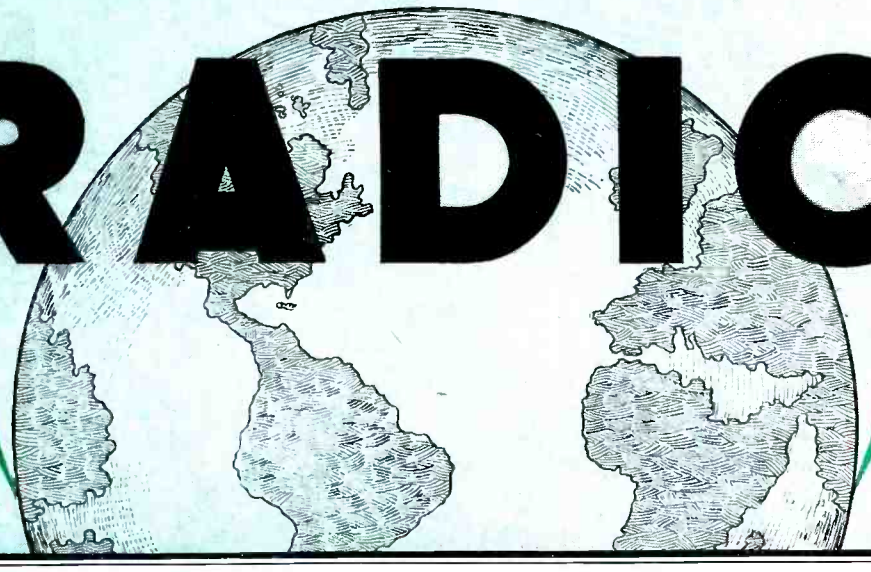
ALL-WAVE RADIO



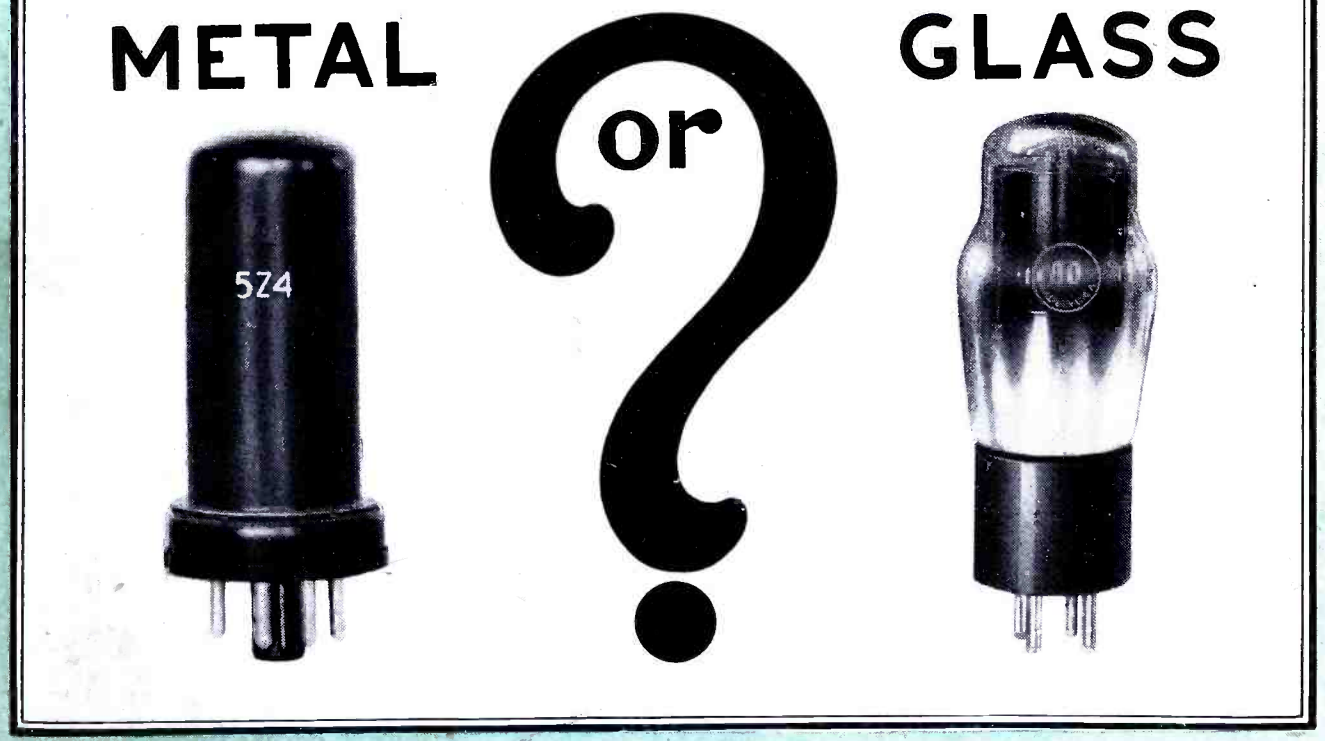
NOVEMBER
1935

Vol. 1

No. 2

15 CENTS U.S.A.

20 cents in Canada



REVIEW OF 1936 ALL-WAVE RECEIVERS

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Engineers Discuss Broadcasting
The Silver Masterpiece IV

BOUCK - BEAT NOTE - LESTER - GRANGER - SILVER - TUMMONDS - HINDS

ULTRA SHORT AND SHORT WAVE • BROADCAST AND LONG WAVE

From the Publisher to you

PUBLISHED BY
MANSON PUBLICATIONS CORP.

TELEPHONE
STUYVESANT 9-0256

ALL WAVE RADIO
200 FIFTH AVENUE
NEW YORK CITY

NEW YORK
Oct 22
1935

Dear Reader:

Thank you for your wonderful response to our first issue of ALL WAVE RADIO. In hundreds of letters you have told us in glowing terms that our venture is already assured of success.

I want to let you know that our organization does not intend to rest on its laurels, but is already actively engaged in securing and preparing for you editorial material that in every sense of the word will be acknowledged the "tops".

Our aim is to make ALL WAVE RADIO the best magazine in the field. Letters of praise are greatly appreciated but it is your suggestions and criticism that will materially assist us in reaching this goal. So let's have them.

In spite of the fact that our circulation department made every effort to guarantee a complete distribution there was, on our last issue, a decided shortage throughout the United States. To avoid the risk of missing a single issue of this magazine, let me suggest that you mail us your subscription promptly. Of course, this is a saving to you, as the price is $1.50 per year.

Again my thanks to you for your overwhelming reception of ALL WAVE RADIO.

Cordially,

Clarence Emerson

CWE:S

Clarence Emerson
Publisher

A NATIONAL MONTHLY MAGAZINE
ULTRA SHORT AND SHORT WAVE • BROADCAST AND LONG WAVE

I will send you a Lesson Free

to show how easy it is to learn at home in spare time to fill a Good Radio Job

J. E. SMITH, President, National Radio Institute, Washington, D. C.—the man who has directed the training of more men for the Radio industry than any other man in America.

SET SERVICING has paid many N.R.I. men $5, $10, $15 a week extra for their spare time. Full time men make as much as $30, $50, $75 a week.

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Clip and mail the coupon, I'll send you a FREE lesson. I'll show you that Radio is fascinating; that I give you practical money-making information, easy to learn, easy to put into use. See for yourself why many men with less than a grammar school education and no Radio experience are now making good money as Radio Experts. Get the facts about Radio's spare time and full time job opportunities. Mail the coupon now.

Many Radio Experts make $30, $50, $75 a week. Get ready for Jobs like these

Broadcasting stations employ engineers, operators, managers, and men for other jobs that pay up to $5,000 a year. Radio factories employ testers, inspectors, foremen, engineers, servicemen, salesmen, buyers, and pay up to $6,000 a year. Radio dealers and jobbers employ servicemen, salesmen, buyers, managers, and pay up to $75 a week. There are many opportunities to have a spare time or full time Radio service business of your own. Radio is picking up. It's a big business—big enough to absorb many more well trained men—and it's growing bigger all the time. Get ready for Radio. Be a Radio Expert. I'll train you at home in spare time.

Many make $5, $10, $15 a week Extra in Spare Time almost at once

Nearly every neighborhood needs a good spare time serviceman. Find out how I help you cash in—how I start sending you Extra Money Job Sheets the day you enroll, for doing Radio repair jobs common in most every neighborhood. How, when you get underway, I send you much more information for servicing sets and for doing other spare time jobs for extra money. My Training is famous as "The Course that Pays for Itself." Many make $200 to $1,000 while learning.

Short Wave, Loud Speaker Systems Television, Auto Radio, etc., included

New Radio developments are continually making new opportunities. Loud speaker systems, police, auto and aviation Radio, are recent new uses that have been found for it. Television promises many good jobs soon. Television is leaving the laboratory in an impressive way. One million dollars is being spent on two stations. Television receiving sets are being designed and built. New opportunities—many of them—are right ahead. Get full information about how I train you at home in spare time to be a Radio Expert. My 50-50 method of training—half with printed and well illustrated lessons, half with Radio equipment I furnish as part of my training—gives you broad practical experience—makes learning at home interesting, fascinating, practical.

You must be Satisfied

I make an agreement with you in writing—if you are not entirely satisfied when you finish my Course, with the lesson and instruction service I have given you, every penny you have paid me for tuition will be refunded.

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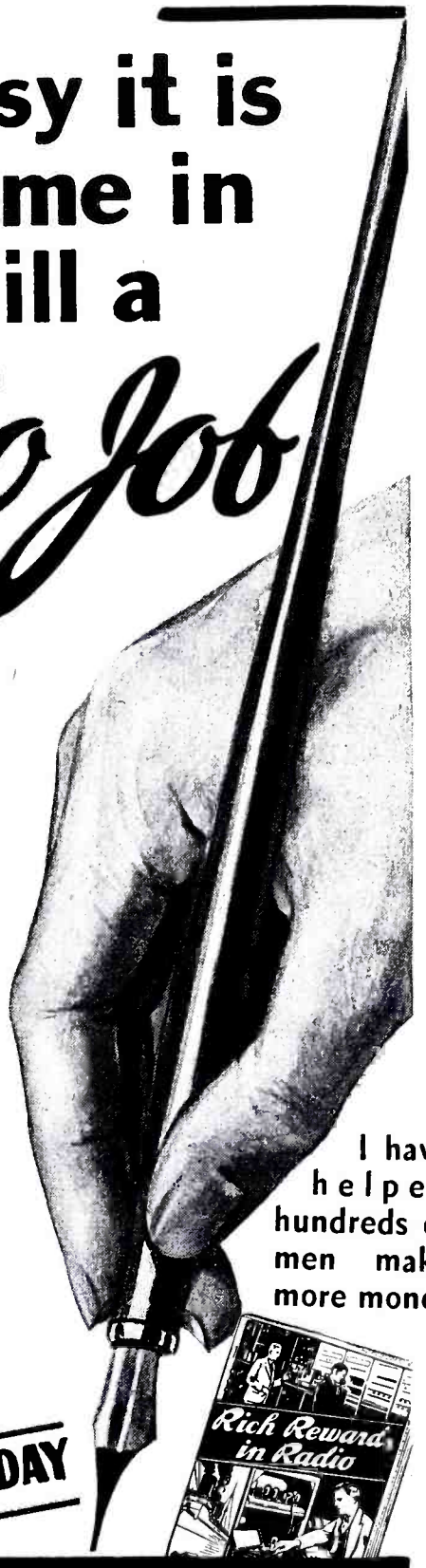
Mail coupon now. I'll send my book "Rich Rewards in Radio" and a FREE lesson at once. Find out about Radio's spare time and full time opportunities; read what others who have taken my Course are doing and making. Read the sample lesson, decide for yourself whether my training is clear, interesting, practical. This offer is open to any ambitious fellow over 16 years old. There is no obligation. Act at once. Mail coupon in an envelope or paste on a 1c postcard.

J. E. SMITH, President
National Radio Institute, Dept. 5MS1
Washington, D. C.



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Washington, D. C.

I want to take advantage of your offer. Without obligating me, send me your Free Sample Lesson and your book, "Rich Rewards in Radio." (*Please print plainly.*)

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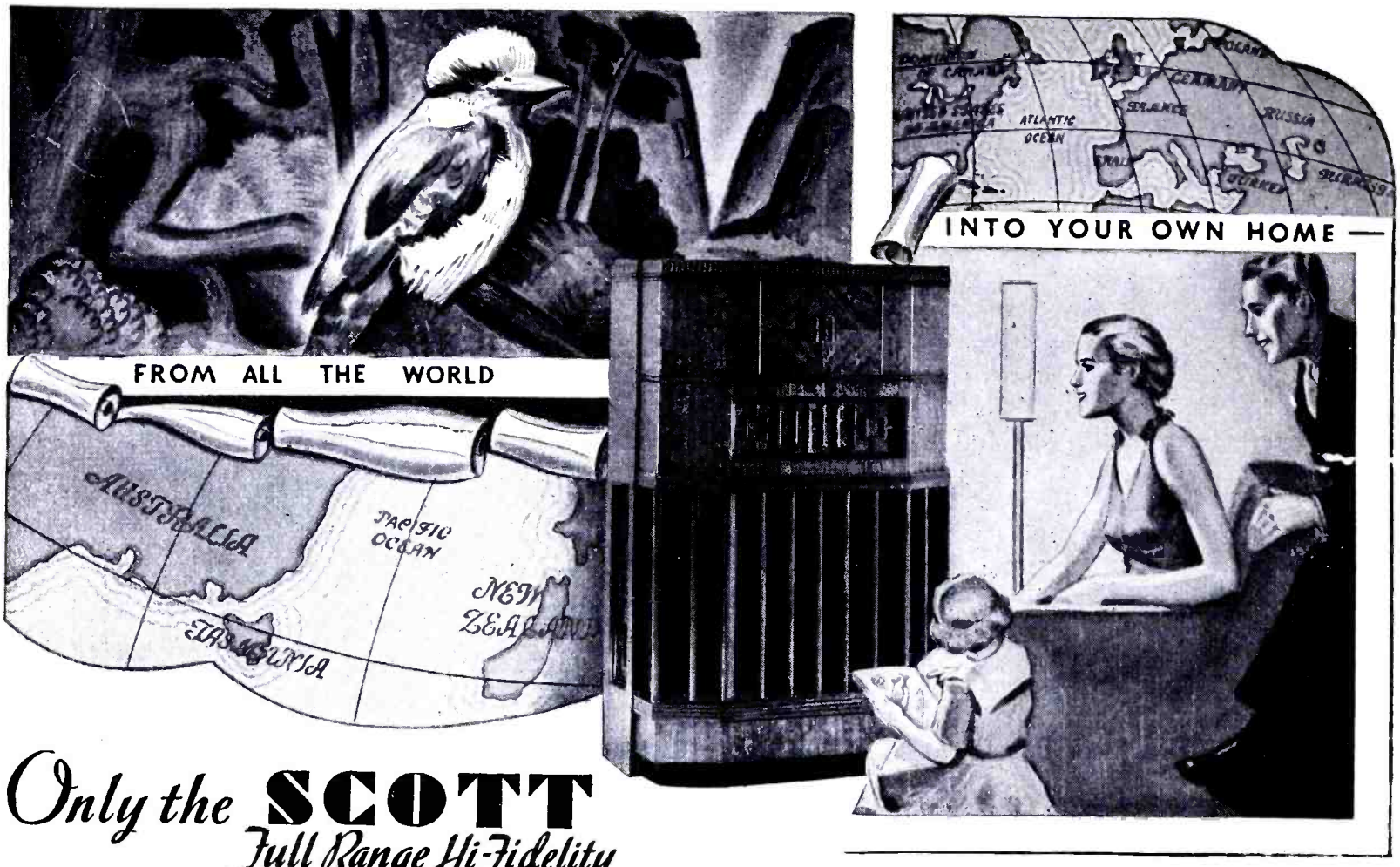
The Tested Way to BETTER PAY



Only the SCOTT
Full Range Hi-Fidelity ALL-WAVE
BRINGS YOU THE FULL BEAUTY OF THE AUSTRALIAN KOOKABURRA'S STARTLING LAUGH

Across the nightfall sky a rush of wings—a sudden laugh, high-pitched, weird, thrilling—laugh of the powerful-throated Kookaburra! Challenging voice of Australia's national bird—regularly from VK2ME Sydney!

In the same breath-taking instant—10,000 miles through the night—you hear this exciting cry with all its inspiring realism—as *only* the magnificent new SCOTT brings it to you!

Australia to Argentina—England to Ecuador—Portugal to Panama—France—Germany—Italy—from *more* foreign stations than can be heard on any other radio—the new SCOTT brings you a tremendous pageant of world programs with a *tone truth*, a *volume strength*, a *diamond clarity* not even approached by any other radio on earth!

50% CLEARER FOREIGN RECEPTION

Highest Useable Sensitivity of any radio at any price—a fact we can prove in an actual comparative test! Six times the undistorted loudspeaker range of the average radio.

The *only* receiver that captures all the glorious beauty of high-fidelity programs for you! Other high-fidelity radios miss half the audible tone range. The *only* receiver which directs the straight-travelling high tones to your ear level *no matter where you sit* in the room.

THE RADIO THE CELEBRITIES OWN

Custombuilt. Fully two years ahead of any receiver sold today. Every SCOTT carries an unqualified guarantee to outperform any radio in the world. Thousands of SCOTTS back this distinguished guarantee with world-record-breaking success—finest testimony to superiority that any manufacturer can offer! This is the internationally famous receiver owned by Toscanini, Guy Lombardo, Al Jolson, Eddie Cantor, Rudy Vallee, Walter Winchell, and hundreds of other celebrities.

FIVE YEAR GUARANTEE

Hear the new SCOTT! You will never be satisfied to own any other radio. Sold direct from the laboratories on 30 day home trial anywhere in U.S.A.—for no more than you would pay for an ordinary radio.

Decide right now, without delay, to send coupon! Send it TODAY—we will gladly mail you "94 PROOFS" of SCOTT superiority, and the most thrilling story of unequalled distance performance that has ever been recorded.

ENJOY WORLD RECEPTION  **WITH THE RADIO THAT HOLDS THE MOST VERIFIED DISTANCE RECORDS**

BULLET-DIRECT SELECTIVITY—piercing the most powerful adjacent wave length stations, bringing you world programs you have never heard before. Continuously variable, 2 to 16 K.C.

HIGHER USEABLE SENSITIVITY—less outside noise than any receiver.

SIX TIMES AVERAGE POWER—for VASTER distances. 35 watts strictly Class "A." (Be sure to check this when considering your new radio. Only *high* Class "A" power brings undistorted programs.)

PERFECTED AUTOMATIC VOLUME CONTROL—keeps world programs at even volume.

SHORT WAVE STATION LOCATOR—tells you instantly when you tune in distant station.

DIFFUSION PANELS—directs all musical frequencies equally throughout the room.

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FULL RANGE HI-FIDELITY—twice the tonal range of any high-fidelity receiver. 25 to 16,000 cycles.

MORE NEW FEATURES OF IMPORTANCE than any receiver, including True Bass Control, Micromatic Dial Calibration, All Tuning Bands, Shadow Tuning, New Highest Efficiency Tubes.

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Send me complete details on new SCOTT Full Range Hi-Fidelity Allwave, "94 PROOFS" of its superior tone, DX performance, and particulars of the 30 day home trial anywhere in U.S.A.

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ALL-WAVE RADIO

VOL. 1 NO. 2

CONTENTS FOR NOVEMBER, 1935

W2IQU

Cover Illustration

The Big Question—Which Is It To Be? See Page 61

(Photos courtesy Hygrade-Sylvania Corp.)

Features

Departments

Published Monthly by the

MANSON PUBLICATION CORP.

200 FIFTH AVENUE
NEW YORK, N. Y.

CLARENCE W. EMERSON
President

EDWIN W. LEDERMAN
Treasurer

Yearly subscription rate: $1.50 in the United States; $2.00 in Canada; $4.00 in foreign countries.

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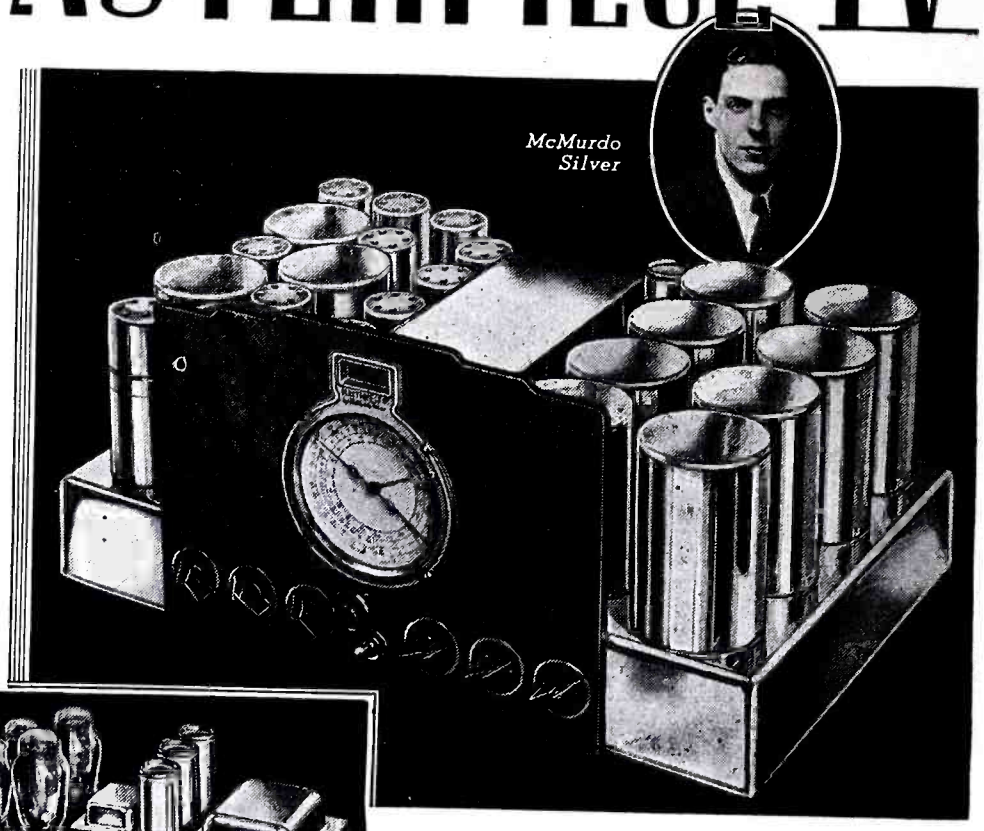
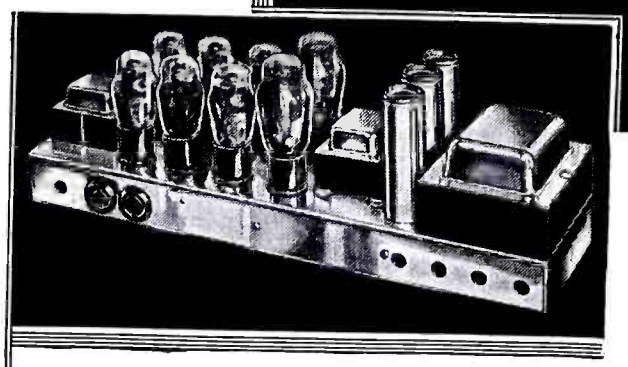
WORLD-WIDE
RECEIVER





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- Unequalled freedom from noise.
- Selectivity, extreme and variable.
- Unmatched Tone Quality.
- Double High Fidelity.
- 35 Watt Undistorted Output.
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- Air Dielectric Trimmer Condensers Throughout.
- No-loss R.F. Inductances.
- All R.F. and I.F. circuits Air Tuned.
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- Calibrated Sensitivity Control.
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- Completely Shielded.
- Public Address and Phonograph Operation.
- No Microphonic Howling.
- Two Matched Speakers.
- Every Part Individually Tested.
- Complete Professional Flexibility.
- One Year Free Service.

AND IN ADDITION . . .
MASTERPIECE IV brings you those important basic features which won for its three predecessors the acclaim of critical users the world over.

FOR outstanding performance under any and all conditions, the record of the new MASTERPIECE IV has provided the radio sensation of the year. If you haven't tried it, you are missing the greatest thrill you have ever experienced in perfected all-wave reception.

Whether you want to bring in weak short wave stations half way 'round the world, that other receivers will not touch . . .

Whether you really want long-distance broadcast reception, free from set noise, fading, interference . . . great power without distortion . . .

Whether you want tone quality such as you have never heard before . . . lifelike fidelity that makes you feel the actual, living presence of programs right in you own home . . .

Whatever you may ask of any radio receiver, the MASTERPIECE IV can give you faithfully, consistently, day in and day out.

But confident as we are that this champion receiver will be a revelation to you, we do not ask you to take our word for it.

. . . *the finest Radio of all time!*

We do not even ask you to take the word of discriminating users — engineers, musicians, champion DX tuners, broadcast station executives, radio editors, governments, experienced listeners — who make up the ever-increasing army of enthusiastic MASTERPIECE owners.

What we suggest is that you let MASTERPIECE IV itself prove its superiority in comparison with any all-wave receiver, at any price, with you as the sole judge.

Try it for 10 days in your own home or laboratory, under your own reception conditions. If it fails to meet every test, return it undamaged and your money will be promptly and cheerfully refunded, less only transportation charges.

Mail the coupon Today for a Free copy of the 32-page "Blue Book of Radio," giving complete analytical description and full details of our 10-DAY TRIAL Offer and 5-YEAR GUARANTEE.

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Send Free "Blue Book" giving complete specifications of Silver MASTERPIECE IV, with details of 10-DAY TRIAL Offer.

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10-A

McMURDO SILVER CORP.

Division of G. P. H. Inc.

3370 N. Paulina Street — Chicago, U. S. A.

THE INSTITUTION OF a new publication and the shaping of its policies is much like the art of sculpture—the image is made in the rough, is added to bit by bit, is altered here and there, and finally is a finished work. If the shaper is fortunate, then the result is an achievement in the expression of an ideal.

Like the sculptor, we have caught ourselves repeatedly "standing off" to obtain the perspective of our work . . . have caught ourselves returning to the image to add a bit here or scoop off a bit there, but always with our ears open to the commendations and criticisms from those who stand behind us . . . you, the reader.

And we have learned a great deal in the short time we have been at the task. We have learned, for one thing, that the general policy of the magazine is highly approved; that there are more radio fans than we realized who have felt themselves dealt with unfairly and are seeking only some publication in which they may have implicit faith. In response to this expression, we can only repeat: that so long as this magazine exists, each member of the staff will be mindful of the basic policy.

In the newspaper office, they ask: "Is It News?" We have created a motto similar in character, as a continuous reminder. It is: "Put Yourself In The Reader's Shoes."

❖ ❖ ❖

CRITICISMS HAVE BEEN received, for which we are thankful. The manner in which the station lists were presented was not generally approved. Consequently, they have been completely done over after the manner in which most readers would prefer to have them.

Mr. Martin's article was so well received that we have commenced the preparation of a similar manuscript dealing with the design and circuits of the manufactured receiver. This will appear in the December issue, and we are sure you will find it enlightening.

We have been asked for the low-down on metal tubes. They are discussed by Mr. Granger in this issue. It is a bit too early to put things down in black and white, but what Mr. Granger has to say about the metal tubes may be taken to imply that, so far, we are quite satisfied with them. We will have more to say about them after we know more about their life span.

❖ ❖ ❖

WE HAVE LEARNED that there are innumerable readers of ALL-WAVE RADIO who, if not active in amateur radio, find it of such unending interest that they wish to have some space devoted to it each month.

Judging from letters received, many all-wave listeners use the amateur 'phone bands as their "stamping grounds," and would like to know more of the amateurs themselves and the stations they operate. Other listeners seem anxious to enter the field, but find it exceedingly difficult to follow the more technical articles dealing with amateur operation and the construction of equipment. Many readers active in the amateur field also express the wish that "Ham" radio be given consideration.

So, we are trying it as an experiment. Read the "Ham Radio" articles in this issue and let us know if you like them.

We are toying with the idea of preparing a complete series of articles on the Story of Amateur Radio—how it started, the ideals supporting it, the operating technique, how one goes about getting into the game and, finally, the details of easily-constructed equipment of the latest type.

How many would welcome such a series?

❖ ❖ ❖

THE CONSTRUCTIONAL details on a specific type of broadcast receiver will appear in the December issue. Get ready for a shock, because it is unlike anything you've ever seen before. No trick circuits, but so logical it will hit you right between the eyes.

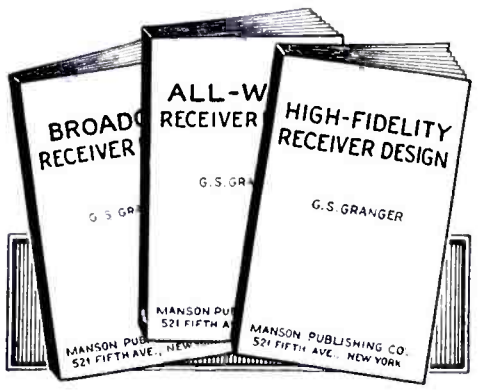
❖ ❖ ❖

WE ARE WORKING on a new system by which we hope to provide comparative data on the characteristics of receivers reviewed in the "Radio Proving Post."

Receivers being what they are, it is too often the case that listening reports alone only confuse the reader. With this system of reporting, a receiver listing at, say $70, may *appear* to be equally as good as a receiver listing at, say, $200.

One of the difficulties lies in the fact that even a single-tube regenerative receiver is capable of receiving signals from Australia. Therefore, reports on stations received mean little, if anything, unless supported by more comprehensive data.

We hope to have the system in operation by next month.



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AUTHORITY AND ENGINEER COMPLETELY COVERS UP-TO-THE-MINUTE RECEIVER DESIGN IN THREE HANDY VOLUMES.

FULLY ILLUSTRATED!

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Name .....

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ALL-WAVE RADIO

FOR NOVEMBER, 1935

BROADCASTING MOVES AHEAD

Are the broadcasting stations up-to-date? Are receivers designed to take advantage of wide-range transmissions? How far advanced are the broadcasters? Read what the chief engineers of CBS and NBC have to say about these questions.

NEW ADVANCES in radio set design, matching the high-fidelity transmission achieved some time ago; the new metal tubes and further refinements in transmitting equipment, will greatly improve the quality of radio entertainment this season in the opinion of radio's leading technical experts.

Progress In Receiver Design

"Broadcasting has passed from the stage of revolutionary development, to one of continuing improvement," says Edwin K. Cohan, Director of Engineering of the Columbia Broadcasting System. "During the development period transmission improved much more rapidly than reception; sets were not designed to reproduce the full range of sound that could be broadcast, and the highest and lowest frequencies were lost. This accounted for a good deal of the criticism of radio by real lovers of fine music. In the last year or two, however, substantial progress has been made in the receiving end of radio engineering. Recently perfected sets give the same quality formerly heard only in the studio control room, where programs are reproduced at their best, exactly as rendered.

Transmission Improvements

"New transmission improvements have been concerned with coordinating the various engineering elements of broadcasting to make the most of existing knowledge and existing equipment. Individual equipment units such as the microphone, transmitter, or tube, used to be considered solely on their own merits, whether they were good or bad in themselves. Now we think of these factors in the terms of all-over results, how the sounds produced in the studio control room can be brought into the home exactly as they are heard in the control room.

"Saying that a chain is no stronger than its weakest link applies very aptly to broadcasting, starting with the performer and ending with the listener. Good radio entertainment is dependent on an infinite number of factors, such as studio acoustics, production technique and the coordination of the many engineering elements of transmitting and receiving equipment. A weakness anywhere along the line means imperfection at the listening end. The perfection of all elements in relation to each other has resulted in greater volume range, perspective, clarity and fidelity. The new sets greatly strengthen the whole technique of broadcasting so that a program can now be heard in the home more nearly like the way it is reproduced in the studio control room."

Better Reception

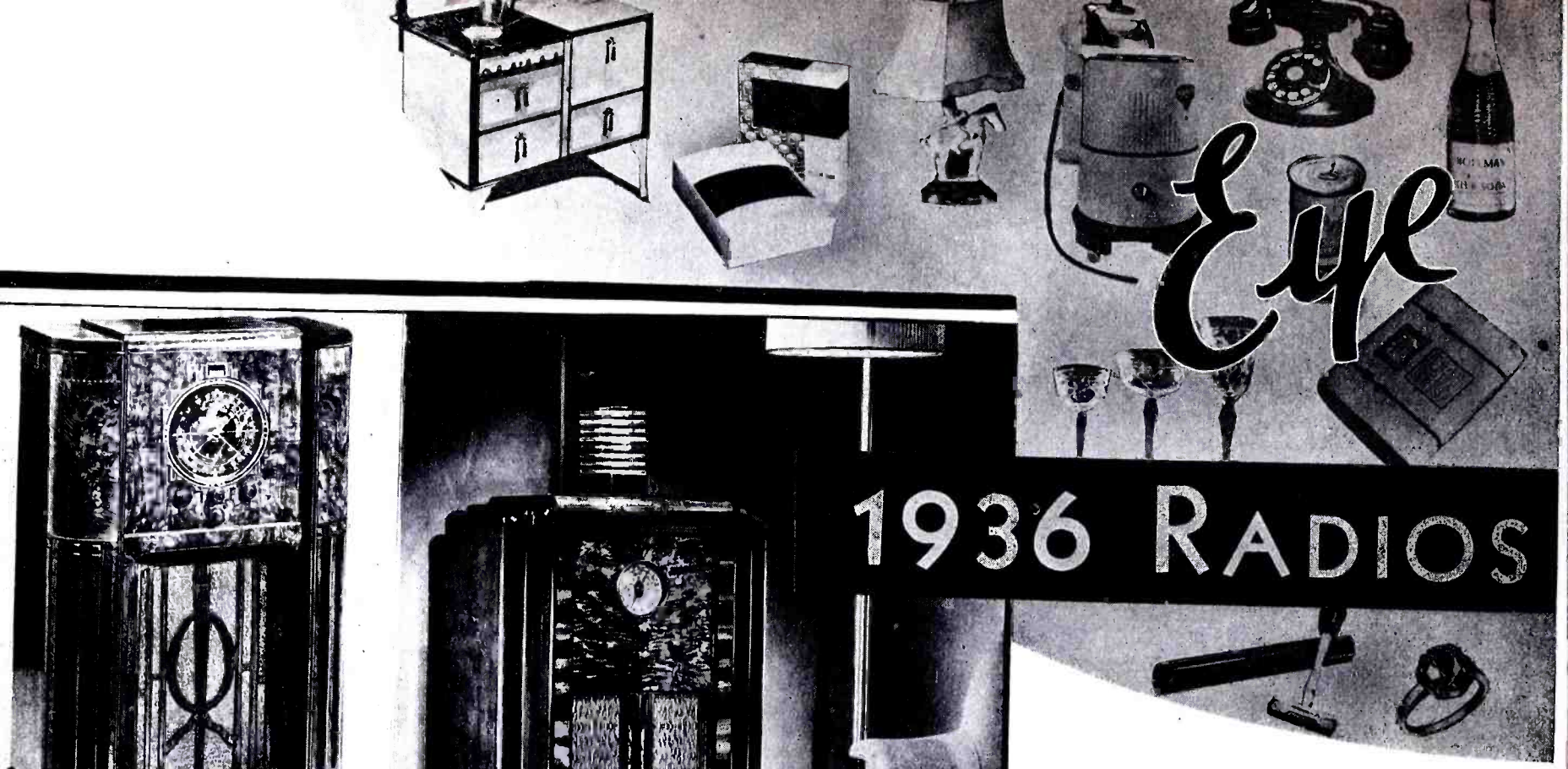
Better reception enables radio's technicians to advance broadcasting quality still further, according to C. W. Horn, Director of Research and Development of the National Broadcasting Company. "The better the receiver," he says, "the more critical it becomes of transmission. Reception improvements enable us to make transmission refinements otherwise impossible. Equipment has been improved all along the line, but the most recent refinements have been largely concerned with better transmitter and antenna design to eliminate operating noise, such as carrier-wave hum, reduce static and other interference, reduce fading, achieve better radiation of the ground waves from the transmitter, and, in general, increase the service area of the transmitter.

"Another notable improvement enables the transmitter to maintain its assigned frequency with only an infinitesimal possibility of variation. This is of special advantage in matched broadcasting, with more than one station on the same wavelength, as it eliminates beat-notes and other noise noticeable when this type of broadcasting was first practiced. Among the many improvements at the listening end has been a better design of antenna, to eliminate interference in reception."

Transmitters Far Advanced

If transmission had not originally been advanced so far beyond reception, the improvements in set design would have forced the broadcasters to make radical changes. When the National Broadcasting Company moved to its new quarters in Radio City, the company installed equipment so advanced that it would be up-to-date for a long time, to forestall any need for sweeping changes in a relatively short time. At the Columbia Broadcasting System's headquarters in New York, engineers have been busily engaged all summer in completely revamping all facilities in accordance with the latest technique of high-fidelity broadcasting. Many individual stations which did not previously modernize their

(Turn to page 93)



1936 RADIOS

By G. S. GRANGER

THE TRENDS IN receiver design for this and the coming year have been established. Though some modifications are bound to take place in a few of the present models, manufacturers from A (Air King) to Z (Zenith) have shot the works. All the nice trade secrets were revealed at the recent National Electrical & Radio Exposition, in New York City.

So, the time to buy is now. Prices are up slightly, but these increases are due principally to the inclusion of metal tubes which are more expensive than their glass sisters. Moreover, there is a brisk demand for the 1936 receivers—so much so, in fact, that prices may go even higher than they are at present. For the first time in years manufacturers are finding it difficult to meet orders. In many cases, production is being retarded because the parts manufacturers cannot turn out receiver components fast enough. We'll be surprised, indeed, if there is any "dumping" of receivers in 1936.

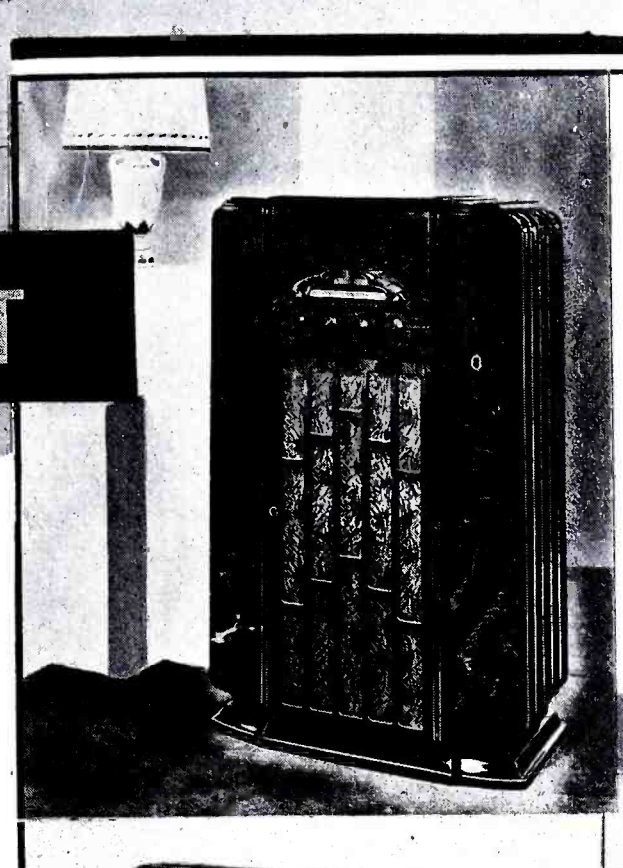
Cabinet Design

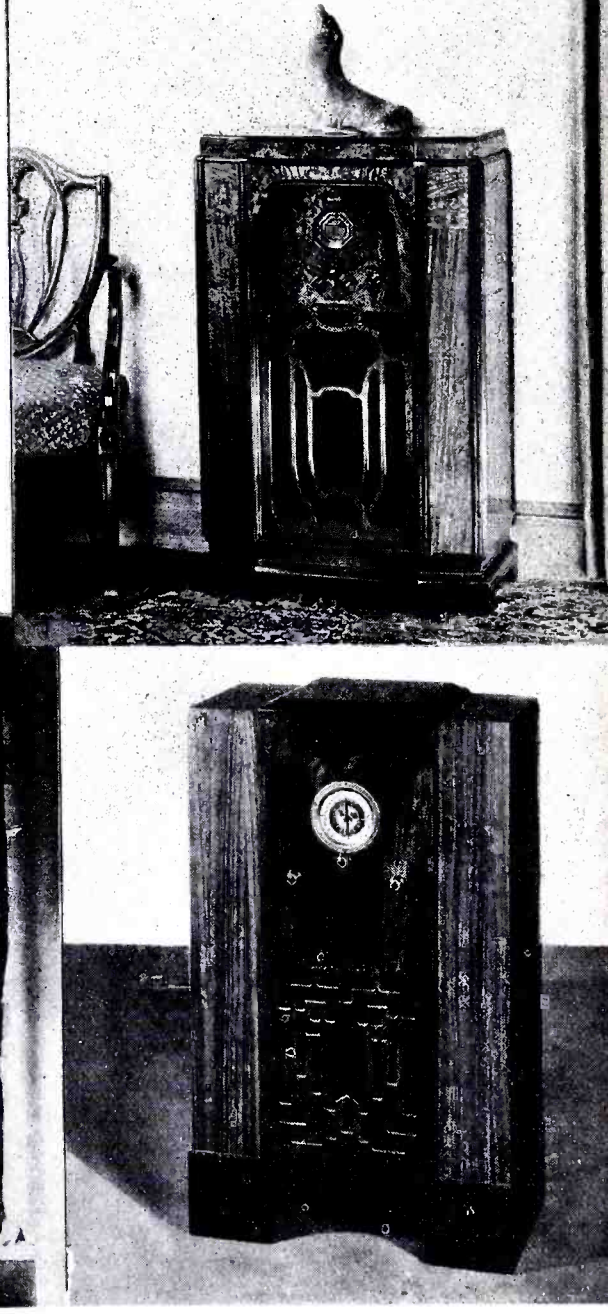
Eye Appeal?—Sure enough. Cast your eyes over the illustrations on this and the accompanying pages. The trend is "semi-modern," and this fits right in with the trend in the furniture field. The whole country has fallen for this design for the reason, we believe, that the semi-modern design expresses utility, and in doing so is necessarily simple and straightforward. Lines are clean, but not harsh, as they were in the earlier "modern" designs. There are no doo-dads and no "gingerbread" glued on to break lines and otherwise make the cabinet look like grandma's curio cabinet.

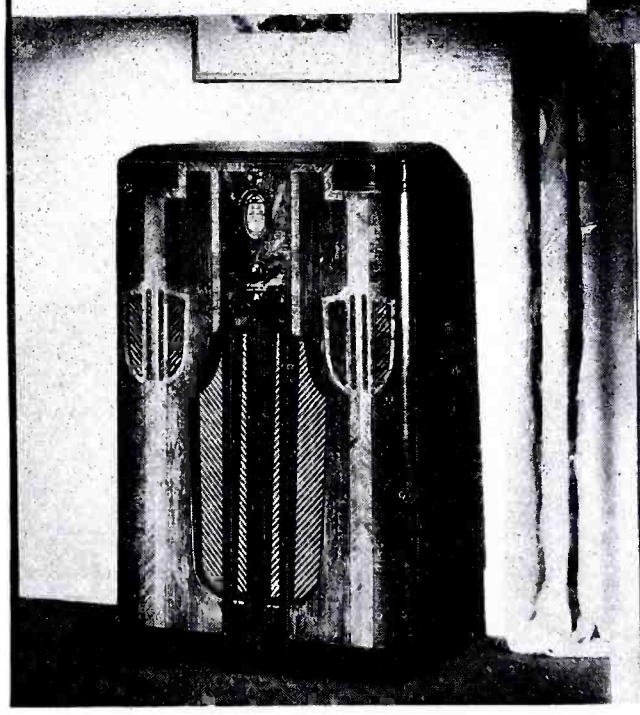
The odd thing about this "semi-modern" is that there is nothing modern

Appeal

HAVE IT







Illustrations Courtesy of
RADIO RETAILING

about it. It's a reversion back to the Early American or Colonial, during which "period" furniture was made of maple and mahogany, and was as straightforward as could be. The New Englanders in particular had no use for the dowdy. When they made a table, the only idea they had in mind was that it should have utility—and to hell with the carvings and scrolls that mean nothing to begin with and only complicate the view.

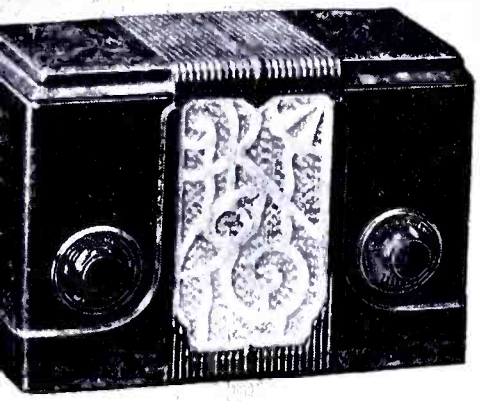
But the radio cabinet is not the only thing—on the face of the cabinet there must be a dial, a loudspeaker opening and various control knobs. Here again, improvements have been made. Rather than attempt to hide dials, the manufacturer has made them larger than ever with the result that they are easier to read and handle. Furthermore, instead of attemping to hide the speaker opening with trick wood carvings so that it would look like a solid, the speaker has been given "breathing space." Here again, utility has been given first consideration. And is cabinet appearance any the worse for this frank manner of design? Not by a long shot! If anything, we would say they are decidedly more pleasing to look at, and certainly easier to live with.

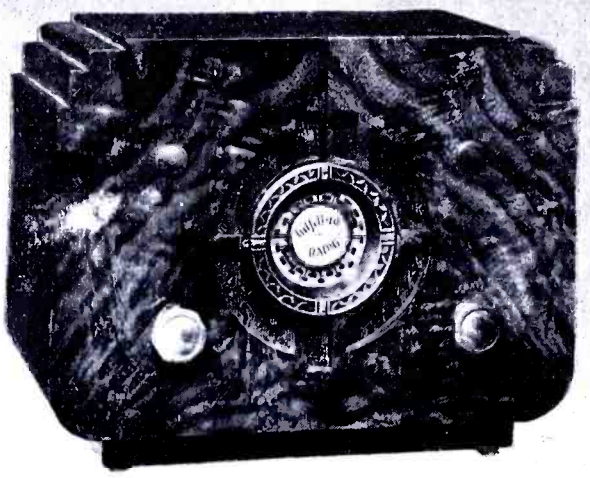
The Chassis

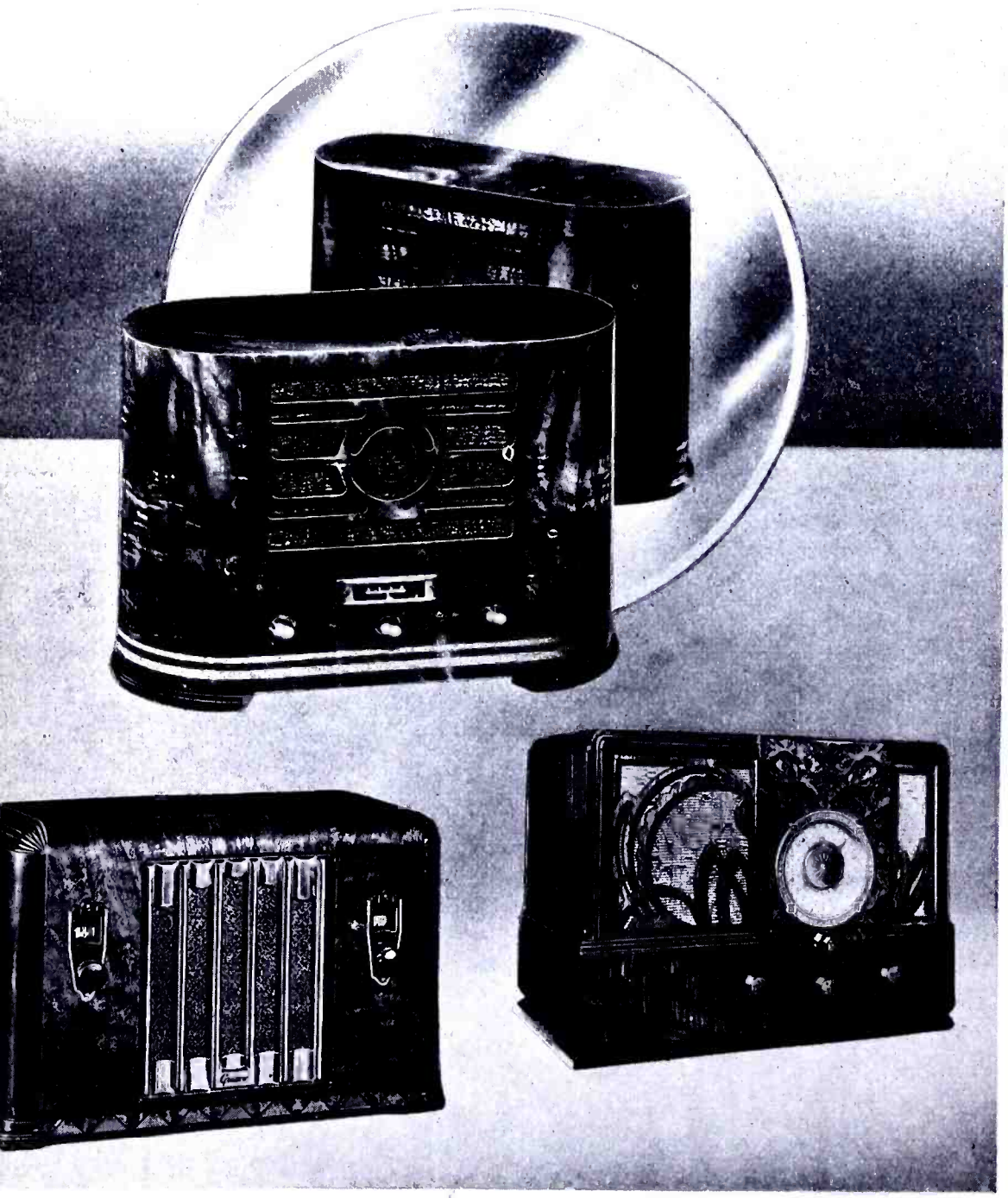
In the meantime, what has happened to the receiver chassis? In what manner does it out-shine the chassis of last year? Considering first the mechanics of chassis construction, you will find upon close examination that most manufacturers have gone in for "floating"—a term and a manner of building borrowed from the auto manufacturer. Floating a radio chassis is as necessary as floating an automobile engine—and it is done for the

Eye Appeal

1936 RADIOS HAVE IT







same reason: to defeat vibration. Vibration in a radio receiver is caused by the sound from the loudspeaker, and this can be of sufficient intensity to loosen anchoring screws, alter the electrical adjustment of chassis parts, loosen pilot lights, break soldered connections and set up corresponding electrical vibrations in the receiver tubes of such magnitude as to affect tone quality.

Through the use of blocks of soft rubber, the radio chassis is isolated from the speaker and the cabinet, and the condenser gang from the chassis. Vibrations set up in the speaker and in the wood of the cabinet are absorbed by the rubber and consequently never reach the chassis. Thus the floating of the chassis protects the precise circuit adjustments and at the same time prevents distortion caused by vibration.

Dials

Other mechanical improvements have also been instituted. The new all-wave receiver dials are practically devoid of slippage and backlash, with the result that dial readings are more accurately interpreted. To make tuning in the short-wave bands easier, dial ratios have been increased to as high as 150 to 1, but with the average ratio in the vicinity of 50 or 60 to 1. The latter ratio seems quite satisfactory in the event that there is no backlash and dial readings are clear. The auxiliary or "mechanical band-spread" pointer permits accurate logging even with low-ratio dials, but here again, it is quite important that there be no backlash or lost motion. A few twirls of a dial will determine this. Try 'em out and judge for yourself.

The 1936 sets also have smoother controls. Wave-band selector switches are easier to operate and are more positive in contact. Consequently they are less apt to become noisy, and there is small chance of the knobs working loose. Most of the band switches in the new receivers have additional sets of contacts which operate some form of band-indicating device. These are usually a series of pilot lights, one for each band, which show which band the receiver is set to by the position of the light or by a change in color.

Receiver Circuits

The observer of radio progress may often wonder what possible advancement can be made in receiver design after reviewing a year's crop of sets. It seems to him at times that the design engineer has gone just about as far in one direction as it is possible to go—yet each year a host of new ideas are made known, on top of the fact that, basically, the manufacturer still clings to the standard superheterodyne circuit.

And, again this year, the same basic circuit is found in every receiver, but by

genius and plenty of hard work, the engineer has made it do new things and do the old things in a better way.

Take sensitivity and selectivity, which, though not complementary, go hand-in-hand in receiver design. Sensitivity has not been increased in the modern receiver so much by increases in inherent tube amplification, but by using better components and simplified circuit structure. To begin with, the engineer has tackled seriously the problem of circuit losses brought about by poor or inadequate insulation, by an absence of constant circuit precision, and by the absence of proper isolation between successive stages of amplification. Straight losses have been reduced by using better grades of insulation material in coils and condensers, and by protecting each part from heat and moisture through the use of impregnating compounds. Losses brought on by changes in circuit adjustments have been obviated by the use of air-dielectric con-

One of the 1936 General Electric metal-tube receivers, with the new cylindrical dial scale.

densers, such as the "Permaliner" type used in all the new G. E. sets. Stages have been isolated by increasing the amount of shielding between components and through the use of resistance-capacity filters in each vital tube circuit. Since heat and moisture will alter the electrical values of condensers and coils, these components are not only treated with damp-proofing compounds, but so placed in the chassis that they are well removed from power and rectifier tubes, power transformers and resistors of high-current-carrying capacity, all of which produce plenty of heat.

Central Tuning Units

Special consideration has been given to the input circuits of receivers, for it is at this point that the true sensitivity of a receiver is determined: if input-circuit losses are high, weak signals are intirely lost.

Bosch has reduced the losses in these circuits by completely redesigning the radio-frequency, mixer and oscillator coil-switching arrangement. The coils used in these stages are fastened directly to the contacts of the wave-band selector switch, with the result that approximately 104 soldered connections are dispensed with, and wire leads simply don't exist. The coils and the switching device form a self-contained unit completely isolated and insulated from the receiver chassis. This "chassis-within-a-chassis" is mounted on rubber pads and, instead of there being a number of individual "ground" or chassis connections which can contribute to noisy operation, there is but one, and this is a flat, braided lead which completes the circuit between the central tuning unit and the main chassis.

Both G. E. and RCA have followed parallel lines in the design of the input stages—G. E. with the "Sentry Box" and RCA with the "Magic Brain." The basic ideas behind these units are the same as in the Bosch "Centr-O-Matic" unit; in each instance sensitivity is boosted where it *should* be boosted, by cutting losses to the limit.

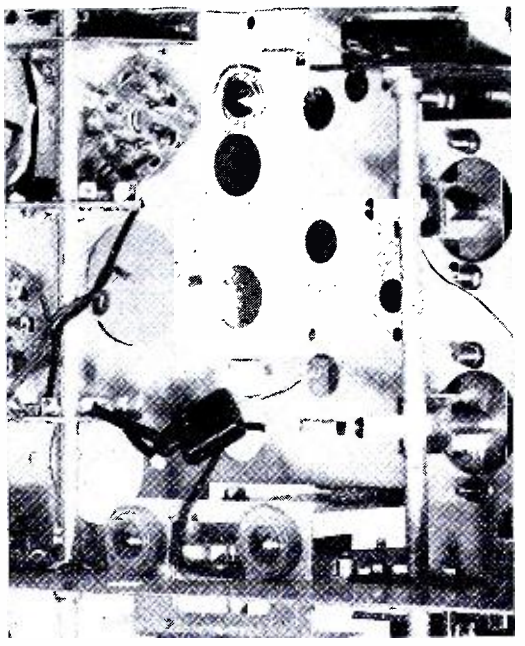
Selectivity has been increased in much the same way—by a reduction in circuit losses, and by the use of at least one stage of tuned radio-frequency amplification in front of the mixer tube, *usable on all wavebands*. For real DX reception, and the absence of station and image interference, an r-f stage on all bands is an absolute necessity.

Selectivity has also been increased in the intermediate-frequency amplifier stages by using transformers having high-Q coils and, in some instances (Fada, and Stromberg as examples) by the use of triple-tuned i-f transformers. In a few instances the Q of the coils has been increased by employing transformers having iron rather than air cores.

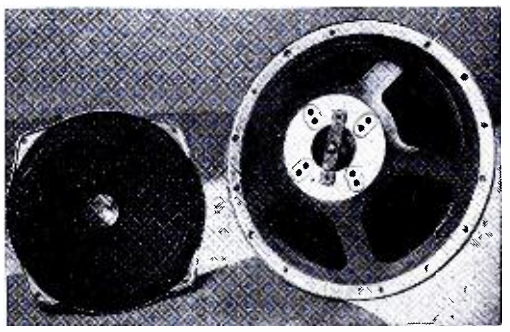
Automatic Volume Control

All modern receivers, except some of the midgets, have automatic volume control. The action and effectiveness of this system has been increased in the new sets, and in most instances is so arranged that the *amount* or *extent* of the control action is correctly proportioned for each waveband. In the better receivers this control action has been divorced from the second detector so that one function cannot have an effect on the other. Either a separate tube is used, or the diodes of one tube are used separately.

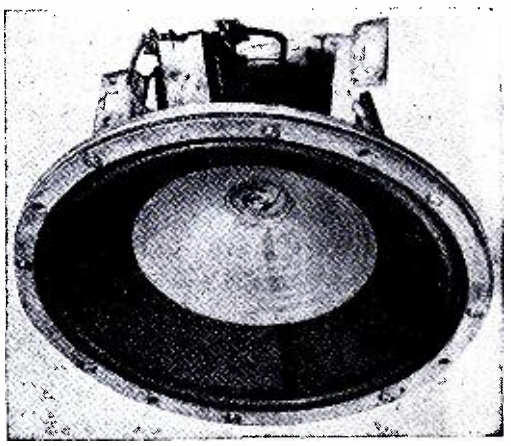
Amplified automatic volume control is used in many receivers so that the control action will be equally as effective on weak signals as on strong ones. This is highly important in connection with reception in the short-wave bands where extreme fading is the rule rather than the exception.



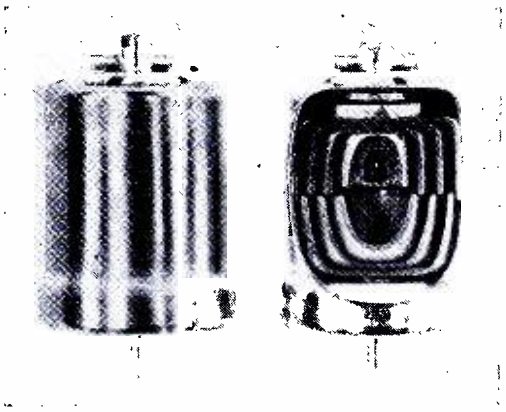
Variable-selectivity control system in a Zenith receiver. Selectivity may be adjusted for "DX" or "High Fidelity."



Acoustic Clarifiers used in Philco receivers. These are not loudspeakers, but resonant cones, which eliminate cabinet resonance.

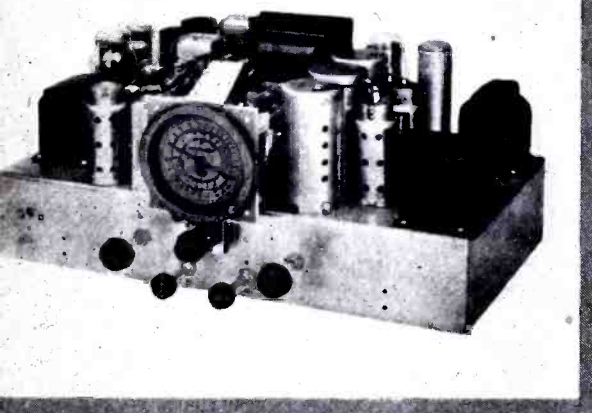


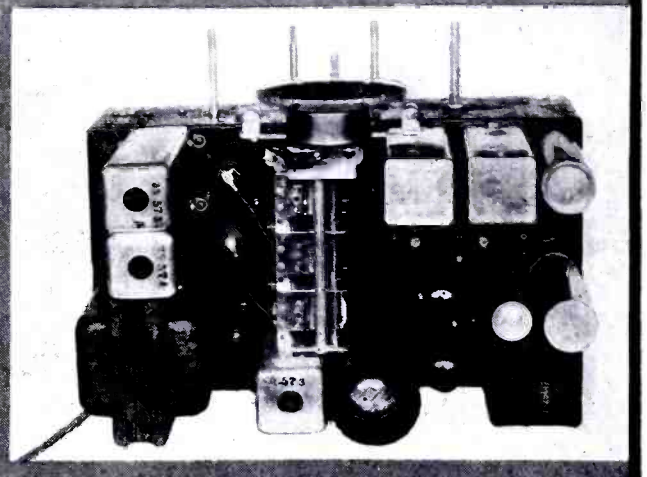
A high-fidelity loudspeaker. This is used in conjunction with the Acoustic Clarifiers, shown above.

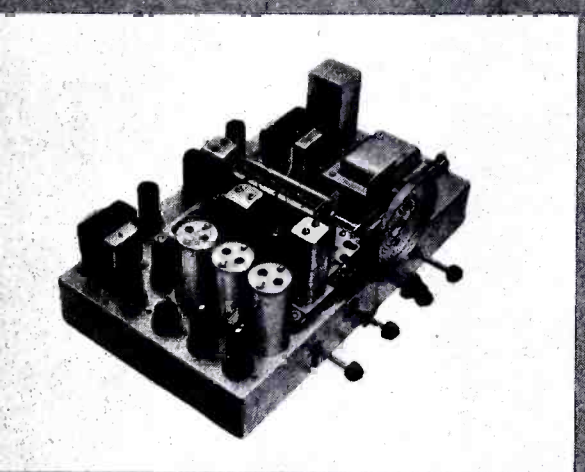


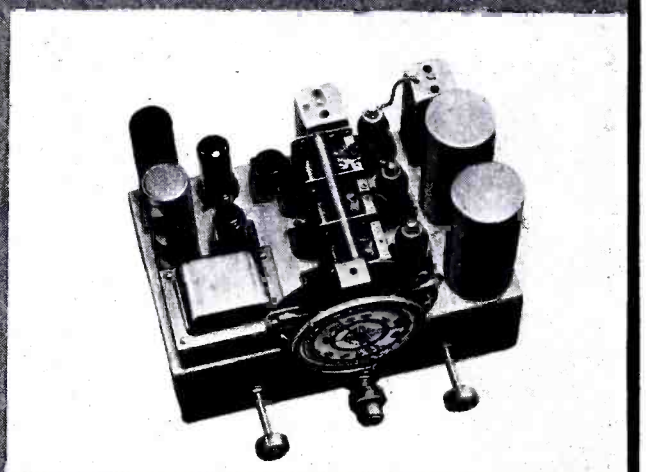
Exterior and interior details of a "Permaliner" (G.E.) This is an air-dielectric trimmer condenser. Advantages: Lower losses, holds adjustment.

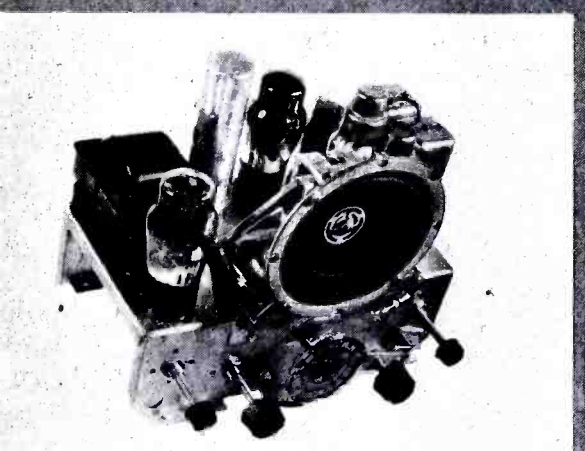
Even the CHASSIS *are Different*

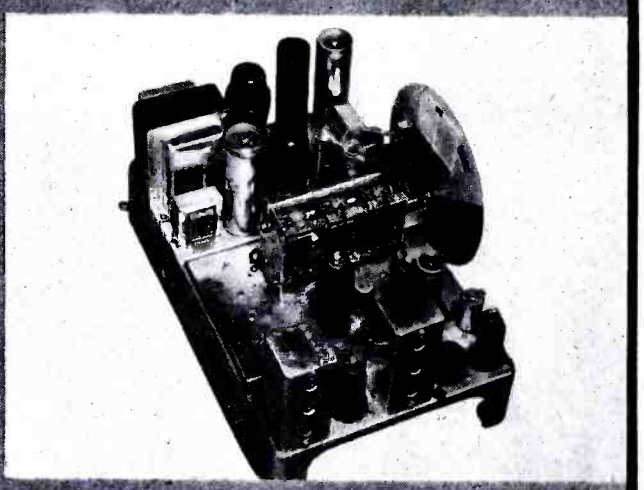


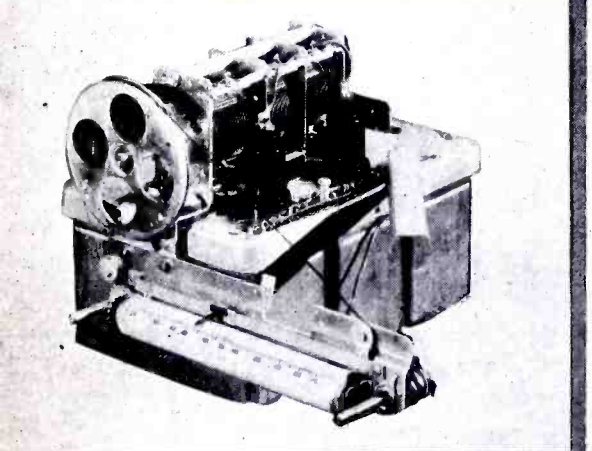


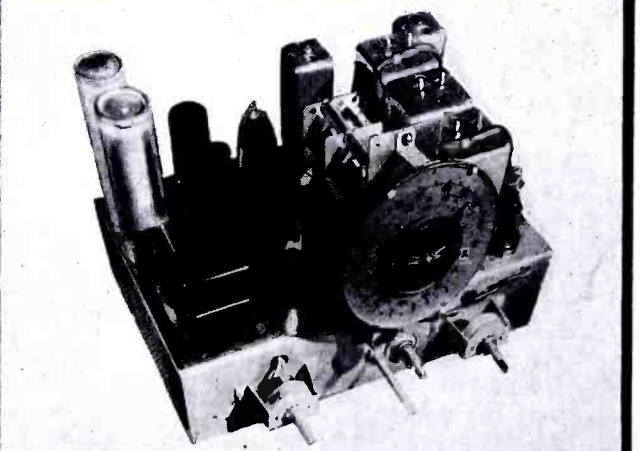












High Fidelity

High fidelity and selectivity simply do not mix. Selectivity is required for DX reception, but the amount of selectivity required to permit inter-station interference defeats tone quality.

In order that all-wave receivers can provide both distant reception without interference, and high-fidelity reception of local broadcast stations when desired, the design engineers have provided the more expensive receivers with "variable-selectivity" i-f amplifiers. The i-f amplifier resonance curve or "band" is contracted to provide maximum selectivity for DX reception, and opened up or expanded for high-fidelity reception. When expanded, the full audio response of the broadcast station is permitted to pass through.

Zenith and Stromberg-Carlson use continuously variable I-F Expanders so that any degree of selectivity may be had. Atwater Kent uses a system controlled by a two-position switch, providing maximum and minimum selectivity. G.E. has one model receiver in which the entire i-f amplifier is cut out of circuit when high-fidelity reception is desired. In this instance the r-f amplifier feeds directly into the detector. Howard uses separate i-f amplifiers for high-fidelity and DX and the tone response is further enhanced through the use of separate audio amplifiers for high and low frequencies.

Audio Amplifiers

There is quite a bit of variety in the audio-frequency amplifiers of modern receivers. Of course, in the smaller receivers using but a single output tube, the pentode is still universally used. But you never can tell what you are going to run into in sets having more than one power tube.

Wells Gardner and Stewart-Warner incline toward the 2A3 Class AB triodes in their larger sets. On the other hand, Stromberg has turned from the 2A3 to the type 42 pentode, but uses the 42's connected as triodes in a Class A Prime circuit. G.E. uses the 6F6 pentodes, as do many of the other manufacturers. In practically every case, however, the pentodes are used in Class AB or A Prime circuits—Class A is practically out of the picture. It is interesting to note, however, that the Zenith "Stratosphere" receiver ($750, if you're interested) uses two type 42's as drivers for *eight* type 45's in the output! The 45 is still a good tube, and don't you forget it.

Power output is what the manufacturer wants to say it is. Mentioning power outputs—at least *undistorted* power outputs—is as foolish as stating the frequency response of a receiver. Obviously, modern receivers have sufficient audio output to suit most people, and have good tone to boot. But in most cases the statements with regard to output and frequency response should be taken with a grain of salt. It's a harmless pastime with some manufacturers and is no doubt related to the same motive that impels an auto manufacturer to go over-optimistic on the number of miles per gallon you can get out of his cars.

Metal, or Glass, or What?

And now for that burning question. Are the metal tubes better than the glass babies? It's a burning question, all right, and not so easy to answer. But, first, let's see who's using what.

The following manufacturers are using a partial complement of metal tubes in the bulk of their receiver models: Air King, Atwater Kent, Automatic Radio, Capehart, Case, Crosley, Detrola, Emerson, Fada, Garod, General Electric (complete line, all metal), Grunow, Gilfillan, Halson, Howard, International "Kadette" (optional), Midwest (optional), Arvin, Pierce Airo, Pilot, RCA Victor, Remler, Sentinel, Sparton, Stewart-Warner, Stromberg-Carlson, Bosch, Wells Gardner, Westinghouse and Zenith.

Quite a list. Now let's see who isn't using them: Ansley, Autocrat, Fairbanks-Morse, Freed, Galvin, Hammarlund, Lincoln, L'Tatro, Silver, Patterson, Philco and Scott.

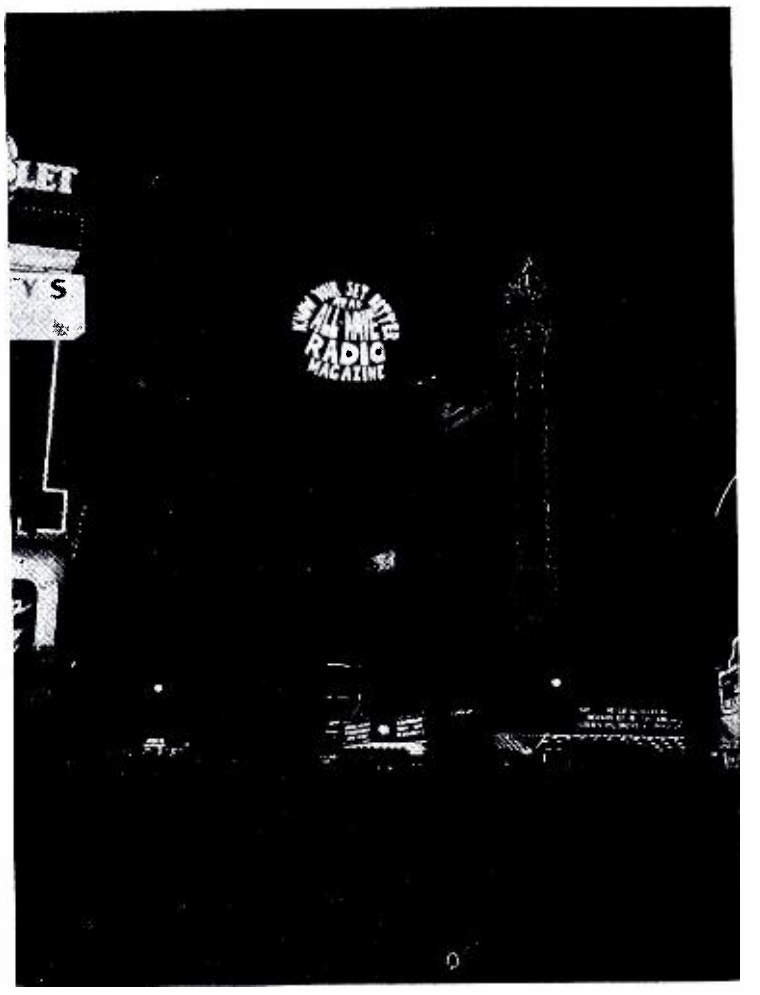
Not quite so many in this list, but no reflection on the manufacturers.

Who uses the glass-metal tubes?—that is, the glass tubes with the octal bases? Belmont for one, and with these tubes optional in the International and Midwest receivers.

Will more of the manufacturers take up with the glass-metal tubes? We don't think so. The glass-metal tube is a stopgap. It was brought out principally to fill in for metal tubes in receivers already produced with the octal-type sockets. Now that tube manufacturers are catching up on production, it is doubtful if the metal-tube shortage will last much longer. As soon as plenty of metal tubes are available, the owner of a set using the glass-metal type can switch over if he wishes. But, since the glass-metal tube has no advantage over the standard glass tube, there is hardly any reason for its continuance and less reason for more manufacturers to take up with it.

The question therefore boils down to the point as to whether set manufacturers sticking to the glass tubes will turn to the metal after the shortage has been taken care of. We believe they will—when, as and if they are satisfied that the metal tube actually has advantages over the glass type. Philco has come out openly and stated that the glass tubes are superior. G.E. and RCA Radiotron are responsible for bringing out the metal tubes, and Philco is responsible for casting suspicion upon them. And, since none of these companies are to be taken lightly, you want to know who's right.

It is too early to provide a definite answer, but this much may be said: Most of the bugs in metal tubes were due to production difficulties which have since been pretty well ironed out. The 5Z4 rectifier was admittedly poor, but we have been advised that this tube has been redesigned. In the meantime, manufacturers have been using the 5Z3 glass rectifier in the metal-tube receivers—and if they should continue to do so until doomsday, it would be no reflection on the regular line of metal tubes. It makes little difference what type of rectifier is used, as the advantages of metal construction are more apt to be apparent in the receiver tubes where improved shielding, sturdier construction and lower capacity between elements really means something. Nevertheless, we wouldn't be surprised if the new 5Z4 turned out to be a superior power rectifier anyhow—but glass or metal, the rectifier tube used in the power supply has only to provide sufficient voltage and current, with good regulation . . . the real work is done by the receiver tubes.



"All - Wave Radio Magazine" — Flashed to New Yorkers from the top of a hotel on Broadway, during the National Electrical & Radio Exposition. The sign was projected on a huge screen, and drew much attention.

Such tests as we have been able to conduct seem to indicate that the metal tube has a slight edge on the glass tube in the short-wave bands. Both types appear about equal in the broadcast band. It has been our experience that a metal-tube receiver is quieter in operation, a point which has been mentioned in their favor, but not wholly accepted on the face of the assertion.

In comparing metal- and glass-tube receivers, it is unfair to pass judgment on the basis of the number of tubes. Remember that in glass-tube receivers a single multi-purpose tube serves as second detector, automatic volume control and audio-frequency voltage amplifier, whereas in the metal-tube receiver the diode detector and automatic volume control is a *separate* tube. Therefore, a metal-tube receiver has, through necessity, one more tube than an *equivalent* glass-tube receiver.

The present types of metal tubes were purposely made to have characteristics approximately the same as the glass types they replace. Therefore it is unreasonable to expect that the metal tubes should provide far superior results. The point is, it has been demonstrated that the new structural design made possible through the use of metals will yield improved operation in spite of the similarity in characteristics between the glass and metal types. Upon this new structure will be based the tubes of the future—tubes having characteristics unattainable in glass types.

GLOBE GIRDLING

CONDUCTED BY J.B.L. HINDS

WHAT A DIFFERENCE in receivers now as compared with those of the days when we labored to tune in VRY, British Guiana; NRH, Costa Rica; HKA and HKC, Columbia; HRB, Honduras; G5SW, England; F3CID, Indo-China; X26A, Mexico; YV11BMO, Venezuela; CMCI, Cuba.

While these stations, now deleted, have pleasant memories for those who have followed the hobby of DX for some years, other stations have taken their places, and today the advance of short-wave radio finds powerful broadcasting plants in nearly every land transmitting programs of value into our homes, and being received and enjoyed by us through modern all-wave receivers operated from the house line instead of batteries, etc.

"All-Waving"

Today it is about impossible to buy a broadcast set. All manufacturers are building all-wave receivers. Whether some owners of these all-wave receivers do not appreciate the ability of their receivers to bring in distant programs, or are not inclined to find out whether they can or not but simply are content to hear only the local stations, are questions to be answered by the individual alone—but those who follow the DX pastime think that a great many are missing many enjoyable hours by not getting away from their own local stations.

You may, therefore, if you wish sit in your own comfortable chair with your all-wave receiver and listen to consistent reception from every corner of the earth—from stations to the south of us with their programs of rhythmic native music, fascinating rhumbas, paso dobles or tangoes, which breathe the very spirit of South America, or you may tune in far-away Japan, the "Land of the Rising Sun," where the music and song cannot be mistaken for anything but Japanese. You may listen to the superb programs of England, Holland, Portugal, Germany and France, the marevllous operatic renditions and music from Italy, keep abreast of the times through the League of Nations stations at Geneva, Switzerland, or twirl the dials and bring the carriers of far-away India, Australia, China, the Fiji Islands, the many transmitters in the Dutch East Indies, or from the heart of Africa.

I will not make the claim however, that you will receive consistent reception daily from all countries in the world, for there are many conditions to be taken into consideration which make that impossible; but those conditions are being rapidly overcome. With improved receivers and antenna systems and the wonderful advance in broadcasting equipment, in a short space of time we have seen such a marked improvement that nothing seems impossible.

Mr. Hinds received the signals more readily than the Vertification Card . . . it is addressed to "Monkess" instead of Yonkers.

LUFTSCHIFFBAU ZEPPELIN
G. M. B. H.
Fernsprecher: S. A. Nr. 841 und 851
Telegramm-Adresse: LUFTSCHIFFBAU
Giro-Konto bei der Reichsbank-Nebenstelle Friedrichshafen
Postscheck-Konto STUTTGART Nr. 7518

Postkarte

FRIEDRICHSHAFEN 5.10.34 G BODENS

Deutsches Reich 15 15

Friedrichshafen a. B., den October 2nd 19 34

Mr.
J.B.L. Hinds
85th Str.Andrews Pl.
Monkess N.Y. USA

Mr. Hinds in his receiving room, at Yonkers, N. Y.

Station Lists

In revising and compiling the station lists for this issue it will be noted that I have combined the Star Short Wave Broadcasters and Phone and Experimental stations and shown all stations on the air in order by frequency, which I believe will be a beneficial change and materially assist those receiving signals to locate a station more readily. As a great many still calibrate their receivers by wavelength in meters, I am showing the meters for each station in addition to the kilocycles. The information in these tables was carefully prepared and contains only such transmitters that are known to be on the air, being compiled from records of actual contact, operating companies and other reliable available sources.

If one, however, refers to the latest issue of "World Short-Wave Radiophone Transmitters," compiled and issued by the Department of Commerce through the Bureau of Foreign and Domestic Commerce, there will be noted various frequencies assigned which are

not listed in the tables referred to, either due to the fact that they never have been contacted or they are assigned, but not used, frequencies. One should bear in mind that frequencies reported in tables as used at certain periods of the day or night may, of course, be used at other periods than those named.

Many stations such as the Java transmitters, PLE, PMA, PMN, PLP, Italian IRW, IRM, IRG, etc., are classed as phone and are used often in relaying and transmitting programs, as likewise with many classed as experimental stations.

Items of Interest

The popular station EHQ, at Madrid, Spain, is being heard as late as 9:30 P. M. of late, though their schedule for October just received does not show them on the air after 7:30 P. M. at the closing of the International Broadcasting Company's added attraction of EHQ's fine regular program.

ZBW, Hong Kong, China, is coming in quite regularly on 8750 KC or 34.29 meters. Time on the air and address of station are shown in this issue. Their verification card also shows them working on 5410 KC or 55.46 meters, although no reports of reception have been received on the latter frequency.

Information has been received that COC, Havana, Cuba, has been changed to call COCO, and COH, Havana, Cuba, to COCH.

World-Wide Broadcasting Corporation station WIZAL, Boston, advise they will broadcast every Tuesday, Thursday, and Sunday evenings starting October 1st, using 11790 and 6040 KC; power 10,000 watts. They do not say if each program is to be broadcast simultaneously on both frequencies or not, so the same time for each frequency is shown in the tables.

Germany is furnishing verifications for DFC, DFL and other special transmitters, but state they prefer to receive short-wave reports of programs from DJA-B-C-D and E.

VEREENIGING VAN RADIO - AMATEURS
VOOR BANDOENG EN OMSTREKEN.
P. M. Y. Bandoeng, Nillmy-Building.
JAVA, NETHERLANDS INDIES.

We received your useful report on our transmission and thank you very much for it. It checks correctly with the stationlog.

The transmitting-station you heard is located at Bandoeng, Java, in a building, situated in the centre of that city, one of the capitals of the Netherlands Indies.

Our wavelength is 58 meters, power 0,6 kW. Call-signal: PMY.

The Hon. Secretary.

A nice one from Java. The border on the card is actually red, not black.

Verification card from **VPD Suva,** Fiji Island, is headed—"Fiji Islands—The Garden of the Pacific," and states these islands were discovered in 1643 by Tasman and ceded to Great Britain in 1874. There are about 250 islands in the group, total area about 7100 square miles, population about 172,000 of which 4200 are Europeans. Principal exports are sugar, copra, bananas, rubber, cotton and shell. Station operated by Amalgamated Wireless of Australasia, and is being heard regularly on 22.95 meters if you happen to be at your receiver between 12:30 and 1:30 E.S.T. And while you are up, listen for JVH, Nazaki, Japan, between 12 and 1 A. M. on 14,600 KC. Daily overseas broadcasts on this same frequency each Monday and Thursday, 4 to 5 P. M., E.S.T. according to late letter advice. These broadcasts are being heard best on the West Coast but some are hearing the late broadcast in the Eastern states.

OPM, Leopoldville, Belgian Congo, 29.59 meters, broadcast on June 29, July 13 and 28, and August 3, special programs for their National holiday and their exposition held in Leopoldville and has been heard on two or three other dates. The writer was fortunate to hear three of the four broadcasts mentioned and with fine signal. Late advice would indicate that these special broadcasts have been discontinued.

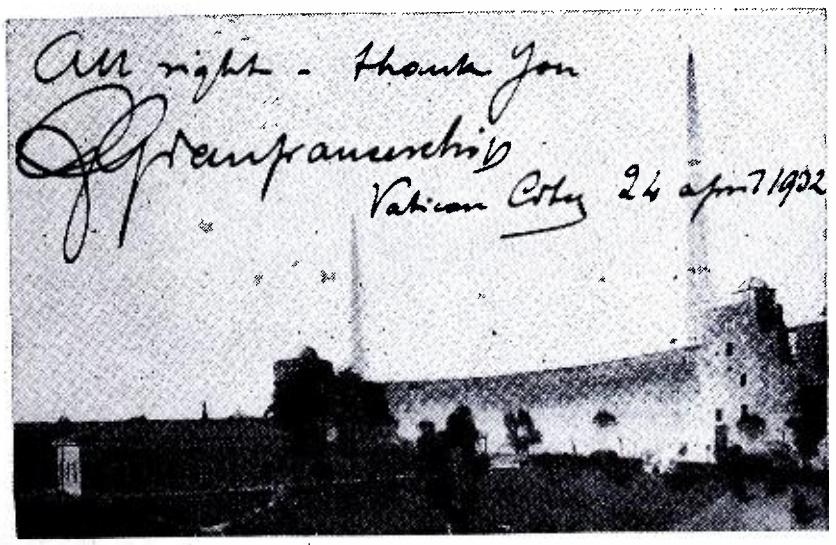
The time shown on the air for VE9HX, Halifax, is the time of long-wave station CHNS with which VE9HX broadcasts simultaneously when on the air. The latter transmitter has been off the air for a time due to extensive alterations. On Sept. 9th the Maritime Broadcasting Co. advised me they expect to have VE9HX back on the air within a few weeks.

We are still continuing CNR on 23.38 and 37.33 meters as broadcast stations although no one in the East has been hearing them for some time. The writer has written them twice of late with a view to learning the facts, but is unable to learn anything definite; they are simply sending the usual form letter and description of plant, which they have always used in making reply to reports received. I have the subject up at present with authorities in France. These stations were heard with good volume in 1931-1932 and part of 1933.

VE9GW Bowmanville, Canada, has changed its call letters to CRCX.

My good friend J. R. McAllister, of Struthers, Ohio, who builds receivers to bring distance for himself, advises he is again hearing ZTJ Johannesburg, South Africa, between 11:45 P. M. and 12:30 A. M. although signal is disturbed by QRM when W9XF comes on the air. "Mack" is the proud possessor of several bonafide verifications from ZTJ.

2RO, Rome, Italy, is now on 25.40 meters with afternoon programs. The 31.13-meter band now only carries the American Hour and the South American programs between 6 and 9 P. M.



A Vatican "Veri," showing the transmitter.

Verifications

Among the many verifications received of late are interesting ones from ZBW, China; VPD, Fiji Islands; JVN, JVM, JVH, JVT, Japan; PLP, PMC, PMY, Java; SUV, SUT, Africa; OER2, Austria; VP6YB, Barbadoes; PRA8, LSN,

CEC, HJ5ABE, South America; TIR, TIU, TIRCC, TIPG, Central America; HAT4, CSL, CTIGO, and DGN, Europe; and COCD, CO9WR and CO9JB, Cuba.

An excellent method to preserve your verifications is to place them in scrap books with "Art Corners" so they may be removed and replaced at any time. I have recently cared for mine in this manner in well bound inexpensive books, assigning them in alphabetical order by countries and reserving space by blank sheets between countries. These books come in loose-leaf form and no trouble is therefore experienced in laying them out. An index can be used showing book number, countries assigned to each book, etc., as desired. The different series of postage stamps of each country as taken from the envelopes containing the verifications are posted on the respective page in the book.

New Stations Listed

CO9JQ, Cuba, 8665 KC; ZP10, Paraguay, 8110 KC; CO9WR, Cuba, 11,800 KC; CEC, Chile, 10,670 KC; VPMR, British Giuana, 7080 KC; YV8RB, and YV10RCS, Venzuela, 5880 and 5720 KC respectively; IRG, Eritrea, 14,710 KC, and HB9B, Switzerland, 7118 and 3770 KC,

TFJ, Reykjavik, Iceland, on 12,240 KC, is being heard quite often of late; usually in the morning, testing with England. Letter advice from them states they are usually on the above frequency and transmit occasional musical and other broadcast items and that their transmitter pumps 7½ KW into the aerial and works on a directional aerial towards the East. Their other transmitter is also now testing on 9060 KC. No regular broadcast hours yet assigned.

New Stations Not Listed

New stations reported or heard are as follows: IRJ, Rome, Italy, 14,730 KC, Phone, heard around 6:00 A. M. HJ2ABD, Bucaramanga, Columbia 9570 KC, evenings. PZH, Paramaibo, Surinam, Dutch Guiana, 7140 KC, said to be broadcasting daily until 5 P. M. and 6:40 to 9 P. M. on Mondays and Thursdays. Also a new Mexican with reported call XBJB on about 11,600 KC. The writer heard them testing shortly after midnight on Sept. 15th, with fairly good signal—am requesting that reports be forwarded to P. O. Box 2825 Mexico City. IQA, Rome 14,735 KC, has been heard irregularly of late with musical programs 11 P. M. to midnight. Also reported on voice on other frequencies.

Relay stations VK5WB, Port Adelaide, South Australia, said to be broadcasting experimental broadcasts each Sunday morning between 2 and 3 A. M., E.S.T. 7310 KC. Kookaburra opens each transmission. It is reported that five transmitters have been ordered from Marconi works for Afghanistan to be installed at Kubal, Maimana, Khanabad, Krost and Dujazunga. Kubal transmitter to cover a range of from 15 to 80 meters; output 3½ to 4½ KW and to communicate with Moscow, Tokio, Shanghai, Rio de Janeiro, Capetown and Melbourne. The other transmitters for internal communication and 250 watts each.

The rebroadcast of speech of Emperor Haile Selassie over the NBC network on Friday Sept. 13th was an exceptionally good rebroadcast. The Short-Wave Reporter (2RC) Hendersonville, N. C., reports direct reception of the s.w. station in Addis Ababa, Ethiopia, transmitting the broadcast mentioned on 18,270 KC and a later broadcast on same date at night. Call letters ETA. The writer heard the rebroadcast but was not fortunate in contacting either frequency on that date. It is said more broadcasts will follow.

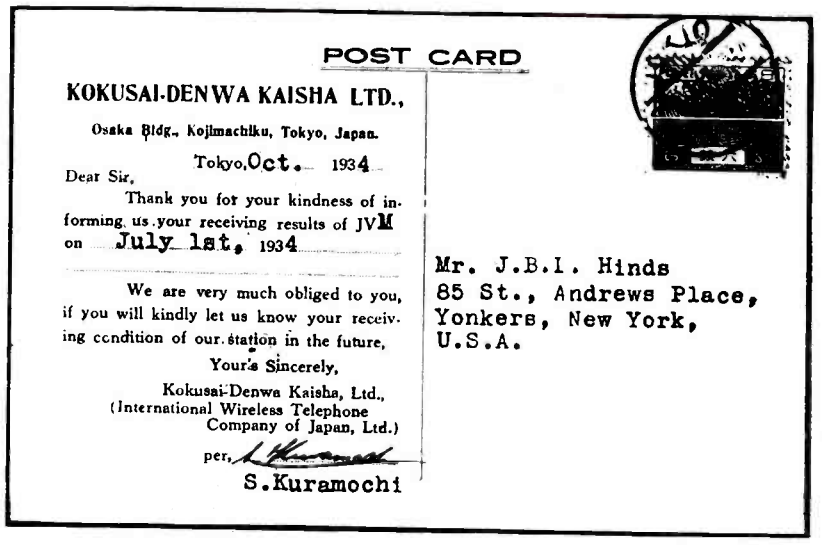
A station is being heard and reported as HC2CW, Ondas de Pacifico, Guayaguil, Ecuador, on about 840 KC or 35.69 meters. Some believe it is the same station as HC2AT which has been broadcasting on and around that wavelength, but which was reported by some as closed down, but by others as still being heard. The writer received advice from HC2AT a short time ago that they were shortly to increase their power but no mention of leaving the air. Schedule of HC2AT is therefore still reported in list.

On Wednesday and Saturday of each week between 5 and 7 P. M. E.S.T. a little 50-watt station CT2AJ at Ponta Delgrada S. Mignel, Azore Islands, can be heard broadcasting programs on 4000 KC or 75 meters. Tune to the high-frequency side or end of the 75-meter phone band until you hear no more U. S. amateur phones and then slightly back off the dial. While I have not heard this station, others have a verification.

An official communication from the Swiss Short-Wave Association (USKA) of Bern, Switzerland, announce that short-wave broadcasts are to be radiated the first Monday of each month from several Swiss stations. These programs have been arranged for Oct. 7th, Nov. 4th, Dec. 2nd, Jan. 6th, and Feb. 3rd. Will be broadcast 3:10 to 4:15 P. M. E.S.T. over HB9B, 14,236 KC, with a beam aerial to North America; HB9H, 7005 KC, with uni-directional aerial for Europe, Australia, North and Central Africa, and HB9J, 14,400 KC, to South and Central America. In order to secure a world-wide coverage program will be repeated on same days from 6 to 7

(Turn to page 96)

Have you one of these? If you don't know when to listen for Japan, ask Mr. Hinds.



POST CARD

KOKUSAI-DENWA KAISHA LTD.,
Osaka Bldg., Kojimachiku, Tokyo, Japan.

Tokyo, Oct. 1934

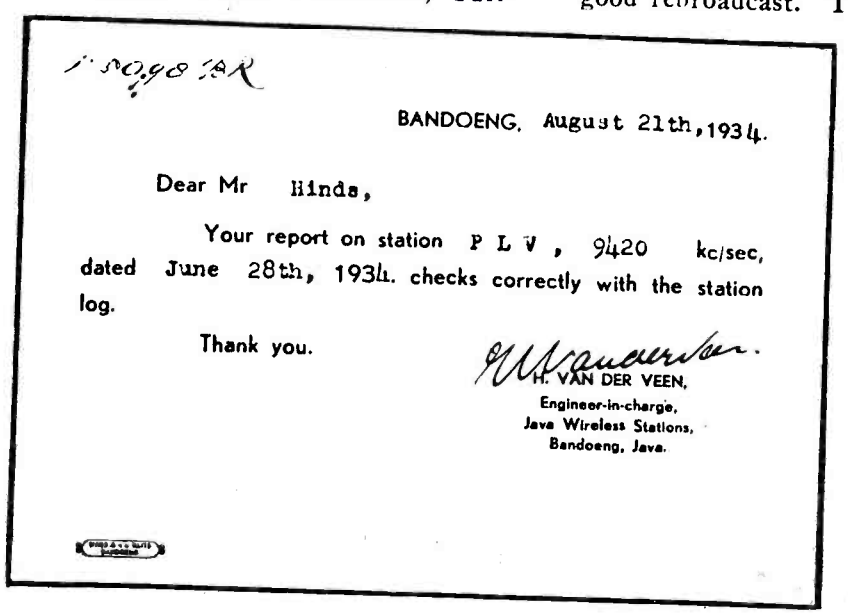
Dear Sir,

Thank you for your kindness of informing us your receiving results of JVM on July 1st, 1934

We are very much obliged to you, if you will kindly let us know your receiving condition of our station in the future,

Yours Sincerely,
Kokusai-Denwa Kaisha, Ltd.,
(International Wireless Telephone Company of Japan, Ltd.)
per, S. Kuramochi

Mr. J.B.I. Hinds
85 St., Andrews Place,
Yonkers, New York,
U.S.A.



BANDOENG, August 21th, 1934.

Dear Mr Hinds,

Your report on station P L V , 9420 kc/sec, dated June 28th, 1934. checks correctly with the station log.

Thank you.

H. VAN DER VEEN,
Engineer-in-charge,
Java Wireless Stations,
Bandoeng, Java.

Another "Veri" from Java . . . as valuable to the owner as a rare stamp.

A receiver designed to "step out" —not to provide the best quality and high power output. Compact, completely shielded, no frills — a Greyhound of the Air.

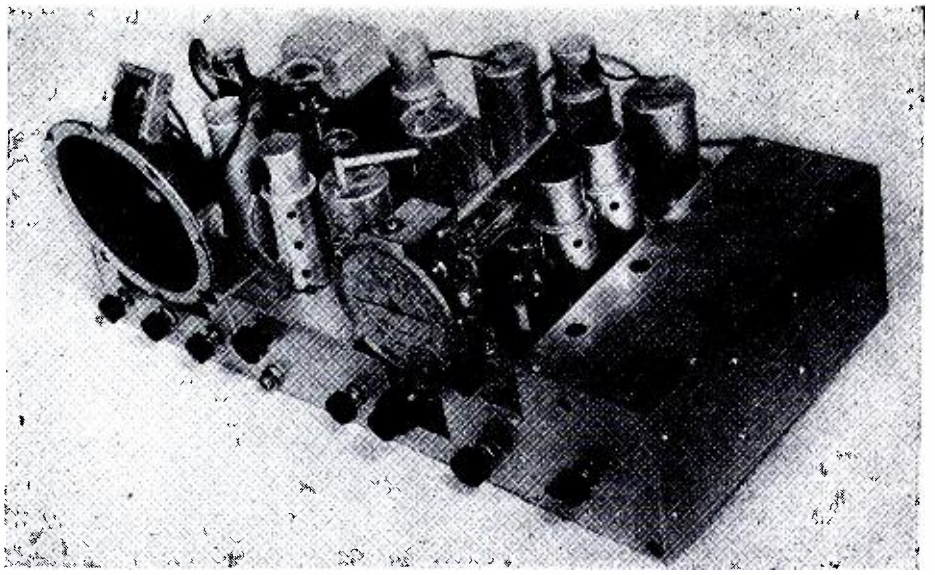


FIG. 3

The Lafayette Professional Nine

By FRANK LESTER

WHOLESALE RADIO SERVICE, INC.

A WELL-KNOWN engineer recently purchased a console receiver costing over $200, for the express purpose of using it for listening in on the short-wave bands. He selected a good receiver, and it must be said in all fairness to the manufacturer, that it worked exceedingly well. However, after using the receiver for some time, this engineer was frank enough to admit that, since he wished a receiver for the short-wave bands only, he could have saved himself quite a bit of money and in the bargain obtained a receiver designed principally for this one class of service, had he given thought to the numerous sets designed for amateur use.

What You Pay For

This is undoubtedly a point which has been given very little consideration by the man who is interested primarily in distance reception on all the usual wave bands covered by an all-wave receiver, and only secondarily in what is usually referred to as "tone quality," but upon analysis turns out to mean the capability of a receiver to turn out more power than can be comfortably used in the home for any purpose other than the reproduction of symphony concerts and recorded music.

This is a very interesting point, in that it demonstrates what the manufacturer of any specific type of receiver does with his pennies. If, for example, we take $60 as a fair price for a table model all-wave receiver having a good sized dynamic speaker and a Class AB push pull output stage, it is apparent that a fair percentage of the cost has gone into the cabinet for one thing, into the dynamic speaker for another, and also into the power output stage. Now, if "living-room beauty" is of no consequence, fine tone quality of only passing interest, excessive power output of no regular value, but distant reception qualities the prime requirement, it is obvious that if some of the $60 tied up in the cabinet, the speaker and the power stage, were used instead to provide increased sensitivity and selectivity, the DX man would get more for his money.

Fig. 2. The Lafayette Professional Nine. Speaker at left, dial at right, controls below—well balanced throughout.

Professional Receiver

Undoubtedly there are any number of people who wish to have the features of high sensitivity and selectivity in an all-wave receiver without having to pay an excessive price for it. That is why there is presented here the circuit and constructional details of a moderate priced professional receiver, designed specifically for amateur use, which may be purchased complete or in kit form. The reader will appreciate as we progress with the description of this receiver that it contains features of importance to the DX listener not to be found in the general type of all-wave receiver for home use.

The Circuit

The complete schematic diagram of the Lafayette Professional Nine is shown in Fig. 1. Starting from the upper left of the diagram it will be noted first of all that there are four wave-band positions and that separate sets of coils are used for each band. The coverage is continuous from 9.7 to 560 meters.

There is a stage of tuned-radio-frequency amplification which functions on all four bands. This stage, using a type 6D6 tube, is transformer coupled to a 6C6 type tube which is used only as the first detector or mixer. A type 41 pentode, connected to function as a triode, is used as the high-frequency oscillator.

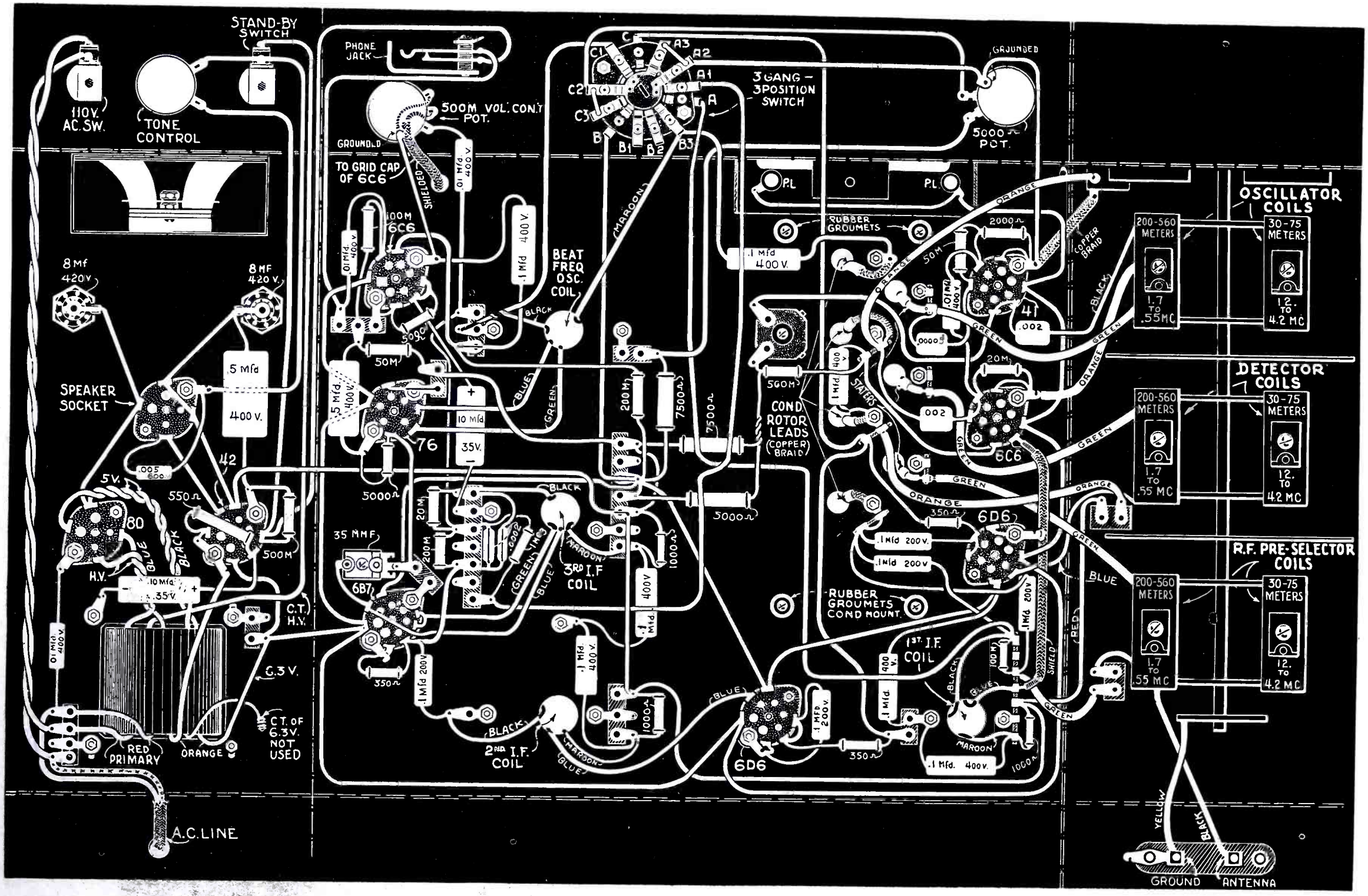


FIG. 4. COMPLETE UNDER-CHASSIS WIRING OF THE LAFAYETTE PROFESSIONAL NINE. TOP AND BOTTOM SHOW WIRING TO COMPONENTS MOUNTED ON CHASSIS WALLS.

Due to the high transconductance of this tube it has a high degree of stability on the shortest wavelengths where many other types of tube fail to function satisfactorily as high-frequency oscillators.

The output of the 6C6 first detector is fed into the first intermediate-frequency amplifier stage, which uses a 6D6 tube. There is a second i-f stage in which is employed the pentode section of the 6B7 tube. The plate circuit of this tube feeds into the primary winding of the third i-f transformer, and the secondary winding of this transformer feeds the diode plates of the 6B7 which are connected in parallel and provide both rectification of the signal and automatic volume control.

There is included in this diode circuit a load resistor across which appears the direct-current component of the rectified signal. This voltage is used to provide automatic control bias on the 6D6 r-f tube and on the 6D6 i-f tube. The audio-frequency component also appears across the load resistor and this is fed through the volume-control potentiometer, the arm of which connects to the control grid of the 6C6 audio frequency voltage amplifier tube.

The 6C6 audio tube is resistance coupled to a type 42 pentode power tube. A phone jack is connected in the plate circuit of the 6C6 a-f tube so that headphones may be used for weak-signal reception. When the phones are plugged into the jack the output of the 6C6 a-f tube is automatically disconnected from the power tube.

A variable-condenser type of tone control is connected in the grid circuit of the type 42 pentode and proves very handy for reducing background noise and certain forms of inter-station interference.

The type 42 pentode feeds a dynamic speaker the field coil of which is used as the filter choke in the power supply unit which employs a type 80 tube.

It will be noted in the lower part of the diagram that there is a type 76 tube used as a beat-frequency oscillator. This oscillator not only permits the reception of cw code signals but is also valuable as a broadcast-station finder. It will indicate the presence of a modulated or unmodulated carrier by a high-pitched sound when the dial pointer is passed through a station.

Special Control Switch

Now take note of the tandem switch shown in the diagram just below the 6C6 first detector tube. Section A of this switch cuts in and out the automatic volume control action. When the arm of this section is on Point 1, automatic bias control is placed on the r-f and i-f tubes. When the arm of this section is on either Point 2 or 3, the grid-return circuits of these two tubes are grounded as they would normally be with no automatic volume control circuit.

Section B of the switch is inoperative until it reaches Point 3 when it places high voltage on the plate of the beat-frequency oscillator and so places it into operation.

Section C of the switch connects the cathodes of the r-f and i-f tubes to ground when automatic volume control is being used, so that both of these tubes will be supplied with residual bias, developed in each case by a 350-ohm resistor. With Section C on either Point 2 or 3, the cathodes of the r-f and i-f tubes are connected to ground through a 5000-ohm potentiometer which serves as a manual sensitivity control by varying the bias on these tubes.

Reviewing the function of this tandem switch, composed of Sections A, B and C, it will be seen that with the switch arms on Points 1, automatic bias control is placed on the r-f and i-f tubes and the cathodes of these tubes connected to ground. With the arms on Points 2 the automatic volume control action is cut out and the sensitivity or gain control is thrown into circuit so that the operator may adjust the gain or volume of the receiver manually. With the arms of the switch on Points 3 the sensitivity of the receiver is still controlled by the manual gain or volume control and, in addition, the beat-frequency oscillator is brought into play. Since automatic volume control cannot be effectively used when receiving cw signals, no provision is made to have it thrown into circuit when the beat-frequency oscillator is on.

A front view of the receiver is shown is Fig 2. The controls from left to right are: On-off switch; tone control; stand-by switch, which cuts off the "B" supply; volume control; automatic volume control and beat-frequency oscillator switch; tuning control, which operates the double pointers on the airplane dial; the sensitivity or gain control; and, lastly, the four-position wave-band switch.

A view of the chassis is shown in Fig. 3. This is so constructed that if it is found desirable, the left-hand unit containing the speaker, the power amplifier and the power-supply unit, may be taken

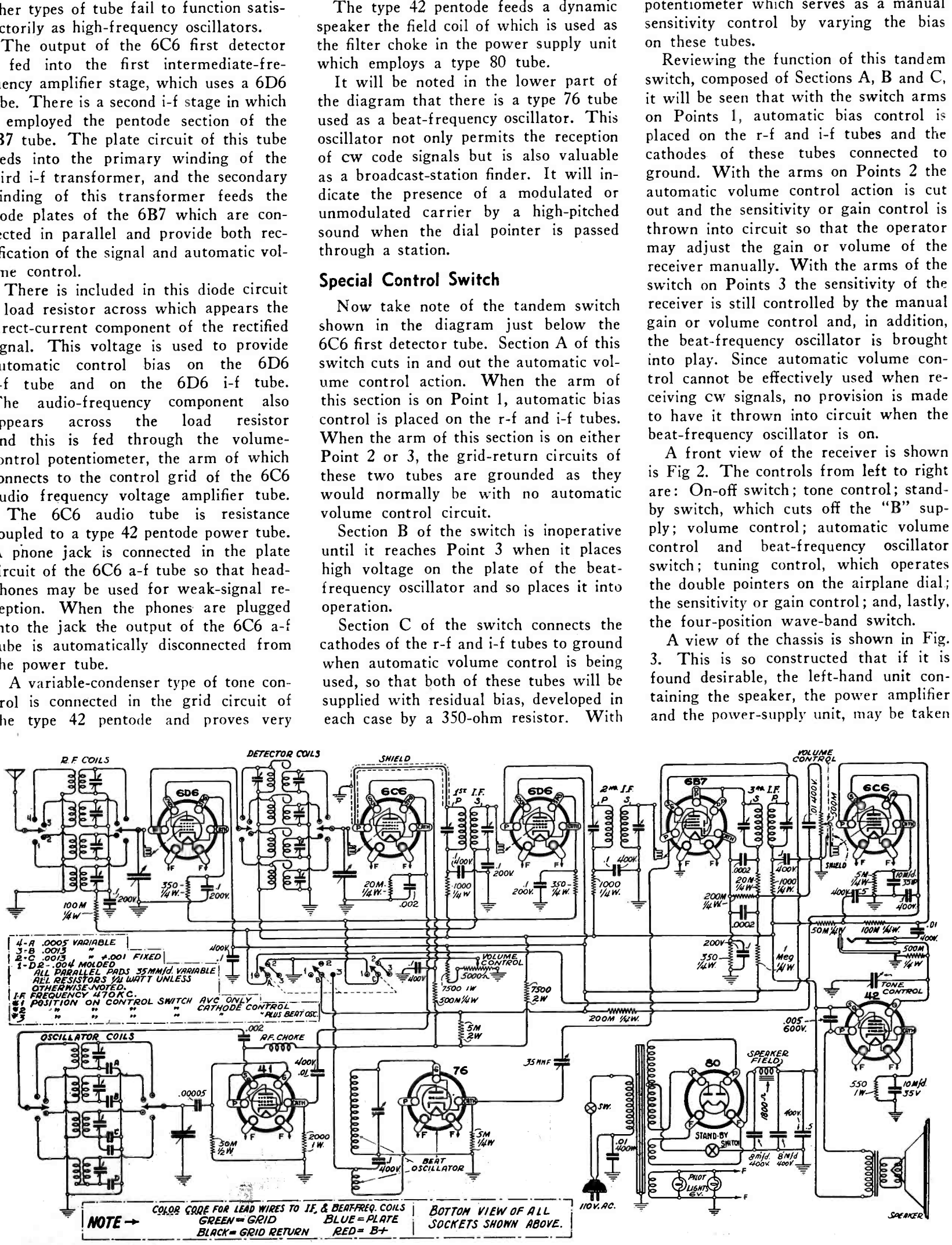


Fig. 1. The schematic diagram of the Lafayette Professional Nine. See text for explanation of tube and circuit functions.

out of the cabinet and mounted some distance away from the receiver proper.

Assembly Procedure

It will be noticed that the chassis is supplied in three separate parts, one part of the chassis incorporating the power supply and output audio stage, and the other part the tuning condenser and dial, along with all of the intermediate frequency stages, and last, the completely assembled, wired and tracked coil switching arrangement. Each of the coil switching arrangements have been carefully tested. It is therefore absolutely imperative that none of the trimmer adjustments are varied, unless one wants to be extremely critical, and after the receiver has been completely wired, make some slight adjustments of the parallel trimmers. Needless to say this procedure should not be attempted unless a calibrated oscillator is available that will cover the wavelength range of this receiver. Great care has been taken in properly tracking and aligning this coil switching unit, and it has been found that if the picture wiring diagram is closely adhered to, absolutely no trimming of the various tuned circuits will be necessary. The intermediate-frequency transformers are also supplied, tuned approximately to the i-f frequency, and therefore it is almost certain that as soon as the receiver is turned on, some signal will be heard, providing, of course, it has been wired correctly. In assembling the chassis, it is advisable to start with the middle section, namely, the one incorporating the tuning condenser. First mount all of the tube sockets, intermediate-frequency transformers, beat-frequency oscillator, etc. When mounting the tube sockets, be sure and include the base of the tube shield on all of the sockets shown in the drawing as shielded. Now, carefully inspect the picture wiring diagram shown in Fig. 4, and next mount all of the small terminal strips in their correct position. Do not mount the variable condenser or dial assembly, until you have completed all of the necessary wiring of this portion of the chassis, or, as a matter of fact, this can be left until the last procedure; or in other words, after the complete receiver has been wired.

Wiring

It will be noticed that one side of the filament or heater is grounded to the chassis on all tubes, with the exception of the 80 rectifier. All tube filament wiring should now be completed and it will be found a good procedure to next wire all grid circuits, then all cathode circuits, and finally, all plate circuits. While wiring this portion of the chassis, it is advisable to mount the avc beat-frequency oscillator, and manual volume control switch, as well as the two volume controls, when the particular circuit you are wiring calls for some connection to be made to these controls. After you have practically finished the middle section of the chassis, this should be laid aside for a few moments, and the power supply section completely assembled and wired, according to the picture diagram. When this has been completely wired with the possible exception of the two condensers near the joining point of the two chassis, the six screws supplied for bolting the two sections of the chassis together at this point, should be employed for this procedure, and when this is finished, the two condensers mentioned above may be mounted with ease. If you have not already wired in the a-c on and off switch, tone control, and standby switch, these controls should now be wired in, along with the phone jack.

Mounting Variable Condenser and Dial

You are now ready to mount the variable condenser and dial assembly. In the mounting of the variable condenser, it will be found that eight metal washers are provided, in addition to four rubber gromets. The rubber gromet is used on each side of the chassis with a washer each side of it, and the fastening screw through the center. There are four separate ground pigtail connections brought from the variable condenser, and these ground connections should be made to the specified position on the chassis, which will be clearly noted in the picture wiring diagram. The dial should next be mounted, employing the special bracket supplied. This bracket fastens to the top of the variable condenser, which is mounted on one of its sides. The side that the variable condenser is mounted on, is the one farthest away from the shaft. This side may or may not be already equipped with mounting brackets. After the dial has been mounted, the two pilot lights should be connected, one side of each of these pilot lights being grounded to the frame of the dial, and the other side connected in parallel, and then a wire brought down to the ungrounded filament or heater connection of the 41 oscillator tube.

Mounting and Wiring Coil-Switching Compartment

The coil-switching compartment of the chassis should now be fastened to the wired portion of the chassis, and the leads connected to the points clearly illustrated in the picture wiring diagram. The three green leads starting from the front of the coil switching unit, are the three stator connections to the variable condenser. These three leads are approximately 3 to 4 inches long and should be kept away from the chassis by at least an inch or an inch and a half. The fourth green lead is a short one about 2 inches long, and connects to the terminal strip mounted near the rear of the coil switching arrangement. One side of the 100,000-ohm resistor, which is also mounted on this terminal strip, also connects to this point. The tuning unit will also be found equipped with three orange colored leads, two being long, and one short. The long lead near the front of the panel should be connected to the same point on the chassis, as the second copper pigtail coming from the variable condenser. The other long orange lead coming from the middle coil section should be connected to the same point on the chassis, as the third lead from the variable condenser. The short yellow lead should be connected to the ground lugs, or grounded side of the filament of the 6C6 tube socket, near the coil-switching compartment. These various ground connections are important, and therefore, care should be exercised in trying to get them in the exact place specified above, as well as we have tried to clearly indicate on the picture diagram.

After you have completed all of the wiring it is advisable that you thoroughly check over both the schematic diagram

(Turn to page 95)

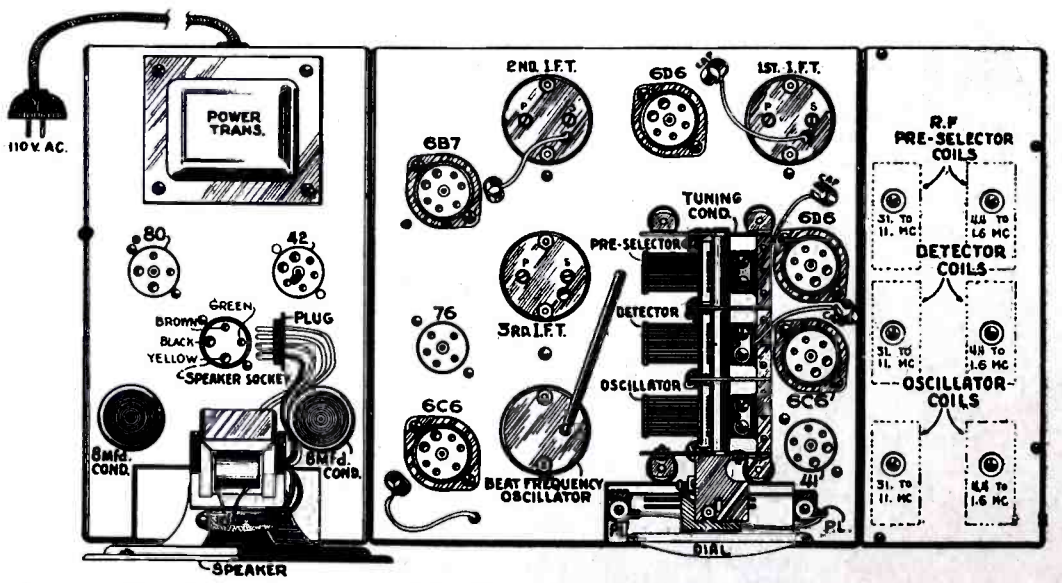


Fig. 5. Respective location for each part on the triple chassis.

By BEAT NOTE

A BOUQUET OF Tube Roses to that dramatizer of radio technicalities, John Mills, who has created for lovers of music the entertaining book "A Fugue in Cycles and Bels," which tells what electricity is doing for music—and to the publishers of the book, our warmest regards for having tickled us no end with the spicy bit of information, framed in their own words, that *"the location of one's seat makes a great difference in the music of a violin solo."*

◆

"GIVE BEAT NOTE *a shot of corn juice; he's good now, but . . ."* (From a letter by Z. A. Ridgeway, San Diego, Calif.)

Never had I left that trophy room without turning my head just a wee bit to catch a last, guarded view of the Bengal Tiger.

Though I had slain her with my own hands, the impression had always remained with me that there was life in the old cat yet. Stuffed as she was, the one good eye she had left would glare and glitter at the most unexpected moments. Yet the vacant socket through which I had once plunged my dagger to the hilt, bore mute (or would one say blank) testimony that the she-devil was as dead as a blown bottle.

It was with no great surprise, then, that one night about half after one, as I felt my way into this darkened chamber, there came to my ears the low, fearsome hiss of the Jungle Cat ready to make its kill—and with no more surprise that I saw cutting through the death-like blackness of that chamber the evil, green gleam of that one, good eye.

My days in Africa taught me never to retreat before the Cat of Cats. So, gripping the neck of the bottle—now completely drained of corn—I slowly advanced until, eye-to-eye with my antagonist, I let loose with all I had . . .

I am told that I was found sprawled on the floor at the foot of my brand new RCA Victor Magic Eye radio; out like a light. Out as well was the Magic Eye, its glass intimately mingled with the remains of what once had been a bottle of good cheer.

◆

HAVING FOCUSED your attention on the Magic Eye, permit us to make lip noises at the engineers who contrived this catlike optic, for having completely missed the opportunity of a lifetime.

We offer to RCA—free of charge and minus all incumbrances—the "Elfin Eye" radio-advertising-belittler which, when the serious-minded announcer shovels out the manure, slily winks at the radio audience.

A ROSE, with aphids clinging thereon, to the McNameene bows to Bowes and the States' bows to Bowes and the Cities' bows to Bowes and Bowes' bows to Bowes which, if stretched end to end would reach back to Bowes anyhow, but compressed somewhat, as they are, manage to eat up a lot of time that might well be devoted to amateurs.

◆

BEING NEUTRAL OF mind and peaceful of nature—in fact, a complete washout—we find our sleep disturbed by the ramifications of the dark influences that play over man like the rays of a searchlight (some metaphor, eh boss?). Who would imagine, for instance, that the politics behind the Ethiopian imbroglio would so influence a man long identified with radio that he would actually indicate in print his partiality to the Colonizing Force. Yes, sir, as difficult as it is to believe, the Editor of "Radio Today" distinctly referred to our very own Federal Communications Commission as the *"Commish."* If you don't believe us, cast your eyes on page 8 of the September issue. (*Free Adv.*)

◆

AND NOW THAT we have your attention on *influences,* let us hasten to record the effects of the Present Administration on the brain cells of our good friend who put to bed the new Wholesale Radio Company's 1936 Catalogue.

Torn between radio and politics, no doubt, our good friend referred with great gusto to the excellent features of the "new deal" on the National HRO Receiver.

◆

NOT TO BE STOPPED, we continue with a short newspaper item to which was appended a very appropriate observation. Here she be.

Sant Margherita, Italy—Marconi announces imminent perfection of experiments to halt airplanes, warships, and autos with ultra short wages.—*Pittsburgh Press.*

Sounds like the powerful N R ray.—*The New Yorker.*

Which merely goes to show that at least half the nation is preoccupied . . . and it's all because of the dark influences playing upon man like the rays of a searchlight.

A TEA ROSE to "Babs" at W6CIN, Arcadia, California, whose gentle, well modulated voice puts stars in our eyes.

About seven in the evening we turn to the 20-meter band to learn how her crop of lemons is coming along. The last we heard, it's going to be a good one. Hope so. She needs lots of lemons to pay for the juice. No juice, no Babs; no stars in our eyes.

◆

WE ARE CONCERNED over the omission of an emphatic denouncement from the list of amateur abbreviations. These boys have their 73's and their CUL's and their FB, OM's, and quite a collection of other hyphenated articulations, but nothing that expresses, even in the mildest form, the disgust they must— and we do—feel at times.

With a view to adhering rigidly to the abbreviated forms used by the Ham fraternity, and subject to the approval of the F.C.C., we offer two simple letters, to be appropriately spaced when used, which, we believe, will satisfy the soul of many a harassed amateur if they be sufficiently drawn out. The letters are P—U.

◆

WE ARE ALL for instituting a course of training for the 'phone-amateurs-who-have-nothing-to-say . . . and say it. As a matter of fact, we are all hopped up over the idea, and have as an object the training of at least one amateur in each district who will read us a story at that critical moment between consciousness and peaceful slumber. Then we can go to bed with the headphones on—a secret desire we have had for some time, like the desire some people have to sleep in the raw.

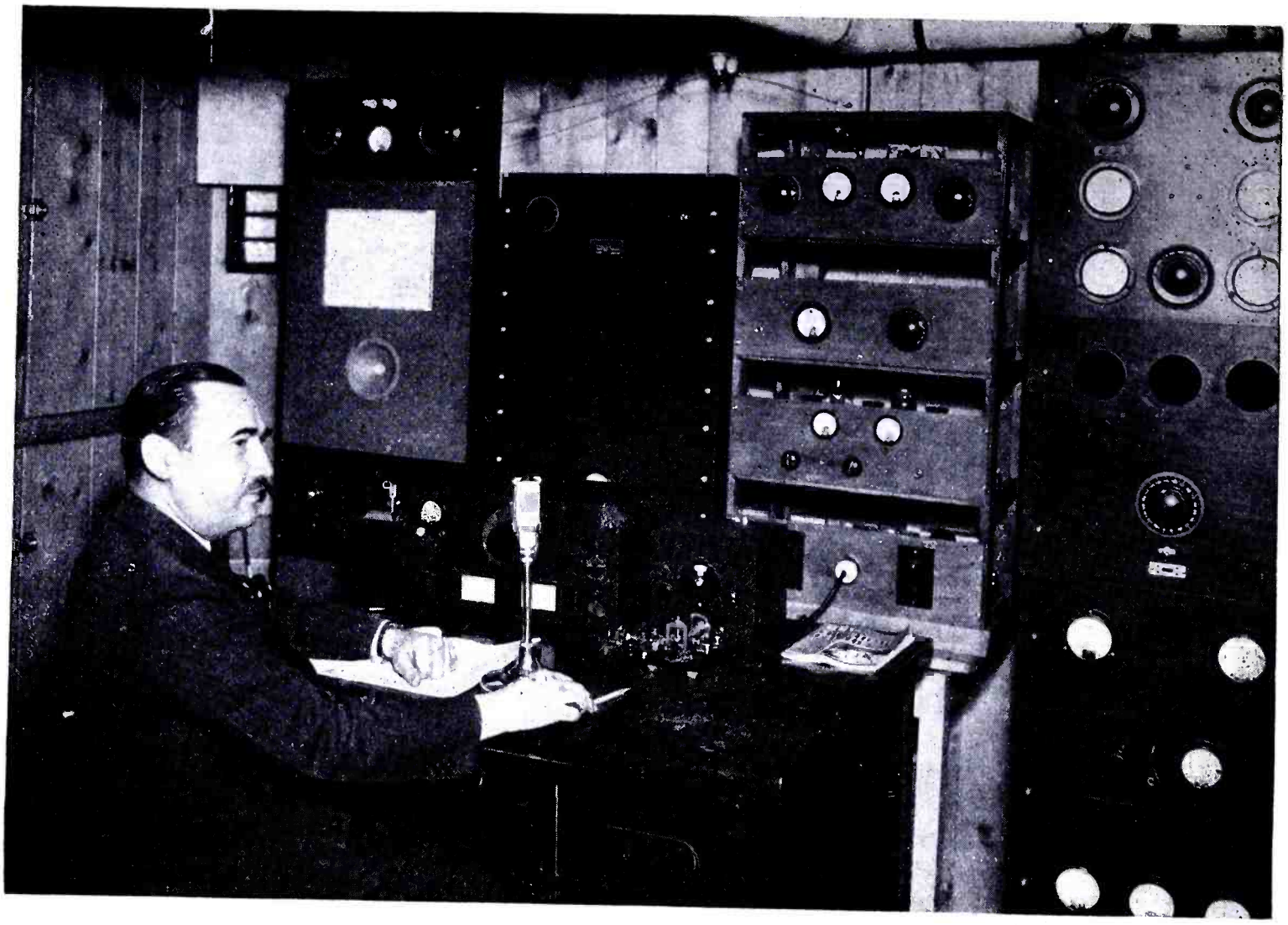
◆

PRIOR TO OUR attack of corns, we had slight difficulty with the 6E5 tuning indicator in our RCA set. Being somewhat of a fiddler, we pulled the chassis and learned upon close investigation what appeared to be an oversight on the part of one of the RCA girls—that is, a missing connection.

After adding the wire our reason told us should be present, we replaced the chassis and idly tuned the set to LQE—a' way down thar in the Argentine. (This is a code baby, and all he sends is LQE and the frills that go with it.)

Happening to glance at the bare face of the 6E5, we saw what looked very much like a string of hot dogs that had been made without thought to uniformity.

Suddenly it dawned on us that we had made LQE's signals remain motionless. Yes, sir—there was that baby's call just as pretty as a picture. Black magic, you say? Not a bit of it . . . stroboscopy, just stroboscopy.



"Doc" Dunn—Amateur Station W2CLA

By S. P. McMINN
W2WD

FEW STATIONS are more complete, certainly none is more one-hundred percent simon-pure amateur, than is W2CLA, owned and operated by Major L. J. Dunn, Ex-Radio Aide to the Chief Signal Officer, U. S. Army, ex-director of the Hudson Division A.R.R.L. organizer and president of the pioneering Garden City Radio Club and bred-in-the-bone experimenter.

"Doc"—the appellation is due to the D.D.S. that follows his name in the phone book—dates his radio activities to the "way back when" days; way back when spark transformers melted the copper in the a-c feed lines; when sync gaps roared and whined; when Gernsbach's gadgets were the pride and joy of more than one budding ham; when coherers gave way to VTI's; when Telefunken tubes began to blossom and then to bloom; when 200 meters meant anything south of WJZ; and when J. H. Bunnell was the only place in New York you could buy a key.

Today the shack holds three complete transmitters and two receivers, not to mention portable equipment for transmitting and receiving and an assortment of necessary testing instruments including a precision type Lampkin freq-meter.

Doc takes his radio seriously. It is a hobby that he rides hard but it doesn't ride him. Closely confining work makes relief vitally necessary. And he finds that relief in radio, among his radio friends numbered in thousands all over the U. S., in flying and in photography. These other things, though, are a side line. Radio is and always has been his favorite child.

He gets a great kick out of building things and making them work. He may not be entirely orthodox in his adoption of circuits and wiring diagrams, but the adaptation generally gets results, and that's what counts.

The Main Rig

Just now the transmitter that gets the greatest play is the 14-mc rig, which, except for a Collins speech amplifier and modulator, was designed and built in the shack with the collaboration of Ed Ruth, W2GYL. The circuit is orthodox and in its present final form represents quite a period of experimentation and revision to bring effectiveness and efficiency to the topmost point. The r-f portion starts off with a '47 controlled by either of two crystals slightly different in frequency for quick QSY and selected by the flip of a switch. That tube, operating in the 3500-kc band, feeds an RK-15 doubler which in turn excites an RK-20 pentode that just about kicks the grids out of a pair of Western Electric 304A's in the final push-pull Class C stage. Running normally, the input is in the neighborhood of 240 watts.

The speech amplifier and modulator, as previously mentioned, is a Collins Model 7-C and has sufficient gain for the use of a crystal microphone without additional pre-amplification. The antenna is a Johnson "Q" fed through a Collins-type impedance-matching network and the signals draw a flock of QSL cards from all over Europe every time the rig is turned on.

Two separate power supplies are used and both are Thordarson throughout.

Each is rated at half a kilowatt. One supplies all the power, both B and C, for the r-f lineup, and the other puts the punch in the modulator which terminates in a pair of 203A's.

All control switches are brought to the operating table. In fact, operation of any and all equipment is within reach of the operator's left hand.

Second Transmitter

The second of the three transmitters is the 3500-kc band cw rig used mostly for AARS network communications and for rag chewing when the urge to pound brass over-rides the kick that comes from voice communication. Like the other, this rig starts off with a '47 similarly controlled from one of several crystals and feeding an 865 doubler which excites a pair of 845's in push-pull, with the final stage a pair of good, old 204's that are still going strong after years of hard service that should have entitled them to peace and quietness in the radio graveyard long ago.

Up to the 845's, juice for this rig comes from a Thordarson-powered rectifier rated at half a kilowatt. The plates of the 204's blush generously under the influence of a 1 kilowatt Esco motor-generator, which is completely enclosed and remotely controlled. The antenna is a half-wave Zepp fed through an impedance-matching network.

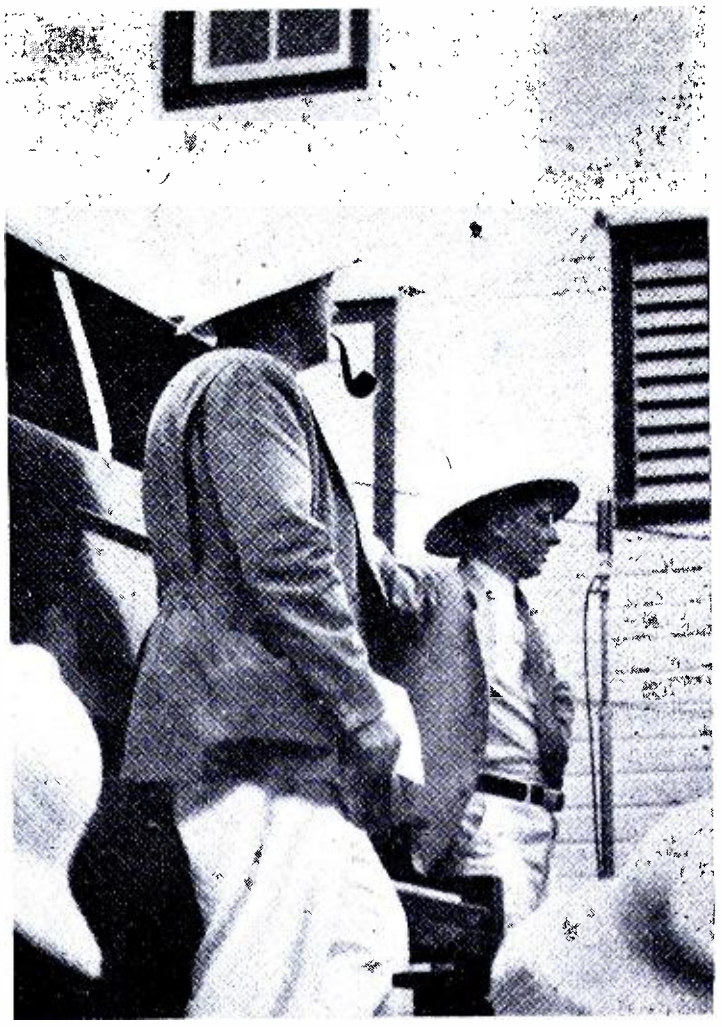
Ultra-Short-Wave Transmitter

The third transmitter—the one that supplies a great deal, if not most, of the fun—is a long-line 56-mc oscillator with a pair of 801's in it modulated by 46's in Class B. Local communication within a radius of 15 or 20 miles is carried on in this 5-meter band, where duplexing becomes so simple and so attractive. The antenna for that rig also is a Johnson "Q" located in the attic. Much experimentation has been done with beam arrays but space limitations have prevented the results that were hoped for.

Receiving Line-Up

In the receiving line-up a National HRO has the place of honor. The complement of coils permits coverage of the entire spectrum from 30 kc to the lower fringe of the broadcast band. The other receiver is the old reliable National SRR which has outlived any number of experiments to improve reception and has come to be looked upon as a standby. As "Doc" says, "It wears well."

Considerable experimental work has been done on frequencies as high as 112 mc and at one time recently a complete network of five or six stations operated in and around Garden City within a radius of about ten miles. At each station the equipment was similar, consisting of a single 800 in a long-line oscillator using modulation equipment switched over from the 56-mc rig. Receivers were built around the then new RCA Acorn tube. Excellent results were obtained locally but the small number of 112-mc stations in operation outside of the immediate neighborhood made return to the 56-mc band seem desirable.



At the Gala Phonefest held at Thorne Donnelley's (W9PZ) Lake Bluff, Illinois estate, Arthur Lynch is shown addressing the thousand or more phone men who were in attendance. Thorne and his famous pipe are shown in the foreground. Incidentally, this photo was taken by James Millen, vice president and general manager of the National Company.

Up In The Air

Doc holds a transport pilot's license and gets up into the air a couple of times a week. Frequently he takes one or another member of the Garden City Radio Club with him to carry 56-mc gear in his lap. A great deal of pioneer work has been done between planes and with ground stations at distances up to nearly a hundred miles.

As an organizer Doc's best work will be remembered for what he did for the Hudson Division of the A.R.R.L. But the birth of the Garden City Radio Club, which has become so well known throughout the length and breadth of Long Island and beyond, will endear him more to those who work most closely with him. The club came into being as the result of thinly veiled threats to wipe the amateur fraternity right off the map of Long Island. Through a misunderstanding of the purposes and achievements of amateur radio the city fathers of Garden City decided after due deliberation that amateur radio was not a desirable thing for a residential community and that there just couldn't be any more of it. Under the leadership of Doctor Dunn, the Garden City Radio Club came into being. A technical committee was organized to offer help, guidance and cooperation with the city authorities and the whole matter was smoothed away to the complete satisfaction of both the amateurs and the graybeards.

The author, S. P. McMinn, pounding brass.

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NEW BBC TRANSMITTERS

THE BBC has placed orders with Marconi's Wireless Telegraph Company, Ltd., and the Standard Telephones and Cables, Ltd., for two additional short-wave broadcasting transmitters for the BBC Empire Broadcasting Service. The construction of a new building at Daventry to house the transmitters, together with a greatly extended aerial system, will begin shortly.

THE REINARTZ S.W.

IT happens that your Editor attended the Cleveland Convention when Reinartz told about the performance of the antenna, which is so well described by Harry A. Tummonds in the accompanying article.

Later, while attending the Gala Phonefest at W9PZ's Chicago station, he ran into Floyd Miers, W8LN, from Buffalo. The latter had also heard Reinartz describe his antenna and made one up and put it to use. He was most enthusiastic about its performance.

In order to determine the characteristics of this new idea, we arranged to have several of them used in the second district and the results have been remarkable.

John Reinartz claims a gain of 8 for this type of antenna, so that a 40-watt transmitter which would normally deliver about 20 watts to the antenna could be considered to have 160 watts in the antenna in the particular direction in which it is aimed.

We suggest that this antenna, and the long lines oscillator arrangement described in this issue, as being just about ideal for five-meter operation.

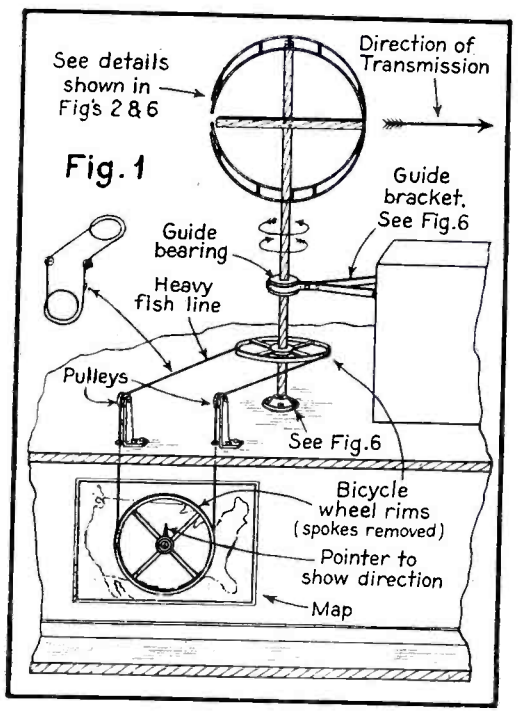
A Reinartz Beam Aerial for 2½-meter operation would be less than 17 inches in diameter. We hope to have more to say about it soon.

By H. A. TUMMONDS
W8BAH

THE AUTHOR

EVERY NOW AND then when activity on one or another of the ham bands seems to be stagnating, John Reinartz, W1QP, pops up with something so revolutionary and so simple as to make us all wonder why we had not thought of it ourselves.

At the Central Division Hamfest recently held at Cleveland, John told us of a new antenna which seems to have tremendous possibilities. It is more than ordinarily useful in locations where other types of directive antennas are out of the question because of their size. A beam array such as James Millen and Ross Hull have been using in connection with their extraordinary work on five meters between Malden and Hartford would be an inconvenient device to attempt to attach to the top of a flag pole. There would be no trouble in using the antenna we are about to describe, even in such a location.



Sketch of a complete Rotary Beam Aerial installation.

Directivity

In addition to providing an antenna of very small dimensions, this new scheme concentrates a large portion of the transmitted wave in a desired direction. The same holds true for the antenna when it is being used for reception. Desired stations, therefore, are received with very much greater signal strength, and interference from stations, if from one side or behind the antenna, is reduced materially.

Where a station is to be operated on a fixed frequency, the antenna can be designed for that particular frequency only and it is likely that greater efficiency may be noticed than in the present design. However, for ham operation in the 56-60 megacycle band, Reinartz recommends that the antenna be designed for optimum performance in the middle of the band and that permits tuning up and down from the 58-megacycle position, without serious losses.

Materials Required

The materials necessary for making the antenna, include:

Two 8-foot lengths of soft drawn copper tubing, ⅜ inch in diameter.

One wooden pole, as high as it is desired to extend the antenna above the roof.

One cross arm, approximately 2½ feet long. A cross section of 2 inches x 2 inches is plenty for these sticks.

Eight 6 inch wooden dowels, or square separators, are used to keep the pipes apart and the manner in which they are employed is shown in the accompanying drawings. These dowels should be immersed in paraffin, if the antenna is to be out in the open.

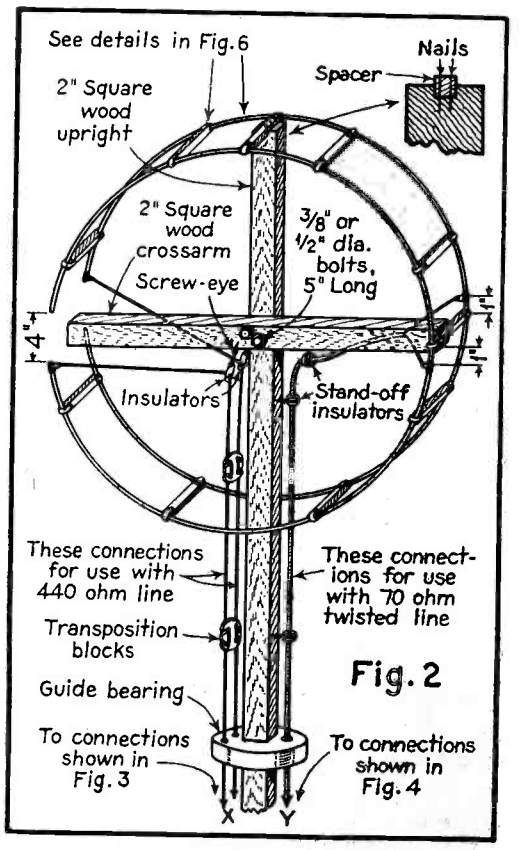
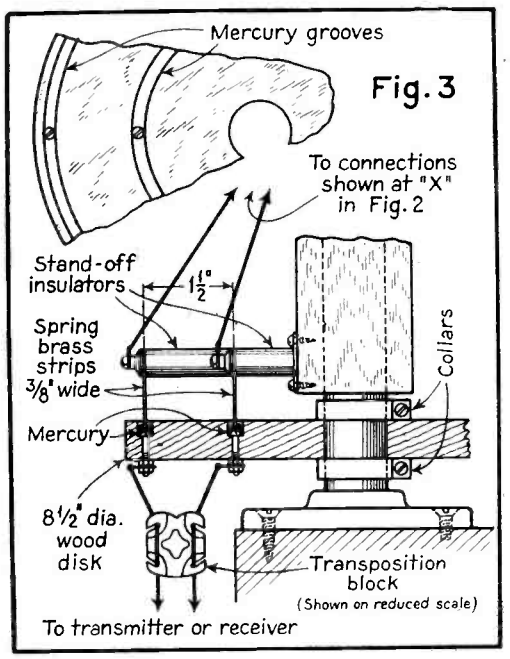


Fig. 2

Details of the aerial proper, and how the transmission lines are connected.

Soft drawn copper tubing is recommended for this type of antenna because it is so easy to manipulate and it will retain the position to which it is set. Hard drawn tubing is a bit more difficult to use because it is likely to spring out of shape. Care must be exercised in manipulating the soft drawn tubing to prevent the outside surface becoming dented. The ultimate form of the antenna is illustrated

ROTARY BEAM AERIAL



How connections are made between the transmission line and aerial.

in Fig. 1 and it will be seen that the 8-foot lengths have been bent into the form of a circle. This circle has an open mouth of 4 inches.

Forming the Tubing

The easiest way to bend the tubing is to describe a circle, having a 33-inch diameter, on the floor or wall. Then nails may be placed around this circle, about 4 inches apart. The tubing is then bent around these nails. Both pieces of tubing are treated in this same fashion. The two are then joined to the wooden dowels by any convenient method, such as a metal strip wrapped around the tubing, as shown in the accompanying drawings. Where maple dowels are not available, sticks made of almost any kind of wood, ½-inch square, will serve the purpose very satisfactorily, particularly if the outside end is slotted so as to form a fit for the tubing itself. Separators of this kind are very easily made from a long length of ½-inch square wood with holes made by a ⅜ inch bit, having their centers 6 inches apart. This long strip is then cut across the holes as shown.

The mast and cross arm are joined by any convenient method and the use of two 4½-inch machine bolts, as illustrated, has been found to work very well.

Next the two pieces of tubing are attached to the separators and the entire assembly is then placed on the mast and cross arm.

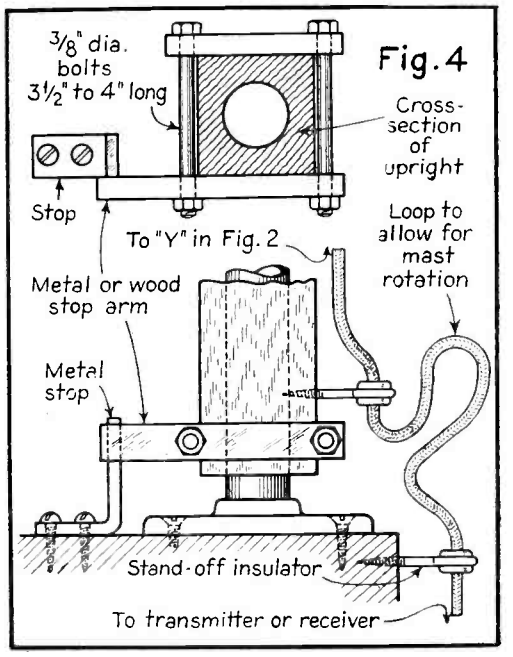
Assembly Details

The details for assembling the mast and cross arm are a matter of convenience and personal preference. It may, for instance, be simpler to extend the top of the mast above the loop and use a thirty-six inch cross arm. In this case, the separators may be fastened to the surface of the mast and cross arm. It is suggested that the separators be drilled, before the wood screws are put in place, to prevent splitting. This form of construction makes the slotting of the mast and crossarm unnecessary.

There is less tendency to split wood and the screws may be driven home with greater ease, if the screws are pushed into a cake of common soap before they are used. The soap acts as a lubricant.

Transmission Lines

Almost any form of transmission line can be used between this antenna and the

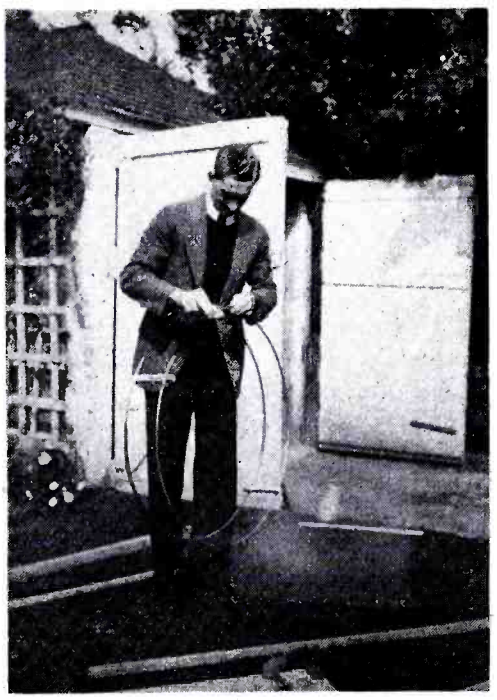


How the base of the aerial is made. Note loop in transmission line.

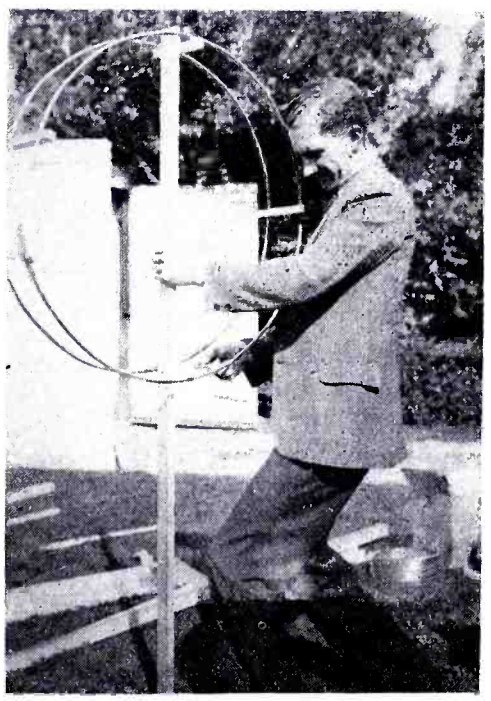
output circuit of the transmitter. If a 440-ohm line, such as is very readily made by the use of two stranded conductors and transposition blocks—the wires are not transposed in this instance—the connections are made as shown, at the left in Fig. 2. If a low-impedance line, such as a twisted pair, is to be employed, the connections are made as shown at the right in Fig. 2. A very simple method of making the connections between the line and the tubing is to utilize the large size National grid clips and when the correct position on the tubing has been found, these clips may be soldered directly to the tubing itself.

The clips should be put on the tubes, before assembly, if a low-impedance line is employed. It will be seen that the

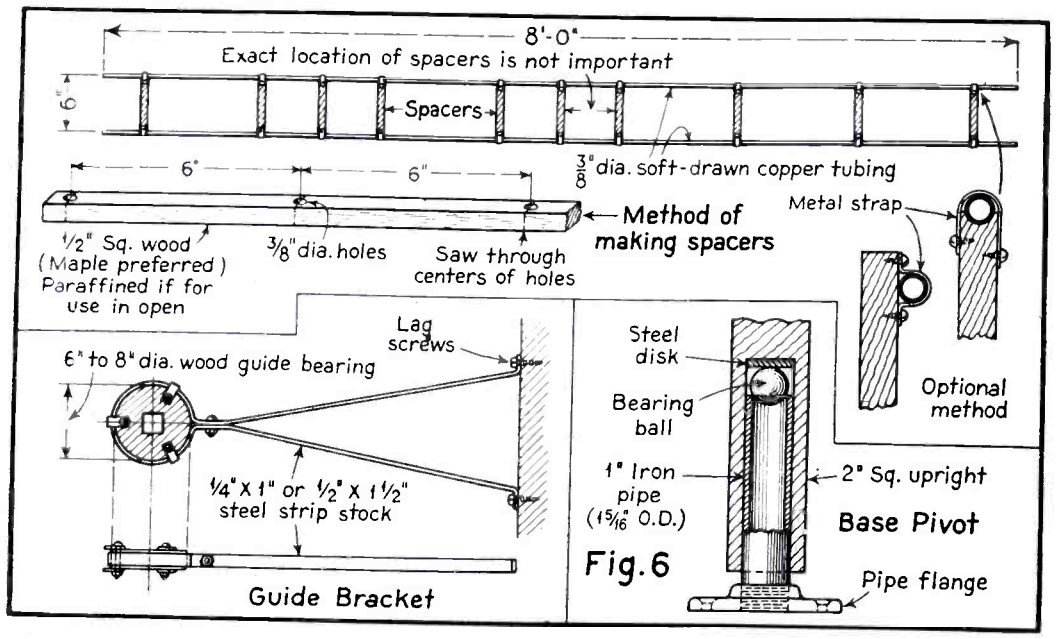
Winding the loops . . .



The loops are fastened . . .



The frame is added.



Details of the spacers, guide bracket and base pivot.

transmission line can be run along the cross arm to the mast and then down the mast to any convenient place above the station, where the twisted pair type of line is employed. Precautions for preventing the line becoming twisted are much easier provided than would be the case where the open line is employed.

The simplest form of a rotary antenna may be obtained by drilling a hole in the bottom of the mast and placing the mast itself over a metal pivot. A few suggestions for mounting the mast and supporting it against the side of the building, as well as a simple means for rotation on a pivot, are all covered in the sketches.

Non-Twisting Feeders

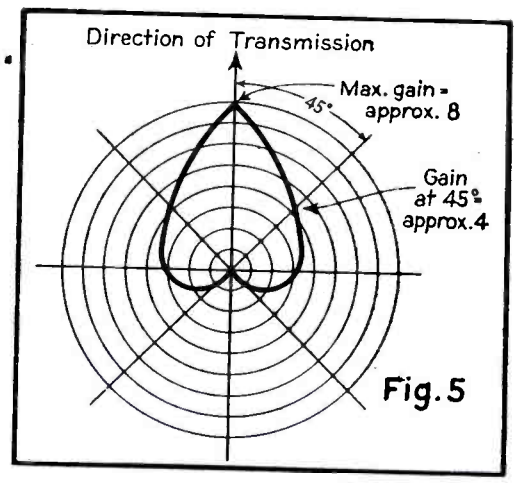
Where the high-impedance, spaced line is used, the difficulty of having the line twisted is obviated by the arrangement shown in Fig. 3. In this case, the transmission line which runs parallel to the mast is terminated at two stand-off insulators. These insulators support two fingers which extend into the mercury which is placed in grooves, in a disc, made from a piece of paraffin-treated wood. A hood can be placed above the mercury container, to prevent dust or water accumulating. By this arrangement it will be seen that the antenna can be rotated continuously at will, without having any trouble with the feeders.

Where the twisted pair transmission line is employed, this device is unnecessary, but a stop should be provided which will permit full 360 degree rotation of the antenna, but will prevent the transmission line becoming twisted more than a single turn, as shown in Fig. 4.

Direction of Transmission

The direction of transmission with both high and low impedance lines is shown in Fig. 1. An approximate idea of the distribution for such an antenna, when it is in any given position, is shown in Fig. 5.

For all-around five meter activity, it would seem as though Reinartz has really provided something very satisfactory for us, in this antenna system.



Showing direction of transmission and distribution pattern of Rotary Beam Aerial.

"Battling the Ionosphere With Kilowatts"

A NEW APPROACH to the transmission of short-wave radiotelegraph signals over long distances will be tried by RCA this Fall on the completion of a new 200-kilowatt short-wave transmitter now under construction at the company's station at Rocky Point, Long Island.

By means of this tremendous short-wave power, which is 5 to 10 times the intensity usually employed in international communication, it is proposed to "battle the ionosphere with kilowatts" and over-ride certain natural obstacles which to date have limited the signal strength under abnormal conditions.

The Ionosphere

The ionosphere is an electrified region at the earth's outer atmosphere. Short-wave radio signals are reflected back and forth between this region and the earth in their passage around the globe. There are cycles in the daily condition of the ionosphere which make it necessary to use several wavelengths for long-distance radio communication. There are also times of magnetic disturbances, when the turbulent condition of the ionosphere causes absorption and dispersion of the radio signals and consequently reduced signal strength at the receiver. It is then that even highly concentrated radio beams become least effective.

What the engineers expect to determine by means of the new 200-kilowatt transmitter is whether the hours of usefulness of one or more of the wavebands used in long-range communication may not be lengthened and the effects of magnetic storms minimized by the use of increased power.

To Transmit on 28 Meters

The new transmitter will be operated at first only on one wavelength, in the neighborhood of 28 meters. This wave has been selected as the trial one which promises the greatest general serviceability. It is expected that when radio signals from this transmitter are hurled against the ionosphere the greater power will cause them to be reflected back even during less favorable hours of operation for that particular wavelength. Present-day commercial radio practice has been brought to a high degree of reliability by directive transmission and the diversity system of reception. This new step by RCA looks toward further conquest of the ether by enabling transmission through severely disturbed periods.

In a word, it is proposed to meet nature in her occasional turbulent moods with the sheer brute force of man-made radio power. And apparatus more powerful than any ever built for this service is being made ready to harness kilowatts to the task.

The new transmitter will be immediately available on completion for commercial use in multiplex radiotelegraph transmission and facsimile transmission. It may ultimately be adapted to the transmission of addressed programs of voice and music to foreign countries.

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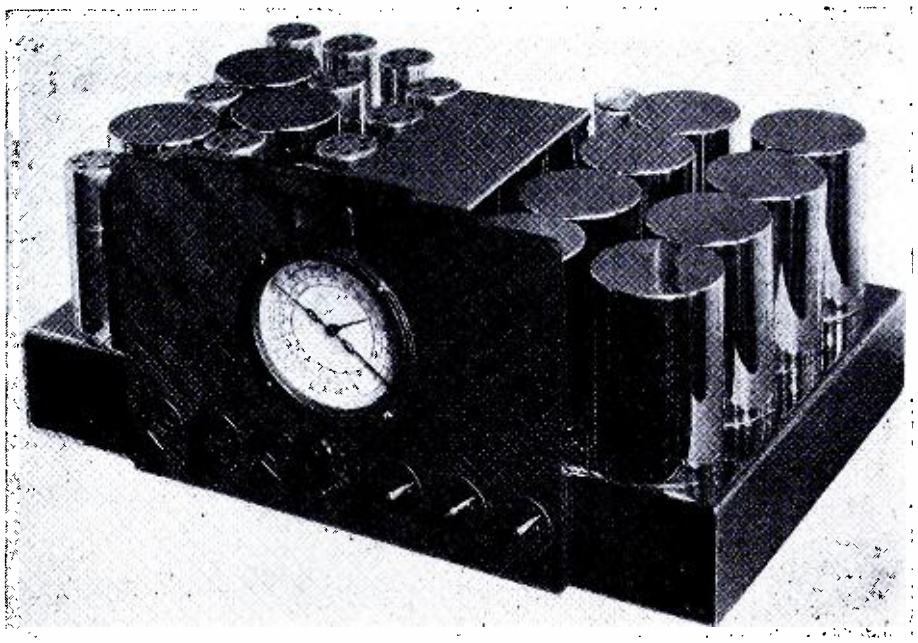
EARLY TO RISE, LATE TO BED IF YOU WANT CHINA

"AMERICANS WHO want to hear broadcasts from China must get up early or stay up late. The waves of ZBW, Hong Kong, flash across their part of the world in the 'dead of the night.' Recently, at 4:15 A. M., in New York, an announcer on the 8,750-kilocycle channel disclosed that ZBW was relaying a program from Daventry, England, but he did not say whether the broadcast was a direct relay or from a recording." *(N. Y. Times).*

Nineteen tubes — battleship construction—high fidelity—sixty watts audio peak—control flexibility—9.4 to 568 meters and 732 to 2150 meters—high r-f gain—"deep down" automatic volume control—double speakers . . . The Masterpiece IV. Here it is.



THE MASTERPIECE IV

By McMURDO SILVER

IN THE DESIGN of the Masterpiece IV as much careful and exacting attention has been devoted to mechanical perfection as to electrical perfection. Much of this is reflected in the cleanness of the units as a whole, and still more by the ship-shape mechanical work visible beneath the chassis themselves, but much more indeed remains unseen and unheard forever, as it should.

In general, the technique of battleship building has been rigorously followed—rivets used where possible, lock washers, screws and nuts, every single component solidly and firmly fastened to its supports on the chassis—construction capable of withstanding both electrically and mechanically the hardest sort of treatment in shipment and in use, be it in the arctic or in the tropics.

Circuit

There are no trick secrets in the design of the Masterpiece IV, simply tried and proved engineering experience carried out to the *nth* degree. Hence, no hesitation is felt in revealing the circuit diagram, and in describing as far as space permits the salient points.

This circuit shows two 6D6 r-f pentodes used in two tuned r-f amplifier stages preceding the 6D6 first detector, to the suppressor grid of which is connected the 76 signal-frequency oscillator. These four circuits cover a total of five tuning ranges with a single four-gang, 365-mmfd condenser by means of five sets of four separate and distinct tuning inductances each, selected by eight five-position, wave-change switches operated by a single shaft and knob. All r-f circuits are trimmed and aligned by air dielectric, isolantite insulated condensers.

Following the first detector are the total of three dual air-tuned, 465-kc intermediate-frequency amplifier stages using 6D6 r-f pentodes, with the two-position, too-section switch which cuts out the first two stages for high-fidelity reception, or cuts them in for ultra-selective distance reception.

AVC System

Coupled to the third i-f amplifier is the r-f pentode section of the 6B7 used to provide additional i-f amplification for the avc system, which is in turn coupled to one diode portion of the same tube to develop rectified voltage for automatic volume control, which applied to the control grids of both r-f stages, first detector and two of three r-f stages, provides quintuple automatic volume control. This amplified and rectified avc voltage is further amplified by the triode elements of the 85 tube, for application to the visual tuning meter.

Also coupled, inductively, to the last i-f transformer secondary, is the 76 audio beat oscillator for short-wave station location and cw code reception. This secondary of the third i-f transformer feeds the two diodes of the 85 tube connected in parallel, which functions as second detector. Through the duo-diode i-f filter and load resistor the new rectified audio signal voltage is resistance coupled to the 76 first audio voltage amplifier.

In the plate circuit of this tube is the headphone jack, and the audio compensating circuits for the dual tone control system. These circuits involve a Clough system tuned push-pull audio transformer for low-frequency boost, the degree of which boost is controlled by varying the resistor (Bass Tone Control) shunting the transformer primary, and a high-frequency tuned circuit and load resistor in the series feed circuit to the 76 plate. The high-frequency compensation rheostat-condenser (Treble Tone Control) shunts the audio transformer secondary, which feeds through a twisted pair in the power cable to the grid of the push-pull Class A triode-connected 42's in the second audio, or power-driver stage, in the amplifier. These in turn couple through the double push-pull transformer on the amplifier to the grids of the four fixed-bias Class A Prime (AB) triode-connected 42's in the power output stage.

Splitting Filter

At this point the splitting filter isolating bass and treble frequencies to the bass and tweeter speakers comes in. It consists of a large output transformer coupling the output stage to the voice coil of the bass speaker, so wound that its distributed capacity is high and provides effective isolation against high frequencies for the bass speaker. Its primary serves as the plate load for the output stage, and across it is connected the series circuit of condenser and primary of the tweeter speaker coupling transformer. This small series condenser, coupled with the carefully worked out im-

pedance relations, effectively and automatically removes the tweeter from circuit on low frequencies but brings it into play from 3,000 cycles up.

Power Supply

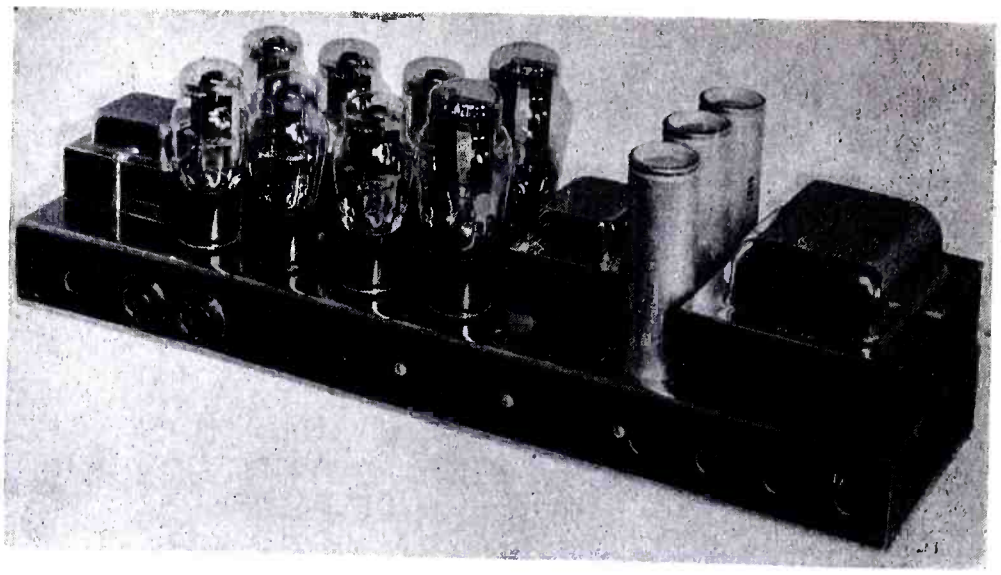
The power supply involves a very large and heavy power transformer operating from any 105- to 125-volt, 50- to 60-cycle power line (or through available reducing transformer, from 210- to 250-volt lines) which has three secondaries. One secondary supplies 6.3 volts at 7.5 amperes to the tubes of the tuner and amplifier. A second lights the 5Z3 rectifier filaments, and the third provides high voltage to the 5Z3 plates for rectification and filtration into the final plate and grid voltages for the receiver. This transformer is provided with an electrostatic shield between primary and secondaries to drain off power-line noise and prevent it getting into the receiver circuits.

Two 5Z3 full-wave rectifier tubes are used, connected in parallel, to supply the 250 milliamperes at 388 volts required to operate tuner and amplifier. Thus, each tube is operated at just half its rating, to insure long and trouble-free life, although one would do the work, but with no safety factor whatsoever.

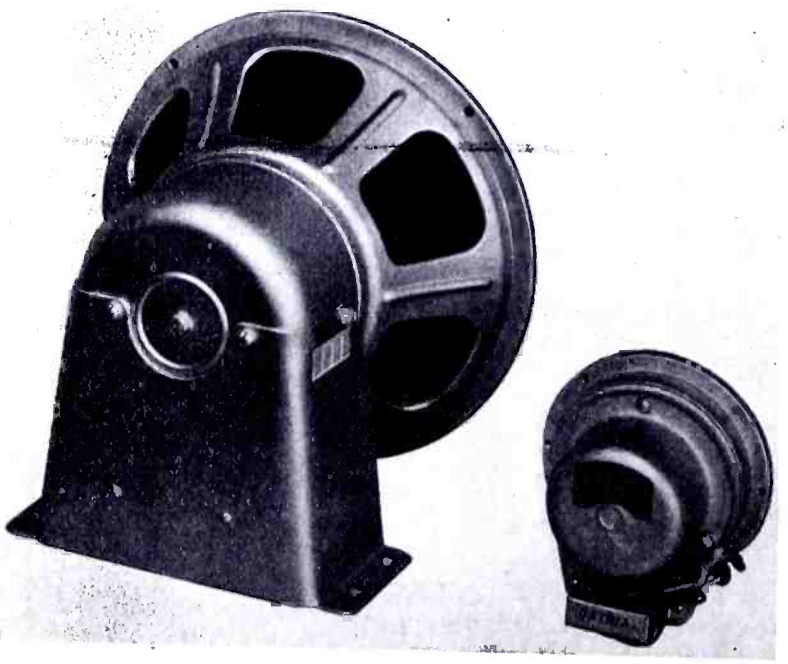
The filter system is choke input, employing one low-resistance choke, and the tweeter and bass speaker fields. The circuit diagram shows a series-pair input condenser, which, however, being of only .25-mfd. capacity (800-volt rating) to eliminate mechanical vibration in the input choke, is too small to function as a starting condenser, so that though diagrammed otherwise, the filter system is actually choke input—absolutely necessary for the well-nigh perfect voltage regulation necessary to powerful audio amplifiers.

Automatic Voltage Regulation

Following this choke is 16-mfd of 475-volt automatically self-healing wet electrolytic capacity; then 12-mfd of self-regulating filter capacity. After this is the third section of the filter, the bass speaker field obtaining 12 watts excitation, followed by 18-mfd of self-regulating capacity. These two self-regulating and total of three self-healing electrolytic condensers are just another fine point of the design. They temporarily absorb the voltage developed as a result of the quick heating of the 5Z3 rectifier tubes, which develop full voltage before the heater tubes are warmed up enough to absorb it as they do in operation. During this time interval of twenty to thirty seconds, the second two filter condensers act as absorbing resistors, but as soon as operating voltage reaches normal, they cease to draw current and resume their function of pure filter capacity. Thus by this new system, all strain on circuit components during "warming-up" is completely eliminated, while filter condensers being automatically self-healing, remove all possibility of breakdown in service.



The husky "power" chassis, containing the double-rectifier power-supply unit with special filter system, and the 35-watt Class AB amplifier which drives the dual dynamic speakers shown below.



"High-Low"—The giant and the midget: one for bass and one for treble. Together they reproduce a wide range of audio frequency tones.

Fixed-Bias Output Stage

Substantially fixed bias for the 35-watt Class A Prime output stage is obtained through the voltage drop across a resistor in the negative power supply lead, through which the entire current for the receiver, amplifier and bleeder network is drawn. During peak signal conditions the maximum voltage variation across this resistor due to changing current through it is such a small percentage of the total current flowing through it (and bias voltage developed across it) that the bias voltage variation is negligible, which permits of obtaining 35 to 60 watts of undistorted power output from the power output stage.

Gain Ratios and Inherent Noise

In the perfect radio receiver the final limit of sensitivity should be, but seldom or never is, the limit set only by thermal agitation in the input circuit—the constant movement of the electrons making up a supposedly solid copper wire in the first tuning inductance. The attainment of this connection is almost impossible to superheterodyne receivers because of noise introduced in the first detector-oscillator frequency conversion function. Quantitively this noise is about 4.0 microvolts for pentagrid converters (2A7—6A7 tubes); about 2.0 microvolts for ordinary separate detector-oscillator tube combinations, and about 1.0 microvolt for suppressor-grid injected oscillator-detector circuits.

From this it is obvious that the inherent circuit noise will be overwhelmingly great in relation to received signal when any attempt is made to receive signals in the range of ½ to 4 microvolts absolute input to the receiver. Equally obvious, any attempt to reach such usable sensitivities by increasing i-f amplification cannot remedy this condition, and will, in fact, only add i-f amplifier noise to already ruinous oscillator-detector

noise in any attempt to receive very weak signals.

The answer to this problem is the use of plenty of r-f amplification before the first detector in order that the received signal presented to the first detector-oscillator shall be so strong as to swamp out detector-oscillator noise, and to so proportion r-f, i-f and a-f amplification in the whole receiver that no noise will be introduced into its output except that due to thermal agitation in its input circuit, if the receiver be sensitive enough to show this up in its output circuit.

Thus it is seen that the ideal superhetrodyne receiver will have high r-f gain, the quietest possible first detector-oscillator system, relatively low i-f gain and relatively high a-f gain, since a-f gain is easy to obtain quietly and in addition prevents overloading of the second detector, provides good avc action, and plenty of amplification for phonograph or microphone operation when it is desired.

These requirements are met in the Masterpiece IV.

Temperature Isolation

The best electrical design insuring frequency stability and permanent accuracy of dial calibration and other characteristics can be easily ruined by normal tube and bleeder resistor heating affecting circuit components, particularly the oscillator circuit. The answer is double barrelled—circuit components substantially independent of heating over ordinary ranges, and the elimination of even such normal heating from delicate circuits.

This means that in the ideal receiver all r-f coils should be in individual shields on top of the chassis for good ventilation, and well away from heated tubes or bleeder resistors, with temperature shielding used in addition to air-dielectric trimmers instead of the usual unstable compression mica trimmers in which capacity change is a function of less than the ten-thousandth of an inch plate movement easily caused by even daily temperature changes, not to mention tube and resistor heating, on already strained plates.

In the Masterpiece IV all r-f circuits are located at the right end of the tuner, well away from all tubes, in individual shields having ample ventilation and of such size as to provide high inductance efficiency. Additional temperature isolation shielding is below the chassis which, coupled with ample ventilation, ample separation from heated tubes and bleeder resistors, stable anti-humidity impregnated inductances on heavy micarta insulating forms, and air-trimmer condensers, gives a permanency and stability of dial calibration and overall performance difficult to equal.

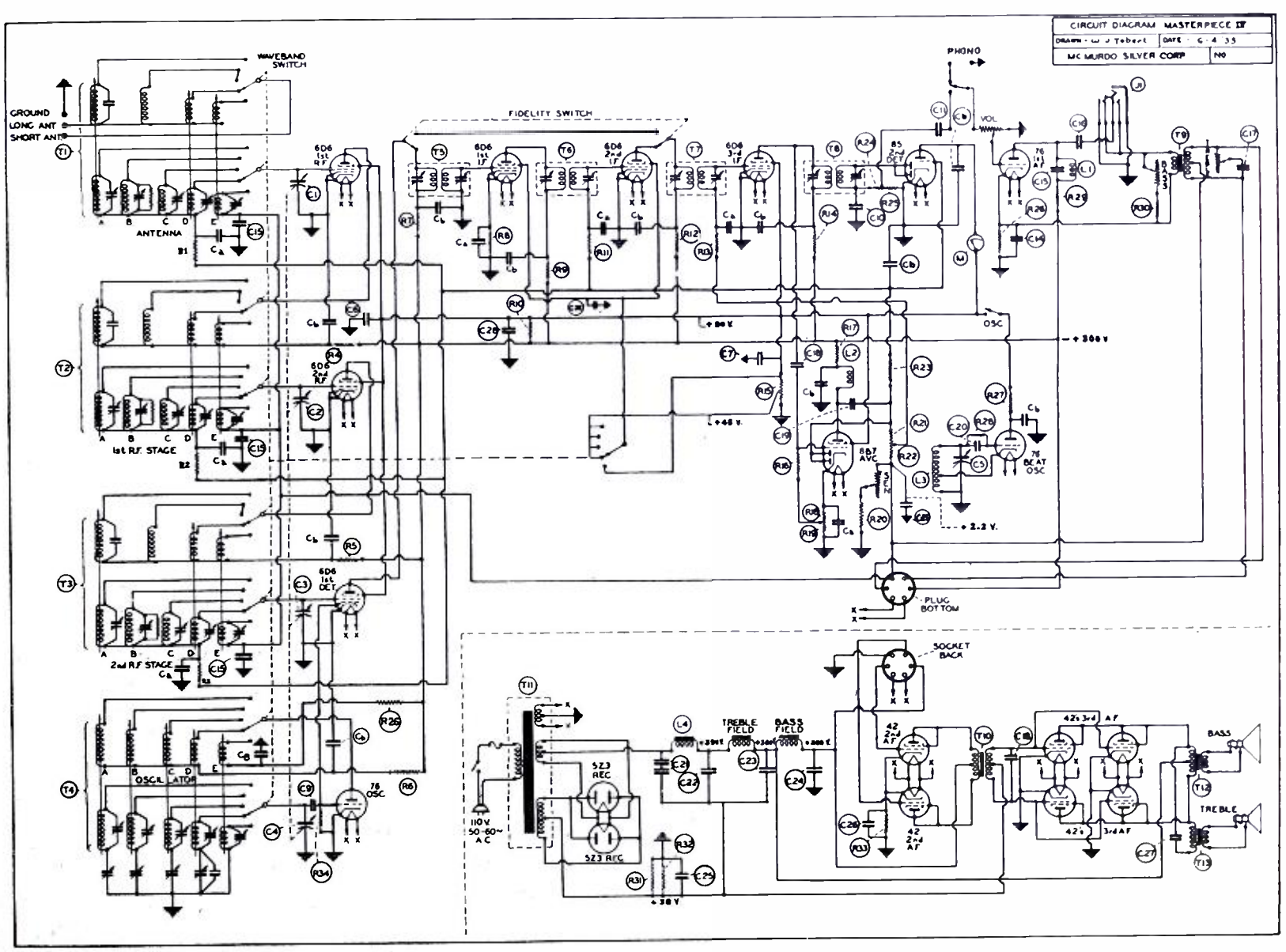
I-F Amplifier

As has been pointed out previously, a receiver boasting high i-f gain is to be avoided because high i-f gain is unavoidably synonymous with high inherent circuit noise. In the Masterpiece IV almost the entire i-f gain is obtained in the one stage used for high-fidelity reception. When the additional two i-f stages all cut in, they provide a total gain of only twelve times, but contribute greatly to selectivity.

This is the true function of the i-f amplifier of any superheterodyne, although only now being realized by a few designers—to provide needed selectivity, not noise-producing and hence undesirable excessive amplification. No i-f amplifier of any superheterodyne should ever show more than 20 microvolts sensitivity, and preferably not less than 60 microvolts, if the receiver lays any claim to high sensitivity not vitiated by excessive inherent noise.

The four i-f transformers of the Masterpiece IV each consists of two high-Q,

(Turn to page 96)



The circuit diagram of The Masterpiece IV—worth a thousand words.

A DOCTOR— AN AMATEUR

Dr. Burton T. Simpson— Station W8CPC

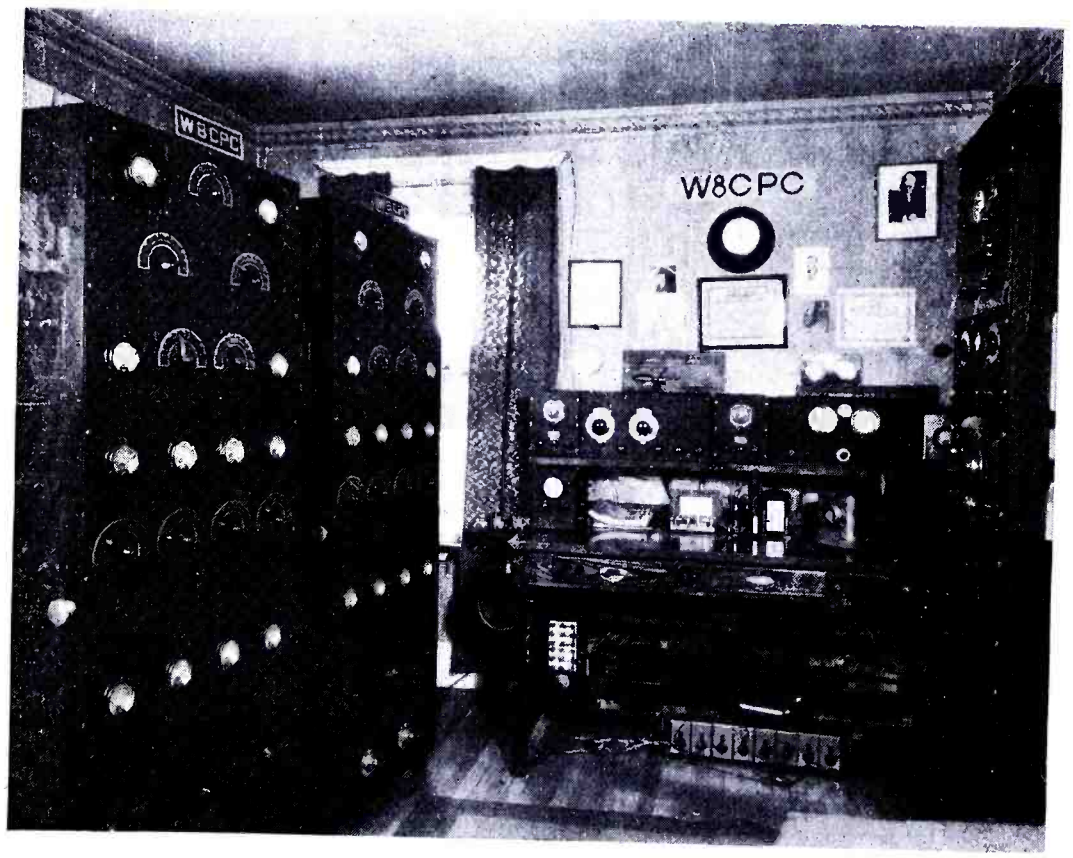
Dr. SIMPSON

By FLOYD MIERS, W8LN—Buffalo

DR. BURTON T. SIMPSON, W8CPC, is one of the most enthusiastic radio amateurs in the United States. He entered the amateur ranks in 1926 with a modest Hartley transmitter and since that time has kept pace with the advancement of the art. He was one of the first amateurs in his territory to successfully put a crystal-controlled transmitter on the air and was the first amateur in Western New York to obtain an extra first class amateur ticket. At the present time Dr. Simpson has one of the outstanding amateur stations of the country, a photograph of which is shown on this page.

The "Shack"

The "shack" is located in a large bedroom on the second floor of his home with a good sized adjoining closet for a work shop. There are two transmitters with identical circuits, viz., 802 oscillator, 210 doubler, 210 buffer, a pair of 830's for amplifier, modulated Class C by a pair of 845's. The final linear amplifier consists of four 852's push-pull parallel. One transmitter, using a 160-meter xtal, is used for 40-meter cw and 8-meter fone, and the other, using a 40-meter xtal, is used for 20-meter cw and 20-meter fone. Both transmitters have one kilowatt input on cw and a half-kilowatt on fone. The antenna is a split Hertz, 33-foot flat-top on each side of the center, fed with 45-foot feeders and 40 feet off ground. This type of antenna is used because it works well on the three bands mentioned and also because of limitation of space in the back yard.



Station W8CPC—Transmitters and receivers galore! One transmitter is used on the 20-meter band only. The other is used on 40 and 160.

The Receivers

The receivers used at W8CPC are: a seven-tube home built superheterodyne with a Peak pre-selector, an RME-9 and an HRO. There are three oscillographs: a National, connected with transmitters to check the outgoing signals; an RCA connected with the receiver to check the incoming signals; and a Kaltman and Romander, connected with the audio system. The rack-and-panel job contains a 100-kc xtal bar oscillator in connection with a frequency meter, also the audio amplifier and a mixer system. The mike used at present is a Turner xtal.

In the work shop the five-meter receivers and transmitter are located. The doctor is an enthusiast on the ultra-high-frequencies and is president of the Omega Tau Five Meter Club.

Amateur Radio As Hobby

When the doctor is asked what he thinks of amateur radio as a hobby he becomes serious and will say that it is the finest hobby in existence, but even more than that—it is almost a liberal education.

Dr. Simpson is at present intensely interested in the formation of fone organizations. He has been partially instrumental in the organization of associations in the following ARRL Divisions: Atlantic, Canadian, New England, West Gulf, Delta, Midwest, Central and Dakota, and is at present the president of the Atlantic Division Radiofone Association. When asked the object of forming fone organizations he will say, "To preserve amateur radio."

With the advent of a great group of short-wave listeners, the conduct of the amateur using radiofone is being sharply scrutinized. Ungentlemanly transmissions will not be tolerated. In the past the amateurs have policed themselves.

More recently the government has made some stringent regulations and has established monitoring stations to check and penalize the amateurs who commit any infraction of the rules.

In the preamble of the constitution of every fone organization may be found the following statement, "We, radio amateurs interested in radiotelephone, being desirous of upholding a high standard of this branch of the radio art, do establish this constitution." There is also a code of ethics by which every member agrees to abide. If every amateur would join the fone association and live up to its ideals there would be little to fear about losing our status and much to be gained.

Dr. Simpson not only likes to contact amateurs over the air, but enjoys meeting them personally. Therefore, he is a confirmed attender of hamfests and conventions. To date this year he has attended more than twenty of these functions.

Dr. Simpson's Activities

Perhaps you would like to know something of the doctor's activities aside from amateur radio. Dr. Simpson is the Director of the New York State Institute for the Study of Malignant Diseases. In plain words, he is the head of one of the largest institutions in the world for the study and treatment of cancer. The Institute has all the modern facilities for research and the largest amount of radium of any single institution in the world. Experiments are being carried on with ultra-high frequencies in the treatment of cancer, so you see that the doctor's knowledge of amateur radio has been of help in his own work.

Dr. Simpson does not confine his attendance to radio conventions but has frequently to attend medical and scientific conventions. He has attended and read papers at several international congresses in Europe and is known throughout the world as an authority on cancer. While the doctor does not practice medicine in Buffalo, he acts as consulting physician to a host of amateurs throughout the United States and Canada, for when an amateur sees in the call book that he is working an M. D., the amateur immediately takes the opportunity to get a little free medical advice! If you should contact W8CPC on the air, ask him to relate some of his amusing experiences along these lines.

The doctor has a favorite remark which he takes every opportunity to express, viz., "There is no such animal as a 'cw' man or 'fone' man—we are all AMATEURS." If one gets his kick out of cw that's his business; likewise for fone. However, the doctor believes that the fully rounded amateur should take advantage of all the art offers and operate both fone and cw. Another belief the doctor has is that every amateur should be a member of the ARRL. Were it not for this organization there would be no amateur radio today. It is conceded that the FCC recognizes the League as the spokesman for the amateur. As members of the League we can therefore cast our vote and have something to do with the recommendations for the best interest of amateur radio.

Frequency Allocations

The doctor is of the opinion that we are more liable to lose some of our frequencies than we are to gain any. The television group is after our 56-megacycle allocation, and if the broadcast listeners become antagonistic, we may lose more. The Government will not tolerate a nuisance and it therefore behooves every amateur to be meticulous in his operating practices. There has been some dissention in the amateur ranks, but this is a mistake and we should stand united if we wish to keep the finest hobby in the world.

A GOOD STORY

ONE OF THE best after-dinner speakers and story tellers we have heard in many moons was brought to our attention when we were among the "stuffed shirts" at the banquet which terminated the Central Division A.R.R.L. Convention, recently held at Cleveland. We refer to Mr. Bail, Director of the A.R.R.L. for the First District. What's more, he claims that the yarn he told is a true story. As we remember it:

The Radio Inspector for the First District has his headquarters in Boston. The present encumbent is a rather pleasant but retiring gent by the name of Kolster. Brockton is a Massachusetts city, famous, among other things, for its Annual Fair. It is not too far from Boston and Mr. Kolster is reported to have taken himself to the Brockton Fair. Among the exhibits a certain amount of radio equipment was on display and among the radio equipment there was a buzzer hooked up with a key, of the type employed by amateurs for code practice.

Naturally the Radio Inspector gravitated to the radio exhibit and ultimately began toying with the key. A young fellow of some sixteen summers listened to the buzzer for a time and then remarked that he, too, knew the code. Mr. Kolster was pleased and turned the key over to the young man who went about his transmission with great zest. After batting out quite a little message he signed off with W1VH.

If our memory has tricked us regarding the call, we are sorry. It is unimportant except for the fact that the kid used a two-letter call. Looking at the boy rather quizzically, the R. I. seemed to be of the opinion that he was rather young to be the possessor of such an old call.

On being interrogated, the youngster told Mr. Kolster that he had never taken a license examination and that he had seen a lot of call letters in a call book and had appropriated one for himself which he thought had a rather nice swing.

Further interrogation brought out the information that there was very little chance of his being caught and sent to jail for operating his station without a license; that the Radio Inspector was an old fogey, who spent all his time in Boston and would not be able to catch up with our young friend even if he did get to Brockton.

Mr. Kolster was then reported to have said:

"I don't suppose you have any idea who I am, do you" The youth agreed that he didn't. After the Federal Badge, on the inside of the R. I's. coat had been displayed. the boy got off some such conversation as this:

"Don't some funny things happen when you least expect them? Here I am telling you all about myself not having a license and you being an old fogey and never getting to Brockton and all that. You know, I never thought about what I was doing. Well, I didn't know who you were and I don't suppose you have an idea who I am, do you?"

Mr. Kolster was taken a bit back by the question and agreed that he did not have any idea who the youth was.

"That's a swell break for me!" said the boy, as he turned on his heel and dashed out of the building.

◆

SEES SHORT-WAVE PROMOTING GOODWILL BETWEEN NATIONS

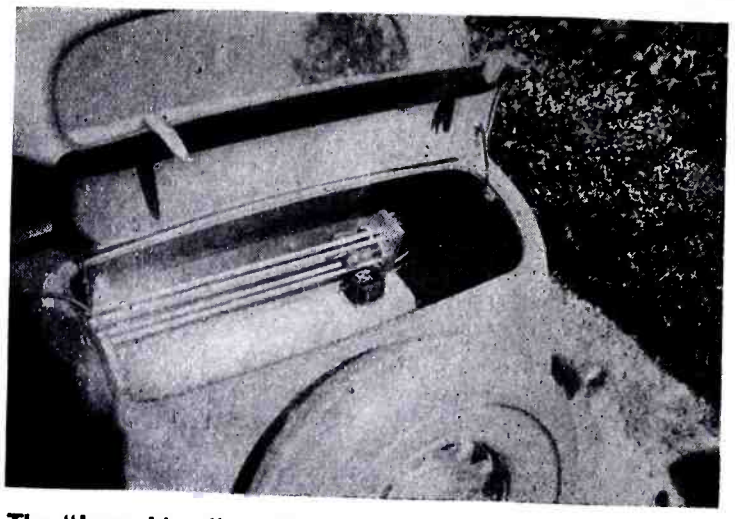
EXTENDING felicitations to the Radio Fellowship at Beverly Hills, Calif., Secretary of Commerce Daniel C. Roper, declared that the Fellowship has splendid purpose in attempting to create a better understanding between the nations of the world through the medium of radio.

"The education of the people in the use of short-wave broadcasting," Secretary Roper said in a letter to M. H. Ryder, Chairman of the organization, "will provide another means of promoting good-will among the people of the different nations."

A Five-Meter "Long Lines" Oscillator

A newly developed method for using this system. Marked stability and increased efficiency are its features, not to forget the simplicity of the oscillator and its low cost.

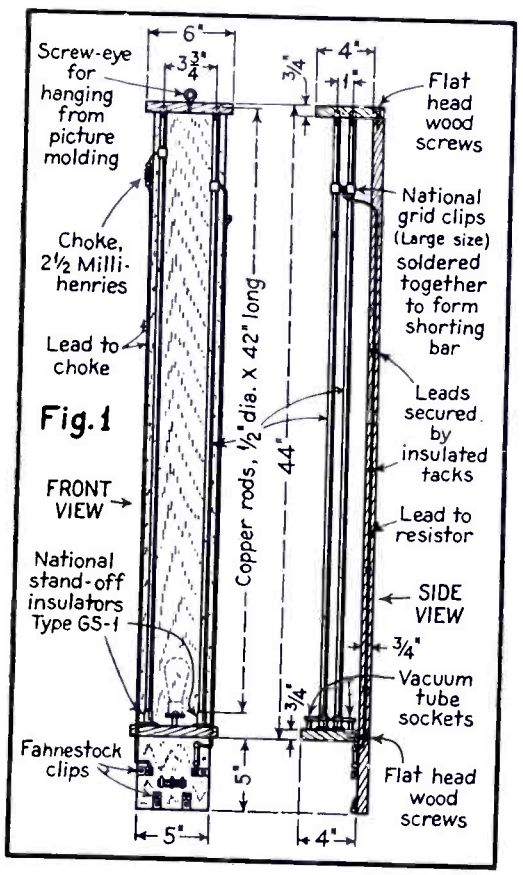
By ED. RUTH, W2CYL



The "Long Lines" oscillator mounted in the baggage compartment of an auto. It has portability plus.

THE ACCOMPANYING drawings illustrate the simplicity as well as the extreme portability of a newly developed method for using the "long lines" oscillator which was introduced to ham radio in its first practical form by George Shuart, W2AMN.

The unit illustrated and described here is actually in use in the station operated at his home, by Arthur H. Lynch, W2DKJ. In this case the oscillator is hung from the picture molding and is several feet away from the remainder of the transmitting equipment. It will be observed that two rather heavy twisted pairs are used to feed the filament current and the plate voltage from the regular power supply.



Constructional details of the "long lines" oscillator used at W2DKJ.

Reduces Broadening Effect

The theory of the "long lines" oscillator is now fairly well understood and it is recognized to provide amateurs with a transmitter of marked stability at but a fraction of the cost of a crystal-controlled transmitter. As a matter of fact, it may be constructed at little more expense than the conventional type of circuit. In addition to providing greater efficiency at the transmitter, as far as output power is concerned, this arrangement has the distinct advantage of concentrating the wave from the transmitter, by reducing the broadening effect which is apparent in all frequency-modulated transmitters. This means that many more stations may be operated in a given frequency spectrum without interfering with each other than would be possible if the older forms of modulated oscillator transmitters were employed.

Mechanical Details

The mechanical details given in the accompanying sketches cover a particular type of oscillator for which parts are quite generally available. It will be observed that the four long lines are made up of ½ inch, OD copper tubing. The rods in the unit shown here have been silver plated to reduce their high-frequency resistance to a minimum. Each pair is spaced 1 inch apart. If other diameter tubing is employed, the spacing between centers should be twice the outside diameter of the tube. The spacing between the two pair, however, is relatively unimportant. The two pair may be placed as close together as desired, provided sufficient room is left for the locating of the vacuum tubes. The dimensions given are suitable for use with all of the tubes now in general use on five meters.

Insulation

The experienced radio man will recognize that simplicity and economy has been exercised in the design of this unit, but the efficiency of the unit is maintained at a maximum because of the intelligent application of the most suitable types of insulators in places where they will be effective and the use of ordinary insulating material where losses would not be likely to occur. The four lengths of metal tubing are slipped over the tops of four stand-off insulators. The reason for using high-grade insulators at this point, is because leakage loss would be noticeable under other conditions. It will be observed that the two vacuum-tube sockets are also of the highest grade, being Steatite sockets with guide grooves. To insure perfect continuity of the circuit in this area, heavy copper braid is soldered directly to the contact points on the sockets, as well as directly to the base of all four of the oscillator rods.

Since the upper extremities of the rods are actually cut out of circuit by the shorting bars of the grid and plate cir-

PARTS LIST

1—Piece of board, any convenient width, about 48 inches long and ¾ inch thick.

2—Wooden blocks ⅜ inch by 6 inches by 5 inches (approximate).

4—Lengths hard-drawn copper tubing, ½ inch outside diameter.

4—1 inch No. 8 brass, flat-head wood screws.

4—Fahnestock clips, any available size.

4—National Stand-off insulators, Type GS-1.

6—National Grid Grips, Type 12.

2—National low loss, Steatite Sockets, with mounting bushings.

1—National R-F Choke, Type R-100.

1 foot ½ inch copper braid.

1—10,000-ohm, 10-watt resistor.

cuits, it is not necessary to use more than ordinarily good insulating material and in this case, wood serves the purpose very satisfactorily.

Naturally, all of the wood used in this assembly should be suitably kiln-dried, and if extra protection is desired, it may be painted with hot paraffin.

The simplest form of clip for use in connection with this arrangement seems to be a large size grid clip. Two of these soldered together, form an ideal shorting bar for the grid circuit, and two similarly soldered, form such a bar for the plate circuit. The two clips for the transmission line are, of course, not connected together and they may be soldered directly to the end of the line itself, or the .002 mica isolating condensers may be placed between them and the line.

Coupling

When the type 45 tubes are used in the transmitter, the position of the various units in connection with the oscillator will be as illustrated, for a frequency of approximately 57 megacycles. In this case, the coupling between the transmission line and the plate circuit, as shown in the photograph, is just about correct for a 440-ohm line, such as is made up by the use of transposition blocks and heavy stranded enamel wire. If a low-impedance line (70 ohms) is employed, the distance between the plate shorting bar and the antenna coupling clips, will be reduced to an inch or less.

Where 801 tubes are used in the oscillator, it will be found that the length of the active portion of the rods in both plate and grid circuits, will be somewhat greater than is shown here for the same frequency.

Duplexing

Another very satisfactory method of employing this oscillator is to locate it within just a few feet of the antenna itself and by so doing, the receiving equipment can be kept well out of the oscillator field, which permits the operator to maintain duplex QSOs with stations very much closer to his own particular frequency than would be possible otherwise. A separate antenna is used for the receiver, in all regular duplex work.

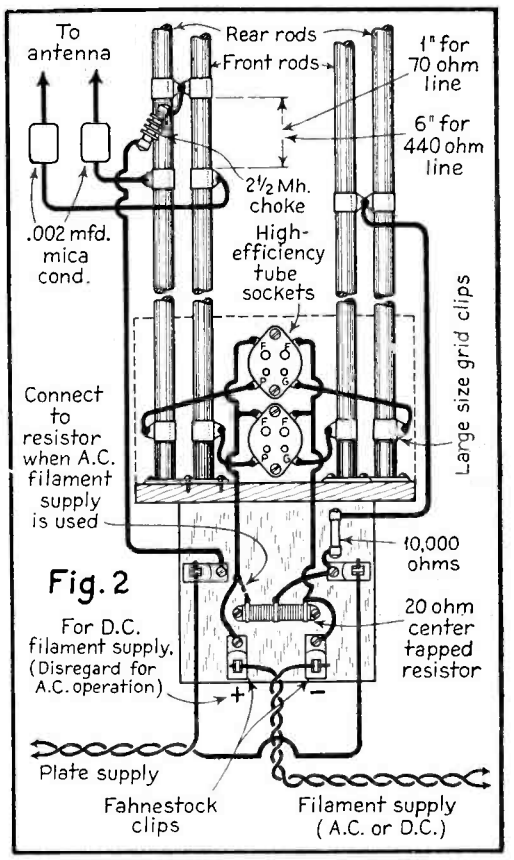


Fig. 2

Complete wiring of "long lines" oscillator.

DESIGN OF TRANSFORMERS FOR AMATEURS

AMONG THE MANY requests which the National Bureau of Standards, Washington, D. C., receives for technical information are a considerable number from amateurs who require design data on power transformers for various purposes. It is not practicable to spend the time of the staff working out individual design problems which are not of public interest. For a number of years, such requests have been partially covered by sending a very short typewritten memorandum on general principles of transformer design. The use of this information, however, involved calculations with which many amateurs are not familiar, and left rather too much to the judgment of the individual.

In seeking for means to improve this memorandum, the possibilities of using curves or graphs to reduce computation were considered. By the use of logarithmic and semilogarithmic crosssection paper it has been possible to reduce all of the graphs except one to straight lines, and to reduce the computation to a very small and simple matter. For example, the designer can tell at a glance how much iron and how much copper will be needed for a transformer of any rated output between 1 volt ampere and 10 kilovoltamperes (that is, 1 watt and 10 kilowatts, at unity power factor); how large must be the cross section of the core; how many turns of wire must be used per volt; the sizes of wire; the regulation; the values of the iron loss and the full-load copper loss; and the efficiency at full load. These labor-saving graphs are the basis of Circular C408 which has just been issued by the Bureau under the title, *"Information for the Amateur Designer of Transformers for 25- to 60-Cycle Circuits."*

The circular includes definitions of terms used in connection with transformers, and states very briefly the mathematical relations on which the design procedure is based. It gives information on kinds of magnet wire suitable for use in making transformers, and outlines methods of constructing the windings and of forming the core. Special information is given for cases which present unusual difficulties, namely, windings for large currents at a low voltage, windings with low-voltage taps, and transformers to have good regulation with inductive loads at low power factor. Although the method of design is intended primarily for the usual frequency of 60 cycles, it may be readily modified so as to be applicable to 25 cycles and to 50 cycles.

As a result of correspondence between the Bureau and the makers of magnet wire and of transformer steel sheets, it has been possible to include in the circular a list of names and addresses of concerns willing to sell small quantities of material to the amateur constructor. Suggestions are given in the circular as to local sources of wire and of insulating varnish.

Copies of this circular are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

Nelson Case and George Hicks, radio announcers of NBC, after the broadcast of the Army maneuvers near "Hill 300," Sterlingville, N. Y. Note the Army Tanks in the background.

THE FOOTLOOSE REPORTER

SPY CHASER

WITH MESSRS. Mussolini, Laval, Eden and Hitler looking at one another very askance, whilst telling what the others can not do and then going ahead and doing whatever they please, is it any wonder that thoughts of 1914 crop up? We have been told that this next war is to be fought in the air and so when we ran across Ralph Sayres our conversation turned to going on the air, just in case all these European rumors come to pass.

In the world-wide unpleasantness of eighteen years ago, Sayres did his share towards making the world safe for democracy in this country's Navy. Having grown up with Al Grebe and Arthur Lynch, it is small wonder that he should have been a radio operator even before the Germanic Egomanic chose Gott as his Ally and set out to do things to civilization in general. In fact, Ralph had an amateur transmitter when it was no heinous crime to work on whatever wavelength you desired!

So when Mr. Wilson finally decided that we just could not stand it any longer, Sayres enlisted in *the* branch of the service as a radioman. After some preliminary training he was put on a torpedo boat destroyer and found out that the North Sea in winter is just about as cold as Admiral Byrd says it is down below in Little America. Yes, indeed; the ship he was on ran into a couple of submarines and sent them to depths their designers never intended them to dive . . . sent them there permanently. Then he was assigned to a converted yacht and—but Sayres says that there was not a great deal of excitement in all that . . . it was much more so when one of his shipmates came aboard one night with a pint in each eye and a couple more inside his blouse. This exhilarated gentleman was hungry and so went to the ship's galley, where, being refused food, armed himself with a butcher's knife and a cleaver and ran amok.

Then Sayres was assigned to a converted yacht patrolling the American coast, at the time when German submarines had crossed the Atlantic. When he first went aboard this vessel, he thought that the half-kilowatt outfit was fine and continued to think so until one day his skipper commented on the fact that whenever the key of the transmitter was held down for an appreciable time it slowed up the ship! This was because the transmitter put such a heavy load on the ship's power plant that there just was not enough current to go around . . . how come, we don't know, but that's the dope.

Later on Sayres was transferred to the Naval Intelligence outfit and it was his job to track down radio stations that were operating without governmental permission and so might be in the hands of spies. He told us that he had on an average of five assignments per day and that the majority of these were nothing more than figments of imagination on the part of over-zealous neighbors.

However, one time the hospital at Lakehurst, N. J., called up and reported that they had been hearing something that sounded like dots and dashes on their telephone and could not account for it. Sayres and his strong-arm squad were rushed out to Lakehurst for an immediate investigation. He arrived in the late afternoon and was told that during certain hours of the day whenever the telephone receiver was removed from its hook and before the operator would ask for the number, these peculiar signals would be heard. This did sound like the work of spies—transmitting at regular times daily. However, nothing untoward was heard that afternoon nor during the night. Next morning a little after ten o'clock, the strange signals commenced. They were intermittent and in neither the Morse nor Continental codes. The office of the telephone company was visited and other lines inspected, but the line to the hospital was the only one on which signals were heard . . . and then only when the line was "open." After listening to the meaningless dots and dashes and trying to put some meaning into them, the idea suddenly came to Sayres that these electrical impulses resembled the intermittent operation of a stock-market ticker! He called the telephone company's office and discovered there was a ticker at a nearby hotel and after a little search found that the lines to the hospital and hotel ran parallel for a short distance and that the electrical impulses of the hotel line were being induced in the hospital's line. Naturally the signals were only present during the time the stock market was open.

The equipment that Sayres carried about consisted of a small, super-sensitive receiver with a loop antenna for locating a transmitter that was operating illegally. On local assignments this apparatus was installed in an automobile and Sayres with his "gang" were liable to be sent out any time of the day or night. Usually the checking-up of the story took but a comparatively few hours, but one job, Sayres told us, took about a month.

Signals, which were unauthorized, were traced to a portion of Long Island that was as wild and desolate, as though it were hundreds of miles from New York. Sayres and his crew sped to the locality and started their search for a house with the usual tell-tale antenna. They fruitlessly inspected every building in the neighborhood and when reporting their negative findings to headquarters were told that the same signals on a different wavelength had been located a few miles north.

Sayres adjusted his receiver to the new frequency, picked up the signals, got the direction and the crew set off. They had traveled a short time, when the station shut down and so left them without a definite destination. They cruised about the place where they thought the station might be, but with no results. Not until the following night were any more signals picked up from this one particular station and then they came from another direction altogether. Sayres then came to the conclusion that the mysterious transmitter was mounted in an automobile, for there was no doubt that the signals were from the same set.

That he was correct in his deduction was evidenced by the fact that for several days, these same signals were traced to many different parts of the Island. The Naval authorities then issued warnings to the police to keep a lookout for a suspicious looking automobile with radio apparatus installed in it. From that time on Sayres' life was made even more miserable, for he and his crew, who were, of course, not dressed in uniforms, were stopped often by the police

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RADIO PROVING POST

THE BOSCH MODEL 575

THE REPORT ON this receiver should prove of special interest. It is the first metal-tube set we have placed on actual test. The results obtained can be applied only to the Bosch Model 575, but at the same time they are some indication as to what may be expected from metal tubes in any well-designed set.

METAL-TUBE SET

Mechanical

As may be seen from the accompanying illustration, there are four control knobs. From the left, the first knob is on-off switch and volume control. The second knob operates the band-selector switch. The third knob, of the dual-speed type, controls tuning. The fourth knob operates the tone control.

Both volume and tone controls are well graduated and quiet in operation. The band-selector switch is inclined to be stiff, but there appears to be no doubt that good contact is made, which is the important thing.

There are three wave-band positions. Each wave band is provided with a separate scale on the airplane-type dial.

The 540- to 1800-kc scale is black and is marked in both meters and kilocycles. The 1800- to 5800-kc scale is green and is marked only in kilocycles. The 5800- to 18,000-kc scale is red and is marked in kilocycles, with the wavelength in meters spotted for each important band.

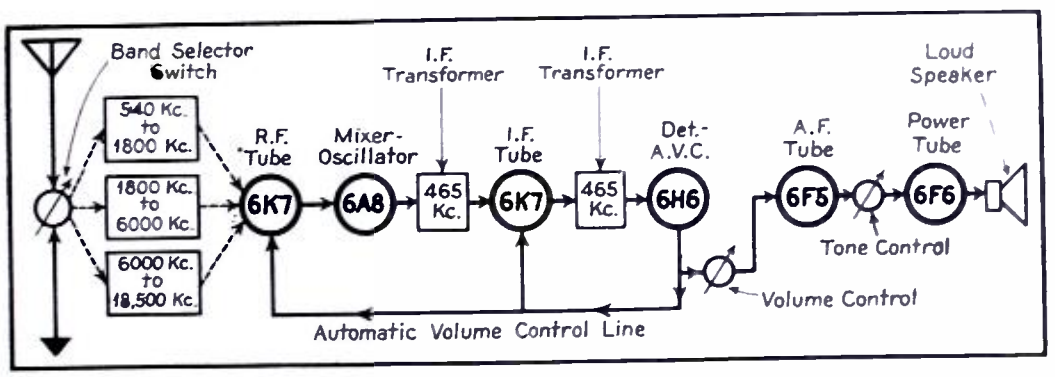
The small telephone-switchboard type pilot light just to the left of the band-selector switch changes in color from white, to green, to red, for the successive switch positions. Since the two higher frequency dial scales carry these colors, one can tell immediately to which band the receiver is set for.

Dial calibration is excellent. There is slight backlash in the "second-hand" dial pointer, but not enough to cause inaccuracies in readings.

Electrical

Selectivity in the broadcast band is good, but not excellent. On the whole, it appears to be adequate in all bands.

Sensitivity is better than good, which may account for the apparent slough-off in selectivity at certain frequencies.



Simplified block diagram of the Bosch Model 575 Metal-Tube Receiver. Complete coil complement is not shown.

Tests on this receiver were conducted during a week when atmospherics were excessive. However, switching back and forth between a receiver "standard" and the Bosch set, brought out the fact that the latter was the quieter of the two. On one evening it was impossible to use the "standard," the noise was so terrific, whereas the Bosch receiver dug down under and brought up some good signals.

The undistorted audio output of this receiver is given as 2.5 watts, with a maximum output of 3.3 watts. This was not checked, but sounds reasonable.

The Circuit

There is nothing unusual about the circuit of the Model 575. There is a radio-frequency pre-amplifier stage using a 6K7 tube, preceding the mixer-oscillator. This is shown in the block diagram on this page.

The mixer-oscillator tube is a 6A8. The mixer section feeds a single stage intermediate-frequency amplifier using a 6K7 tube. The signal from the i-f amplifier is fed to the 6H6 duo-diode tube.

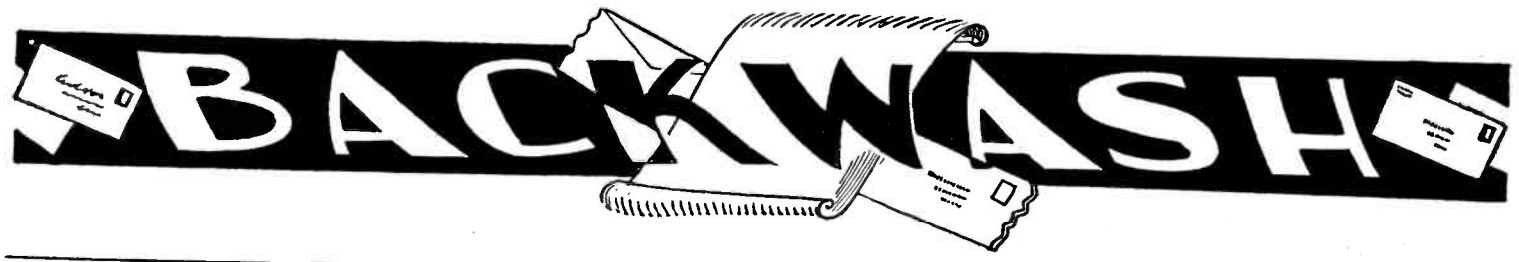
The diodes of the 6H6 are connected together and serve as second detector and automatic volume control. The direct current component of the signal in the diode load circuit is used to control the bias (gain) of the 6K7 r-f tube and the 6K7 i-f tube. This is indicated in the diagram. The audio frequency component of the signal in the diode load circuit is passed through the manual volume control to the type 6F5 audio-frequency tube where it is amplified and fed to the 6F6 power pentode tube. The 6F6 tube pumps the signal into the dynamic loudspeaker.

A type 80 rectifier tube is used in the power-supply unit of this receiver. It is not shown in the block diagram.

The feature of the circuit is the "Centr-O-Matic" unit. This is a separately shielded case containing all the antenna, radio-frequency and oscillator coils, as well as the adjusting condensers. These coils are connected directly to the contacts of the band-selector switch—no wire leads at all. According to the manufacturer, 104 soldered connections and 49 leads have been dispensed with.

There is no question that this system reduces circuit losses, and where they

(Turn to page 93)



A PAGE GIVEN OVER TO THE EXPRESSIONS AND OPINIONS OF READERS

HAM GAB

Editor, ALL-WAVE RADIO:

The other evening I lit up the filaments of my brand new two-band receiver and got all set to gather in a few earfulls of what was transpiring on the high-frequency bands. And did I? Well, I'll say so.

Naturally I got a kick out of listening to London and Berlin, but, thought I, "the real short-wave stuff is down where the Hams are holding forth," and so there I went. And what did I hear? This:

"Well, old man, your modulation is certainly great tonight. What did you do to your outfit?"

"Old man, if I were you, I'd make certain changes in order to get your modulation a little better. Now I did—blah-blah-blah-blah—to mine and you gotta admit that my modulation is better than it was last week, isn't it?"

"How's my modulation?" Your's is swell."

And so on, ad nauseam.

Now if I might make so bold as to ask a question, is the subject of modulation the only one in which Hams are interested? I fished around for quite awhile and I give you my word, Mr. Editor, that the only thing I heard on amateur phone was a discussion of modulation. Having broadcast in the younger days of radio, I am acquainted with "mike-fright," but it seems to me that after a man has been on the air with his own station as long as some of these men have, that some other topic would come up naturally. Or did I hit upon an evening when all the world and its brother had just changed some part of their setup and was looking for criticism of the results? If this was not the case, why don't you start a discussion that will be of interest to Hams and which would give the non-transmitting radio enthusiast, like myself, some incentive to listen in on the Hams with the idea that something of interest might be picked up.

Good luck to ALL-WAVE RADIO. It's a swell book. Keep it up.

"CONSTANT READER"

We presume that by "Constant Reader" you mean that you have read the first issue again and again. When your copy gets dog-eared, trade it for a new one!

Conversations—Ham or Diplomatic—may be excellent or downright putrid. Possibly you picked a poor night, but one fact is clear, you were not listening in on the 20-meter band. Try it, and give us another report. And, if by chance, the poor conversations were heard on the 75-meter 'phone band, try it again.

But, 20-, 75- or 160-meter bands, keep in mind the fact that Ham transmitters are not broadcast stations run for the entertainment of the public. Since they are experimental bands, it is only natural that numerous references are made to station efficiency and operation.

It would be nice, of course, to find Ham talk less stereotyped. We do not take to the idea of their putting on a show for the listener, but there are possibilities in the idea of amateurs developing a more interesting "party-line" technique.—Ed.

◆

LIKES 5-METER SET

Editor, ALL-WAVE RADIO:

It was with much interest that I read your new magazine, and I wish to congratulate you, especially on your editorial policy.

Of especial interest to me was the 5-meter receiver, and I am pleased to state that yesterday I completed one and the results so far indicate it to be everything you claim.

R. J. HAGERTY, W6JM1,
LOS ANGELES, CALIF.

Thanks for your report. No doubt you will find of interest the two "5-meter" articles in this issue. They serve to round out the receiver article.—Ed.

◆

AN OLD-TIMER RETURNS

Editor, ALL-WAVE RADIO:

Several days ago, I noticed a copy of ALL-WAVE RADIO on a newsstand and bought it. I have read with much interest both your editorial statement of the purposes of the new magazine and also several of the articles. It seems to me that you are on the right track. I have been much disappointed in recent years not to have been able to find a magazine along these lines.

I began my interest in radio in the early days of the KDKA broadcasts and built a receiver with the old 200 and 201 tubes. The early magazines were helpful and dependable, but when the radio boom came on, so far as I am concerned they became practically worthless, except of course, *QST*, which became too technical for me to follow.

In your September issue, I was especially interested in the articles, "Debunking Radio Circuits," "Signals and Noise," and "Some Frequent Questions Asked About Radio Reception."

In some early issue I would like to see instructions for building at a reasonable cost a receiver having an audio-frequency range up to ten or twelve thousand cycles, covering the broadcast band; also a short-wave set, covering the range down to where one who is not a radio expert could count on getting satisfactory results.

ELWYN N. MOSES.
FORT PIERCE, FLA.

Possibly your assertions as to the lack of dependability of some radio publications are unconsciously born out by your request for the details on a receiver with an audio range extending to ten or twelve thousand cycles. We have something of this sort on tap for an early issue, but its limit will be six or seven thousand cycles—possibly the full, permissable eight thousand.

A good short-wave set is described in this issue. Others will follow.—Ed.

◆

FROM A HAM

Editor, ALL-WAVE RADIO:

Congrats on your first issue of ALL-WAVE RADIO. I would say as an amateur that it is FB (fine business). It should grow.

I guess it's quite a problem to know just what to put into the magazine, but I'm sure if enough Fans would help out, it would be an easy task.

A lot of radio mags I read are filled with so much stuff that isn't straight. Maybe I'm different, but I would think that a mag is printed for the benefit of John Q. Public, not the editors.

You are right in not publishing the data on a receiver or transmitter unless it has been tested. I have tried a number of *so-called* "tested" sets and found myself out dough in the end.

You fellows who are planning to get "tickets," take my advice and don't "bootleg." There is a lot of this going on in

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CHANNEL ECHOES

BY ZEH BOUCK

IT APPEARS from press reports that foreign writers who express anti-Nazi views are *persona non grata* in Germany. By the time television crawls around the corner, the American fan may see something like this flicker across the screen:

SCENE: A modest *Hotel* on the *Strasse Adolphe,* Berlin. Time: "The immediate future" (about 1956). It is evening as the scanner starts, disclosing one Zeh Bouck, gray and stooped (pronounced in one syllable), and gazing dreamily at a tiny glass of *Wacholderbranntwein.* An imperious knock is heard at the door. Z. B. downs the *Wacholderbranntwein,* chokes, and then calls out in his best high-school German (four years of it—the first term taken eight times).

Z. B.: *Herein!*

The door opens, admitting a Suave Young Man who looks as if he might be selling Fuller Brushes. He clicks his heels and bows.

The Suave Young Man: *Ist Herr Bouck zu Hause?*

Z. B. nodding: I am Herr Bouck.

S. Y. M.: Herr Zeh Bouck?

Z. B. (using the remaining one-third of his vocabulary): *Ja.*

S. Y. M.: Did you on the Saturday of September 1st 1934, Herr Bouck, state in a New York paper that you didn't think much of the Spanish announcer over DJB?

Z. B.: I don't remember. That's a long time and many *Wacholderbranntweine* ago. I may have, though. It sounds logical enough.

S. Y. M.: *Wirklich!* And did you in that same issue that there was entirely too much talk and not enough music on the Zeesen programs state?

Z. B.: That's possible too. Have some *Wacholderbranntwein?* (Z. B. passes the empty glass.)

S. Y. M.: So! And did you not also the same day in that same paper write that the piano melody played as an identifying signal sounded like a cat on the piano walking—except that a cat would not be quite so monotonous?

Z. B.: I don't remember whether I said cat or not.

S. Y. M.: *O, pfui!*

Z. B.: Phooey yourself—

S. Y. M.: *Gottsferdamph* to you. Herr Bouck, it is my sad duty to tell you that within twenty-four hours you must Germany leave. If you have not in twenty-four hours gone, I shall be forced to send several storm troopers and *Schutzmanne* to escort you to the frontier. Understand, you are not being expelled from Germany—you are only being requested to leave. *Leben zie woll* (Exit Suave Young Man with a farewell click of his heels.)

Z. B. (at the telephone): Room service, please. Hello—send up enough *Wacholderbranntwein* to last twenty-four hours. *Ja,* twenty-four hours.

ZEH BOUCK
Radio's Severest Critic

◆

THE PROBLEM of congestion and code inference on the short-wave 'phone channels is rapidly assuming proportions which should justify international action. Conditions are such as to make a joke of the existing Madrid agreement—rendering it an agreement to disagree. The 31-meter band is typical of the whole mess.

It was agreed that the channels between 9,500 and 9,600 kilocycles would be allocated to short-wave broadcasting. As virtually all the short-wave stations have an international range, there is room for only ten stations within that band. There are no less than 26 stations that should be operating within this band, and 15 of them are actually radiating between 9.5 and 9.6 mc.

The Madrid agreement stipulates that no country can assign a frequency which will result in interference with the international service of an existing station in another country. Thus new stations are automatically forced out of the agreed 9,500-9,600-kc band, into bands allocated for code transmission. This can be done, because all countries reserved the right to assign their own frequencies, regardless of the band agreement (which is thereby practically abrograted and nullified), providing they do not interfere with other services.

The United States being possibly the most powerful of the signatories, it is probable that this country alone could bring to bear sufficient influence to promote a new conference. It is about time that the short-wave organizations (including the American Radio Relay League, which has its own bones to pick) got after Congress and started the ball rolling toward Madrid!

◆

EUREKA! We have it. Just thumbing through our copy of the "International Radio Telegraphic Conference Madrid 1932," we experienced a flash that in anyone else would be little short of genius. *Ergo*—an amazingly simple method whereby Congress can be made to take action along the lines suggested in the preceding paragraph.

It was agreed, in old Madrid, that the international distress call for 'phone stations—the SOS of the radiotelephone—would be the French expression, "M'aider." This means, "aid me—help!"—and is pronounced "mayday." It should be sufficient merely to point out this fact to the Senate in order to stimulate the necessary action, which, ultimately, will result in a new international conference where all our woes may be aired and—perhaps—remedied.

However, if it should prove necessary to go into detail, as Will Rogers found out is occasionally the case with Congress, we shall corner those Senators who were responsible for the altered uniforms in the Senate restaurant. The reader will recall that the collars of the waiters had embroidered upon them in red letters, "U. S. S. R.", which obviously stood for United States Senate Restaurant. Unfortunately, the letters also stand for Union of Soviet Socialistic Republics—in other words, Russia! This was immediately pounced upon by nimble-witted Senators as a bit of insidious Red propaganda, perpetrated under the very dome of the Capitol, which must be trampled under foot even if the poor waiters' necks got in the way. Legislative wheels whirred into action (as they never have before nor since) and either the inscription was changed or the waiters now go collarless—we forget which.

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In Writing For Veries . . .

ADDRESSES OF PRINCIPAL SHORT-WAVE STATIONS BY COUNTRY

AFRICA

Call	*Address*
CNR	Director General des Postes, Rabat, Morocco.
CR6AA	Estacao Radio Difusora, Caixa Postal 103, Lobito, Angelo, Portugese West Africa.
OPL-OPM	Radio Leopoldsville, Congo Belge, Africa.
SUV-SUX	Post Office Box 795, Cairo, Egypt.
VQ7LO	P. O. Box 777, Nairobi, Kenya Colony, Africa.
ZSS	Overseas Communications, Kodak House, Shortmarket St., P. O. Box 962, Capetown, So. Africa.
ZTJ	Radio ZTJ, P. O. Box 4559, Johannesburg, Transvaal, South Africa.

ASIA, OCEANIA AND FAR EAST

Call	*Address*
CQN	Government Broadcasting Station CQN, Postmaster General, Post Office Bldg., Macoa, (Portugese), China.
FZS	Postale Boite 238, Saigon, Indo-China.
HSP	Government Post & Telegraph, Bangkok, Siam.
Java Stations	H. Van der Veen, Engineer, Java Wireless Stations, Bandoeng, Java.
"JV" & "JZ" Stations	International Wireless Telephone Company of Japan, Osaka Bldg., Kojimachiku, Tokio, Japan.
"JY" Stations	Radio JYR, Kemikawa-Cho-Chiba, Ken, Japan.
KAY et al.	Philippine Long Distance Telephone Co., Manila, P. I.
PMY	Radio Station PMY, Nillmy Bld., Bandveng, Java, Netherlands Indies.
RV15	Far East Radio Station RV-15, Khabarovsk, U.S.R.R.
VK2ME	Amalgamated Wireless Ltd., Wireless House, 47 York St., Sidney, N.S.W. Australia.
VK3LR	Australian Broadcasting Commission, Broadcast House, 264 Pitt St., Sidney, Australia.
VK3ME	Amalgamated Wireless Ltd., P. O. Box 1272-L, Melbourne, Australia.
VPD	Amalgamated Wireless, Ltd., Suva, Fiji Islands.
VUC	Indian State Broadcasting Service, 1 Garstin Place, Calcutta, India.
VUY-VUB	Indian State Broadcasting Service, Irwin House, Sprott Road, Ballard Estate, Bombay, India.
XGW	Radio Administration, Sassoon House, Shanghai, China.
YBG	Radio Service, Serdangweg 2, Sumatra, Dutch East Indies.
YDA	H. Van der Veen, Engineer, Java Wireless Stations, Bandoeng, Java.
ZBW	Station ZBW, Hong Kong Broadcasting Committee, P. O. Box 200, Hong Kong, China.
ZGE	Radio ZGE, Kuala Lumpur, Malaya States.
ZHI	Radio Service Company, Broadcast House, 2 Orchard Road, Singapore, Malaya.
ZHJ	Hadio Station ZHI, Radio Society of Penang, Penang, Malay Straits.
ZLT-ZLW ZLR	Supt. Post & Telegraph, GPO, Wellington, New Zealand.

CANADA

Call	*Address*
CGA-CJA, et al.	Marconi Station, Drummondville, Quebec, Canada.
CJRX-CJRO	Royal Alexander Hotel, Winnipeg, Manitoba, Canada.
VE9LJ	Capitol Theatre, St. Johns, N. B. Canada.
VE9CS	743 Davie St., Vancouver, B. C. Canada.
VE9DN	Canadian Marconi Co., Box 1690, Montreal, Quebec, Can.
VE9GW	Rural Route No. 4, Bowmanville, Ontario, Canada.
VE9HX	Post Office Box 998, Halifax, N. S., Canada.

CUBA, MEXICO, CENTRAL AMERICA AND WEST INDIES

Call	*Address*
CO9GC	Laboratorio Radio-Electrico, Grau y Caminero, Apartado 137, Santiago, Cuba.
CO9JG	Estacion Experimental de Onda Corta-CO9JG, Calle del General Gomez, No. 4, Camagney, Cuba.
CO9WR	P. O. Box 85, Sancti-Spiritus, Santa Clara, Cuba.
COCA	Post Office Box 98, Havana Cuba.
COCD	"La Voz del Aire, S. A.", 25 y. g. Vedado, Havana, Cuba.
COCH	Estacion COH, Calle B No. 2 Vedado, Havana, Cuba.
HI1A	Radiodifusora HI1A "La Voz del Yaque," Santiago de los Caballeros, R. D.
HI3C	Radiodifusora HI3C, Sn. Roberto Bernado, Prop., La Ramona, R. D.
HI4D	Radiodifusora HI4D, "La Voz de Quisqueya," Dominican Republic.
HH2T HH2S	Societe Haitienne d'Automobile, Port-au-Prince, Haiti.
HIH	Radio HIH, "Las Voz del Higuamo," San Pedro de Macoris, R. D.
HIL	Radio HIL, Apartado 623, Santo Domingo City, R. D.
HIX	Radio HIX, J. R. Saladin, Director of Radio Communication, Santo Domingo, R. D.
HI1J	Radiodifusora HI1J, Apartado 204, San Pedro de Macoris, R. D.
HIZ	Radiodifusora HIZ, Calle Duarte No. 68, Santa Domingo, R. D.
HP5B	Radio HP5B, P. O. Box 910, Panama City, Panama.
HP5J	La Voz de Panama, Apertado 867, Panama City, Panama.
TGX	Radiodifusora TGX, Director M. A. Mejicano Novales, 11 Avenue N. 45, Guatemala City, Guatemala.
TGW	Radiodifusora Nacional TGK, Republic de Guatemala.
TI2PE	Radio TI2PE, Perry Girton, Prop., Apartado 225, San Jose, Costa Rica, C. A.
TIEP	"La Voz del Tropico," Apartado 257, San Jose, Costa Rica, C. A.
TIGHP	Radiodifusora TIGHP, "Alma Tica," Apartado 775, San Jose, Costa Rica.
TIRCC	Radioemisora Catolica Costaricense, Apartado 1064, San Jose, Costa Rica, C. A.
VPN	Station VPN, Nassau, Bahama Island.
WTDV	H. M. McKenzie, St. Thomas, Virgin Islands.
WTDW	S. I. Winde Christiansted, Virgin Islands.
XAM	Director General de Correos, Merida, Yucatan, Mexico.
XDA-XDC	Secretaria de Communicaciones, Mexico, D. F.
XEBT	El Buen Tono, S.A., Apartado 79-44, Mexico, D. F.
XECR	Estacian XECR Secretaria de Relaciones Exteriories, Mexico, D. F.
XECW	Radio XECW, Del Caballero Santokan, Bajio 120, Mexico, D. F.
YNA	Tropical Radio Telegraph, Managua, Nicaragua, C. A.
YNIGG	La Voz de Los Lagos; Radiodifusora YNIGG, Managua, Nicaragua, C. A.
YNLF	Radiodifusora YNLF, c/o Ing, Moises Le Franc Calle 15 de Set No. 206, Managua, Nicaragua.

EUROPE

Call	*Address*
2RO	5 Via Montello, Rome, Italy
CSL	Radio CSL, Emissora National, Lisbon, Portugal.

CT1AA	Antonio Augusto de Aguair, 144, Lisbon, Portugal.
CT1CT	Oscar G. Lomelino, Rua Gomez Freire 79-2 D, Lisbon, Portugal.
CT1GO	Portugese Radio Club, Parede, Portugal.
DAF	Hauptfunkstelle Nordeich, Norden-Land, Germany.
DJA, et al.	German Short Wave Station, Broadcasting House, Berlin, Germany.
Dutch Phones	Partstaat 29, S'Gravenhage, Holland.
EAQ	P. O. Box 951, Madrid, Spain.
EA8AB	Radio Club Tenerefe, Alvarez de Lugo 1, Santa Cruz de Tenerife, Canary Islands.
EHY-EDM	Piy Margall 2, Madrid, Spain.
English Phones	Engineer-in-Chief's Office (Radio Branch) G.P.O. Armour House, London, EC1.
English Ships	Connaught House, 63, Aldwych, London W.C. 2, England.
French Phones	166 Rue de Montmartre, Paris, France.
G6RX	Rugby Radio Hillmorton, Warwickshire, England.
GSA-GSH, et al.	British Broadcasting Corporation, Broadcasting House, London, W.1, England.
HAS-HAT	Director Radio, Hungarian Post, Gyali St. 22, Budapest, Hungary.
HB9B	Radio Club, Box 1, Basle, Switzerland.
HBL-HBP et al.	Information Section, League of Nations, Geneva, Switzerland.
HVJ	Radio HVJ, Castine, Pio IV, Vatican City, Vatican, Italy.
IAC	Coltano Radio, Piza, Italy.
IRM-IRW	Italo Radio, Via Calabria N. 46/48, Rome, Italy.
LKJ1	Ministere Du Commerce, Administrator des Telegraphes, Oslo, Norway.
OER2	Radio OER2, Vienna, Austria.
ORK-ORG	Director de Communications, Bruxelles, Belgium.
OXY	Stateradiofonien Heibersgade 7, Copenhagen, Denmark.
PCJ	Philips Radio PCJ, Eindhoren, Holland.
PHI	Phillips Radio PHI, Huizen, Holland.
PI1J,	Radio Station PI1J, Dr. M. Hellingman, Owner and Operator, Dordrecht, Holland.
Pontoise	Minister des Postes, 193 Rue de Grenelle, Paris, France.
RNE-REN RV59	Radio Centre, Solianka 12, Moscow, U.S.S.R.

SOUTH AMERICA

Call	*Address*
CEC	CIA Internacional de Radio, Casilla 16-D, Santiago, Chile.
CP5	Radio CP5, Casila 637, La Paz, Bolivia.
El Prado	Apartado 98, Riobamba, Ecuador.
HC2AT	Radiodifusora HC2AT, P. O. Box 872, Guayaguil, Ecuador.
HC2ET	Radiodifusora del Telegrafo, Casilla 249, Guayaquil, Ecuador.
HC2JSB	Ecuador Radio Station HC2JSB, Juan S. Behr, Prop., Guayaguil, Ecuador.
HC2RL	P. O. Box 759, Guayaquil, Ecuador.
HCJB	Casilla 691, Quito, Ecuador.
HCK	Radiodifusora HCK, Quito, Ecuador.
HJA7	Radio HJA7, Cucuta, Colombia.
HJ1ABB	Apartado 715, Barranquilla, Colombia.
HJ1ABD	Estacion HJ1ABD, Cartagena, Colombia.
HJ1ABE	Apartado 31, P. O. Box 252, Cartagena, Colombia.
HJ1ABG	Apartado 816, Barranquilla, Colombia.
HJ1ABJ	"La Voz de Santa Marta," Radio HJ1ABJ, Santa Marta, Colombia.
HJ2ABA	"La Voz Del Paiz," Tunja, Boyaca, Colombia.
HJ2ABC	Pompilio Sanchez, Cucuta, Colombia.
HJ3ABD	Colombia Broadcasting, Apartado 509, Bogota, Colombia.
HJ3ABF	Apartado 317, Bogota, Colombia.
HJ3ABA	"La Voz de La Victor," Apartado 565, Bogota, Colombia.
HJ3ABI	Apartado 513, Bogota, Colombia.
HJ4ABA	Emisora HJ4ABA, "Ecos de la Montana," Medellin, Colombia.
HJ4ABB	Radio Manizales, Apartado 175, Manizales, Colombia.
HJ4ABC	Radiodifusora HJ4ABC "La Voz de Pereira," Pereira-Caldas, Colombia.
HJ4ABE	Radiodifusora de Medellin, Medellin, Colombia.
HJ4ABL	"Ecos de Occidente," P. O. Box 50, Manizales, Colombia.
HJ5ABC	"La Voz de Colombia," Radiodifusora HJ5ABC, Cali, Colombia.
HJ5ABD	"La Voz del Valle," Cali, Colombia.
HJ5ABE	Radiodifusora HJ5ABE, Cali, Colombia.
HJB	Marconi Telegraph Co., Apartado 1591, Bogota, Colombia.
HJN	Ministero de Correos y Telegraph, Bogota, Colombia.
HJY	All-America Cables, Inc., Bogota, Colombia.
HKE	Observatoria Nacional de San Bartolome, Bogota, Colombia.
HKV	Radiodifusora HKV, Radio Dept.—War Ministry, Government of Colombia, Bogota, Colombia.
LSN-LSL, et al.	Compania Internacional, 143 Defensa, Buenos Aires, Argentina.
LSX	Transradio Internacional, San Martin 329, Buenos Aires, Argentina.
OAX4D	Radiodifusora OAX4D, All- American Cables, Inc., (L. N. Anderson, Mgr.) Calle de San Antonio, 677; Casilla 2336, Lima, Peru.
OAX4Q	Radiodifusora OAX4G, Roberto Grelland & Cia., Apartado 1242, Lima, Peru.
OCI-OCJ	All-America Cables, Inc., Lima, Peru.
PPU-PPQ, et al.	Caixa Postal 500 Rio de Janeiro, Brazil.
PRA8	Radio Station PRA8, Radio Club of Pernambuco; "The Voice of North," Pernambuco, Brazil.
PRF5-PSK	Comp. Radio Internacional Do Brazil, P. O. Box 709, Rio de Janeiro, Brazil.
VP3MR	Radio Station VP3MR, Georgetown, British Guiana.
YV2RC	Apartado Correos 2009, Caracas, Venezuela.
YV3RC	Radiodifusora Venezuela, YV3RC, Caracas, Venezuela.
YV4RC	Estacion S.A.R., Este 10 bis N. 71, Caracas, Venezuela.
YV5RMO	Box 214, Maracaibo, Venezuela.
YV6RV	"La Voz de Carabobo," Radio YV6RV, Valencia, Venezuela.
YV8RB	Radiodifusora YV8RB, "La Voz de Lara," Barguisimento, Venezuela.
YV10RC	Radiodifusora YV10RSC "La Voz del Tachira," San Cristobal, Venezuela.
YVQ-YVR	Servicio Radiotelegraphico, Maracay, Venezuelo.
ZP10	Radio Prieto ZP10, Asuncio, Paraguay.

UNITED STATES

Call	*Address*
Dixon Stations	140 Montgomery St., San Francisco, Cal.
W1XAL	70 Brookline Ave., Boston, Mass.
W1XK	Hotel Statler, Boston, Mass.
W2XAD-W2XAF	General Electric Co., Schenectady, N. Y.
W2XE	485 Madison Ave., New York, N. Y.
W3XAU	1622 Chestnut St., Philadelphia, Pa.
W3XL-W3XAL	30 Rockefeller Plaza, New York, N. Y.
W4XB	Isle of Dreams Broadcasting Corp.; Radio W4XB, Herald Bld., Miami, Florida.
W8XAL	Crosley Radio Corp., Cincinati, Ohio.
W8XK	William Penn Hotel, Pittsburgh, Pa.
W9XAA	Navy Pier, Chicago, Ill.
W9XF W9XBS	20 North Wacker Drive, Chicago, Ill.
WVD	Radio WVD, 517-Federal Office Bldg., Seattle, Wash.

SHORT-WAVE STATION LIST

STAR BROADCASTERS INDICATED BY BOLD TYPE; PHONE (P); EXPERIMENTAL (E).

KC	Meters	Call	Location	Time
21540	**13.92**	**W3XK**	**Pittsburgh, Pa.**	**7-9 A.M.**
21530	**13.93**	**GSJ**	**Daventry, England**	**6-8:45 A.M.**
21500	13.95	NAA	Washington, D. C.	(E) Time signals regularly
21420	14.01	WKK	Lawrenceville, N. J.	(P) Phones LSN-PSA daytime
21160	14.19	LSL	Buenos Aires, Arg.	(P) Phones GAA mornings; DFB and EHY irregular
21080	14.23	PSA	Rio de Janerio, Brazil	(P) Phones WKK-WLK daytime
21060	14.25	KWN	Dixon, Calif.	(P) Phones afternoon irregular
21020	14.29	LSN	Buenos Aires, Arg.	(P) Phones WKK-WLK daily; EHY, FTM irregular
20860	14.38	EHY	Madrid, Spain	(P) Phones LSM-PPU-LSY mornings
20860	14.38	EDM	Madrid, Spain	(P) Phones LSM-PPU-LSY mornings
20380	14.72	GAA	Rugby, England	(P) Phones LSL mornings; LSY-LSM-PPU irregular
20040	14.97	OPL	Leopoldsville, Belg.	(P) Congo Africa Tests with ORG mornings
20020	14.99	DHO	Nauen, Germany	(P) Phones PPU-LSM-YVR mornings
19980	15.02	KAX	Manila, P. I.	(P) Phones KWU evenings
19820	15.14	WKN	Lawrenceville, N. J.	(P) Phones GAU mornings
19720	15.21	EAQ	Madrid, Spain	(P) Relays and tests in A.M.
19680	15.24	CEC	Santiago, Chile	(P) Phones OCI-HJY afternoons
19600	15.31	LSF	Buenos Aires, Arg.	(P) Phones and tests irregularly
19530	15.36	EDR2	Madrid, Spain	(P) Phones LSM-PPU-YVR mornings
19530	15.36	EDS	Madrid, Spain	(P) Phones LSM-PPU-YVR mornings
19520	15.37	IRW	Rome, Italy	(P) Phones LSM-PPU mornings
19500	15.40	LSQ	Buenos Aires, Arg.	(P) Phones daytime irregularly
19355	15.50	FTM	St. Assise, France	(P) Phones LSM-PPU-YVR mornings
19345	15.52	PMA	Bandoeng, Java	(P) Phones PCK-PDK early mornings
19260	15.58	PPU	Rio de Janerio, Brazil	(P) Phones DFB-EHY-FTM mornings
19235	15.60	DFA	Nauen, Germany	(P) Phones HSP-KAX early mornings
19220	15.61	WKF	Lawrenceville, N. J.	(P) Phones GAS-GAU mornings
19200	15.62	ORG	Brussells, Belgium	(P) Phones OPL mornings
19140	15.68	LSM	Buenos Aires, Arg.	(P) Phones DFB-FTM-GAA-GAB mornings
18970	15.81	GAQ	Rugby, England	(P) Phones ZSS mornings
18960	15.82	WQD	Rocky Point, N. Y.	(E) Tests LSY irregularly
18950	15.83	HBF	Geneva, Switzerland	(E) Phones So. America mornings
18910	15.86	JVA	Nazaki, Japan	(P) Phones and tests irregular
18890	15.88	ZSS	Klipkewvel, So. Africa	(P) Phones GAQ-GAU mornings
18860	15.91	WKM	Rocky Point, N. Y.	(E) Tests and relays irregularly; Phones PCV mornings early
18830	15.93	PLE	Bandoeng, Java	(P) KWU evenings; music at times
18740	16.01	PCP	Kootwijk, Holland	(P) Relays and phones mornings irregular
18680	16.06	OCI	Lima, Peru	(P) Phones CEC-HJY days; WKK-WOP noon
18620	16.11	GAU	Rugby, England	(P) Phones VWY-ZSS early A.M.; Lawrenceville, daytime
18480	16.23	HBH	Geneva, Switzerland	(E) Relays to N. Y. mornings irreg.
18440	16.25	HJY	Bogota, Colombia	(P) Phones CEC-OCI noon; music at times
18405	16.30	PCK	Kootwijk, Holland	(P) Phones PLE-PMC early A.M.
18350	16.35	FZS	Saigon, Indo-China	(P) Phones FTK early mornings
18340	16.36	WLA	Lawrenceville, N. J.	(P) Phones GAS mornings
18310	16.38	GAS	Rugby, England	(P) Phones WLA-WMN mornings
18295	16.39	YVR	Maracay, Venezuela	(P) Phones DFB-EHY-FTM mornings
18250	16.43	FTO	St. Assise, France	(P) Phones LSM-LSY mornings
18200	16.48	GAW	Rugby, England	(P) Relays and phones N. Y. irreg.
18190	16.49	JVB	Nazaki, Japan	(P) Phones Java early mornings
18170	16.51	CGA	Drummondville, Que.	(P) Phones GBB mornings
18135	16.54	PMC	Bandoeng, Java	(P) Phones PCK-PCV early mornings
18115	16.56	LSY3	Buenos Aires, Arg.	(E) Phones DFB-FTM-GAA-PPU A. M.
18040	16.63	GAB	Rugby, England	(P) Phones LSM noon
17980	16.69	KQZ	Bolinas, Calif.	(E) Tests and relays to LSY irreg.
17940	16.72	WQB	Rocky Point, N. Y.	(E) Tests with LSY mornings
17900	16.76	WLL	Rocky Point, N. Y.	(E) Relays to Geneva and Germany mornings
17850	16.81	LSN	Buenos Aires, Arg.	(P) Phones S. A. stations irreg.
17830	16.82	PCV	Kootwijk, Holland	(P) Phones PLE early mornings
17790	**16.86**	**GSG**	**Daventry, England**	**6-8:45 A.M. 9:00 A.M.-12:00 noon**
17780	**16.87**	**W3XAL**	**Bound Brook, N. J.**	**9 A.M.-1 P.M. daily except Sunday**
17775	**16.88**	**PHI**	**Hiuzen, Holland**	**Mon. Thurs. Fri. 7:30-9:30 A.M. Sat. & Sunday 7:30-10:00 A.M. 7:00-11:30 A.M.**
17760	**16.89**	**DJE**	**Zeesen, Germany**	(P) Phones and Tests to ships A.M.
17750	16.91	IAC	Piza, Italy	(P) Phones DFA-DGH-KAY early mornings
17740	16.91	HSP	Bankok, Siam	(P) Phones and tests to ships A.M.
17699	16.95	IAC	Piza, Italy	(P) Phones GAU-GBC-GBU mornings
17545	17.10	VWY	Poona, India	(P) Phones PPU-YVR-KAY mornings
17520	17.12	DFB	Nauen, Germany	(P) Phones GAU-GBC-GBU daytime
17480	17.16	VWY	Poona, India	(P) Phones ships mornings
17260	17.37	DAF	Nordenland, Germany	(P) Phones ships daytime
17120	17.52	WOO	Ocean Gate, N. J.	(P) Phones England irreg.
17120	17.52	WOY	Lawrenceville, N. J.	(P) Special relays and phones irreg.
17080	17.56	GBC	Rugby, England	(P) Phones England irreg.
16305	18.39	PCL	Kootwijk, Holland	(P) Phones JVE-KWU evenings
16300	18.44	WLK	Lawrenceville, N. J.	(P) Phones FTA-FKT early A.M.
16240	18.47	KGO	Manila, P. I.	(P) Phones Hong Kong early A.M.; Phones JVF-KGO-PLE early A.M.
16214	18.50	FZR	Saigon, Indo-China	(P) KWU afternoons and evenings
16050	18.69	JVC	Nazaki, Japan	(P) Phones 9:00 A.M. and irreg.
16030	18.71	KKP	Kankuku, Hawaii	(P) FZR-FZS-LSM-PPU-YVR mornings
15930	18.83	FYC	Pontoise, France	(P) Phones Shanghai early A.M.
15880	18.89	FTK	St. Assise, France	(P) Phones OCJ mornings
15860	18.90	JVD	Nazaki, Japan	(P) Phones GAA mornings
15860	18.90	CEC	Santiago, Chile	(E) Tests KKW-KWE-KWU evenings
15810	19.02	LSL	Buenos Aires, Arg.	(P) Phones Nazaki early A.M.
15760	19.04	JYT	Kemikawa-Cho, Japan	(E) Tests afternoons
15740	19.06	JIA	Chureki, Japan	(P) Phones PLE early A. M.; KTO evenings.
15670	19.15	WAE	Brentwood, N. Y.	(P) Phones CEC daytime
15660	19.16	JVE	Nazaki, Japan	(P) Phones KWO-KWU after 4 P.M.
15625	19.20	OCJ	Lima, Peru	(E) Tests and relays mornings irreg.
15620	19.21	JVF	Nazaki, Japan	(P) Tests JYK-JYT-PLE evenings
15595	19.24	DFR	Nauen, Germany	(P) Phones JVF evenings
15430	19.44	KWE	Bolinas, Calif.	**5:00-7:00 P.M. Sunday**
15415	19.46	KWO	Dixon, Calif.	**Sunday 8-9 A.M.**
15410	**19.47**	**Prado**	**Riobamba, Ecuador**	(P) Phones Japan, Manila and Java evenings
15370	**19.52**	**HAS3**	**Budapest, Hungary**	**2-3 P.M. Weekdays-Sunday 10:30 A.M.-4 P.M.**
15355	19.54	KWU	Dixon, Calif.	**8-11:30 A.M.**
15330	**19.56**	**W2XAD**	**Schenectady, N. Y.**	**10 A.M.-5 P.M.**
15280	**19.63**	**DJQ**	**Zeesen, Germany**	**12:15 P.M.-4 P.M.**
15270	**19.64**	**W2XE**	**Wayne, N. J.**	(P) Phones RKI early mornings
15260	**19.66**	**GSI**	**Daventry, England**	**6-10 A.M.**
15252	19.67	RIM	Tashkent, U.S.S.R.	**Sunday 7:30-10:00 A.M. Tues. 3-6 A.M. Wed. 7-11 A.M.**
15243	**19.68**		**Pontoise, France**	
15220	**19.71**	**PCJ**	**Eindhoven, Holland**	

KC	Meters	Call	Location	Time
15220	**19.71**	**W8KX**	**Pittsburgh, Pa.**	**9 A.M.-7 P.M.**
15200	**19.74**	**DJB**	**Zeesen, Germany**	**3:45-7:15 A.M. 8:00-11:30 A.M.**
15140	**19.82**	**GSF**	**Daventry, England**	**6-8:45 A.M. 9 A.M.-12 noon 4:15-5:45 P.M.**
15121	**19.84**	**HVJ**	**Vatican City, Vatican**	**10:30-10:45 A.M.**
15055	19.92	WNC	Hialeah, Fla.	(P) Phones daytime
15040	19.95	RKI	Moscow, U.S.S.R.	(P) Phones RIM early A.M.
15040	19.95	HIR	Santo Domingo, R. D.	(P) Phones WNC daytime
14980	20.03	KAY	Manila, P. I.	(P) Phones DFC-DFD-GCJ early A.M.; KWU evenings
14940	20.06	HJB	Bogota, Colombia	(P) Phones WNC-PPI-YVQ days
14920	20.11	KQH	Kahuku, Hawaii	(P) Tests irregularly
14845	20.19	OCJ2	Lima, Peru	(P) Phones HJY and others daytime
14800	20.27	WQV	Rocky Point, N. Y.	(E) Tests Europe irreg.
14710	20.39	IRG	Nassua, Eritrea, Africa	(P) Phones and tests with JVH 5:00 to 7:00 A.M.
14690	20.42	PSS	Rio de Janerio, Brazil	(P) Phones LSL-WLK-WOK daytime
14653	20.47	GBL	Rugby, England	(P) Phones Nazaki, early A.M.
14620	20.52	EHY	Madrid, Spain	(P) Phones LSM mornings irreg.
14620	20.52	EDM	Madrid, Spain	(P) Phones PPU-PSA-PSE mornings
14600	20.55	JVH	Nazaki, Japan	(E) Phones DFB-GTJ-PCJ-TYB early mornings and B.C. music
14600	**20.55**	**JVH**	**Nazaki, Japan**	**12 A.M.-1 A.M. Daily; 4-5 P.M. Mon. and Tues.**
14590	20.56	WMN	Lawrenceville, N. J.	(P) Phones England daytime
14550	20.60	HBJ	Geneva, Switzerland	(E) Relays to Riverhead daytime
14530	20.65	LSN	Buenos Aires, Arg.	(P) Phones PSF-WLK-WOK irreg.
14485	20.71	TIR	Cartago, Costa Rica	(P) Phones WNC daytime
14485	20.71	TIU	Cartago, Costa Rica	(P) Phones WNC daytime
14470	20.73	WMF	Lawrenceville, N. J.	(P) Phones England daytime
14440	20.78	GBW	Rugby, England	(P) Phones Lawrenceville daytime
14200	21.20	W10XFB	The Schooner "Morrissey"	(E) Irregular
14100	**21.25**	**HJ5ABE**	**Medillin, Colombia**	**11:00 A.M.-12 noon daily ex. Sun. 6:00-10:30 P.M.**
13900	21.58	WQP	Rocky Point, N. Y.	(E) Test daytime
13820	21.70	SUZ	Cairo, Egypt	(P) Phones DFC-DGU-GBB daytime
13738	21.82	RIS	Tiflis, U.S.S.R.	(P) Tests with Moscow irregular
13690	21.91	KKZ	Bolinas, Calif.	(F) Tests Japan and Java early A.M.; days Honolulu
13667	21.98	HJY	Bogota, Colombia	(P) Phones ECE afternoons
13610	22.04	JYK	Kemikawa-Cho, Japan	(E) Tests irregular A.M.
13585	22.08	GBB	Rugby, England	(P) Phones CGA3-SUV-SUZ daytime
13545	22.15	PFG	Kootwijk, Holland	(P) Tests mornings irregular
13415	22.36	GCJ	Rugby, England	(P) Tests with JVH afternoons
13390	22.40	WMA	Lawrenceville, N. J.	(P) Phones GAS-GBS-GBU-GBW daily
13345	22.48	YVQ	Maracay, Venezuela	(P) Phones WNC-HJB days
13340	22.49	KBJ	Manila, P. I.	(P) Phones nights and early A.M.
13285	22.58	CGA3	Drummondville, Que.	(P) Phones England days
13180	22.76	DGG	Nauen, Germany	(P) Relays to Riverhead days
13075	**22.95**	**VPD**	**Suva, Fiji Islands**	**Mon. to Sat. 12:30-1:30 A.M.**
13000	23.08	FYC	Paris, France	(P) Phones CNR mornings
12985	23.11	DFC	Nauen, Germany	(P) Phones KAY-SUV-SUZ early A. M.
12865	23.32	IAC	Piza, Italy	(P) Phones ships irregular
12840	23.36	WOO	Ocean Gate, N. J.	(P) Phones ships days
12830	23.37	HJC	Barranquilla, Colombia	(P) Phones HJB-HPF-WNC days
12825	**23.38**	**CNR**	**Rabat, Morocco**	**Sunday 7:30-9:00 A.M.**
12825	23.38	CNR	Rabat, Morocco	(P) Phones FYB-TYB-FTA irreg.
12800	23.44	IAC	Piza, Italy	(P) Phones ships and tests Tripoli, irreg.
12780	23.47	GBC	Rugby, England	(P) Phones VWY early A.M.
12396	**24.20**	**CT1GO**	**Parede, Portugal**	**Sun. 11:30 A.M.-1 P.M.; 7:15-8:30 P.M. Tues. to Fri. 7:15-8:30 P.M.**
12394	24.21	DAF	Nordenland, Germany	(P) Phones ships irreg. mornings
12300	24.39	PLM	Bandoeng, Java	(P) Phones 2ME near 6:30 A.M.
12295	24.40	ZLU	Willmigton, N. Z.	(P) Phones JLJ early A.M.
12290	24.41	GBU	Rugby, England	(P) Phones Lawrenceville days
12280	24.43	KUV	Manila, P. I.	(P) Phones early A.M.

KC	Meters	Call	Location	Time
12250	24.49	TYB	Paris, France	(P) Phones JVH-XGR and ships irreg.
12240	24.51	TFJ	Reykjavik, Iceland	(P) Phones England days
12220	24.55	FLJ	Paris, France	(P) Phones ships irreg.
12215	24.56	TYA	Paris, France	(P) Algeria, days—"Inverted Speech"
12060	24.88	PDV	Kootwijk, Holland	(P) PLE - PLV - PMC early mornings
12035	24.93	HBO	Geneva, Switzerland	(E) Relays programs & phones irreg.
12020	24.95	VIY	Rockbank, Australia	(P) Tests CJA6 early A.M. and evenings
12010	24.97	CJA6	Drummondville, Que.	(P) Tests VIY early A.M. and evenings
12000	**25.00**	**RNE**	**Moscow, U.S.S.R**	**Daily 3-6 P.M. Wed. 6-7 A.M. Sun. 6-7 A.M. 10-11 A.M.**
11991	25.02	FZS	Saigon, Indo-China	(P) Phones FTA-FTK early A.M.
11950	25.11	KKQ	Bolinas Calif.	(P) Relays programs to Hawaii eve.
11940	25.13	FTA	St. Assise, France	(P) Phones FZS-FZR early A.M.
11935	25.14	YNA	Managua Nicaragua	(P) Cent. and S. A. stations, days
11885	**25.23**		**Pontoise, France**	**10:15 A.M.-1:15 P.M. 2-5 P. M.**
11870	**25.26**	**W8XK**	**Pittsburgh, Pa.**	**5-9 P.M.**
11860	**25.29**	**GSE**	**Daventry, England**	**9 A.M.-12 noon**
11830	**25.36**	**W2XE**	**Wayne, N. J.**	**5-7 P.M.**
11811	**25.40**	**2RO**	**Rome, Italy**	**8:15-9 A.M. 9:15-10:15 A.M. 12 noon-1 P.M.-1:45-5 P.M.**
11800	**25.42**	**CO9WR**	**Sancti-Spiritus, Cuba**	**4-6:30 P.M. 9-11 P.M.**
11790	**25.43**	**W1XAL**	**Boston, Mass.**	**Tues. and Thurs. 6-9 P.M. Sunday 5-7 P.M.**
11770	**2549**	**DJD**	**Zeesen, Germany**	**12 noon-4:30 P.M.-5:05-10:45 P.M.**
11750	**25.53**	**GSD**	**Daventry, England**	**1:15-3:20 A.M. 12:15-4 P.M. 4:15-5:45 P.M. 6:00-8:05 P.M. 10-11:05 P.M.**
11720	**25.60**	**CJRX**	**Winnipeg, Manitoba**	**Week days 7:30 P.M.-12 midnight; Sunday 3-10 P.M.**
11713	**25.62**		**Pontoise, France**	**3-4 A.M.-6-9 P.M. 10 P.M.-12 A.M.**
11710	**25.63**	**HJ4ABA**	**Medillin, Colombia**	**11:30 A.M.-1 P.M. 6-10:30 P.M.**
11680	25.68	KIO	Kaukuku, Hawaii	(P) Phones Far-East early A.M.
11670	25.71	PPQ	Rio de Janerio, Brazil	(P) Phones WCG-WET-LSX evenings
11660	25.73	JVL	Nazaki, Japan	(P) Phones Taiwan evenings
11570	25.93	HH2T	Port-au-Prince, Haiti	(P) Evenings—irregular
11538	26.00	XGR	Shanghai, China	(P) Tests irregularly
11500	26.09	XAM	Merida, Mexico	(P) Phones XDF-XDM-XDR irreg.
11495	26.10	VIZ3	Rockbank, Australia	(P) Tests CJA4 early A.M.
11405	26.26	CJA4	Drummondville, Que.	(P) Phones VIZ3 early A.M.
11385	26.35	HBO	Geneva, Switzerland	(E) Phones and relays irregular
11275	26.61	ZAM	Merida, Mexico	(P) Phones XDR-XDM irregular
11000	27.27	ZLT	Wellington, N. Z.	(P) Phones VLZ early mornings
11000	27.27	PLP	Bandoeng, Java	(P) Phones early A.M.; broadcasts 10-10:30 A.M.
10975	27.35	OCI	Lima, Peru	(P) Phones CEC-HJY days
10975	27.35	OCP	Lima, Peru	(P) Phones HKB early evenings
10910	27.50	KTR	Manila, P. I.	(P) Phones DFC early A.M. irreg.
10850	27.63	DFL	Nauen, Germany	(P) Relays programs afternoons irreg.
10840	27.68	KWV	Dixon, Calif.	(P) Phones Japan, Manila, Hawaii, mornings
10790	27.80	YNA	Managua, Nicaragua	(P) Phones So. America days, irreg.
10770	27.86	GBP	Rugby, England	(P) JYS and XGR irreg.; Phones VLK early A.M. and eve.
10740	**27.93**	**JVM**	**Nazaki, Japan**	**4-7:30 A.M. irregular**
10675	28.10	WNB	Lawrenceville, N. J.	(P) Phones ZFB daytime
10670	28.12	CEC	Santiago, Chile	(P) Phones HJY-OCI daytime
10670	**28.12**	**CEC**	**Santiago, Chile**	**8:30-9:00 P.M. Thurs. and Sun.**
10660	28.14	JVN	Nazaki, Japan	(P) Phones JIB early A.M.: Relays JOAK irreg.
10660	**28.14**	**JVN**	**Nazaki, Japan**	**4-7:30 A.M. Irregular**

KC	Meters	Call	Location	Time
10630	**28.22**	**WED**	**Rocky Point, N. Y.**	**Relays program service irreg.**
10620	28.25	EHX	Madrid, Spain	(P) Phones CEC and EHZ afternoons
10610	28.28	WEA	Rocky Point, N. Y.	(E) Tests Europe irreg.
10550	28.44	WOK	Lawrenceville, N. J.	(P) Phones LSN-PSF-PSH-PSK evenings
10535	28.48	JIB	Tawian, Japan	(P) Phones JBL-JVN early mornings
10520	28.52	VK2ME	Sydney, Australia	(P) Phones GBP-HVJ early A.M.
10520	28.52	VLK	Sydney, Australia	(P) Phones GBP-HVJ early A.M.
10440	28.74	DGH	Nauen, Germany	(P) Phones HSG-HSJ-HSP early A.M.
10430	28.80	YBG	Medan, Sumatra	(P) Phones PLV-PLP early A.M.
10420	28.79	XGR	Shanghai, China	(P) Tests GBP-KAY early A.M.
10420	28.79	PDK	Kootwijk, Holland	(P) Phones PLV A.M. and special programs irreg.
10410	28.82	KES	Bolinas, Calif.	(P) Phones S. A. and Far East irreg.
10400	28.85	KEZ	Bolinas, Calif.	(P) Phones Hawaii and Far East irreg.
10380	28.90	WCG	Rocky Point, N. Y.	(E) Special program service irreg.
10375	28.92	JVO	Nazaki, Japan	(P) Manchuria and Dairen early A.M.
10370	28.93	EHZ	Madrid, Spain	(P) Phones EHX daytime
10350	**28.98**	**LSX**	**Buenos Aires, Arg.**	**Near 10 P.M. irregular. 6-7:15 P.M. daily**
10335	29.03	ZFD	Hamilton, Bermuda	(P) Phones afternoons
10330	**29.04**	**ORK**	**Brussels, Belgium**	**1:30-3:00 P.M.**
10310	29.10	PPM	Rio de Janerio, Brazil	(P) Tests New York and Buenos Aires evenings.
10300	29.13	LSQ	Buenos Aires, Arg.	(P) Phones GCA-HJY-PSH afternoons
10300	29.13	LSL	Buenos Aires, Arg.	(P) Phones GCA-HJY-PSH afternoons
10290	29.15	DIQ	Zeesen, Germany	(E) Phone and pgm. service irreg.
10290	**29.15**	**DIQ**	**Zeesen, Germany**	**Used irregularly.**
10290	29.15	HPC	Panama City, Panama	(P) Phones C. A. and S. Am. daytime
10260	29.24	PMN	Bandoeng, Java	(P) Tests VLJ early A.M.
10250	29.27	LSK3	Buenos Aires, Arg.	(P) "Inverted Speech" afternoons
10220	29.35	PSH	Rio de Janerio, Brazil	(P) Phones LSL-WOK evenings; special pgm. service irreg.
10170	29.50	RIO	Bakou, U.S.S.R.	(P) Phones RIR-RNE early A.M.
10169	29.50	HSG	Bankok, Siam	(P) Phones DGH early A.M. irreg.
10140	29.59	OPM	Leopoldsville, Belg-Congo	(P) Phones OPK afternoons
10140	**29.59**	**OPM**	**Leopoldsville, Belg-Congo**	**Occasional Saturdays 3:30-4:10 P.M.**
10080	29.76	RIR	Tiflis, U.S.S.R.	(P) Phones RIO-RNE early A.M.
10070	29.79	EHY	Madrid, Spain	(P) Phones YVR afternoons
10055	29.84	ZFB	Hamilton, Bermuda	(P) Phones WNB daytime
10055	29.84	SUV	Cairo, Egypt	(P) Phones DFC-DGU-GCA and GCB daytime
10040	29.88	HJA3	Barranquilla, Colombia	(P) Tests early evenings irreg.
9990	30.01	KAZ	Manila, P. I.	(P) Phones JVQ-KWX-PLV early A.M.
9966	30.08	IRS	Rome, Italy	(P) Tests irregularly
9950	30.13	GBU	Rugby, England	(P) Phones WNA evenings
9930	30.21	HKB	Bogota, Colombia	(P) Phones CEC-OCP PSH-PSK afternoons
9930	30.21	HJY	Bogota, Colombia	(P) Phones LSQ afternoons
9890	30.33	LSN	Buenos Aires, Arg.	(P) Phones WOK-WLK evenings and nights
9870	**30.40**	**JYS**	**Kenukawa-Cho, Japan**	**4-7 A.M. irregular**
9860	**30.43**	**EAQ**	**Madrid, Spain**	**Saturday 1-3 P.M. Daily 5:15-7 P.M. often to 9:30 P.M.**
9840	30.47	JYS	Kenukawa-Cho, Japan	(E) Tests irregular
9830	30.50	IRM	Rome, Italy	(P) Phones JVP-JZT-LSX-WEL mornings
9810	30.58	DFE	Nauen, Germany	(P) Relays and tests afternoons irreg.
9800	30.59	GCW	Rugby, England	(P) Phones Lawrenceville eve. and nights
9800	30.59	LSI	Buenos Aires, Arg.	(P) Relays very irreg.
9760	30.74	VLJ	Sydney, Australia	(P) Phones PLV-ZLT early A.M.
9760	30.74	VLZ	Sydney, Australia	(P) Phones PLV-ZLT early A.M.
9750	30.77	WOF	Lawrenceville, N. J.	(P) Phones GCU irreg.
9710	30.88	GCA	Rugby, England	(P) Phones LSL afternoons
9700	30.93	LQA	Buenos Aires, Arg.	(P) Tests and relays early evening
9635	**31.13**	**2RO**	**Rome, Italy**	**Mon. Wed. Fri. 6-9:00 A.M.**
9620	31.17	DGU	Nauen, Germany	(P) Phones SUV A.M. Tests and relays irreg.
9620	31.17	FZR	Saigon, Indo-China	(P) Phones Paris early A.M.
9600	**31.25**	**CT1AA**	**Lisbon, Portugal**	**Tues. Thurs. Sat. 4:30-7 P.M.**
9595	**31.27**	**HBL**	**Geneva, Switzerland**	**Saturday 5:30-6:15 P.M.**
9590	**31.28**	**W3XAU**	**Philadelphia, Pa.**	**11 A.M.-7 P.M.**
9590	**31.28**	**VK2ME**	**Sydney, Australia**	**Sundays 12:30-2:30 A.M. 4:30-8:30 A.M. 9:30-11:30 A.M.**
9590	**31.28**	**HP5J**	**Panama City, Panama**	**11:45 A.M.-1 P.M. 7:30-10 P.M.**
9580	**31.31**	**GSC**	**Daventry, England**	**4:15-5:45 P.M. 6-8:05 P.M. 10-11:05 P.M.**
9580	**31.31**	**VK3LR**	**Melbourne, Australia**	**Mon. Tues. Wed. Thurs. 3:15-7:30 A.M. Fri. 10:30 P.M.-2 A.M. Sat. 5-7:30 A.M.**
9570	**31.34**	**LKJ1**	**Jeloy, Norway**	**5-8 A.M. 10 A.M-6 P.M.**
9570	**31.33**	**WIXK**	**Boston, Mass.**	**Week days 6 A.M.-12 midnight Sunday 7 A.M.-12 midnight**
9565	**31.36**	**VUY**	**Bombay, India**	**11:30 A.M.-12:30 P.M. Wed. & Sat. Sunday 7:30-8:30 A.M.**
9560	**31.38**	**DJA**	**Zeesen, Germany**	**12:30-2:15 A.M. 8-11:30 A.M. 5:05-9:15 P.M.**
9540	**31.45**	**DJN**	**Zeesen, Germany**	**12:30-2:15 A.M. 3:45-7:15 A.M. 5:05-10:45 P.M.**
9530	**31.48**	**W2XAF**	**Schenectady, N. Y.**	**Week days 6:30 P.M.-12 A.M. Sundays 4:15 P.M.-12 A.M.**
9510	**31.55**	**GSB**	**Daventry, England**	**1:15-3:20 A.M. 9 A.M-12 noon 12:15-4 P.M. 4:15-5:45 P.M. 6:00-8:05 P.M.**
9510	**31.55**	**VK3ME**	**Melbourne, Australia**	**Wed. to Sat. Inc. 5-7 A.M.**
9501	**31.56**	**PRF5**	**Rio De Janeiro, Brazil**	**4:45-5:45 P.M. daily 9-10:45 P.M. irreg.**
9480	31.65	PLW	Bandoeng, Java	(P) Phones Australia early A.M.
94.80	31.65	KET	Bolinas, Calif.	(P) Phones WEL evenings & nights
9470	31.68	WET	Rocky Point, N. Y.	(E) Tests LSX-PPM-ZFD evenings
9460	31.71		Tripoli, Africa	(P) Phones Italy mornings.
9430	31.80	YVR	Maracay, Venezuela	(P) Tests mornings
9428	31.81	COCH	Havana, Cuba	10 A.M.-12 noon. 4:00-6:30 P.M. 8:00-10:00 P.M.
9415	31.86	PLV	Bandoeng, Java	(P) Phones PCV-PCK-PDK -VLZ -KWX and KWV early mornings
9400	31.92	XDR	Mexico City, Mexico	(P) Phones XAM irreg. days
9330	32.15	CGA4	Drummondville, Que.	(P) Phones GCB-GDB-GBB afternoons
9280	32.33	GCB	Rugby, England	(P) Phones Canada afternoons
9180	32.68	ZSR	Kliphewvel, S. Africa	((P) Phones Rugby afternoons seasonally
9170	32.72	WNA	Lawrenceville, N. J.	(P) Phones GBS-GCU-GCS afternoons
9147	32.79	YVR	Maracay, Venezuela	(P) Phones EHY afternoons
9120	**32.88**	**HAT4**	**Budapest, Hungary**	**6:00-7:00 P.M. Sundays**
9110	32.93	KUW	Manila, P. I.	(P) Tests and phones early A.M.
9020	33.26	GCS	Rugby, England	(P) Phones Lawrenceville afternoons
9010	33.30	KEJ	Bolinas. Calif.	(P) Relays programs to Hawaii eve.
8975	33.43	VWY	Poona, Ind.	(P) Phones GBC-GBU mornings
8950	33.52	WEL	Rocky Point, N. Y.	(E) Tests with Europe irreg.
8950	33.52	W2XBJ	Rocky Point, N. Y.	(E) Tests irregularly
8900	33.71	ZLS	Wellington, N. Z.	(P) Phones VLZ early mornings
8830	33.98	LSD	Buenos Aires, Arg.	(P) Relays to N. Y early evenings

KC	Meters	Call	Location	Time
8790	34.13	HKV	Bogota, Colombia	(E) Tests early evenings and nights
8790	34.13	TIR	Cartago, Costa Rica	(P) Phones Central America daytime
8790	**34.13**	**HKV**	**Bogota, Colombia**	**6:00-11:00 P.M. irregular**
8775	34.19	PNI	Makasser, D. E. I.	(P) Phones PLV early mornings
8760	34.35	GCQ	Rugby, England	(P) Phones ZSR afternoons
8750	**34.29**	**ZBW**	**Hong Kong, China**	**4:00-10:00 A.M. 11:30 P.M.-1:15 A.M.**
8740	34.35	WXV	Fairbanks, Alaska	(P) Phones WXH nights
8730	34.36	GCI	Rugby, England	(P) Phones VWY afternoons
8680	34.56	GBC	Rugby, England	(P) Phones ships and New York daily
8665	**34.62**	**CO9JQ**	**Camagney, Cuba**	**11:30 A.M.-12:30 P.M. 8:00-9:00 P.M.**
8650	34.68	WVD	Seattle, Wash.	(P) Tests irregularly
8560	35.05	WOO	Ocean Gate, N. J.	(P) Phones ships daytime
8470	35.39	DAF	Nordenland, Germany	(P) Phones ships irregularly
8104	**35.69**	**HC2AT**	**Guayaguil, Ecuador**	**8:00-11:00 P.M. ex. Sunday**
8380	35.80	IAC	Piza, Italy	(P) Phones ships irregularly
8214	**36.50**	**HCJB**	**Quito, Ecuador**	**12:30-2:15 P.M. 7:15-11:15 P.M. daily ex. Monday**
8185	36.65	PSK	Rio de Janerio, Brazil	(P) Phones LSL-WOK evenings and special programs
8140	36.86	LSC	Buenos Aires, Arg.	(P) Tests evenings and nights irreg.
8120	36.95	KTP	Manila, P. I.	(P) Phones KWX-KWV-PLV-JVQ mornings
8110	**37.00**	**ZP10**	**Ascunsion, Paraquay**	**8:00-10:00 P.M.**
8035	**37.33**	**CNR**	**Rabat, Morocco**	**Sunday 2:00-5:00 P.M.**
7970	37.64	XGL	Shanghai, China	(P) Tests early mornings
7968	37.65	HSJ	Bankok, Siam	(P) Tests and phones early A.M.
7960	37.69	VLZ	Sydney, Australia	(P) Phones ZLT early A.M.
7920	37.88	GCP	Rugby, England	(P) Phones VLK irreg.
7900	37.97	LSL	Buenos Aires, Arg.	(P) Phones PSK-PSH evenings
7880	38.05	JYR	Kemikawa-Cho, Japan	(E) Tests and relays irregularly
7860	38.17	SUX	Cairo, Egypt	(P) Phones GCB afternoons
7855	38.19	LQP	Buenos Aires, Arg.	(P) Tests evening irreg.
7797	**38.47**	**HBP**	**Geneva, Switzerland**	**5:30-6:15 P.M. Saturdays**
7790	38.49	YNA	Managna, Nicaragua	(P) Phones Cent. & So. America daytime
7790	**38.49**	**HC2JSB**	**Guayaguil, Ecuador**	**9:15 A.M.-2:15 P.M. 7:15-11:15 P.M.**
7780	38.56	PSZ	Rio de Janerio, Brazil	(P) Tests LSX early evenings
7765	38.63	PDM	Kootwijk, Holland	(P) Special relays to Dutch Indies
7715	38.89	KEE	Bolinas, Calif.	(P) Relays programs to Hawaii seasonally
7669	39.11	TGF	Guatemala City, Guatemala	(P) Phones TIU-HPF daytime
7626	39.31	RIM	Tashkent, U.S.S.R.	(P) Phones RKI early mornings
7610	39.42	KWX	Dixon, Calif.	(P) Phones KKH nights; KAZ-KTP-PLV-JVT-JVM mornings
7565	39.66	KWY	Dixon, Calif.	(P) Phones Shanghai, early mornings
7520	39.89	KKH	Kanhuku, Hawaii	(P) Tests KEE evenings: Phones KWX-KWV nights
7518	39.90	RKI	Moscow, U.S.S.R.	(P) Phones RIM early mornings
7510	39.95	JVP	Nazaki, Japan	Tests Point Reyes early A.M.
7470	40.16	JVQ	Nazaki, Japan	(P) Relays and phones early A. M.
7470	40.16	HJP	Bogota, Colombia	(P) Phones HJA3-YVQ early evenings
7445	40.30	HBQ	Geneva, Switzerland	(E) Relays Special B.C. evenings irreg.
7430	40.38	ZLR	Wellington, N. Z.	(P) Phones VLJ early mornings
7400	40.54	WEM	Rocky Point, N. Y.	(E) Special relays evenings.
7390	**40.55**	**HJ3ABD**	**Bogota, Colombia**	**12 noon-2 P.M. 8:00-11:00 P.M.**
7385	40.62	OEK	Wein, Austria	(P) Tests early evenings very irreg.
7380	**40.65**	**XECR**	**Mexico City, Mexico**	**Sundays 6-7 P.M. Occasionally later**
7370	40.71	KEQ	Kankuku, Hawaii	(P) Relays programs evenings

KC	Meters	Call	Location	Time
7280	**41.20**	**HJ1ABD**	**Cartagena, Colombia**	**11:15 A.M.-1:15 P.M. Sunday. Weekdays 7:15-9:15 P.M.**
7210	**41.60**	**EA8AB**	**Santa Cruz, Canary Is.**	**5-7:30 P.M. irregular**
7177	**41.80**	**CR6AA**	**Labito, Angela, Africa**	**2:30-4:30 P.M. Wed. & Sat.**
7113	**42.13**	**HB9B**	**Basle, Switzerland**	**Mon., Thurs., Fri. 4-6 P.M.**
7100	**42.25**	**HKE**	**Bogota, Colombia**	**Monday 6-7 P.M. Tues. and Friday 8-9 P.M.**
7080	**42.37**	**PI1J**	**Dordrecht, Holland**	**Saturday 10:10-11:10 A.M.**
7080	**42.37**	**VP3MR**	**Georgetown, Br. Guiana**	**Sun 7:15-10:15 A.M. Mon 3:45-4:45 P.M. 6:45-7:15 P.M. Wed. Thurs. Sat. 5-7:45 P.M.**
6990	42.92	JVS	Nazaki, Japan	(P) Phones China mornings early
6935	43.25	WEB	Rocky Point, N. Y.	(E) Relays programs evenings
6905	43.45	GDS	Rugby, England	(P) Phones WOA-WNA-WGN evenings
6900	**43.48**	**HI3C**	**LaRomana, R. D.**	**Daily 12:15-2 P.M. 6-7:30 P.M. Sat. 12 midnight-2:00 A.M.**
6860	43.73	KEL	Bolinas, Calif.	(P) Tests KAZ-PLV early A.M.
6840	43.86	KEN	Bolinas, Calif.	(P) Used irregularly
6811	**44.12**	**HIH**	**San Pedro de Macoris, R.D.**	**Sunday 3-4 A.M. 12:30-2 P.M. 4-6 P.M. Mon. to Sat. inc. 12:30-2 P.M. 7-9 P.M.**
6755	44.41	WOA	Lawrenceville, N. J.	(P) Phones GDW-GDS-GCS evenings
6750	44.44	JVT	Nazaki, Japan	(P) Phones JOAK irregular; Phones Point Reyes at times
6750	**44.44**	**JVT**	**Nazaki, Japan**	**2:00-8:00 A.M. irregular**
6740	44.51	WEJ	Rocky Point, N. Y.	(E) Commercial program service evenings
6733	44.53	WDA	Rocky Point, N. Y.	(E) Tests evenings irreg.
6725	44.60	WQO	Rocky Point, N. Y.	(E) Tests evenings irreg.
6720	**44.96**	**YVQ**	**Maracay, Venezuela**	**8:00-9:00 P.M. Saturdays**
6701	**44.71**	**TIEP**	**San Jose, Costa Rica**	**7:00-10:00 P.M. daily**
6680	44.91	DGK	Nauen, Germany	(P) Relays to Riverhead evenings irreg.
6672	44.96	YVQ	Maracay, Venezuela	(P) Phones and relays N. Y. evenings
6650	45.11	IAC	Piza, Italy	(P) Phones ships irregularly
6635	**45.00**	**HC2RL**	**Guayaguil, Ecuador**	**5:45-7:15 P.M. Sunday. 9:15-11:15 P.M. Tuesday**
6620	**45.31**	**Prado**	**Riobamba, Ecuador**	**Thursday 9:00-11:15 P.M.**
6610	**45.38**	**REN**	**Moscow, U.S.S.R.**	**1:00-5:00 P.M. irregular**
6590	**45.50**	**HI4D**	**Santo Domingo, R.D.**	**12:15-2:00 P.M. 5:00-8:00 P.M. except Sunday**
6550	**45.81**	**TIRCC**	**San Jose, Costa Rica**	**Sunday 11:00 A.M.-1:00 P.M. 6:00-7:00 P.M. 8:00-9:00 P.M. Weekdays 6:00-9:00 P.M. and later**
6520	**46.01**	**YV6RV**	**Valencia, Venezuela**	**11:30 A.M.-12:30 P.M. 5:30-10:00 P.M. except Sunday**
6503	**46.10**	**HIL**	**Santo Domingo, R.D.**	**Mon. to Sat. inc. 12:15-1:45 P.M. Sat. 7:45-9:45 P.M.**
6490	**46.30**	**HJ5ABD**	**Cali, Colombia**	**7:00-10:00 P.M. ex. Sunday**
6447	**46.51**	**HJ1ABB**	**Barranquilla, Colombia**	**11:45 A.M.-1:00 P.M. 5:30-10:00 P.M. ex. Sunday**
6125	**46.69**	**VE9AS**	**Fredericton, N.B.**	**Occasional broadcasts — not regular**
6425	**46.69**	**W9XBS**	**Chicago, Ill.**	**Not regular. Usually Tuesday and Thursday 1:00-5:00 P.M.**
6420	**46.70**	**W3XL**	**Bound Brook, N. J.**	**No regular schedule maintained**
6415	46.77	HJA3	Barranquilla, Colombia	(P) Phones HJA2 evenings
6400	**46.88**	**YN1GG**	**Managua, Nicaragua**	**Daily 1:00-2:30 P.M. 7:00-10:00 P.M.**
6385	**46.99**	**TI2GP**	**San Jose, Costa Rica**	**8:30-11:00 P.M.**
6375	**47.10**	**YV4RC**	**Caracas, Venezuela**	**4:30-10:30 P.M.**
6350	**47.39**	**JZG**	**Nazaki, Japan**	**5:00-7:00 A.M. irregular**
6315	**47.50**	**HIZ**	**Santo Domingo, R.D.**	**4:45-5:45 P.M. daily. 10:45 P.M.-12:45 A.M. Sat.**
6235	48.10	OCM	Lima, Peru	(P) Phones afternoons
6230	**48.00**	**OAX4G**	**Lima, Peru**	**7:00-11:30 P.M. ex. Sunday**
6198	**48.40**	**CT1GO**	**Parede, Portugal**	**Sunday 11:30-1:00 P.M. 7:15-8:30 P.M. Tues. to Fri. inc. 7:15-8:30 P.M.**
6185	**48.50**	**HI1A**	**Santiago de Caballeros, R.D.**	**11:45 A.M.-1:45 P.M. 7:45-9:45 P.M. ex Sunday**

KC	Meters	Call	Location	Time
6170	48.62	HJ3ABP	Bogota, Colombia	6:00-11:00 P.M. ex. Sunday
6165	48.66	YV3RC	Caracas, Venezuela	10:30 A.M.-1:30 P.M. 4:30-10:00 P.M. except Sunday
6150	48.78	HJ5ABC	Cali, Colombia	Daily 11:00 AM.-12 noon; 7:00 P.M.-10:00 P.M.
6150	48.78	HJ2ABA	Tunja, Colombia	1:00-2:00 P.M. & 7:00-10:00 P.M.
6150	48.78	CJRO	Winnipeg, Manitoba	Weekdays 7:30 P.M.-12 noon. Sundays 3:00-10:00 P.M.
6150	48.78	CQ9GC	Santiago, Cuba	12:00 A.M. Sat.-2:00 A.M. Sunday
6150	48.78	CSL	Lisbon, Portugal	7:30-8:30 A.M. 2:30-7:00 P.M.
6140	48.86	W8XK	Pittsburgh, Pa.	9:00 P.M.-1:00 AM. daily
6130	48.92	ZGE	Kuala Lampur, S.S.	Sun. Tues. Fri. 6:40-8:40 A.M.
6130	48.92	COCD	Havana, Cuba	Sunday 12:00-2:00 P.M. 8:00-10:30 P.M. Weekdays 11:30 A.M. 4:00 P.M. 6:00 P.M.-12 A.M.
6130	48.92	LKJ1	Jeloy, Norway	10:00 A.M.-6:00 P.M. daily
6120	49.02	W2XE	Wayne, N. J.	7:00-10:00 P.M. daily
6120	49.02	YDA	Bandoeng, Java	5:30-11:00 P.M. 5:45-6:45 P.M. 10:30 P.M.-1 A.M.
6115	49.06	HJ1ABE	Cartagena, Colombia	Sun. 10 A.M.-2 P.M. Mon. 7:30-9:30 P.M. Mon. 11:30 P.M.-12:30 A.M. Sat. 6:00-8:00 P.M. Tues. to Fri. inc. 7:30-9:30 P.M.
6112	49.08	YV2RC	Caracas, Venezuela	Daily 11:00 A.M.-1:30 P.M. 4:00-9:30 P.M. Sunday 8:30 A.M. to 10:30 P.M.
6110	49.10	HJ4ABB	Manizales, Colombia	11:00 A.M.-1:00 P.M. 5:00-8:00 P.M.
6110	49.10	VUC	Calcutta, India	Daily 9:30 A.M.-11:00 A.M. 5:00-10:00 P.M.
6110	49.10	VE9HX	Halifax, Nova Scotia	11:30 A.M.-2:00 P.M. 6:00 P.M.-1 A.M.
6110	49.10	GSL	Daventry, England	12:15-4:00 P.M. 10-11:05 P.M.
6100	49.18	W9XF	Chicago, Illinois	Daily 12:00 M-1:00 A.M. Tues. Thurs. Fri. Sun. 8:00-9:00 P.M.
6100	49.18	W3XAL	Bound Brook, N. J.	Mon. Wed. Sat. 5:00 P.M.-12:00 A.M.
6095	49.22	CRCX	Bowmanville, Ont.	Thurs. Fri. Sat. 7:00-1:00 P.M. Sun. 12 noon-8 P.M.
6090	49.26	VE9BJ	St. John, N.B.	5:00-11:00 P.M.
6090	49.26	ZTJ	Johannesburg, S. Africa	11:45 P.M.-12:30 A.M. 3:30-7:00 A.M. 9 A.M.-4:45 P.M.
6080	49.34	W9XAA	Chicago, Ill.	Daily 10:00 A.M.-6:00 P.M.
6080	49.34	ZHJ	Penang, S.S.	6:40-8:40 A.M.
6080	49.34	CP5	LaPaz, Bolivia	7:00-9:00 P.M. daily
6070	49.42	VE9CS	Vancouver, B.C.	6:00-7:00 P.M. Sunday. 1:45 P.M.-1:00 A.M.
6070	49.42	HH2S	Port-Au-Prince, Haiti	Evenings—irregular
6070	49.42	OER2	Vienna, Austria	9:00 A.M.-5:00 P.M. Saturdays until 6:00 P.M.
6070	49.42	HJN	Bogota, Colombia	6:00-10:45 P.M.
6065	49.45	HJ4ABL	Manizales, Colombia	11:00 A.M-12 noon Sat. to 5:30. 7:30 P.M.-10:30 P.M.
6060	49.50	W8XAL	Cincinnati, Ohio	5:30 A.M.-7:00 P.M. 10:00 P.M.-1:00 A.M.
6060	49.50	W3XAU	Philadelphia, Pa.	7:00 P.M.-10:00 P.M.
6060	49.50	VQ7LO	Nairobi, Kenya Colony, Africa	5:45-6:15 A.M. 11 A.M.-2 P.M.
6060	49.50	OXY	Skamleback, Denmark	1-6:30 P.M. Sunday 11 A.M.-6:30 P.M.
6050	49.59	GSA	Daventry, England	6-8:05 P.M.
6043	49.65	HJ1ABG	Barrinquilla, Colombia	12 noon-1 P.M. 6-10:30 P.M.
6040	49.67	HJ4ABC	Pereira, Colombia	9:30-11 A.M. 7-9 P.M.
6040	49.67	PRA8	Pernambuco, Brazil	9:30-11:30 A.M. 2:30-8:30 P.M.
6040	49.67	W4XB	Miami, Florida	Weekdays 12-2 P.M. 5:30 P.M.-12 A.M. Sunday 11:30 A.M.-3 P. M. 5 P.M.-12 A.M.
6040	49.67	W1XAL	Boston, Mass.	Tuesday & Thurs. 6-9:00 P.M. Sundays 5-7:00 P.M.
6030	49.75	HP5B	Panama City, Panama	12 noon-1 P.M. 8-10:35 P.M.
6020	49.83	DJC	Zeesen, Germany	12 noon-4.30 P.M. 9:30-10:45 P.M.
6020	49.83	CQN	Macoa, China	Monday & Friday 3-5:00 A.M.
6012	49.85	HJ3ABH	Bogota, Colombia	11:30 A.M.-2 P.M. 6-11 P.M. Sunday 4-9 P.M.
6010	49.92	ZHI	Singapore, S.S.	Mon. Wed. Thurs. 5:40-8:10 A.M. Sat. 10:40 P.M.-1:10 A.M.
6010	49.92	COCO	Havana, Cuba	Sun. 8-10 P.M. Weekdays 10:30 A.M.-1:00 P.M. 4-8:00 P.M.
6006	49.95	HJ1ABJ	Santa Marta, Colombia	11 A.M.-1 P.M. 7-9 P.M.
6005	49.96	VE9DR	Montreal, Que.	Used very irregular
6005	49.96	VE9DN	Montreal, Que.	Used very irregular
6000	50.00	XEBT	Mexico City, Mexico	10 A.M.-12 midnight and later at times
5980	50.17	HIX	Santo Domingo, R.D.	Daily 11:40 A.M.-1 P.M. Tues. & Fri. 8:10-10:00 P.M. Sunday 7:15 A.M.-10:30 A.M.
5980	50.17	XECW	Mexico City, Mexico	4-4:45 P.M. 10-12 midnight
5969	50.26	HVJ	Vatican City, Vatican	2-2:15 P.M.
5960	50.30	YNLF	Managua, Nicaragua	6-11 P.M.
5930	50.60	HJ4ABE	Medillin, Colombia	11 A.M.-12 noon. 6-10:30 P.M.
5900	50.85	HJ2ABC	Cucuta, Colombia	11 A.M.-12 noon. 6:30-9 P.M.
5900	50.85	HCK	Quito, Ecuador	8:00-11:30 P.M.
5890	50.93	TGX (TG2X)	Guatemala City, Guatemala	11 A.M.-2 P.M. 6-10 P.M. irregular
5880	51.02	YV8RB	Barguisimeto, Venezuela	6-11 P.M.
5853	51.20	WOB	Lawrenceville, N. J.	(P) Phones ZFA afternoons
5850	51.28	YV5RMO	Maracaibo, Venezuela	11:30 A.M.-1 P.M. 5:45-10 P.M.
5845	51.30	KRO	Kaukuku, Hawaii	(P) Tests early mornings
5825	51.50	HJA2	Bogota, Colombia	(P) Phones HJA3 afternoons irreg.
5820	51.50	TIGPH	San Jose, Costa Rica	7-10 P.M.
5800	51.72	KZGT	Manila, P. I.	(P) Tests mornings irregularly
5790	51.81	JVU	Nazaki, Japan	(P) Phones JZC early mornings
5780	51.90	HJ1J	San Pedro de Macoris, R.D.	3-9:30 P.M.
5780	51.90	OAX4D	Lima, Peru	9-11:30 P.M. Wed. and Sat.
5750	52.17	XAM	Merida, Mexico	(P) Phones XDR-XDF early evenings
5730	52.36	JVV	Nazaki, Japan	(P) Phones JCZ early A. M.
5720	52.45	YV1ORCS	Santo Cristobal, Venezuela	8:00-11:00 P.M.
5712	52.54	CFU	Rossland, Canada	(P) Phones CFO and CFN evenings
5670	52.91	DAN	Nordenland, Germany	(P) Phones ships irreg.
5435	55.20	LSH	Buenos Aires, Arg.	(P) Relays LR4 and tests evenings
5400	55.56	HJA7	Cucuta, Colombia	Phones irregularly. Broadcasts music in evening at times
5400	55.56	HJA7	Cucuta, Colombia	Monday 4-8 P.M.
5265	57.00	KEC	Bolinas, Calif.	(P) Phones Honolulu irregularly
5170	58.50	PMY	Bandoeng, Java	(E) Phones and relays programs early mornings
5080	59.08	WCN	Lawrenceville, N. J.	(P) Phones GDW evenings seasonally
5025	59.76	ZFA	Hamilton, Bermuda	(P) Phones WOB evenings
4975	60.30	GBC	Rugby, England	(P) Phones ships afternoon and nights
4905	61.15	CGA8	Drummondville, Que.	(P) Phones GDB-GCB afternoons
4820	62.20	GDW	Rugby, England	(P) Phones WCN-WOA evenings
4752	63.13	WOY	Lawrenceville, N. J.	(P) Tests very irregular
4752	63.13	WOO	Ocean Gate, N. J.	(P) Phones ships irreg.
4600	65.22	HC2ET	Guayaquil, Ecuador	9:15-10:45 P.M. Wed. and Sat.
4555	65.95	WDN	Rocky Point, N. Y.	(P) Tests Rome and Berlin evenings
4510	66.52	ZFS	Nassau, Bahamas	(P) Phones WND daily; Tests GYD-ZSV irregular
4348	69.00	CGA9	Drummondville, Que.	(P) Phones ships and Rugby evenings
4320	69.40	GDB	Rugby, England	(P) Phones CGA8 and tests evenings
4295	69.90	WTDV	St. Thomas, Virgin Is.	(E) Weather reports 2-3 P.M.
4295	69.90	WTDW	St. Croix, Virgin Is.	(E) Weather reports 2-3 P.M.
4295	69.90	WTDX	St. John, Virgin Is.	(E) Weather reports 2-3 P.M.
4272	70.20	WOO	Ocean Gate, N. J.	(P) Phones ships afternoons and eve.
4272	70.20	WOY	Lawrenceville, N. J.	(P) Tests and phones ships evenings
4250	70.65	RV15	Khabarovsk, U.S.S.R.	1:30-9:00 A.M.
3770	79.60	HB9B	Basle, Switzerland	Mon. Thurs. Fri. 4-6 P.M.

BOSCH MODEL 575

(Continued from page 83)

should be reduced—at the input of the receiver. No doubt this unit accounts for the rather good sensitivity of the receiver.

Results of Tests

Atmospherics were too strong to pick up KFI in the broadcast band, but the rest of the country was pretty well accounted for. Stations in Canada and Mexico were also brought in.

All bands were tested for dead spots and image reception. None. The automatic volume control took hold well on most signals and, unlike the avc systems in some sets, held strong signals within bounds.

On the short-wave bands, Italy and Rio came in, in fine fashion, but London on three bands and Berlin on two bands didn't show up well until later in the week. VK2ME was hauled in with moderate signal strength on a Sunday morning. The 49-meter band brought up almost the entire flock of Central and South-American stations, and also Portugal.

Conditions on the 20-meter amateur band were reported as being rather poor, so we took a fling in that band to see what the Bosch set could do under adverse conditions.

A load of 4's, 5's and 9's were hauled in; also a few 2's and the following 6's and 7's: W6AXT, W6DDA, W6QQG, W7AOF, and W7BCI.

The following foreign amateur phone stations were logged: X1G, X1AG and X1HH, Mexico; CO2SB, CO2AM, 2LL and 8YB, Cuba; HH5PA and HI7G, Haiti and Dominica; VP5PZ, Jamaica; PY1GK, Brazil; TI2RC, Costa Rica; CX2HK, Uraguay, and F8DR, France.

JNB and JNJ—both code stations—were picked up slightly off the 20-meter amateur band.

South Norwalk, Conn. Sept. 15th.

◆

BROADCASTING MOVES AHEAD

(Continued from page 55)

equipment because sets were not capable of reproducing the highest broadcast quality, are now erecting new transmitters, to keep in step with reception advances.

With many brilliant new radio features in prospect and with better listening available, a banner radio season is anticipated. Improved conditions and greater public buying power lead the manufacturers to predict a boom season in radio set sales. Those who replace sets used for several years may expect a surprise when they experience the new perfection of quality which many of the new sets feature.

CHANNEL ECHOES

(Continued from page 85)

It should only be necessary to point out to these Senators that May Day is the first of May—an anniversary of international significance, celebrated in every country of the world by the Communists as their Fourth of July. Congress will immediately sense the sinister workings of the Kremlin, the undercurrent of Stalin's machinations that resulted in this phrase being accorded world-wide publicity—under the very noses of the representatives of non-communistic nations, at the Madrid conference! A new conference will be instigated. "M'adier" will be changed to something less crimson—such as, "Oh yoohoo"—and we shall have cleared up short-wave broadcasting allocations—maybe.

SPY CHASER

(Continued from page 82)

and had to explain who they were and why they had a car full of radio equipment. One over-zealous chief of police refused to take any credence at all in their story. He said he had heard and read about how these smart German spies worked and they could not fool him, no sir.

"How did you get out of that one?" we asked Sayres.

"We didn't," was the reply. "That low-comedy cop absolutely wouldn't believe our credentials. He had been warned about spies with a radio set in their car and now that he caught 'em, he was going to keep them. And he did. He put us in separate cells, took all our papers away from us and refused to let us telephone headquarters. Hours later, he sent one of his cops to bring us before him and from the way he had raved it wouldn't have surprised me a bit to have had him announce that he had decided to have us shot at sunrise.

"Well, when we were lined up before his desk, he started apologizing and we knew that he had come to his senses and called the Navy Yard in New York. We found out later that he had gone around telling all his friends that he had made a big spy haul, and I'll bet he expected some medals for his detective work. But you know, even though I was sure we would get out of there all right, I had a mighty uncomfortable feeling being shoved in the hoosegow the way we were."

"But how about the spies?" we reminded Sayres. "Did you finally catch up with them? And were they really spies?"

"Yes, we got them and they were indeed German spies. They had mounted their transmitter in a small, fast delivery truck with no name on the side panels. It was as sweet an outfit as I had ever seen and those boys sure did know their stuff, when it came to dodging us. We never found out much about them, but they all spoke perfect English and when once we had them cornered they never put up a bit of a scrap. They came along quietly with us and I heard were sent to an internment camp for the duration of the war."

"Spy hunting certainly doesn't sound as exciting as some novelists would have us believe," we remarked. "Didn't you have any gun-fights or anything like that?"

Sayres shook his head.

"Sorry to disappoint you, but we didn't. Most of the cases I looked up were reported to us because the person had a German name or because some neighbor had a grudge against him or for some other equally simple reason. Of course, as far as we knew any one of the hundreds of cases I investigated might have been a spy and we just couldn't take a chance that it was another false alarm.

"When a country is at war," he went on, "the people as a whole are in a strange state of mind. They are apparently only too ready to believe the worst about a person, and often quite wrongly. I remember one case in particular that was really quite sad. A family, whose son was a radio operator on board a freighter that had been torpedoed by the Germans, had a Dutch name and so was checked up by the Intelligence. I got in on the case through checking up on the son, who was one of the very few that had been saved from the freighter before she sank. The whole family was eventually given a clean bill and the case dropped. However, about ten years later I met that boy, who told me that he and his family had had to move away from that small town in which they had lived for years, because their neighbors refused to have anything to do with them, after they had been investigated.

"Certainly all cruelty in war times isn't confined to the war zone, is it?"

MODERN RADIO SERVICING

By Alfred A. Ghirardi, published by the Radio and Technical Publishing Co., 45 Astor Place, New York City, N. Y., 1300 pages, 706 illustrations, price $4.00.

Modern Radio Servicing is really a second edition of *Radio Servicing Course,* but a rather large one, for the new edition contains 1300 pages in comparison to 182 pages for the preceding book. In planning this new volume the general style of the first issue was retained, and many additional chapters covering new topics were added.

This book has been divided into four parts. Part I has seventeen chapters de-

voted to the theory and construction of modern radio test equipment. The nine chapters of the second part are given over to the practical servicing of radio receivers. The third section of the book contains six chapters on specialized servicing problems, while the last part deals with vacuum-tube charts.

Part I begins with a four-page introduction and follows it with chapters on the theory of "Milliammeters, Ammeters, and Voltmeters" and "Methods and Instruments for Measuring Resistance." The remaining pages of this section are concerned with ohmmeters, condenser testers, capacity meters, output meters, vacuum-tube voltmeters, tube checkers, voltage-current set analyzers, point-to-point testing, and test oscillators. Data is included on commercial types as well as the types which may be built up by the Service Man.

Chapter titles of Part II are as follows: "Preliminary Tests for Trouble," "Peculiarities of avc and qavc circuits," "Receiver Analysis by Voltage-Current Tests," "Receiver Analysis by Resistance Tests," "Testing Individual Radio Components," "Obscure Troubles Not Revealed by Analyzers," "Aligning and Neutralizing t-r-f Receivers," "Aligning and Neutralizing Superheterodyne Receivers," and "Repairing Individual Radio Components."

The third section covers the installation and servicing of auto-radio and marine receivers, and the servicing of all-wave receivers. The remaining chapters are entitled: "Reducing Electrical Interference," "High-Fidelity Receiver Problems," and "How to Sell Your Service,"

Review questions are given at the end of nearly all the chapters, the total number being 723. Also, a complete, cross-referenced index has been included.

Modern Radio Servicing is a practical text on the theory, construction, and use of modern radio service equipment, and the rapid and systematic methods of radio servicing.

LAFAYETTE NINE

(Continued from page 68)

and the picture layout diagram, in an effort to make absolutely sure that you have everything in its proper place, and properly connected into the circuit. After you are sure that this is the case, the receiver should be air tested, and the intermediate - frequency transformers aligned, using a broadcast signal for this purpose, if a calibrated oscillator is not available. The intermediate frequency employed is 470 kilocycles.

Mounting Chassis

The appearance of the front panel, which is equipped with two brackets will make it quite apparent how the chassis is to be mounted. Of course, it will be necessary to remove all of the knobs from the controls, as well as one washer, and one nut from the headphone jack. It is now only necessary to slide the chassis in between the two brackets, until the holes in the brackets line up with the holes in the bottom of the chassis. The 6/32 screws provided should then be employed to fasten the chassis in this position.

Additional Hints

The grid leads of the first r-f and first detector tubes, are taken from the stator lugs of the variable condenser above the chassis, and at almost the same height as the grid caps of the tubes will be, while the return wiring is taken from the other side of the condenser, from the other stator terminal.

Make all leads as short and direct as possible, with the exception of the leads mentioned in the text, that are to be kept away from the chassis.

The beat-frequency oscillator coupling condenser should be left almost all the way open, or at its minimum capacity setting, until you have the rest of the receiver properly aligned and are obtaining satisfactory performance. Upon throwing the switch to the beat-frequency oscillator position, the BFO tuning lever should be adjusted for maximum hiss or rush, which is usually quite noticeable. If, upon tuning into a cw signal or some other carrier, the beat produced is not loud enough, the coupling condenser may then be adjusted for additional BFO signals.

Do not attempt to wire the receiver from the schematic diagram only, for as mentioned above, the various ground points and the location of several leads is very important, and in view of this, the picture diagram should be adhered to closely.

There are only two shielded leads employed in the entire receiver, one being the audio grid lead to the 6D6 first audio stage, and the other, the plate lead of the first detector.

When mounting the loudspeaker, the speaker should be fastened to the panel first, and then the chassis slid forward towards the panel, until the holes in the brackets and the chassis line up. It is also advisable to mount the dial escutcheon plate along with the loud speaker.

(*Results of the tests made on this receiver will appear in the "Radio Proving Post" next month.—Ed.*)

SHORT-WAVE UNIVERSITY

SHORT-WAVE listeners with a thirst for education may tune in on a wide variety of courses offered by the International University of the Air, over W1XAL, Boston, (6040 or 11,790 kc) every Tuesday and Thursday, 7:15 to 9:15 P. M., E.S.T.

BACKWASH

(Continued from page 86)

all the Ham bands, and the F. C. C. is cracking down. Your chances of ever getting a license are slim if you start off by bootlegging.

Would like to communicate with any amateurs working the 40-meter band who would like to help with some traffic with the West Coast and Spain. If you want a good rag chew, listen for me on 7160. I'll be only to glad to have a QSO with you.

ROBERT O. SLEMMER, W3ETE
CUMBERLAND, MD.

How do you like the Ham stuff in this issue? More on the way. Potential Hams—take the advice of 3ETE and don't go on the air without a license. *Some people have gained the idea that it isn't necessary to have a license for transmitting on 5 meters. We don't know where this story was started—but just keep in mind that a license is required for any type of radio transmitter. So keep your nose clean.—Ed.*

THE MASTERPIECE IV

(Continued from page 77)

three-section Litz wound coils each tuned by a 100-mmfd air condenser. Both coil and condenser insulation is isolantite. Again large shields 3" in diameter and 4 11/16" high are used to insure no impairment of the efficiency of these very excellent tuned circuits.

High Fidelity

The admission, amplification and final reproduction of the frequency band of 30 to 9000 cycles necessary to full-range, high-fidelity reception seems relatively simple at first glance. Some of the problems are not as simple.

One of the first problems is broadcast stations themselves. Some are good and many are bad. Some modulate up to 10,000 cycles, and some don't go up to 5,000 cycles, but the designer's task is to make them all sound perfect. In the course of design work, when everything in the receiver seems okay, and a local station is tuned in, quality is ragged and poor, so the station is blamed. But a checkback on the station itself, if it should be made, says the station quality is good. So the search for perfection again goes forward, and finally reproduction is obtained for which no excuses of poor station quality need be made.

This explanation is offered because many high-fidelity receivers are being offered with excuses as to poor quality on some stations, or on all stations at some times of the day, which are really excuses for poor receiver reproduction. As a result of most careful design, no such excuses need be made for the Masterpiece IV. It will reproduce without "station distortion" the programs of any good station, day or night, network or local origin, with good undistorted quality limited only by the strength of the station (local or semi-distant) and the tone range it may be covering at the time (few network programs go above 5,000 to 6,000 cycles today, and usually only locally originated programs will go up to 9,000 cycles.)

GLOBE GIRDLING

(Continued from page 64)

P. M. E.S.T. over League of Nations station HBL (9505), HBP (7797), HB9B (14,236), and HB9AT (14,290). Correct reports will be verified. Send reports to Secretary of above organization. HRN, Tegucigalpa, Honduras, 5870 or 5875 KC, reported heard around 10 P. M. Signs off with "Good Night Melody."

Quixite Radio Club in late report shows HJ4ABD, Medillin, Colombia, testing out in evening on 6060 KC; 49.50 meters. Also HJ4ABJ, Ecos del Combrima, Ibagne, Colombia, on about 6460 KC, or 46.44 meters.

Mr. Wilfred T. Siddle, Birmingham, Ala., says he is hearing a station on 6040 KC or 49.67 meters with call of HRP1, known as "Ecos de Honduras," around 7:30 P. M. E.S.T. and located at San Pedro Sula, Honduras, and that he has received verification to his report.

One needs a super-selective set to pull them out of the 49-meter band with its additions and continual changes.

Reports From Readers

In conclusion, may I extend a cordial request that my readers send me reports of their own receiving experiences, changes in time schedules, errors noted, etc., with a view to improving this section of ALL WAVE RADIO. It affords me personal pleasure in replying to your letters, exchanging ideas and assisting where I can.

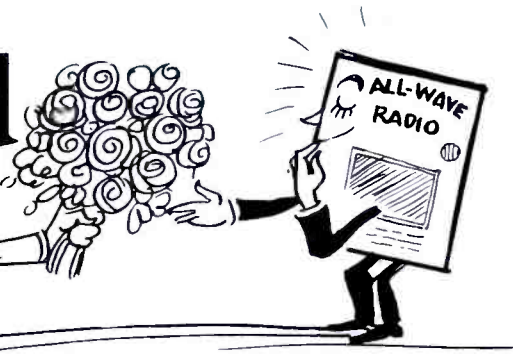
I do not claim to be the foremost authority on the subject of distance reception, yet I believe my long experience in radio receiving, its conditions, and my close touch with the situation in general, will be of assistance in furnishing you the information you desire.

I would much prefer to have you feel that I am one of you and to gain your confidence and esteem by giving you as reliable information as is possible to give at all times. I have made many warm friends in radio in my contact with it and wish not to lose them, for "all the wealth of the world could not buy you a friend or pay you for the loss of one." And friends are not made or retained through misrepresentation or endeavoring to create an impression that you are superior to those with whom you work.

We've made our bow

and

We're glad you liked our first issue



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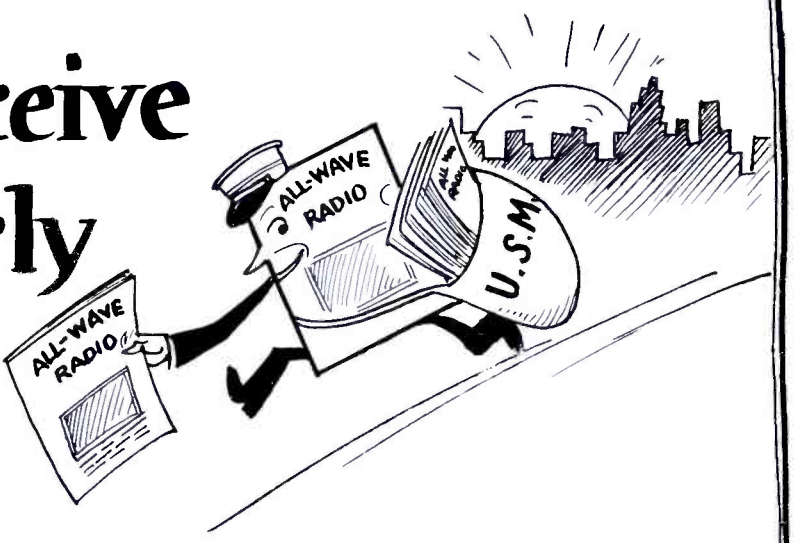

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