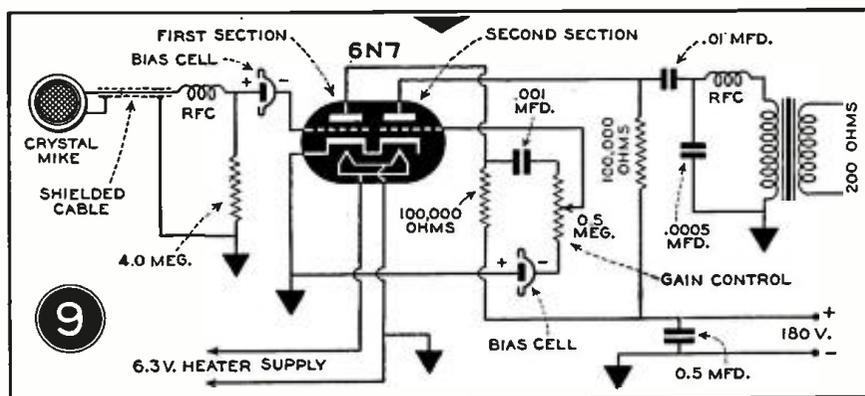
sides. These sides form the "brackets" for the bottom pan.

One advantage of this type of construction is that the under part of the audio-power chassis is not covered up. When it is desired to work on this section with the transmitter completely assembled, it is only necessary to lay the transmitter on its side to have easy access, even with the transmitter turned on and working. The large space between the audio-power deck and the upper r.f. deck also permits of testing and work on the underside of the r.f. deck with the transmitter in operation. The lower panel may also be removed. This accessibility of all portions of the transmitter while it is in operation will be appreciated by those constructors who have built transmitters without keeping this important point in mind.

### The Audio Section

The power-supply section and output arrangement of the 2A3s was previously described. The remaining portion of the audio-power deck comprises the three speech amplifier stages. These follow the procedure which has been found most satisfactory by experiment. The input tube is a high-gain triode (6F5) resistance-coupled to a low-gain triode (6C5) transformer-coupled to a push-pull driver stage (6N7). This latter driver stage is, of course, transformer-coupled to the 2A3s. The gain control is placed between the first two stages. This stage layout provides more than enough overall gain with the least trouble from feedback and hum.

It will be noticed that no audio trans-



Pre-amplifier protected against r.f. feedback.

formers are inserted in the low-level stages. The lowest level transformer is T, in the grid circuit of the driver stage. This transformer is mounted on a 45-degree angle to all other transformers and chokes on the chassis. This angle is indicated in Fig. 2 and may be easily noted in the photograph.

The positions of most of the various components on the audio-power chassis may be noted from the photographs. Referring to the rear view photo, the power transformer, T5, is at the left rear corner. Next is the filament transformer, T4. Following across, in order, are the input choke, T6, and second choke, T7. The third choke, T3, is of the midget unshielded variety and is mounted under the chassis, beneath the other filter chokes.

The audio line-up may be easily identified. Starting at the right front corner (rear view) it extends across to the output transformer, T2, at the left front corner. The additional tube on the chassis is the 5Z3 rectifier. The three dual filter condensers, C12, C13 and C16, may be located by their relative sizes, C12 being the smallest and C16 the largest.

All cathode, plate and power-supply filtering is handled by these three dual filter condensers. The only additional condensers required are the small tubular coupling condensers, C14 and C15. This greatly simplifies the mounting and wiring of the various condensers.

In wiring the audio section, attention should be paid to keeping all grid and plate leads as short as possible. They should be run close to the chassis bottom, for shielding effect, and away from other wires. The grid leads to the 6F5 and 6C5 should be shielded for their entire length as indicated in Fig. 2. The three speech amplifier tubes, being of the metal type are adequately shielded in themselves except for the grid cap of the 6F5. A small top shield should be employed in this position, as indicated in the photograph.

The connections to the primary of the first transformer, T, should be experimentally reversed with the audio section in operation for lowest hum level. On the particular transformer used in the model, lowest hum resulted with the "B" lead to the coupling condenser, C15, and the "P" lead to ground. Other transformers may give opposite results, so be sure to check on this point.

The connections on the rear edges of both the audio-power and r.f. chassis are indicated in the insert of Fig. 2. On the front edge of the audio-power chassis are three bar knobs. The one at the right is the filament switch, SW2, the center one the plate switch, SW3, while the left one is the combined gain control-audio switch, R7-SW1. With the gain control turned all the way to the left the

cathode return circuit of the 2A3s is opened by SW1. This removes the drain of the plate circuit of the 2A3s while tuning up the r.f. system.

### Testing

The audio-power section of the transmitter should be tested first. The power supply should give approximately 400 volts, depending on its load. It will be

noted that dual filter condenser C16 is of the paper dielectric type, with a working voltage rating of 600. Ordinary electrolytic condensers with a working voltage of 450 volts run dangerously near the no-load voltage of this supply. The condenser specified for this position will hold up safely.

The audio section can be most easily checked with an additional inexpensive

*Quality above all*



**SOLAREX**  
Oil Impregnated  
**TRANSMITTING CAPACITORS**

- Ratings of 1, 2 and 4 mfd. in operating voltages of 1000, 1500, 2000 and 3000 D. C.
- Heavy metal cans, with deeply imbedded insulators.
- Full voltage protection.
- Outstanding value. — Ask your dealer about the very reasonable Solarex prices.

Catalog upon request

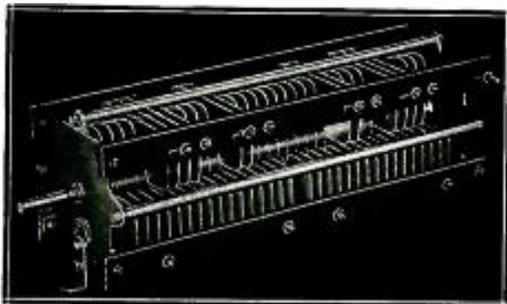
**SOLAR MFG. CORP., 599-601 BROADWAY, NEW YORK, N. Y.**

# NEVER BELOW PAR CARDWELL "Preferred"

by amateur constructors, commercial radio designers—by every engineer who knows that **QUALITY COUNTS**. Manufacturers of recognized prestige are staking their reputation on the **PERFORMANCE** of Cardwell condensers.

Explorers, risking their lives for science, men who go down to the sea in ships and into the air for commerce or pleasure, and every arm of our national defense, **DEPEND** on communication facilities in which **CARDWELL PRODUCTS** play no small part. **CARDWELL DESIGN REPRESENTS TIME TESTED DEPENDABILITY**, and is your **STANDARD OF COMPARISON**.

## NEW Type FEX MULTI-BAND CONDENSER FOR 250 WATT FONE "RICS"



### ONLY VARIABLE AIR CONDENSERS CAN GIVE YOU COMPLETE BAND COVERAGE

The type "FEX" makes use of one rotor effective on 3 separate dual section variable condensers in a single frame only 11 inches long.

A proper split-stator value for every band from 5 meters to 160 inclusive, all rolled up in one condenser.

Write for our bulletin on "How to Use Cardwell Multi-band Tank Capacitors."

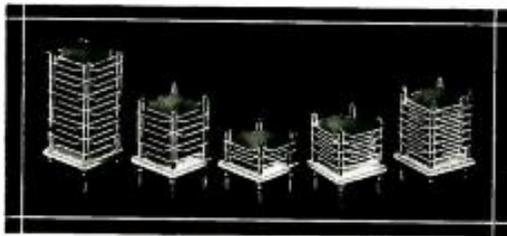
### EFFECTIVE BALANCED (SPLIT STATOR) CAPACITY RANGES for FEX

5 and 10 M.	- Range 1 - 5.8 to 18.5 mmfds. effective
20 and 40 M.	- Range 2 - 7 to 35 mmfds. effective
80 M.	- Range 3 - 10 to 50 mmfds. effective
160 M.	- Range 4 - 19 to 120 mmfds. effective

Note: Correct values are obtained to fit Barker & Williamson and Coto Coils.

### GENERAL SPECIFICATIONS

Airgap - .100". Effective airgap (2 sections in series) .200"  
General Electric Mycalex Insulation.  
Buffed and polished plates.  
Dimensions—1" x 4" x 11".  
List \$25.00—usual amateur discount applies.



### TYPE "J" PLUG-IN FIXED AIR CONDENSERS

Now include new Type JR-750-OS - \$8.80 list for stabilizer capacitor for electron coupled "Rubber Crystals." Write for bulletin on "E" Type Midnet Fixed Condensers, General Electric Mycalex, Flexible and Rigid Couplings and other new Cardwell products.

See us at "207 MARCONI BLVD.," NATIONAL RADIO PARTS TRADE SHOW, JUNE 8-11, HOTEL STEVENS, CHICAGO.

**THE ALLEN D. CARDWELL  
MANUFACTURING CORPORATION**  
82 PROSPECT STREET, BROOKLYN, NEW YORK

output transformer which will match the 2A3s to a 500-ohm line load as well as voice coil impedances. A type T-67S54 Thordarson will do the trick. The primary of this transformer should be connected to output posts (4), (5) and (6). Besides being useful for testing purposes, this transformer will permit the amplifier to be used for other purposes where an output-to-line or voice coil is desirable.

An ordinary 10-watt electric light bulb should be connected across the 500-ohm winding of this additional transformer. Lighting of this bulb to full brilliancy will indicate an output of approximately ten watts. With no microphone plugged into jack J, it should be possible to open the gain control wide with no indication of light at all in the bulb. This indicates low hum level and lack of feedback.

With the microphone plugged in, it should be possible to light the bulb to full brilliancy by speaking in a normal voice several inches from the mike with the gain control no more than half open. The overall gain of this audio section is considerably higher than necessary with ordinary types of dynamic and crystal microphones.

The audio quality should be checked by connecting the voice coil of some dynamic speaker to the voice coil winding. A magnetic speaker may be used, in a pinch, connected across the 500-ohm winding. Input may be from a high-impedance phonograph pickup or from the detector of some radio tuner. Be sure that the grid circuit of the 6F5 is not overloaded. An extra gain control of 500,000 ohms or so may be connected temporarily at the input circuit (externally) to avoid this difficulty.

With a good speaker and high quality input the resulting quality from the speaker should be equal to that usually expected from a high-fidelity radio. We use a similar amplifier with the same class of Thordarson transformers for high-fidelity radio and p.a. work.

### Pointers on Oscillator

The "critical" point of the r.f. section, particularly for 5-meter operation, is the grid circuit of the RK-25 oscillator stage. Be sure that the 10-meter crystal is clean. If it does not oscillate, or shows signs of being erratic, remove the top plate of the holder and clean the crystal and plates with a little Carbona. Be very careful, as a 10-meter crystal is rather fragile. With a clean crystal no difficulty should be experienced and it will work as smoothly, and with as much output, as its lower frequency brethren.

The cathode coil should follow the specifications closely for 5-meter operation. The  $2\frac{1}{4}$  turns specified may seem small but is correct. This oscillator follows recommendations of the Bliley people as closely as possible.

For self-excited operation with a type Lg coil, watch the position of the cathode tap. When too near the ground end of the coil the stage will refuse to oscillate. When too far up the coil the stage will oscillate "all over," with output from the plate circuit regardless of the tuning of the plate condenser, C3. When working properly, output will be secured at only one position of C3, depending on the frequency to which the grid condensers C and C1 are tuned. This indicates independence of the grid and plate circuits of the RK-25.

The RK-34 can be most easily neutralized with its plate voltage lead temporarily removed. The adjusting screws should be left in the neutralizing condensers and turned so that neutralization is obtained with both condensers set at equal capacity. This will provide symmetrical neutralization. If the correct settings cannot be obtained remove the screws, bend the movable plates out further than normal and then replace the screws. This had to be done with the particular condensers used. The correct setting of the condensers will be found rather broad, neutralization being not at all critical.

As mentioned before, excitation to the RK-34 is adjusted by varying the distance between L1 and L2. Loading of the antenna system is adjusted by varying the size and position of the output link, L4. Fine adjustment may be obtained by turning this link, remembering to keep it at the center of L3 at all times.

A little trouble was had with interaction of the audio and r.f. sections when the transmitter was first tested. This was cured with bypass condensers C9, C10 and C11. C9 is placed directly across the socket, S. C10 and C11 are placed directly at the socket of the RK-25 for best results.

A Transducer Ball-Type MK-35 Dynamic Microphone is used with the transmitter. This microphone works directly into the high-impedance grid circuit of the 6F5, eliminating the necessity for an input transformer. The output level of this microphone is minus 55 db., approximately the same as most crystal types. The shell is a 3" diameter metal ball, completely excluding undesirable r.f. and a.c. fields. *No polarizing voltage is required.*

The output coils L3 and L4 may well be replaced by the new Barker & Williamson Type BL Variable Link assemblies. These new coils were announced too late for inclusion in the low-power unit, the position of L3 and L4 in the model not permitting their mounting. If a bit more room is allowed between the RK-34 stage and side bracket of the chassis B and L type coils may be used to advantage. The high-power final amplifier will employ them in grid and plate circuits.

## NIGHT-OWL HOOTS

(Continued from page 315)

he is heard on the "Radio Orchestral Hall" every afternoon over that station from 2-3. . . WGN's new towers will cost a quarter of a million dollars and will rise 750 feet into the air. It will be the highest structure of its kind in the world and it will be 130 feet higher than the World's Fair Skyride. . . Tony Tarr asks if we heard the one about the rookie who was so green that he thought a TP was an Indian wigwam.

George Brode, once a regular reporter to this column is now W3HHS. Congrats George and may you have plenty of FB QSO's! . . . Enrique Hidalgo, who did a commendable job of announcing that DX program which closed CMHJ's season, coached the Cuban track and field team into third place in the Fourth Central American Games held this year in Panama. . . Harry Snyder postcards from Chicago where he is taking part in the National Bowling tournament. . . Besides tuning in TP's Tony Tarr finds the sound of nickels tinkling into pin-ball machines music to his ear! . . . Quite an impressive layout is the listening post of Dick Wright in Chicago. An ARRL World Map, a National Geographic map of the Caribbean countries, one of the United States, another showing the South American countries and still another of Europe adorn the walls of his room. Besides these are a series of smaller maps showing all continents. Of course the whole set-up is topped with a generous number of verifications mounted on the walls.

## Cheers and Jeers

Three long and rousing cheers this month for a grand fellow and a grand station. Senor Amando Cespedes Marin and his TI4NRH have just completed a month of dedicatory programs celebrating the station's tenth year of broadcasting. On the broadcast band his station is seldom heard and therefore little is

known of the pioneer Latin American station, but those of you who also twirl the short-wave dials will understand why we devote a few lines to cheer for friend Marin and his "little NRH."

A practice which is fast becoming popular among the Latin American broadcasters is causing much grief to the broadcast band DXer. Stations are

# new low prices on... type TJ-U capacitors

## CORNELL-DUBILIER DYKANOL FILTER CAPACITORS



Prices have been substantially reduced on all Cornell-Dubilier DYKANOL Universal Mounting transmitting capacitors.

No sudden shift in policy is this. No cutting down on C-D high quality standards. Our price reduction is the result of months of careful planning—of enlarged production facilities, to meet an ever-increasing demand. Remember—nothing has been cut but the prices.

C-D Type TJ-U transmitting capacitors are impregnated and filled with DYKANOL—the non-inflammable, non-explosive high dielectric impregnant used in the construction of capacitors for the U. S. Signal Corps. DYKANOL has proven its exceptionally stable characteristics through years of dependable operation in tens of thousands of broadcasting and amateur stations throughout the world.

For complete listing of new Type TJ-U prices see your local C-D jobber or write for catalog No. 161.

CABLE ADDRESS: CORDU

Cat. No.	Cap. Mfd.	600 V. D. C.	List Price
TJ-U 6010	1 Mfd.		\$2.75
TJ-U 6020	2 "		3.50
TJ-U 6040	4 "		4.50
1000 V. D. C.			
TJ-U 10010	1 "		3.00
TJ-U 10020	2 "		4.00
TJ-U 10040	4 "		5.00
1500 V. D. C.			
TJ-U 15010	1 "		3.50
TJ-U 15020	2 "		5.00
TJ-U 15040	4 "		7.00
2000 V. D. C.			
TJ-U 20010	1 "		4.50
TJ-U 20020	2 "		5.50
TJ-U 20040	4 "		9.00
3000 V. D. C.			
TJ-U 30010	1 "		12.00
TJ-U 30020	2 "		15.00
TJ-U 30040	4 "		22.00
5000 V. D. C.			
TJ-U 50010	1 "		25.00
TJ-U 50020	2 "		32.00



# CORNELL-DUBILIER ELECTRIC CORPORATION

1013 Hamilton Boulevard, South Plainfield, New Jersey

# Par-Metal

## RACKS—PANELS— CABINETS GIVE YOUR JOB THAT PROFES- SIONAL TOUCH

The professional appearance of PAR-METAL Racks, panels, and cabinets has won for them a high place in the estimation of men who build their own jobs. You will appreciate the high quality of materials, construction and the clean, uniform finish. Standardization of units facilitates easy assembly of the job which, when finished will be modern and professional in appearance.

The PAR-METAL line is the most complete in the industry and includes units which enable you to build almost anything from a short wave receiver to a professional transmitter or public address system.



SEE US AT THE CHICAGO SHOW  
204 Bell Street



Our complete line will be on display at the Chicago Show including standard relay racks, enclosed relay racks, steel cabinets for rack panels, Amplifier Foundation Units, meter panels, etc.

New Free Catalogue is now available at your jobber or write direct to

**PAR-METAL PRODUCTS CORP.**  
3521-41 St., Long Island City, N.Y.  
Dept. AW-8

## FOR ALL HAM TRANSMITTERS

"More Watts Per Dollar"

**Taylor** CUSTOM BUILT **Tubes**

Your parts dealer's choice.

### "HAM" SPECIAL Standard Teleplex

A highly efficient code teacher using heavy specially prepared waxed paper tape, having two rows of perforations. Write for Free folder AW. DEALERS—Correspondence invited with dealers for protected territories.

We are the originators of this type instrument  
**TELEPLEX CO.**  
72 Cortlandt St., N.Y.C.

Instrument with tapes prepared by expert and complete course of lessons: all for \$11.95

verifying reception of BCB signals with their SW verification cards without making any specification regarding the station that was actually reported. Chief offender is LR3 and its ever-growing chain of broadcasters which extends into Uruguay. Reports addressed to any station on the network are turned over to LR3 for verification and "Radio Belgrano" verifies all reports with the same form letter bearing only their call and making no reference whatever concerning any other station. Many Cuban stations use cards showing both SW and BC call letters, but in filling out the cards fail to check which of the stations was reported by the listener. We have nothing but jeers to offer the stations practicing these methods of verification.

Please use your R.S.S.L. Monitoring Station Call when reporting to this department. Address all correspondence intended for Night Owl Hoots to Ray La Rocque, 20 Hampden St., Worcester, Mass.

## RACK & PANEL RIG

(Continued from page 321)

One 6.3-volt winding on T15 is connected to the paralleled meter lights for illumination.

### The Relay System

A total of five relays are used in the transmitter. Start-stop switches control the filament and plate voltages. The circuit is so arranged that the plate voltage cannot be applied before the filaments have reached their operating temperature.

When the plate relay is on, if it is desired to shut off both the filament and plate voltages simultaneously, pressing the filament stop button will accomplish this.

If an overload develops in the final amplifier, the overload relay will automatically shut off the plate power. It is then necessary to reset the relay and reapply the plate voltage.

The relays are of the electrical hold type, with one set of contacts on the filament relay used for the holding circuit. The other set of contacts controls the load.

The plate control relay is arranged somewhat differently. One set of contacts controls both the holding circuit and the load. The other set closes the B return lead in the exciter unit. When the plate relay is energized, excitation and plate power are applied simultaneously to the final amplifier.

When the duplicate set of controls is installed in the pre-amplifier, care must be taken to connect the start buttons in parallel and the stop buttons in series.

Keying is accomplished in the final amplifier stage. A keying relay is used, the contacts of which make and break the center-tap lead on the secondary of the HF-200 filament transformer.

## RECORDING

(Continued from page 291)

Fig. 3 shows the Presto Junior Recorder in use. The good-looking fellow is reading some of Zeh Bouck's hot stuff into the mike. Note that the recording is from the inside out; the cutting head commences its travel near the center of the record and works out. As it cuts into the record blank, the shavings wind around a spindle placed on the hub of the turntable expressly for this purpose. Though these units are available for cutting from the outside in, the inside-out method is preferable for a number of reasons, one of the important ones being that the shavings are drawn in to the spindle where they cannot get caught under the cutting stylus and cause it to jump track.

The same illustration clearly shows the playback pickup at the rear, and the instrument panel carrying the controls and the volume level meter. The loudspeaker opening is at the front of the case. A rubber pulley on the motor shaft engages the rim of the turntable and rotates it in this manner. An adjustment screw permits the motor to be swung out, and the pulley released from the turntable rim, so that constant pressure during periods when the machine is not in use will not flatten the rubber surface and cause a variation in turntable speed.

### On the Record

Our first recording experience was pretty much of a flop, principally because we took the instructions outlined in the Operating Manual a bit too seriously. For example, we got too excited over the long, threadlike shaving as it came off the record and insisted on fiddling with it for fear that it would get caught under the cutting stylus. As a result of this we broke the shaving a number of times and in an attempt to get it winding around the spindle again, jolted the cutting head, slowed down the turntable and made the stylus jump. The result was a recording full of pops, "wows" and repetitions. The pops were due to short, un-cut sections where the stylus

jumped; the "wows" (a wavering of pitch) to a slowing up of the turntable speed when we man-handled it, and the repetitions to a broken wall between recorded grooves which permitted the playback needle to return to the same groove over and over again.

We learned by experience that had we kept our hands off the thing, the very first recording would have been okay, as it is seldom that the shavings don't take care of themselves . . . or at least the first recording would have been okay if we hadn't also taken too literally the instructions regarding the volume level meter. We were that cautious to keep the meter needle from jumping beyond the red mark that our entire recording was made at too low a level, with the result that things had to be run wide open on the playback to get any sort of decent volume.

**Off the Record**

But on our second try—on the reverse side of the 6" disc we commenced with—we let the shavings shift for themselves and let the real loud peaks swing the meter needle considerably beyond the red mark. And the results were beyond our expectations. This particular recording was made with the microphone in the general vicinity of the radio loudspeaker, and when we played back the recorded program it sounded almost as good as the original. That got us, and from then on we were simply a fiend on the subject ready to catch all programs that appealed to us, strictly private conversations and, of course, the voice of the family.

But business is business, and so we trotted the equipment down to Mort Kahn's ham station, W2KR, with the purpose in mind of recording some DX in the 20-meter band (see Fig. 4). We were after VR6AY (remember?) and fortunately caught him one morning when

the band was wide open. The result was amazingly good—heterodynes and all. Friends of Lew Bellem who heard the playback at various times recognized his voice immediately.

At another time, when Mort had Frances Farmer and her mother, and Leif Erickson at his station so they could talk with Miss Farmer's sister in Hilo, Hawaii, we made recordings of both ends

of the conversation. We tried the record on a number of movie fans without tipping them off, and every one of them recognized Miss Farmer's voice without the least bit of prompting.

All of these recordings were made with the microphone. We then tried our hand at recording directly from the output of a high-fidelity radio receiver. This is easily done as it is only necessary to

★ . . . . *International*  
**3 TIME DX CHAMPION . . . . .**  
**1<sup>ST</sup> in '36 ... 2<sup>ND</sup> in '37 ... and again 1<sup>ST</sup> in '38**

XE2N, XE1A, Juan Lobo y Lobo of Mexico City, Mexico, won the 1936 contest with 189,081 points, in 1937 finished second with 201,520 points and this year again is in FIRST place with 236,322 points. Only 150 watts input to an HF-100 final. Splendid performances were also recorded by many other active amateurs, including W8LEC of Detroit, Michigan, with Amperex HF-200's, and W1CDN of Amherst, Mass., with Amperex HF-300's . . .



**RADIO EXPERIMENTAL**  
**XE2N**

Juan Lobo y Lobo                      Orlindo 974                      Alberto 718

**MONTERREY, N. L., MEXICO**

Amperex Electronic Products Inc.  
79 Washington Street  
Brooklyn, New York

Gentlemen:

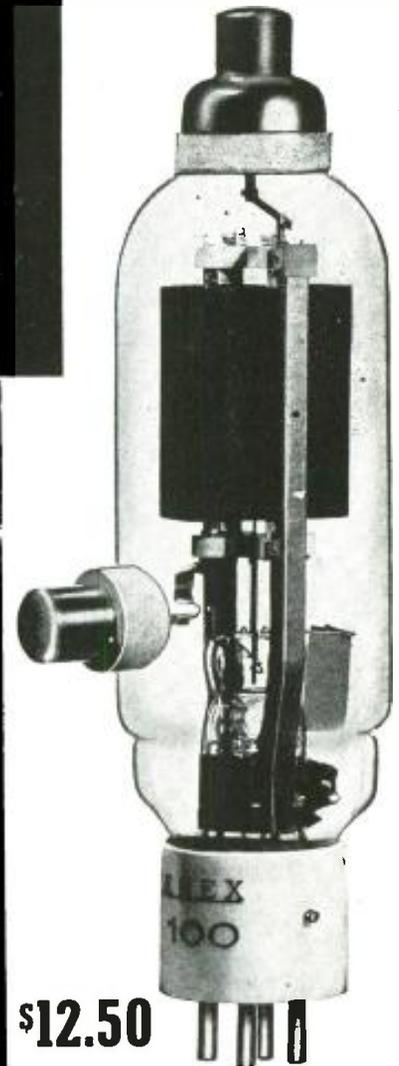
It took me only two hours to build up on a bread-board a final with the HF-100 and a few minutes later, I was ready to use it from 10 to 160 meters with the same power supply used for my old 210's (1,000 volts). Even capacitative coupling was tried for more simplicity, neutralizing was so easy on all bands and Oh Boy!! What an out put from only 150 watts input that was all I could get from my power supply!!!

Next day the "CW" International DX Contest started and I don't need to say any thing of my signal as there are many thousands of stations all around the world that heard me during those days.

Five bands were used: 10-20-40-80 and 160 meters and near 2,000 QSO's were made during the eighteen days of the Contests. Several WAC's both on "PHONE" and "CW" were also made even it was supposed that I must work W & VE's only.

To close this letter, permit me to congratulate you for the excellent performances of the HF-100 and at the same time, recommend it to all those amateurs interested on "REAL DX."

Yours very truly,  
*Juan Lobo y Lobo*  
"XE2N"



**\$12.50**

Thank you, XE2N, thank you amateurs everywhere, for PROVING with PERFORMANCE . . . that Amperex tubes are the choice of champions . . .

**AMPEREX ELECTRONIC PRODUCTS, Inc.**  
**79 WASHINGTON STREET • BROOKLYN, NEW YORK**

Complete stocks available at SEATTLE, ATLANTA and LOS ANGELES warehouses

**YOU'VE BEEN  
HEARING IT  
On the Air  
HERE IT IS...**



### THE PRESTO JR. SOUND RECORDER

A new, low priced instrument that makes high quality phonograph records that can be played back immediately.

With the Presto Jr. you can record your DX contacts for proof of the QSO... record station signals and transmit them back, so the other fellow can hear his own transmission. You can make records of voice and music, from all over the world, to add to your record library.

Presto Jr. is a complete, portable recorder and phonograph. It includes a 12" turntable, recording mechanism, playback pickup, amplifier and condenser microphone.



### THE PRESTO RADIO RECORDER

is also available if you prefer to use your own microphone and amplifier or plan to record only from your radio receiver. The radio recorder includes the turntable, cutting mechanism and pickup... no microphone or amplifier.

**Ask your regular dealer to write us. He can easily arrange to give you a demonstration of the Presto recorder.**

**PRESTO RECORDING CORPORATION**  
153 W. 19th St. New York City, N. Y.

clip the special cable provided with the recorder across the voice coil of the loudspeaker and plug the cable into the "Radio" jack on the recording unit. In this case the output from the receiver is fed directly into the cutting head, the microphone and amplifier in the recorder not being used. Volume level is taken care of by the volume control on the receiver.

For this work we used the 12" record blanks, giving us 5-minutes playing time per side. Recordings were made of selections played by the NBC Symphony Orchestra, the New York Philharmonic Orchestra and the Metropolitan Opera Company Orchestra. Cuttings were also made of Charlie McCarthy and Edgar Bergen, Jack Benny and Kenny Baker, and of the Saturday Night Swing Club. Of this group we had but one failure, and this was due to a poor connection between one of the clips and the loudspeaker voice coil. One failure out of a total of 16 recordings!

### Comparisons

Undoubtedly the question uppermost in your mind is, how good were the recordings? Our answer is that each one, including the symphony orchestra selections, sounded perfectly natural in every respect... exactly as they sounded from the radio loudspeaker which, of course, was operating during the recording periods. In these tests, the records were played on our own phonograph unit with a high-fidelity crystal pickup, and reproduced through the same amplifier and speaker as used with the radio tuner.

Commercial records have a slight edge on these "home-made" discs in so far as high-frequency response is concerned. Though the commercial records aren't supposed to carry much above 4500 cycles, the more recent ones appear to come close to 6000 cycles. The difference is noticeable only when the records are produced through a high-fidelity system.

On the other hand, the home discs are as quiet as a mouse compared to the commercials when it comes to needle scratch. The difference here is very apparent.

The life of the acetate type disc is probably shorter than that of the commercial record, but this life can be increased considerably if the "Disclub" liquid is applied to the cuttings directly after the record is made. This liquid tends to harden the sound engravings made in the grooves without affecting the frequency characteristics of the record. It can be applied with a cloth, with the record revolving, in about two seconds.

It might be added at this point that

a recorder minus amplifier, loudspeaker, microphone, etc., is made by Presto for those who are interested only in making recordings directly from the output of a radio receiver. This unit is illustrated in Fig. 5. It consists of the same motor, weighted turntable, cutting head, feed drive and playback as used in the Junior Recorder. It can be used for making fine musical recordings, cuttings of DX stations, etc., from any radio receiver. If personal recordings are desirable, the Junior model with the microphone and amplifier is required.

## ULTRA-HIGH

(Continued from page 311)

are portable-mobile units of 10 watts power and are operated by the Harvey Radio Lab. . . . Walt says that NMF, the Coast Guard radio station at Winthrop, Mass., has been heard testing on 31.0 mc. several times. A few of the DX fones heard in Lynn are; VP6MR, CX1FB, L1KN, ES5D, SM5WJ and YR5AA.

Clyde C. reports that the band has closed up out there except from 32.0 mc. down. Clyde says that W2XEW on 31.6 mc. is making it practically impossible to hear anything. W2XEW is supposedly owned by the Press Wireless, Inc., and is using buzzer modulated c.w. During the recent A.R.R.L. contest Clyde, using a diamond antenna and his rebuilt Super-Skyrider with 4 r.f. stages listed his best catches as OK3VA and OK2KO. To follow that up he heard a mess of ZLs and VKs, three Js and three KA1s, but the best one was W6MWK portable aboard ship 170 miles from Hong Kong, China. Very very FB. Although the band above 32.0 mc. has failed, 5 meters has opened up for lower atmosphere bending and is enabling him to hear stations within 100 miles.

Raymond Benton, Plymouth, N. H., sends further information on the Mt. Washington stations. Besides all the stations mentioned last month, he tells us that W1XR is still keeping schedules with W1XW, Blue Hill Observatory on 60.6 mc. W1XZ is also used occasionally on the same frequencies, while W1FUR is used in the amateur bands.

Finally, here at our location, we made what we consider a rather good record—we heard Police Car No. 22 out of Waco, Texas, as it sped along the New Dallas Highway at 65 miles an hour. The unusual part of it was that this 10-watt station was heard for fifteen

feet high. Perhaps they will be on the air again some day.

### Amateur Phones

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

Country	Frequency	Calls	Time Heard
Australia	HF	VK2AEZ-2HF-2BK	7:20 a.m., 10:30 p.m., 12:20 a.m.
Australia	LF	VK2IQ-2GV	10:30-10:35 p.m.
Australia	LF	VK2AFO-2AQ	7:25-7:30 a.m.
Australia	LF	VK2AZ-2EH-2BN-2CP	3:4:10 a.m.
Australia	LF	VK2ADV-2NY-2AHA	12:40-4:05 a.m.
Australia	LF	VK3XP-4EC-4RJ-4ZZ	2:40-4:42 a.m.
Australia	LF	VK5WD	6:10 a.m.
Africa (South)	LF	ZS6CT	6:14 p.m.
Africa (Egypt)	HF	SU1AM	7:12 p.m.
Africa (Egypt)	LF	SU1RD-1KG	8:15 p.m.-12:05 a.m.
Africa (Algeria)	HF	FA3HC	9:10 p.m.
Argentina	LF	LU4NB	6:58 p.m.
Argentina	HF	LU7BK	10:40 p.m.
Antigua	LF	VP2AM-2AB	
Belgium	HF	ON4MZ	4:34-8:40 p.m.
Barbados	HF	VP6MO-6FO	12:30 a.m.
Brazil	LF	PY1FR-1GJ-5AJ	12:10-5:45 a.m.
British Honduras	LF	VP1DM-1BA	5:55-6:50 p.m.
Colombia	LF	HK1EF-1DG-5DB	10:12 p.m.-2:30 a.m.
Cuba	HF	CO2WN	9:23 p.m.-12:45 a.m.
Cuba	LF	CO2OK-2JJ	10:30 p.m.
Cuba	LF	CO2WM-2RP-2MA	10:50 p.m.-12:35 a.m.
Costa Rica	LF	TI2FG-2RC	5:35-10:25 p.m.
Denmark	HF	OZ5BW	11:30 p.m.-6:30 p.m.
Denmark	LF	OZ9Q	1:37 a.m.
Dom. Rep.	LF	HI7G	10:45 p.m.
England	HF	G3DO	6:10 p.m.
England	LF	G3CP-5CC-5JA	12:40 a.m.
England	LF	G2BM-5KH-6LL-6WY	6:13-8:07 p.m.
England	LF	G5RV-5BJ	5:30-8:33 p.m.
England	LF	G8QH-8GM	1:1:02 a.m.
Ecuador	LF	HC1JB-1JW	6:34-8:58 p.m.
France	HF	F3AM-8AM	10:25 p.m.-12:45 a.m.
France	LF	F8JI-3HZ	1:35-2:25 a.m.
France	LF	F8SI-3MF-8QD-3CH-8ZF	4:38-5:40 p.m.
Honduras	HF	HR1AP	12:05-2:30 a.m.
Irish Free State	LF	EI8M-GI5QX	10:55 p.m.
Jamaica	AB	VP5BR	3:52-6:45 p.m.
Mexico	HF	XE2FY-XE1A	7:10 p.m.
Mexico	LF	XE3AF-1GJ	9:35 p.m.-1:50 a.m.
Nicaragua	LF	XE3AF-1GJ	6:15 p.m.-2:30 a.m.
Portugal	HF	YN3DG	9 p.m.
Portugal	HF	CT1RH	5:49 p.m.
Philippine Islands	LF	CT1BQ	5:45 p.m.
Philippine Islands	AB	KA1ZL	8 a.m.
Peru	HF	KA1MG	12:45 a.m.
Rumania	LF	OA4AR	12:45 a.m.
Rumania	LF	YR5CF	12:20 a.m.
Rumania	LF	YR5GW	6:10 p.m.
Sweden	HF	SM6WL	12:53 a.m.
Sweden	LF	SM7QC	12:17 a.m.
Trinidad	HF	VP4GA	12:25 a.m.
Uruguay	LF	CX2AK-2AZ	
Venezuela	LF	YV1AK-5AN-5ABQ	5:31-5:45 p.m., 6 p.m., 5:55-6 a.m.

### Acknowledgment

As always we acknowledge with much pleasure the many letters and reports received from listeners and readers and deeply appreciate your cooperation and many kindly comments.

Your inquiries as to unknown stations, reception and station matters in general will be given prompt consideration.

## HAMFEST

(Continued from page 297)

OMs from wishing their XYLs were hams. It is disastrous to the happy home life of the OM, although he does come in handy when the receiver starts oscillating or the aerial breaks down!"



THANKS FOR THE loan of the card, W4DVO, and here's hoping your wrist has subsided since handling some four hundred messages of the Tampa Fair (W4DUG) traffic. W4BNR was a little better than DVO with about five hundred—while yours truly came in third with something less than 300. All told, 3576 messages were originated—and we are wondering how many of the DUG msgs are still floating around. (You can't miss 'em—"Having a great time at the Tampa Fair—Wish you were here.")

WLTC, (AARS, Kalamazoo, Mich.) got so fed up on it, he sent through the following service message to DUG—AM NOT AT FLORIDA STATE FAIR STOP WISH YOU WERE HERE REGARDS.

And Bob Barr, W5GHF, had his own headaches. He writes—"Each time I suffered from QRM on 80, trying to clr tfc, the QRM was caused by DUG tfc! I heard VEs, W6s, W7s, WLMZ, WLU and all nets through the USA, and without a single exception every station reported to his control with QTC or ZMA from the DUG booth! And Arkansas!! You can clr tfc to Burma, India or Johannesburg much more easily than to Bob Burns' native state. The seasoned tfc operator just won't take a message for Arkansas. I managed to catch W5AAJ, a fellow townsman of Bob Burns in Van Buren, and cleared a few at the beginning of the tornado—pardon me, I mean the Fair tfc skeds—but since then they have all crawled into a hole in the Ozarks. In desperation—not being able to raise an AARS, NCR or an ORS, I started one message via a free-lance station. I've had that msg back three times so far, and it's on the hook at present!"



PLANS ARE UNDER way for what will probably be the biggest and most interesting convention in Hudson Division history—the Hotel Astor, Times Square, New York City on Friday and Saturday, June 17th and 18th, 1938. The A.R.R.L. Hudson Convention will open at Friday noon and will continue with lectures, contests and demonstrations during Friday and Saturday culminating in the Grand Ball and Banquet on Saturday evening at which time numerous valuable

**THE HEART OF A GOOD RECEIVER OR TRANSMITTER DEPENDS UPON QUALITY PARTS**



### AND OF COURSE BIRNBACH MAKES THEM!

No matter how good a receiver or transmitter may be "on paper", it requires quality parts to make an efficient finished product. Perhaps that is why so many designers and engineers specify "BIRNBACH" when they lay out their rigs. Insulators, jacks, plugs, sockets, wire, cable and other BIRNBACH products always are tops in quality though NO MORE in price. When you build your CRYSTAL CONTROLLED 5 or 10M. X-MTR be sure you use BIRNBACH Parts.

### VISIT BOOTH 217 AT THE SHOW

where all our line is on display. If you can't make it, get our Big, Revised Catalog direct from us. Address Dept. AW-6.

**BIRNBACH RADIO CO.**  
145 HUDSON ST. BIRCO, NEW YORK, N. Y.

**BUILDING A PORTABLE?**

**HAMMARLUND "SWK" coil kit** (15-270 meters), MC-140-M midget condenser, and type "S" Isolantite sockets form the basis of a good portable receiver. Built right with quality parts, a portable can provide no end of enjoyment. Don't start off handicapped—build with Hammarlund parts. Send for catalog!

HAMMARLUND MFG. CO., Inc. AWR-6  
424-438 W. 33 St., N. Y. City  
( ) Please send me new "38" catalog.

Name .....  
Address .....  
City ..... State .....

Canadian Office: 41 West Av., No. Hamilton, Ont.

**HAMMARLUND**



**HOT** from the judges Sanctum Sanctorum comes the news that Robert Rossi of 733 Watkins Street, Philadelphia, Pa., has just won the short wave distance contest run by the International 6,000 to 12,500 Mile Broadcast-Short Wave Amateur Club, with 225 verifications of reception of short wave stations, every one over 5,000 miles away. Congratulations, Mr. Rossi!

You can't do better than to choose the "world's champion" receiver Robert Rossi uses—you can't lose if you follow the choice of this International D-X Champion, and, yourself, pick a custom built McMurdo Silver "15-17."

Write for complete details of this, the "world's champion" all-wave receiver—or, hear it at your nearest progressive music merchant.

## McMURDO SILVER

McMURDO SILVER CORP.

2900-B S. Michigan Blvd., Chicago, Ill., U. S. A.



## Radio Amateurs

buy a fresh copy today of the

### RADIO AMATEUR CALL BOOK

The CALLBOOK is the only publication that lists all licensed radio amateurs in the United States and over a hundred and seventy-five different foreign countries.

Each issue also contains a world map showing amateur prefixes, press time and weather schedules, amateur prefixes listed alphabetically and by countries and a world time conversion chart.

Complete . . . Accurate . . . Up-to-Date

Issued Quarterly

MARCH . . . JUNE . . . SEPTEMBER  
and DECEMBER

Annual subscription \$4.00  
Single copies \$1.25

Buy your copy now from your radio jobber  
or direct from:

Radio Amateur Call Book, Inc.  
608 S. Dearborn St., Chicago, Ill., U. S. A.

# W8QBW

FRED SUTTER, (M.I.T. '93)  
1000 KENSINGTON ROAD  
Grosse Pointe Park  
Michigan

---

---

**STAR ISLAND**  
Michigan  
9 miles south of Algonac  
ALL MAIL TO W8QBW

W8QDK

Fig. 3. Good balance—plenty of white space—and different.

prizes will be awarded. There will be entertainment and dancing until the wee sma' hours of Sunday morning. Tickets—but \$3.00 for everything. Tickets may be obtained from your radio dealer or from any local club member. Don't miss this bang-up affair.

AS A LAST-MINUTE flash—just in time to make this issue—comes the following report from H. H. (Robbie) Robinson, W4EDD on some excellent work accomplished on 5 meters. His letter reads as follows:

Sunday, May 15, we ran a pre-determined test on 56 megacycles in co-operation with W2AMJ and W2JCY. At exactly one o'clock, Eastern Standard Time, I called CQ test and keyed each transmission on a frequency of 56,080. At 1:15, Eastern Standard Time, I listened in and found the band to be wide open and a very large number of stations from the first, second, third and eighth districts calling me. I came back

on the air at 1:30 and transmitted further CQ tests and gave the reports of the stations heard until 1:45. At 1:45 I again listened for 15 minutes until 2:00. At 2:00 I came on and gave further reports of additional stations heard.

The following is a list of stations worked on QSO after the test period from 2:00 until 4:05:

W1EYM—R-7	W2JCY—R-8-9
W2CUZ—R-9	W2BHD—R-8
W2HWX—R-9	W8NED—R-6
W8CIR—R-8	W8YUT—R-6

The following is a list of calls heard during the listening period and their strength:

W1XP—R-6	W2AMJ—R-8-9
W2GZC—R-7	W2ISY—R-8
W3CMA—R-7	W3HKN—R-6
W3GMZ—R-6	W3GGC—R-6
W3FOM—R-6	W3GOK—R-7
W3EZM—R-7	

We heard a far greater number calling

W2KUG

RADIO.....

WKD HR.....193...

..... EST

UR SIGS RST.....

XMTR.....

RCVR.....

W210F

JENNIE PAULINE LATHROP 114 UNION ST., SCHENECTADY, N.Y.

# W2KUG

Fig. 4. Tough on the OM. Let this be a warning!

us but the QRM was terrific. Apparently everyone who was on 5 meters in the first, second, third and eighth districts was calling us most of the time.

The power input here was 150 watts. The antenna was a duplicate of the 10-meter antenna that you ran on the front cover of ALL-WAVE RADIO some months ago. This was fed with a 3/8 copper concentric line. The receiver was one of Wholesale's Acorn superhets with only the input coil changed.

Will keep you advised on further results obtained on 56 megacycles. This was the first test attempted and the one I believe I talked to you about early in the winter.

## R.S.S.L. NEWS

(Continued from page 313)

dition will gather meteorological data in cooperation with other weather bureau stations of the Norwegian government so that storms heading towards Norway and England from the Polar Regions may be noted and weather forecasts made for several days ahead. Scientific data will also be gathered on the aurora borealis and on the intensity and direction of cosmic rays.

This station will be completely out of touch with civilization as another steamer will not return for a full year and radio will supply the only connecting link. Mr. Tillier's wife will be at Madison, Wisconsin, and he is extremely anxious to arrange daily contact with her via amateur radio on and after July or August 1938. Any R.S.S.L. members who know radio amateurs at Madison would confer a favor on Mr. Tillier by arranging for such a two-way contact.

The call letters of this interesting short-wave weather bureau station have not yet been assigned but schedule will be at 1:00, 7:00, 13:00 and 19:00 G.M.T. to Bergen (LGN), Norway or other Norwegian weather bureau stations. R.S.S.L. members are first to hear of this expedition and will pick up some very interesting conversation by tuning in during the middle of July or the first of August and getting these transmissions. Complete information on frequencies and calls used will be published in ALL-WAVE RADIO as soon as determined.

### Who's Who

Many times as I have scanned the incoming application blanks, I have wished that it were possible for all the members to sit beside me and meet these newcomers, that we might have a big gathering with all our members in one grand mass meeting. What a huge crowd it would be, large enough to fill the biggest auditorium in the city. What would it look like? Well, there would be young and old, the oldest member being 76, with some younger ones around the 40 and 50 mark and, as shown by an average I have just made, the vast bulk of the members would be serious young

men from 20 to 30 years with here and there a younger brother of 15 or 16 years of age.

There would be few of the gentler sex. A check of our membership last week showed only 10 on our entire membership roster, some of them married, with their husbands also members. And so far, only a few scattering monitoring reports have come in from the y'l's. Are we to believe they are less interested in the serious side of radio?

The occupation of R.S.S.L. members seems to defy analysis. There are many college, university and high-school students. But the bulk of the membership seems to be working at every conceivable occupation. Just as a rough outline of occupations, the following were noted on thumbing through a few score of blanks: doctor, army officer, banker, executive, author, plumber, radio serviceman, policeman, owner of radio broadcast station, commercial radio operator, clerk, salesman, electrical engineer, dentist, minister, farmer, fire department lieutenant, sailor, architect, miner, teacher, lawyer, printer, cashier, textile worker, research director, chauffeur, accountant, insurance salesman, gardener, photographer, florist, manager of a fleet of taxicabs, shoemaker, advertising manager, broker, machinist, movie operator, employment manager, baker, lifeguard in Hawaii, letter carrier, mason, statistician, optometrist and others.

### "RSSLville"

If they could all be gathered together in one big city, what a radio paradise it would be! We might call it "RSSLville" and would have sufficient trades and professions represented to carry on all the business from putting up buildings to operating our own police force, army, navy and air force, schools, hospitals, etc. And strange to say, there would be few, if any, politicians on the list! We can well believe that such an imaginary city would pass laws permitting no local interference and that radio reception conditions would be ideal.

As to receivers, there would hardly be a single make not represented. Our latest check of the application records shows more than 76 different makes of receivers. In addition, there would be a wide variety of home-made jobs from superhets down to simple two- and three-tube regeneratives. The skyline of "RSSLville" would be covered with a network of every imaginable type of aerial. Every member has, on the average, three aerials; some more, ranging from beam types to fishing rod aerials and a wide variety of more conventional styles.

### Nationalities Represented

The nationalities would be predominantly American, ranging from tall, lanky New Englanders to western ranchers and southern friends with a drawl that might be hard for the 200 members from Great Britain to understand. On the west coast, there would be some Japanese. From the North would be coming many Canadian members from as far west as British Columbia as well as from our own Alaska. Only a single member would be on hand from Germany and none from France,

while from Iceland, India, Sweden and Switzerland, we would have a small group. Australia and New Zealand would have many representatives and a few members in Hawaii would probably come, bringing their surf boards, perhaps to swim in the surf at Atlantic City with our Acers Chapter and the y'l's belonging to it. But space and distance prevent and across the thousands of miles separating members only radio and the mailman can carry the friendly good wishes that unite this vast group of DX enthusiasts.

A few pictures of members appear in this issue of AWR and headquarters would be very glad to have more for use in future issues. Photographs should be sharp and clear and preferably show the operator sitting at his desk his radio equipment behind him.

Though time may not always permit a personal reply and acknowledgment of survey reports, or letters, the Director and Headquarters Staff read every letter with interest and carefully consider suggestions for improving the League and its service. The one thing that would prove of the greatest help is if every member sent in at least one survey report on the survey listed in AWR monthly. The increasingly

### HAVE YOU SEEN THE NEW TEMCO 50

Write for new free 16-page catalog. It's the sensation of the season! Everything that your heart desires at a price you can afford to pay. Available for C.W. only or for C.W. and Phone.

If your Dealer hasn't one in stock write for details to

Transmitter Equipment Mfg. Co.  
130 Cedar St., New York, N. Y.



### FREE RADIO AND PARTS CATALOG



ALLIED'S new Spring Catalog is packed with news for every Ham! 164 pages, all latest Amateur Gear—all loading lines, transmitters, receivers, transceivers, over 12,000 parts, new Kits of all types, 52 new Knight sets. Test Equipment: P. A. Write today! ALLIED RADIO CORP.  
Dept. 4-F-8, 833 W. Jackson Blvd., Chicago

### 100 WORDS PER MINUTE On The American Code Reader

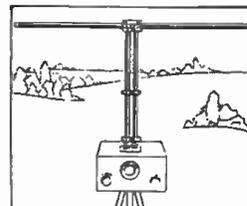
You can easily copy any speed from 2 to 100 W.P.M. on the American Code Reader, the only machine of its kind. Teaches you code the new, easy way. You see and hear what you send. List price \$20.

### AMERICAN COMMUNICATIONS CORPORATION

1650 Broadway

New York City

### FOR 5 METERS



The Johnson "Q" is the most efficient antenna available. Exceptionally compact and self-supporting when used with special mounting accessories, it is ideal for either portable or fixed operation. May be mounted directly on the transmitter case or remotely located and fed with an open wire line. See Your Jobber, or Write for Bulletin 100L describing the "Q" antenna for all amateur bands and our general catalog 964L.

**E. F. JOHNSON COMPANY**  
WASECA, MINNESOTA, U.S.A.



**FITTED**  
to your needs  
..to your purse

● These popular rectangular steel-can transmitting condensers are now provided with adjustable mounting ring. Mount upright or inverted, high or low. Genuine oil-impregnated oil-filled construction. High-tension pillar terminals. Conservatively rated. Heavy duty service. Note amateur net cost:

HYVOL 609 Series Oil-impregnated Oil-Filled Condensers			
Cap.	600 v.	1000 v.	1500 v.
1 mfd.	\$1.62	\$1.76	\$2.06
2	2.06	2.35	2.94
4	2.65	2.94	4.12
Cap.	2000 v.	2500 v.	3000 v.
1 mfd.	\$2.65	\$4.70	\$7.06
2	3.23	7.64	8.82
4	5.29	...	...

And here's more news! For normal-duty service, you can now have HYVOL oil-impregnated wax-filled condensers at a marked saving over the oil-filled units. Otherwise, specifications are identical. Note amateur net cost:

HYVOL 1011 Series Oil-impregnated Wax-Filled Condensers				
Cap.	1000 v.	1500 v.	2000 v.	3000 v.
1 mfd.	\$1.10	\$1.45	\$1.75	\$2.50
2	1.50	2.00	2.45	4.95
4	2.00	3.25	4.65	...

**Ask** your jobber to show you these new HYVOL transmitting condensers. Compare quality, reputation, cost. And note that HYVOL condensers are now used in all leading ham kit transmitters.



large group of Class "A" stations shows a growing realization of the importance of such reports.

#### Class "A"

This month, the following have qualified as Class "A" Monitoring Stations of the R.S.S.L.:

Harry F. Deibert, W5H12, Walnutport, Pa.  
Roy E. DeMent, W19P2, Plainview, Texas  
J. D. Gallivan, K5Z1, Balboa, Canal Zone  
Harry E. Kentzel, W4F5, Averill Park, N. Y.  
Bill King, W30D3, Silverton, Oregon  
L. E. McNamara, W29M37, Los Angeles, Calif.  
H. L. Ray, VE24A7, Alberta, Canada  
J. W. Sherman, W7T5, Tampa, Florida  
Edward Walpole, W31J14, Alameda, Calif.

#### DX Citations

The R. S. S. L. DX Citations are being issued as fast as possible to all who fulfill the requirements. J. Humm, G155, of Walthamstow, England, writes, "Just a line to acknowledge with thanks receipt of DX Citation and return of veri cards. The certificate is quite a neat job and looks quite good when framed." While W. Hotnsby, G104, of Middlesex, England, says, "Many thanks for DX Citation, Shortwave Broadcast Band, which I received here in very good condition and must congratulate you for issuing such a fine certificate. It really is very nice and I have already framed it and it is now occupying a prominent place in my radio corner. I need one more VK for my Second-Degree Citation." Since our last issue, the following have been awarded citations:

First degree short-wave-broadcast band to Don Smith, W3E7, Salem, Oregon; 2nd degree s.w. broadcast band to Lee Meade Williams, W5J28, Baltimore, Md.; 2nd degree amateur phone bands to Thomas H. McCormack, W11J8, Culver, Ind.; 2nd degree s.w. broadcast bands to Frank W. Stockbridge, W3F91, Westboro, Mass.; 3rd degree s.w. broadcast band to Norman Ebling, Portland, Ore.; 1st degree s.w.b.c. band to David Bloch, Jamaica, L. I., N. Y.; 3rd degree s.w.b.c. band to G. Holmes Wilson, W3G27 of Providence, R. I.; 11th degree s.w.b.c. band to Henry V. Miner, Wollaston, Mass.; 1st degree s.w.b.c. band to Richard Prasher, W12F2, Appleton, Wis.; 2nd degree s.w.b.c. band to Mr. & Mrs. Ralph E. Weikal, W17L1, Pratt, Kan.; 1st degree, s.w.b.c. band to George A. Traver, W2-4A175, Metuchen, N. J.; 3rd degree s.w.b.c. band to Robert F. Rowser, W31J5, Mare Island, Calif. Mr. Miner with an 11th degree citation leads all others. These handsome certificates are still available and headquarters will gladly send details on request to anyone enclosing a stamp for reply.

#### Call Letters

From time to time, members request the location of local stations on short-wave bands whose calls consist of two or three letters or numerals that do not seem to be either amateur or foreign short-wave calls. These are usually military, airplane or government stations. Formerly all radio work in the army was operated by the Signal Corps but of recent years, communication of the smaller units such as regiments, brigades, etc., is operated by the personnel of the unit concerned—infantry, artillery or cavalry as the case may be. As all units from the battalion up have one

or more radio sets, ranging from the small five-meter portables to more powerful installations contained in tanks and airplanes, short-wave listeners often pick up these signals and wonder where they are located.

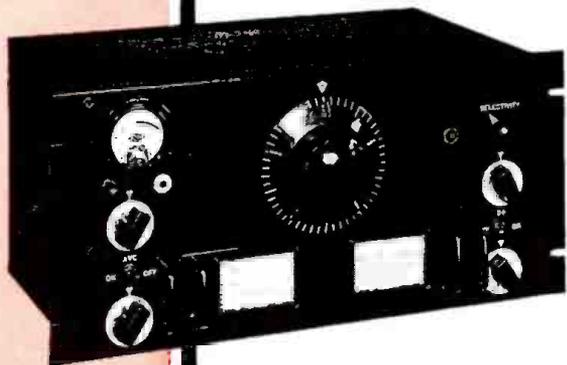
In an attempt to get a definite list of such stations, R.S.S.L. headquarters wrote to the Chief Signal Officer of the Army at Washington. We were advised—"In answer to your letter, reference call signs of army radio stations, the Chief Signal Officer directs me to inform you that the information you request is not available for publication." As these stations are on the air at irregular intervals, it seems useless to attempt to compile any list of them, especially as they often change call letters and the character of the station can usually be determined by the messages handled.

#### Short-Wave Forest Fire Stations

Recently the Director visited a number of the fire towers in New Jersey where short-wave phone transmitters are used for communications, replacing to a large extent the previous use of regular telephones. They use only two letters as a call symbol, such as AB, VY, etc., but usually add the name or location of their fire tower to indicate its character. As the messages relate exclusively to location of forest fires, reporting smoke, etc., it is easy to identify these stations as State operated.

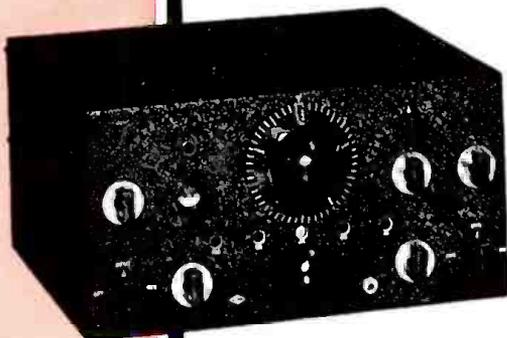
## INDEX TO ADVERTISERS

Aerovox Corp. ....	338
Allied Radio Corporation .....	337
American Communications Corp. ..	337
Amperex Electronic Products, Inc. .	331
Barker & Williamson .....	334
Birnback Radio Company, Inc. ....	335
Bliley Electric Company .....	333
Bud Radio Company .....	333
Cardwell Mfg. Corp., Allen D. ....	328
Cornell-Dubilier Electric Corp. ....	329
Hallicrafters, Incorporated ...Back Cover	
Hammarlund Manufacturing Co. ..	335
Johnson Company, E. F. ....	337
Kenyon Transformer Company ....	334
Mallory & Co., Inc., P. R. ....	325
Meissner Manufacturing Co. ....	333
National Company, Inc. ....Third Cover	
Pacific Radio School .....	333
Par-Metal Products Corp. ....	330
Presto Recording Corp. ....	332
Radio Amateur Call Book .....	336
Silver, Inc., McMurdo .....	336
Solar Manufacturing Corp. ....	327
Taylor Tubes, Inc. ....	330, 333
Television Corp. of America, Second Cover	
Teleplex Company .....	330
Transmitter Equipment Mfg. Co. ..	337
Utah Radio Products Corp. ....	333
Ward Leonard Electric Co. ....	333
Wholesale Radio Service Co., Inc. .	333



## HRO

Designed with cost secondary to performance, with the one idea of obtaining the maximum of effectiveness in difficult communications work, the HRO Receiver has won a unique reputation for outstanding capability.



## NC-101X

Somewhat lower in price than the HRO, and equipped with the added convenience of knob-controlled coil shifting, receivers of the NC-100 series have a consistently high performance that makes them favorites in amateur stations throughout the world.



## NC-81X

Offering the maximum of performance possible at a low price the NC-80 series are true Communication Receivers, capable, long-lived, and efficient. They provide extremely good performance-per-dollar value.



## ONE-TEN

A special purpose receiver, the 1-10 Receiver covers the range from one to eleven meters, and is intended solely for work at ultra-high frequencies. It fills the need of the experimenter for an adequate receiver to cover this wide and increasingly valuable field.

A FINE RECEIVER FOR EVERY PURPOSE

NATIONAL COMPANY, INC., MALDEN, MASS.

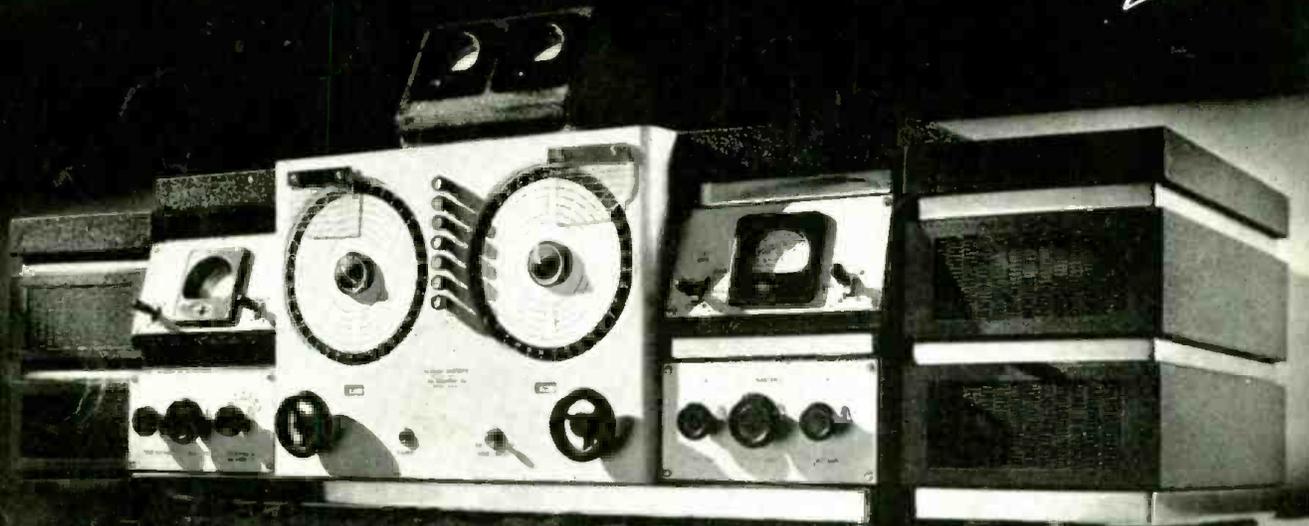


diversity reception for the amateur



# the skyrider Diversity

Model DD-1



## A Dual Diversity Receiving System

Students of modern radio are familiar with diversity reception as used by the larger commercial stations. Receiving Systems based on the diversity principle have been built at great expense. Designed to provide better short wave reception, they have been highly successful in eliminating fading and have effected remarkable improvement in the quality of reception.

In an attempt to bring this same quality of reception in practical form to the amateur operator and short wave listener, Mr. James L. Lamb\*, Mr. J. L. A. McLaughlin\*\* and Mr. Karl W. Miles\*\*, engineers notable for their activity in the amateur radio field, have made an intensive study of Diversity Reception.\*\*\* The SKYRIDER DIVERSITY represents the culmination of several years' work by these engineers. The principal advantages of Diversity Reception, as provided by this Dual Diversity Receiving System, may be summed up as follows: 1. The reduction of fading to negligible proportions. • 2. An Increase of Signal Strength over that of any single receiver. • 3. Improvement of Signal-to-Noise ratio over any single receiver. • 4. Reduction of heterodyne beat note interference.

The principles of functional design have been followed throughout the construction of the SKYRIDER DIVERSITY. Every single component has had especial attention from the designing engineers, and no expense or effort has been spared to bring the SKYRIDER DIVERSITY to a high standard of electrical and mechanical perfection worthy of so advanced a receiving system.

In the SKYRIDER DIVERSITY, the Hallicrafters offer the advantages of Diversity Reception to the amateur and short wave listener for the first time, in easily operable form, and at a price within reach of the average purse. See the New SKYRIDER DIVERSITY at your dealer's today!

\* Technical Editor—QST    \*\* the hallicrafters, inc.    \*\*\* QST—May, 1936, QST—November, December, 1937

All Hallicrafters Receivers available at liberal Time Payments

# the hallicrafters inc.

2605 INDIANA AVE., CHICAGO, U. S. A. • CABLE ADDRESS: "HALLCRAFT," CHICAGO

world's largest builders of amateur communications receivers