March
25 Cents
Canada 30¢

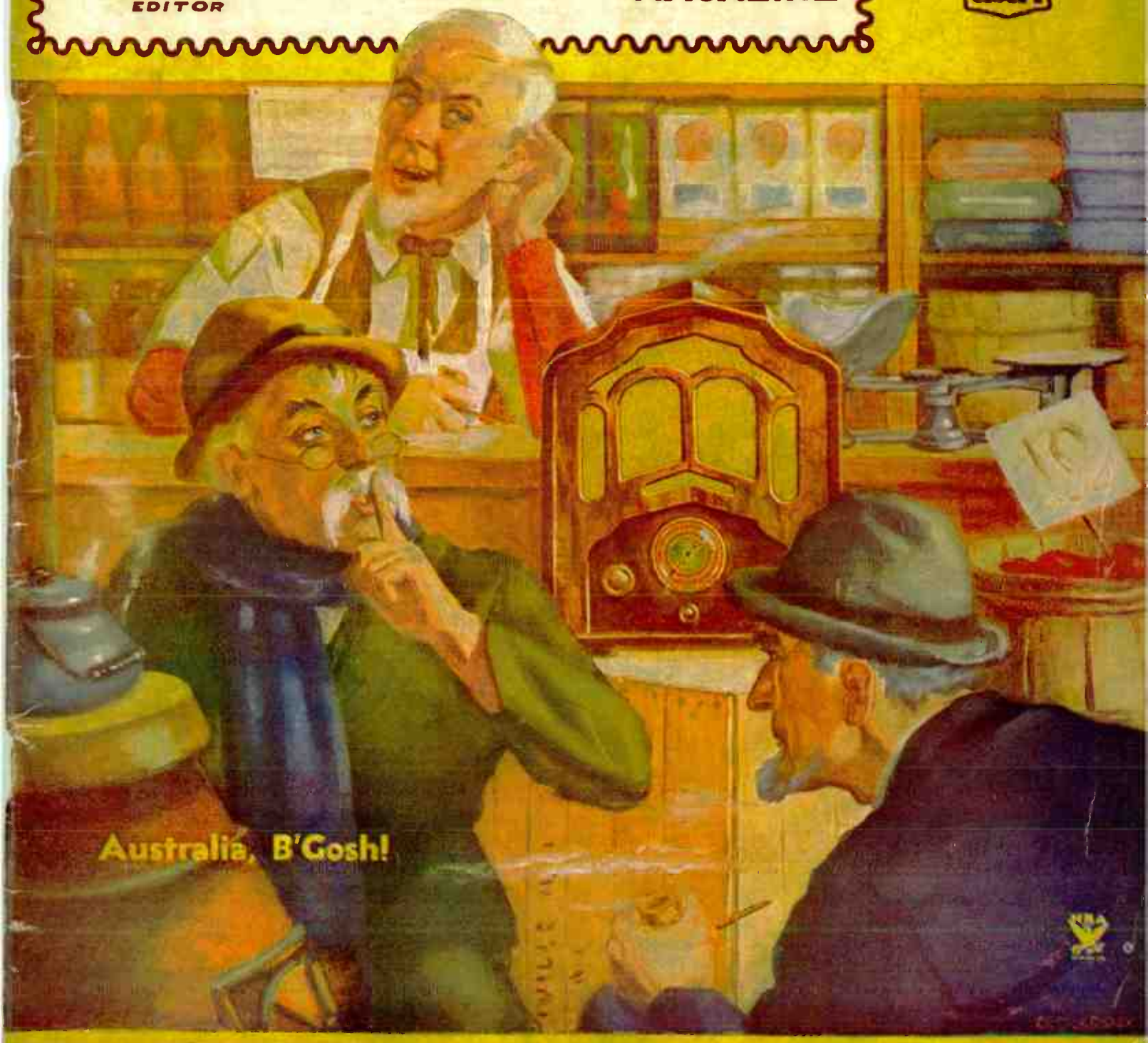
OFFICIAL

Short Wave Listener

HUGO GERNSBACK
EDITOR

MAGAZINE

PUBLISHED BY
THE PUBLISHERS OF
SHORT WAVE CRAFT



LARGEST AND BEST SHORT-WAVE STATION LIST IN PRINT • PHOTOS OF S-W ARTISTS
WHERE TO FIND S-W STATIONS ON YOUR DIAL • WORLD SHORT-WAVE STATION MAP

WORLD GLOBES

FOR SHORT WAVE ENTHUSIASTS

NOW AT LOW PRICES

THESE remarkable globes, executed in fourteen colors, are absolutely indispensable for short wave fans. Notable among the numerous features of these world globes, is that a damp cloth quickly removes all dust and water does not harm the surface.

Short Wave fans are enabled to determine correct time in various centers of the world with the aid of these maps; distances from city to city can be accurately established.

There is a graduated "Meridian" scale of black enameled metal with the 9" and 12" globes. An additional feature is the movable hour scale found at the north pole—this facilitates determining the hour in any part of the world.

Only on a globe of this size is it possible to get an accurate picture of countries and their relative positions to each other. You will actually be amazed when you compare distances—from New York to Moscow; from Cape Town to Tokio; from Los Angeles to Rio de Janeiro, etc. A flat map is deceptive for measuring, but take a small string and stretch it across the globe, from city to city, and you have the correct distances.

Here are globes that add dignity to home, office, studio or laboratory—a globe that everyone would be proud to possess.

Each world globe contains a listing of over 7,500 cities in nations the world over—spellings conform to international geographic standards—all globes are of 1934 production. GET ONE OF THESE FINE WORLD GLOBES TODAY!

No. 147

World Globe No. 147

12" Globe. New model—equipped with wooden floor stand finished in walnut. Height overall 35". Globe constructed with half meridian. New **World Globe Handbook included FREE.** A marvelous buy. Never has a floor model Globe been sold at such a low price. Shipping weight 9 lbs.

PRICE

$4.15

F.O.B. Chicago.

No. 99

World Globe No. 99

9" Globe, equipped with sturdy, black metal base and full meridian. Same ball as our No. 139 but reduced ¼ in size and scale. Included with globe is newly printed **World Globe Handbook FREE.** Shipping weight 6 lbs.

PRICE

$2.05

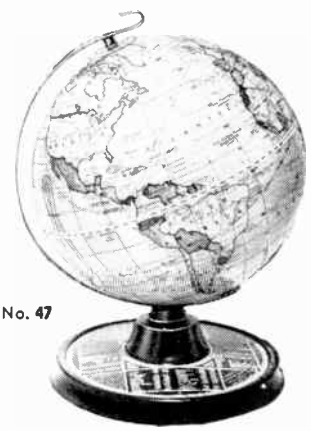
F.O.B. Chicago.

World Globe No. 47

7" Globe, equipped with sturdy metal base and half meridian. Index to countries of the world by latitude and longitude shown on base. Shipping weight 2 lbs.

PRICE

$0.90 F.O.B. Chicago.



No. 47

Gentlemen:

I received the World Globe and am certainly well pleased with its completeness, appearance and its usefulness.

Short wave listening has become a hobby with me, and this World Globe is a necessary accessory to any short wave listener or, for that matter, to any home.

P. C. ELLIS, Supt.
Laboratory—19th and Campbell Streets, Kansas City, Mo.

No. 139

SPECIAL THIS MONTH

World Globe No. 139

12" Globe, equipped with sturdy, black metal base and half meridian. Contains over 7,500 names and cities. Spellings conform to authoritative world standards. **Hundreds sold to many short wave fans during the last year. Copy of World Globe Handbook included FREE.** Shipping weight 8 lbs. **PRICE**

$2.95 F.O.B. Chicago.

ORDER YOUR GLOBE TODAY!

SHORT WAVE CRAFT S W L-3-35
99 Hudson Street, New York, N. Y.

Gentlemen: Enclosed you will find my remittance of $..... for which please ship me the following World Globe.

( ) World Globe No. 99 @ $2.05
( ) World Globe No. 147 @ $4.15
( ) World Globe No. 47 @ $0.90
( ) World Globe No. 139 @ $2.95

Name .....

Address .....

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

Send remittance in check or money order—register letter if it contains cash, stamps or currency. GLOBES ARE SHIPPED FROM OUR WAREHOUSE IN CHICAGO—F. O. B. FROM THAT CITY.

All globes are carefully packed in original cartons assuring safe delivery. ORDER BY NUMBER. Send check or money order, plus sufficient postage for delivery by parcel post. Globes are shipped from our Chicago warehouse. Register letter if it contains cash, or currency or stamps. If preferred, specify that shipment be sent express collect. ALL ORDERS ARE FILLED PROMPTLY.

ALL GLOBES SHIPPED IMMEDIATELY

SHORT WAVE CRAFT 99 HUDSON STREET, NEW YORK, N. Y.

SAY FELLOWS

I'LL FINANCE YOUR TRAINING IN THE GREAT FIELD OF

RADIO

LEARN BY DOING IN 10 WEEKS

mail the coupon below and I'll give you all the facts about my plan to finance your training - and let you pay for this training in easy monthly payments, which won't start until 60 DAYS AFTER your 10 weeks training period is over - then you will have over a year to complete your payments.

Then after you have completed your training my employment department will get behind you and give you assistance to help you locate the job for which you have been trained.

Here at COYNE you are trained on actual RADIO-TELEVISION and TALKING PICTURE machinery and equipment, and not by books or lessons - ALL PRACTICAL WORK with only the necessary theory which is given in a practical way. you don't need advanced education or previous experience.

Right now I'm including, at no extra cost, my big new course in ELECTRIC REFRIGERATION AND AIR CONDITIONING.

If you write me today or send coupon I will send you complete details of my sensational new plan and my big Free illustrated book telling all about Coyne and how many EARN WHILE LEARNING.

H C Lewis
Pres.

COYNE ELECTRICAL AND RADIO SCHOOL
500 - SOUTH PAULINA ST
CHICAGO ILLINOIS DEPT. 35-8K

MAIL THIS COUPON FOR ALL FACTS

H.C. LEWIS PRES. DEPT. 35-8K
COYNE ELECTRICAL AND RADIO SCHOOL
500 SOUTH PAULINA ST.
CHICAGO ILLINOIS.

Please send me your big Free book and all the facts.

NAME _____

ADDRESS _____

CITY _____ STATE _____

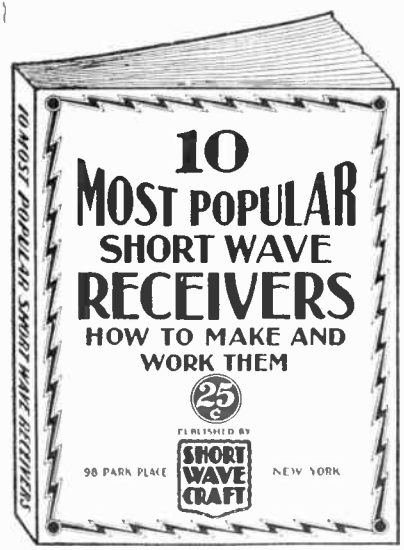
The 4 ESSENTIAL SHORT WAVE BOOKS

'ROUND THE WORLD FANS USE THESE GREAT SHORT WAVE BOOKS

These great books contain everything on short waves that is really worth knowing—they are books which have been most enthusiastically welcomed by short-wave fans. The cost of the books is extremely low in comparison with the valuable material which they contain.

There is not a short-wave fan, experimenter or interested radio-minded reader who will not want these books. Right up-to-the-minute with new material on outstanding developments in the short wave field. The books are authoritative, completely illustrated and not too highly technical.

Ten Most Popular Short Wave Receivers. How to Make and Work Them



This new volume is a revelation to those who wish to build their own short wave receivers. The editors of SHORT WAVE CRAFT have selected ten outstanding short wave receivers and these are described in the new volume. Each receiver is fully illustrated with a complete layout, pictorial representation, photographs of the set complete, hookup and all worthwhile specifications. Everything from the simplest one tube set to a 5-tube T. R. F. receiver is presented. Complete lists of parts are given to make each set complete. You are shown how to operate the receiver to its maximum efficiency.

CONTENTS

The Doerle 2-Tube Receiver That Reaches the 12,500 Mile Mark, by Walter C. Doerle.

2 R F Pentode S-W Receiver having two stages of Tuned Radio Frequency, by Clifford E. Denton and H. W. Secor.

Mc de Luxe S W Receiver, by Edward G. Ingram.

The Binneweg 2 Tube 12,000 Mile DX Receiver, by A. Binneweg, Jr.

Build a Short Wave Receiver in your "Brief Case" by Hugo Gernsback and Clifford E. Denton.

The Denton 2 Tube All Wave Receiver, by Clifford E. Denton.

The Denton "Stand By," by Clifford E. Denton.

The "Stand By" Electrified.

The Short Wave MEGADYNE by Hugo Gernsback.

A FOUR POCKET Short Wave Receiver by Hugo Gernsback and Clifford E. Denton.

B. X. the Dee Roll in on the One Tuber by C. D. Doering.

The S W PENTODE 4 by H. G. Cisin M. E.

Louis Martin's Idea of A GOOD S-W RECEIVER is As Martin.

40 PAGES
OVER 75 ILLUSTRATIONS

IMPORTANT

THERE IS NO DUPLICATION BETWEEN THIS BOOK AND OUR OTHER VOLUME—"HOW TO BUILD AND OPERATE SHORT WAVE RECEIVERS." ALL THE MATERIAL PUBLISHED IN THE NEW BOOK HAS NEVER APPEARED IN ANY BOOK BEFORE.

25c

The Short Wave Beginner's Book

Here is a book that will solve your short wave problems—leading you in easy stages from the simplest fundamentals to the present stage of the art as it is known today. It is the only low-priced reference book on short waves for the beginner.

The book is profusely illustrated with all sorts of photos, explanations and everything worth while knowing about short waves—the book is not "technical." It has no mathematics, no "high-falutin" language and no technical jargon. You are shown how to interpret a diagram and a few simple sets are also given to show you how to go about it in making them.

It abounds with many illustrations, photographs, simple charts, hookups, etc., all in simple language. It also gives you a tremendous amount of very important information which you usually do not find in other books, such as time conversion tables, all about aerials, noise elimination, how to get verification cards from foreign stations, all about radio tubes, data on coil winding and dozens of other subjects.

Partial List of Contents

Getting Started in Short Waves—the fundamentals of electricity—Sounds the Short Hand of Radio—how to read schematic diagrams—Short Wave Coils—various types and kinks in making them—Short Wave Aerials—the points that determine a good aerial from an inefficient one—The Transposed Lead-in for reducing Man Made Static—

The Beginner's Short Wave Receiver—a simple one tuber set that anyone can build—The Beginner's Set tests—Amplifier—how the Antenna may be increased by adding an amplifier—

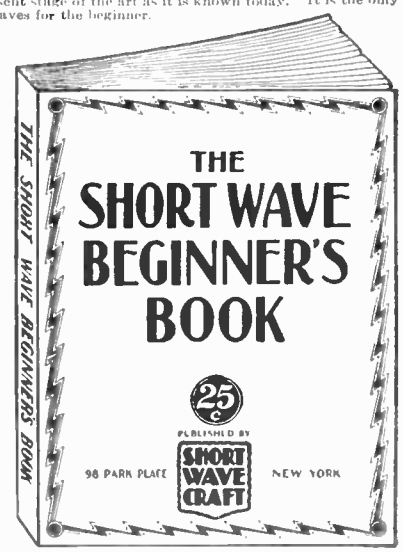
How to Tune the Short Wave Set—telling the important points to get good results—Regeneration Coarse Tuning—Short Wave Reception—

Audio Amplifiers for S-W Receivers—How to Couple the Speaker to the set—Locating the Code—for greater enjoyment with the S-W set—

Wave Length to Kilocycle Chart—

Wire Chart—to assist in the construction of coils—

Kinks that every user of S-W Receivers should know—



40 PAGES
OVER 75 ILLUSTRATIONS

25c

How to Build and Operate Short Wave Receivers

is the best and most up-to-date book on the subject. It is edited and prepared by the editors of SHORT WAVE CRAFT, and contains a wealth of material on the building and operation, not only of typical short-wave receivers, but short-wave converters as well. Dozens of short-wave sets are found in this book, which contains hundreds of illustrations; actual photographs of sets built, hookups and diagrams galore.

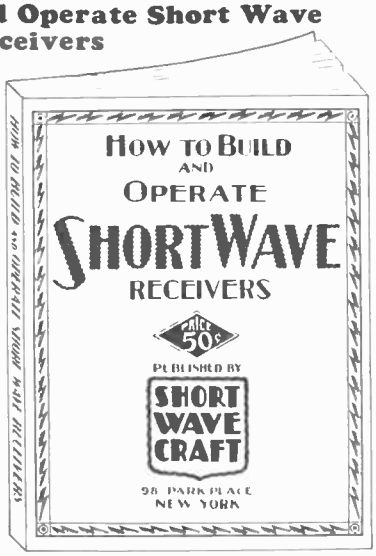
The book comes with a heavy colored cover, and is printed throughout on first-class paper. No expense has been spared to make this the outstanding volume of its kind. The book measures 7½x10 inches.

This book is sold only at such a ridiculously low price because it is our aim to put this valuable work into the hands of every short-wave enthusiast.

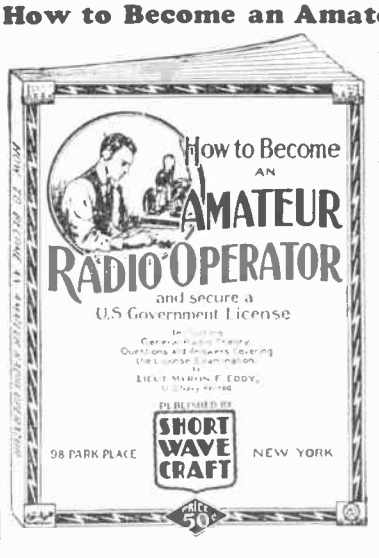
We know that if you are at all interested in short waves you will not wish to do without this book. It is a most important and timely radio publication.

Over 150 Illustrations
72 Pages 7x10 Inches

50c



How to Become an Amateur Radio Operator



We chose Lieut. Myron F. Eddy to write this book because of his long years of experience in the amateur field have made him pre-eminent in this line. For many years he was instructor of radio telegraphy at the R.C.A. Institutes. He is a member of the I.R.E. Institute of Radio Engineers, also the Veteran Wireless Operators' Association.

If you intend to become a licensed code operator, if you wish to take up phone work eventually, if you wish to prepare yourself for this important subject—this is the book you must get.

Partial List of Contents

Ways of learning the code. A system of sending and receiving with necessary drill words in simple but effective way—not with approved methods. Complete, authentic definitions of radio terms, units and laws. Brief descriptions of commonly used pieces of radio equipment. This chapter gives the whys and wherefores of the radio operator. Graphic symbols are used to indicate the various parts from circuits. General radio theory particularly as it applies to the beginner. The electron theory in brief is given, then waves—their creation, propagation and reception. Fundamental Ham Code requirements, particularly those used in radio are outlined next and typical basic circuits are analyzed. Descriptions of modern receivers that are being used with success by amateurs. You are told how to build and operate sets. Amateur transmitters. Diagrams with specific coils are furnished for construction by the beginner. Power equipment that may be used with transformers and receivers, rectifiers, filters batteries, etc. Regulations that apply to amateur operators. Appendix which contains the International "Q" signals, conversion tables for various purposes, etc.

Over 150 Illustrations
72 Pages 7x10 Inches

50c

All the books shown on this page are published exclusively by

SHORT WAVE CRAFT

99-101 Hudson Street, New York, N. Y.

CLIP—MAIL

SHORT WAVE CRAFT SWL 3-3

99-101 Hudson Street, New York, N. Y.

Gentlemen: I enclose herewith my remittance for the amount of $ ..... for which you are to send me, postpaid, the books checked below.

( ) Ten Most Popular Short Wave Receivers. How to Make and Work Them...25c each

( ) The Short Wave Beginner's Book.....25c each

( ) How to Build and Operate Short Wave Receivers.....50c each

( ) How to Become an Amateur Radio Operator.....50c each

Name.....

Address.....

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

(Send remittance in form of check or money order. If letter contains cash or unused U. S. Postage Stamps, register it.)

These Books are Authentic For All Short Wave Work and LOW in Price

COUPON TODAY!

HUGO GERNSBACK.....President
H. W. SECOR.....Vice-President
EMIL GROSSMAN
Director of Advertising
London Agent: HACHETTE & CIE, 16-17 King William St., Charing Cross, W.C.2
Paris Agent: HACHETTE & CIE., 111 Rue Reaumur
Australian Agents: McGILL'S AGENCY, 179 Elizabeth St., Melbourne

Editor
HUGO GERNSBACK

Managing Editor
H. WINFIELD SECOR

Associate Editor
GEORGE W. SHUART W2AMN.

FEB.-MAR. 1935

VOLUME I No. 4

OFFICIAL SHORT-WAVE LISTENER MAGAZINE
Combined with
OFFICIAL SHORT-WAVE LOG AND CALL MAGAZINE

Contents . . .

A FEW WORDS FROM THE PUBLISHER

THE OFFICIAL SHORT WAVE LISTENER MAGAZINE, with which is now combined the OFFICIAL SHORT WAVE LOG AND CALL MAGAZINE, is brought to you this month in an entirely new dress. It was felt that the former CALL MAGAZINE did not present sufficient variety, and for this reason the present magazine has been poplarized in a way that I know will appeal to all short-wave listeners, particularly those of a non-technical mind.

We have gained quite a bit of experience in publishing three issues of the former magazine and this experience has taught us many things. I believe the time is now ripe for a general magazine of this type, due to the tremendous interest in All-Wave sets and general short-wave sets, which are now actually being put out by the million.

I dedicate the new magazine to the serious short-wave listener who wishes to keep abreast with what is going on in the short-wave "lanes" at all times and how he can get the most out of his set. This, remember, is not a technical magazine and you will not find in it either diagrams or technical jargon. We have tried to give you a "simplified" short-wave listening magazine and I hope we have succeeded. And, of course, we are always open to your suggestions, so let us have them.

HUGO GERNSBACK,
Publisher.

Popular Book Corporation
Editorial and General Offices
99-101 Hudson St. New York, N. Y.

This magazine is published every other month. The next issue will be out April 5th.

OFFICIAL SHORT WAVE LISTENER MAGAZINE entry as second class matter at the Post Office, New York, N. Y., under the act of March 31, 1879, is pending. Trademark and copyrights by permission of H. Gernsback, 99 Hudson Street, New York City. Text and illustrations of this magazine are copyright and must not be reproduced without permission. OFFICIAL SHORT WAVE LISTENER MAGAZINE is published every other month, six numbers per year. The subscription price is $1.50 per year in United States and possessions; Canada and foreign countries, $1.75 per year. Single copies 25c.

Address all contributions for publication to the Editor, OFFICIAL SHORT WAVE LISTENER MAGAZINE, 99-101 Hudson Street, New York, N. Y. Publishers are not responsible for lost manuscripts or photographs. Contributions cannot be returned unless authors remit full return postage. This magazine is for sale at all principal newsstands in the United States and Canada. European agents: Brentano's, London and Paris. Printed in U. S. A.
Make all subscription checks payable to Popular Book Corporation.

David Sarnoff, President of the Radio Corporation of America.

Television will be solved by... Micro-Waves

By David Sarnoff
PRESIDENT OF RADIO CORP. OF AMERICA

Mr. Sarnoff points out that the gateway to Television undoubtedly lies in the direction of high-speed Facsimile radio transmission on micro-waves. When we can send motion pictures on these micro-waves, then we will have solved the problem of Television.

● High-speed facsimile radio transmission on micro-waves, so small that they are measured in inches, is making good progress in our laboratories. It is the gateway to television. The Radio Corporation of America expects to have a circuit between New York and Philadelphia, for which an experimental license has been granted, in operation within the next year. On this circuit messages and letters will be flashed between the cities, appearing at the receiving end in exact duplication of the way in which they are written.

This method provides a new and revolutionary approach to the problem of rapid communication of record. Ultimately we will not be dependent on the dots and dashes of the Morse code.

Micro-waves are practically free from static. There are no shadows or double images in them, as in the case of the usual short waves, which catapult into the air and are reflected by the "radio roof." Micro-waves are quasi-optical in character. They carry approximately as far as the eye can see. If released from a skyscraper, their range is to the theoretical horizon. The present limitation of distance may be overcome by "booster," or relay stations.

Facsimile, on normal short waves, already has proved its usefulness in flashing news pictures and printed matter across the ocean. For the domestic, intercity facsimile system new instruments are being designed. Practical tests between New York and Philadelphia give every reason to believe that the dream of the research experts is true, and that this will evolve eventually into a micro-wave system noted for its speed.

In this way we will first transmit still pictures and printed matter instantaneously. This is high-speed facsimile radio. It will represent a great advance.

The next step will then be to send motion pictures. That is television!

I believe the day is not far distant when radio will dip into the mail bag. If a letter is worth the time required for dictation, for the stenographer to write, for rereading by the sender, then the stamp and, let us say, a month for arrival in Australia, then it is worth a little more to flash it across the world for quick delivery and an answer. I believe thousands of letters and messages will fly between cities and from country to country by facsimile radio.

In this ethereal realm we expect to transmit facsimile messages at higher speeds and lower tariffs than is possible by dots and dashes. The charge will be at so much a square inch, in the international service at so much per square centimeter, or even so much for a standard size letter sheet.

Identifying Short-Wave Stations

By Lee McCanne
MANAGER, TE-LEK-TOR DIVISION, OF STROMBERG-CARLSON TELEPHONE MFG. CO.

● WHEN a broadcast program is found on a new or uncharted division of the short wave dial, or when you are in doubt as to the identity of a short wave broadcaster, the following checking operations should be followed:

1. Determine, if possible, what language the announcer and speakers are using. Bear in mind, however, that the hearing of an announcement spoken in English, French, German, Italian, Spanish, etc., is not an infallible guide, because

a) Many foreign stations repeat their announcements in several languages.

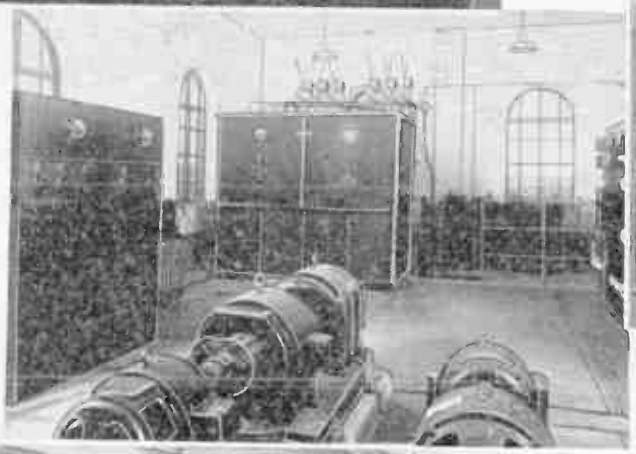
b) Some of them "swap" programs. For example, Station EAQ in Madrid, Spain, sometimes transmits the same program as the English stations, brought to it by a telephone chain network.

c) Many foreign countries have colonies in all parts of the world; others use a "borrowed" language. Thus, for example, Spanish is spoken in South America; French and Italian in North Africa; English in Australia, etc.

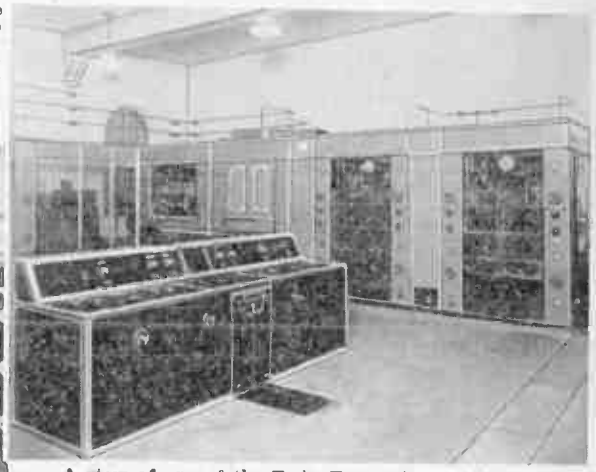
(*Continued on page 47*)

Where the Italian Short-Wave Programs Start

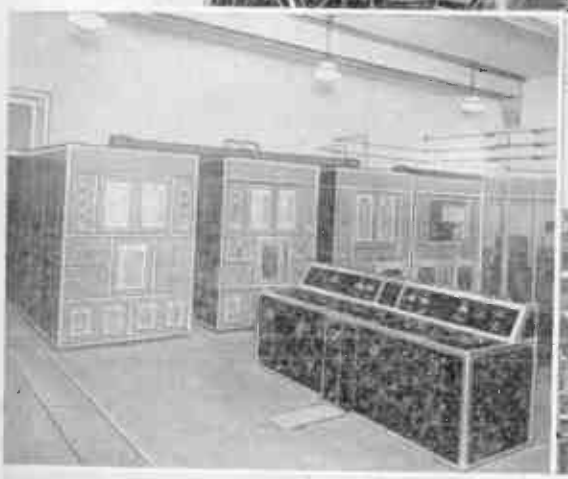
Senatore Guglielmo Marconi broadcasting the inaugural program

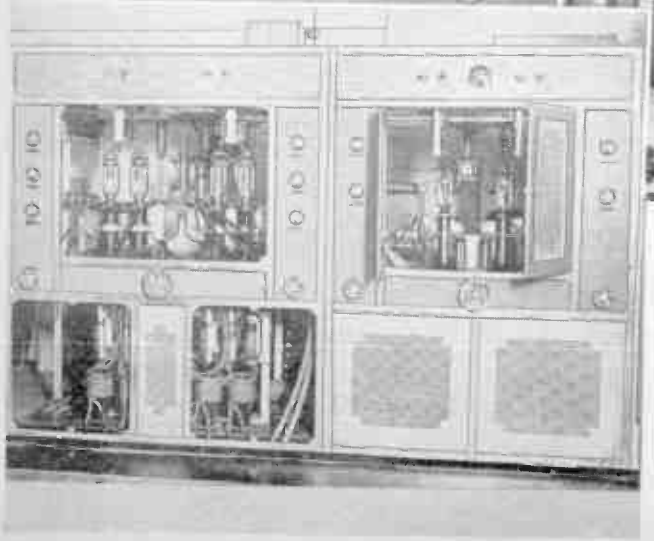


This view (right) shows the mercury vapor rectifiers used for supplying power to the plates of the transmitting tubes in the Twin Transmitters, and also shows a partial view of the generators used for supplying the filament current for the tubes.



A view of one of the Twin Transmitters showing both the transmitting equipment and the central control panel. It is interesting to note that the control panel is of the horizontal type, which is much favored in Europe in contrast to the vertical type favored by American engineers. This transmitter is used generally for broadcasting to North America and the Orient.





Above at left—transmitter and control panel used for broadcasting to South America and Africa. This plant is practically a duplicate of the one used for the North American broadcasting. Above—a view of the Royal Italian Opera House in Rome, from which the operatic performances are relayed by "short waves" to all the world. Most short-wave listeners are familiar with the wonderful performances given by the artists from this theatre. Left—power amplifiers, including the final and pre-final stages of the North American transmitter. One of the panels is shown with the protective screen removed in order to see the interior more clearly.

● Italy has joined the ranks of the countries possessing powerful short-wave broadcasting stations. The new Italian short-wave broadcasting station was opened with an address by Senatore Marconi late in October. Two transmitters are employed in the new station, each of them applying a power of 25 kilowatts, making them the most powerful short-wave broadcaster in Europe.

Above—Margot Antillano, the youngest radio artist in YV2RC. The softness of her voice and her great acting abilities have made her a favorite in the mystery serials that are regularly broadcasted by YV2RC.

Above—YV1RC stars, Carmencita Serrano and Conchita Ascanio. These two young ladies regularly contribute to make more attractive YV2RC programs.

Left—The DX'ers friend, Edgar J. Anzola. Anzola's announcements in English of all special programs from YV2RC have made him countless friends all over the world. His knowledge of his native land and of the States and other countries where he has lived, enables him to make his announcements very interesting and vivid, as he has a great ability to make realistic descriptions.

Short-Wave Stars From Caracas

NEARLY five years ago the "C. A. Almacen Americano," in Venezuela, realized that a well-organized commercial broadcasting station was needed to serve the country surrounding Caracas. Consequently, on December 11, 1930, the pioneer broadcasting station for that vicinity—only 100 watts output, but a marvel nevertheless—was inaugurated. Immediately the populace of Caracas and the surrounding territory went radio mad, for the novelty of local programs, strong and clear enough for the people to receive on their modest types of receivers, was really something to be enthusiastic about.

So successful was this venture, with its two-fold income from the sale of receivers and time on the air, that on July 10, 1932, a new 5 KW RCA Victor transmitter was placed in commission, with the call letters YV1RC. The resultant expansion in coverage resulted in increased sales of receivers, and, of course, increased the value of program time.

Shortly after this step, experiments were conducted in the short-wave field with a view toward operating an auxiliary transmitter, using the same programs. Confirmations began to pour in from all America—from Canada to Brazil. In fact, as the experiments progressed, thousands of acknowledgments were received from all over the world. The result was that a modern 250-watt high-frequency transmitter with the call letters YV2RC was put on the air to operate simultaneously with the long-wave transmitter.

The studios are conveniently located in the city of Caracas, on the second floor of the Almacen Americano Building, while the transmitting equipment is located four and a half miles distant, on top of a mountain. The tops of the two insulated steel towers are over 4,000 feet above the sea level, and being within five and a half miles of the coast line, they present an outstanding landmark to the incoming steamships. As the climate is such that there is never any fear of freezing, the water-cooling system for the transmitting tubes is arranged outside the station in the form of an attractive fountain. In the background, other mountain tops thrust their peaks even higher, often disappearing into passing cloud banks. Altogether, a more picturesque and romantic setting for a modern scientific marvel of this kind is difficult to envision.

A recent popularity contest conducted by this organization had many unique features, and might well be duplicated by American stations with similar success. First, through the local newspapers, several very attractive artists from the local territory were introduced by numbered photographs. The identity of each young lady was withheld. By means of coupons, the people's first, second, and third choices were established. Immediately following this, the same articles were presented to the listening public over the air, and again the identities were withheld—the artists being identified this time only by letters of the alphabet. Thus it was impossible for the audience to definitely associate the voices that were heard with the photographs they had seen. A second voting contest was then held to ascertain the first, second, and third choices of the listeners. The winners were then determined by a combination of the two ballots, and their pictures appear herewith. Miss Josephine Corcano, having received the greatest number of votes for both her personal appearance and for her microphone artistry, was elected "Miss Broadcasting Caracas." Miss Alicia Hardy came out second best and won the title of "Miss YV1RC," while Miss Graziella Osorio won the title of "Miss YV2RC," through being next in line. Altogether, the contest drew a tremendous amount of popular interest and enthusiasm, with the result that these three stars are now called upon to deliver regular performances at the studios of "Broadcasting Caracas."

The monthly fan mail received from foreign listeners (outside of Venezuela) averages 1,500 communications, approximately 80 per cent of which comes from North America. This station has been heard in every country throughout the world, and acknowledgments are continually being received from the Antipodes.

YV1RC broadcasts on a frequency of

Caracas, Venezuela, South America, has certainly become one of the brightest stars in the short-wave firmament. The programs radiated from Caracas are extremely artistic and a delight to all those in this country as well as the many other foreign countries who listen daily to them. This station lays down a strong signal in this country, thanks to the 250 watt high efficiency transmitter installed high up on a mountain top. The call letters of the station are YV2RC.

960 kilocycles (312.3 meters), while YV2RC broadcasts on a frequency of 6112 kilocycles (49.8 meters). The city of Caracas and the radio stations are run on local apparent time, which is 28 minutes ahead of Eastern Standard time. In other words, a program which starts at 9 P.M. in Caracas may be heard at 9.28 P.M. Eastern Standard time. The C. A. Almacen Americano, which operates the "Broadcasting Caracas" organization, as well as being local distributors for the RCA Victor Company, Inc., runs regular RCA Victor programs twice a week, designed to assist their dealers throughout the surrounding territory; in fact, each program is directed to one of these dealers. These special programs are on the air Tuesdays from 9 to 9.30 P.M. Caracas time (9.28 to 9.58 Eastern Standard time), and on Saturdays from 8.30 to 9 P.M., Caracas time (8.58 to 9.28 Eastern Standard time).

Mr. Albert Lopez, the young chief engineer of "Broadcasting Caracas," began his career in the Lee DeForest laboratories in the United States, and in 1924, when the sound-movie industry was first awakening, he was active in the development of sound equipment. He is a member of the Institute of Radio Engineers, and was recently appointed president of the Venezuelan Radio Club.

The entire organization of "Broadcasting Caracas" is proud of owning their up-to-date transmitter equipment, and feel that it is the best investment that they could have made.

A very complete and interesting illustrated booklet entitled "Interesting Facts About Venezuela and Broadcasting Caracas," may be had upon written request to these stations. Probably every question that the broadcast listener might ask concerning YV1RC and YV2RC has been answered within its covers, and this booklet might well serve as a guide to the management of other stations contemplating the production of a similar booklet.

Much of this data and several of the photos are reproduced here through the courtesy of RCA'S "Broadcast News" magazine.

Other stars broadcasting over the Caracas stations are as follows:

Alicia Hardy, elected by the radio fans as "Miss YV1RC." Miss Hardy's poetical recitations are unbelievably beautiful and her microphone appearances are always welcomed by the short-wave audience.

Antonio Jose Ramos—Mr. Ramos is a skilled pianist and has traveled through Central America as accompanist for many celebrities.

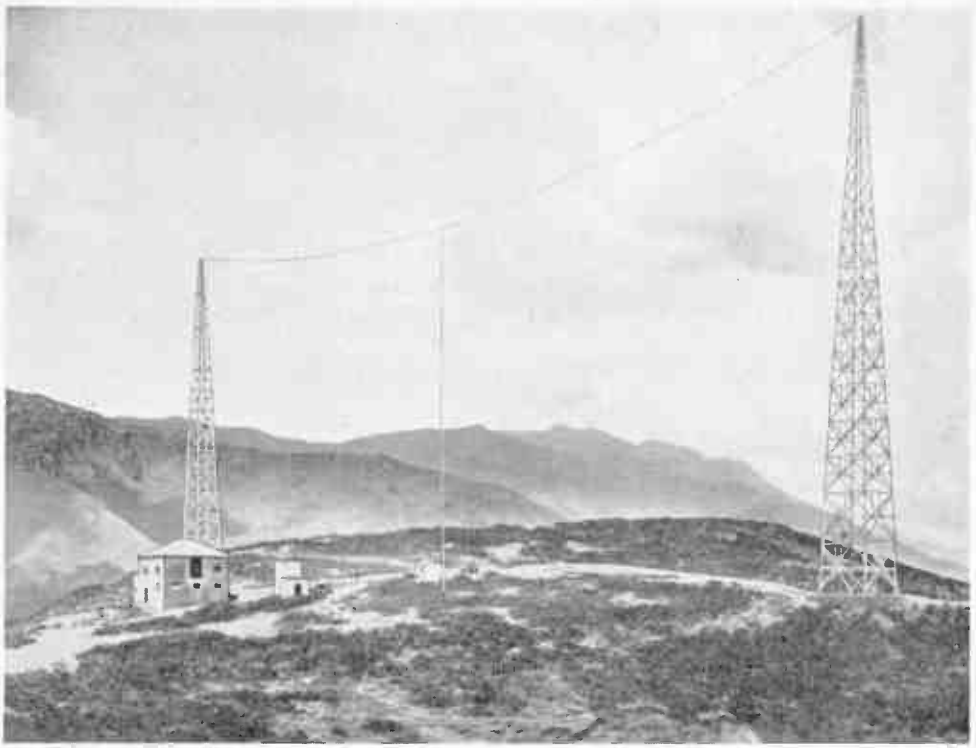
Mariblanca—A charming young comedienne who enjoys great popularity among listeners. Her rendering of popular Latin American tunes can hardly be equalled.

Maristany and Alfonzo—Here is a song team that can present with the same skill Spanish and American songs. Alfonzo is a composer of talent and some of his productions enjoy great popularity.

Ricardo Espina—This young man is the creator of "Don Lisandro," a very popular character through Central America. "Don Lisandro" appears in a family serial that enjoys among us the same popularity that the Goldbergs do in the United States.

Dr. Alfonso Ortiz Tirado—The famous Mexican surgeon, well-known all over the world for his

Three beautiful short-wave stars who entertain thousands of short-wave listeners from the Caracas Station. Left, Alicia Hardy—"Miss YV1RC". Center, Graziella Osorio —Miss "YV2RC". Right, Josefina Corcano— "Miss Broadcasting Caracas".



High up in the mountains, in fact 4000 feet above sea-level, we find the transmitting antenna and power station of the Caracas, Venezuela station. The broadcast studios ars located down at the foot of the mountain in the city of Caracas four and one-half miles away. The blue waters of the Caribbean Sea can be seen on a clear day from this lofty site of the antenna.

The photos on this page show the antenna system and transmitter of the Caracas, Venezuela station, from which the artists pictured on the two preceding pages broadcast.

phonograph recordings, films and radio appearances. Dr. Ortiz Tirado is probably the most popular Latin-American singer today.

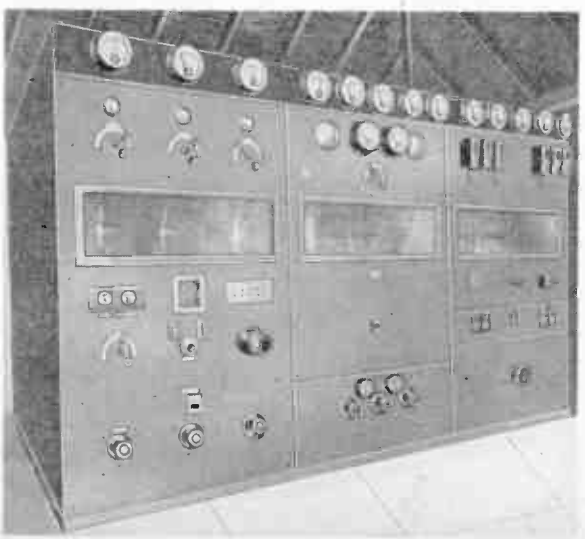
Conchita Ascanio—Talented singer with a very original voice and a very personal way of rendering her creations.

Juan Avilan—the love song crooner. Girls love to hear him sing and he has a tremendous following among short-wave listeners.

A FEW FACTS ABOUT CARACAS

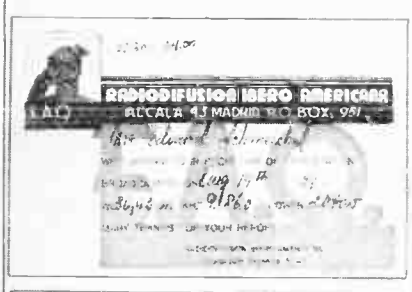
Caracas, the capital of the republic of Venezuela, most northern country in South America, is located in a valley among the mountains 3000 feet above sea level, 10½ miles south from the shore. The maximum temperature never rises above 80 degrees Fahrenheit and the minimum is never below 50 degrees Fahrenheit. Caracas was founded in 1567 by Diego de Lozada, conqueror of the Province, on the site of the village of the "Caracas" Indian tribe, and was given the name of Santiago de Leon de Caracas. Caracas is the birthplace of Simon Bolivar, the great Liberator and founder of the Gran Colombia, now divided into Venezuela, Colombia, Ecuador and of Peru and Bolivia, and it was in Caracas, in the year 1797 that the first uprising against Spanish domination took place. On the 26th of March, 1912 the city was destroyed by a tremendous earthquake that killed over 12,000 persons and it was on that day that Bolivar emerged from the smoking ruins and pronounced his famous phrase: "If nature is opposed to our purposes, we will fight nature".

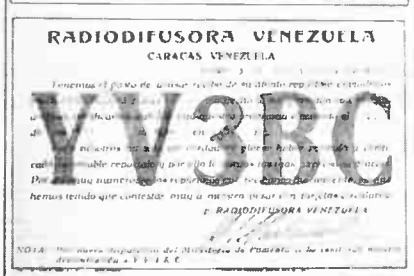
In the old parts of the town you will find the charm of colonial days. The old-fashioned windows with iron bars where the "senoritas" have furtive talks with their lovers, and hear their serenades on moonlit nights. In the new sections there are beautiful bungalows as well as palatial residences. At night you may see in the commercial district, Caracas' little "Broadway", where the show windows display the latest in European and American fashions and merchandise, ranging from frivolous novelties to tremendous machinery. You will find modern theaters in which you may see and hear anything from the latest "talkies" to Grand Opera. On Sunday mornings you will find big crowds at base-ball and football stadiums—in the afternoons a fashionable and enthusiastic set meets at the race-track and later will go to one of the clubs to enjoy a Rumba or a Tango, or perhaps to one of our modern cabarets.



Photo, at left, shows the RCA Victor 5 kw. transmitter at Caracas, Venezuela, South America. Note that roof of the building is of thatched formation.

Veri Cards... How to get them





● IF you have never received one of the many unique and artistic verification cards, or S-W station "veris" as they are commonly called, you have missed the best half of the thrill which every Short-Wave Listener is entitled to. While we may not all agree that it is a grand idea to decorate the four walls of our short-wave "listening post," there are other very attractive ways in which to preserve veri cards, by using a post-card album, etc

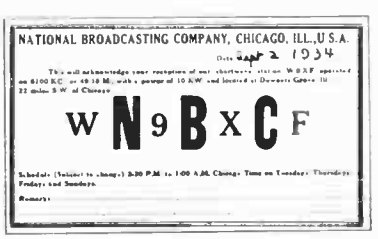
One of the first things to remember in sending for a "veri" card after you have heard a short-wave broadcasting station such as DJD, Berlin, Germany, for example, is to enclose with your letter requesting the "veri" an **International Postage Reply Coupon.** Cash or stamps should not be sent to foreign countries to pay for the mailing of the "veri" to you; only the coupon aforementioned; these coupons cost 9c and you can purchase them at your local post office. Do not paste the coupon to your letter but simple attach it with a clip or pin.

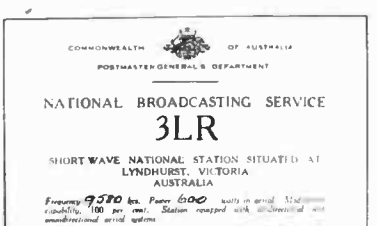
It is always best to print your name and address on both the letter and the envelope going to foreign countries as one of the hardest things in the world is to solve the ordinary handwriting or running script written in a foreign language, as you will probably remember if you have ever tried to read German or French script.

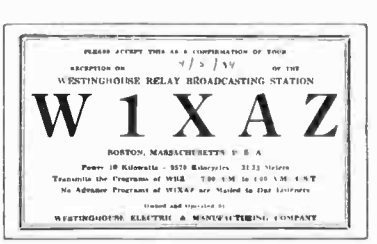
Some people often ask the question whether or not it is necessary to have the complete local address of the short-wave broadcast station, for example, one located in Moscow, U.S.S.R. In most cases if you cannot check up the local or street address, it will be sufficient to address the envelope to the short wave station, for example—Station XYZ (the letters of course to be the exact ones used in broadcasting such as RV59 for Moscow, etc.), together with the name of the city in which the station is located and also the country.

Many short-wave "fans" make a serious mistake in not inquiring at their local post-office as to the exact postage required for a certain foreign country, and this is the reason why "veris" frequently do not materialize. The average is 5c postage for countries such as Europe, Australia, Asia, and Africa. It is also not good practice to simply send a post-card; furthermore the **International Postage Reply Coupons** cannot be sent with a post-card anyway! The reason why it is imperative that you send the Postal Coupons in asking for the verification card of a foreign station is that their postage bill in a year really amounts to quite a sum, as you may readily realize. If you wish to count on receiving that "veri," do not fail to send the Postal Reply Coupon and also state:

The exact "local" time that the program was received and if possible, the Greenwich Meridian Time. Greenwich Time is five hours ahead of Eastern Standard Time; six hours ahead of Central Standard Time; seven hours ahead of Mountain Time; eight hours ahead of Pacific Time, etc. When it is six o'clock E.S.T. for example, it is eleven o'clock Greenwich Time (G.M.T.).







EAQ—The Short-Wave Voice From Spain

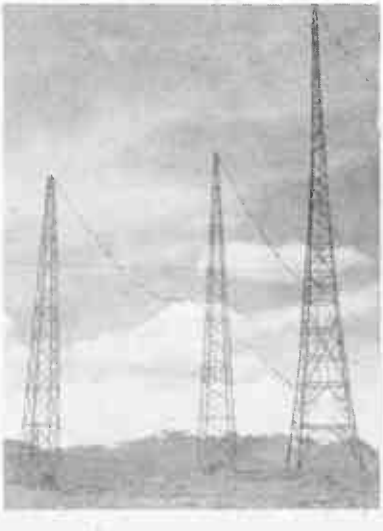
EAQ — Undoubtedly one of the most popular short-wave broadcast stations of Europe, is heard nightly in this and many other countries broadcasting their fine programs. And our readers will be pleased to view the "works" of this remarkable station.

Above we have the very elaborate antenna system of EAQ, Madrid, Spain.

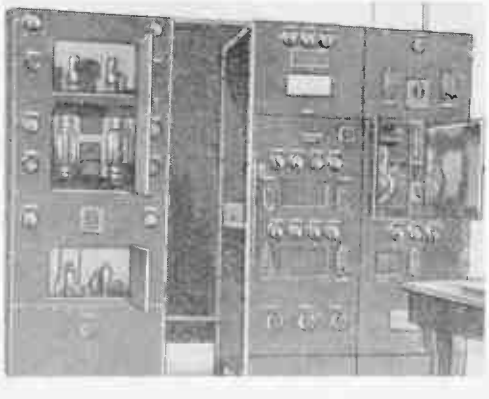
Left: Complete transmitter of the EAQ, which we must admit is quite an elaborate installation. It consists of a twenty kilowatt Marconi transmitter driven by two power amplifying stages and the main oscillator. The large tubes used in the transmitter are oil-cooled. The 20 kilowatt amplifier energizes the two-bay Marconi beam "directional" antennas which are used in sending the program to Buenos Aires, S. A.; another non-directional antenna is used for the 15 meter broadcast and the 30.4 meter broadcasts.

Bolivia Has Crack S-W Station

● Undoubtedly nearly all of our readers who have been listening in on the short waves for any length of time have heard CP5 of La Paz, Bolivia. This broadcasting station is installed a short distance from La Paz, in the mountains of "Illimani," at an altitude of approximately 13,500 feet above sea level, making it the highest broadcast station in the world. This enormous height undoubtedly accounts for the excellent performance of this station and the fact that they are heard constantly throughout the entire world. The main transmitter consists of a 1 kilowatt RCA short-wave broadcast transmitter, operating on a frequency of 6080 kilocycles or 49.3 meters. The station is so arranged that the wavelength can be changed for communication purposes during the day and in this case the call letters and the frequencies used are CP6 on 9,120 kc. or 32.8 meters, CP7 on 15,300 kc. or 19.6 meters. The time schedule for the short-wave broadcast over CP5 is 7:45 to 9:15 p.m., E.S.T., CP5, although only having an output of approximately 1 kilowatt, has been reported being heard in the United States, England, Canada, Japan, Spain, New Zealand, South Africa, Australia, Central America, and India and Mexico. In all of these countries the station has received very excellent reports and we think the directors of this station have done an excellent job with what today is considered a low-power short-wave station. Few stations having such low power can boast of such excellent results. The identifying phrase is "Illimani", La Paz, Bolivia.



Here we have the main transmitter and antenna system used at CP4 and CP5 of La Paz, Bolivia. The steel towers are 300 feet high.



Mr. Oscar Pulido, tenor, admired by lovers of good music; he sings the best types of Mexican songs, also Operas, Spanish songs, and classical numbers. Speaks English fluently.

Senorita Amanda Herrejon, Mexican interpreter of Tropical Songs, as Son, Danzon Rhumba, etc. Exclusive artist of the stations XEB and XEBT.

Senor Antonio Escobar: A very fine pianist, and one of the youngest Mexican composers of today. Exclusive artist of the stations, XEB and XEBT.

Mexican Short-Wave Entertainers

● STATION XEBT in Mexico City, Mexico, had radiated many artistic programs, both instrumental and vocal, and several of the Mexican short-wave artists are shown in the accompanying photographs. Many short-wave listeners, especially if they have been enthusiastic enough over the highly entertaining and artistic musical programs broadcast by XEBT, to have written for a verification, have undoubtedly been pleasantly surprised to receive an elaborate verification card, together with a small phonograph record containing a special selection which can be played on any phonograph. The Mexican station, XEBT, which also rebroadcasts the programs radiated from the long-wave Mexican station, XEB, employs as an identification signal the crowing of a rooster, while the sound of an automobile horn is heard between program numbers.

The power of XEBT is several hundred watts and specially designed antennas help to concentrate the power radiated so that a strong signal is laid down, even at points several thousand miles away. XEBT has been heard in the United States and Canada and in all the principal foreign countries.

Commercial programs are broadcast from the studio, located in Mexico City.

One of the charms for short-wave listeners who tune in "foreign" stations, such as XEBT, lies in the beautifully blended and highly artistic musical programs as it is a well-known fact, of course, that music plays a much stronger part in the everyday life of many of these people, than it does in the make-up of the average American.

Considering the relatively low power of the station XEBT in Mexico City, we believe they have done a very fine job in pushing their signals out to the far corners of the earth. This just goes to show what can be done with low power and efficient engineering. Anyone would normally expect a station with several thousand watts to cover comparatively long distances, but when the radio engineers attain a distance such as is obtained by XEBT with low power, they really deserve a lot of credit! Undoubtedly the efficient antenna system accounts for the distance covered by this low power; the location of the transmitting station also has a lot to do with it. And, we believe that the personnel of XEBT deserve a lot of credit for their remarkable accomplishments.

Senor Lusi P. Saldana: One of the outstanding tenors of Mexico City. Exclusive artist of XEBT short-wave station.

TUNING IN Short Wave Stations

AS many of our readers know by this time there are hundreds of broadcast stations operating on wavelengths below 100 meters, which provide fine entertainment with regular programs consisting of music, speeches and other usual radio features. In fact, short-wave programs, in most cases, are identical to those heard on the regular broadcast band. This is due to the fact that many short-wave stations broadcast the same program that is being broadcast by regular broadcast stations; in our country, station W3XAL rebroadcasts the National Broadcasting Company programs heard over station WEAF; the British S-W stations broadcast features which are simultaneously being radioed over "local" English networks, etc.

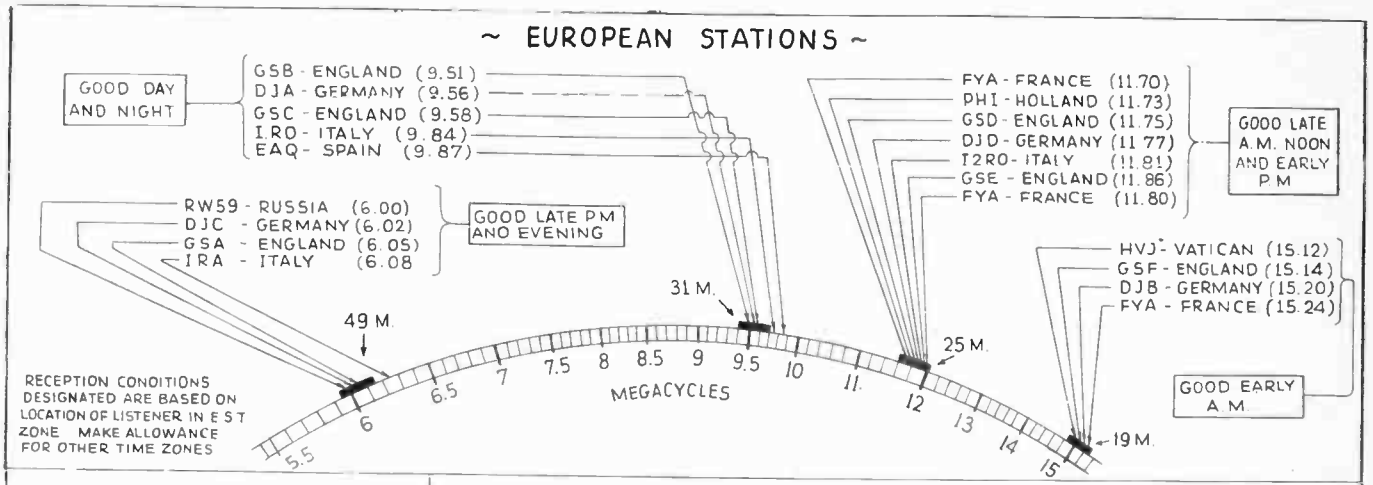
The reader, if he does not already possess a short-wave receiver, will have no trouble in obtaining one because most of the majority of set manufacturers are building and marketing all-wave receivers that cover a range of from 15 meters up to 550 meters. There are also hundreds of makes of regular short-wave receivers intended entirely for short-wave reception and which do not cover the regular broadcast channels between 200 and 550 meters.

There are three very important factors in receiving short wave stations: First, the quality of your receiver, secondly, the antenna, and third, but by no means least, the fine art of tuning in S-W stations. In this article we will endeavor to present a clear picture of just how a short-wave listening station should be operated. Although the short waves are supposed to be more or less free from the natural static, there is no doubt that the average background noise encountered on the shorter waves is in excess of that found in the regular broadcast (200 to 550 meter) band. These noises are caused by power leaks, electrically operated machinery, and in some cases, natural static and many other sources over which we have little control. In another article in this issue, a description of various types of antennas which will aid in decreasing this background noise, is presented. The majority of short-wave receivers do not have what is commonly termed band-spread and tuning is very critical. With the slightest movement of the dial you may pass over two or three really "strong" stations. Therefore, the main point to remember is to tune very slowly, otherwise you will pass right over stations, and will not even know that they exist.

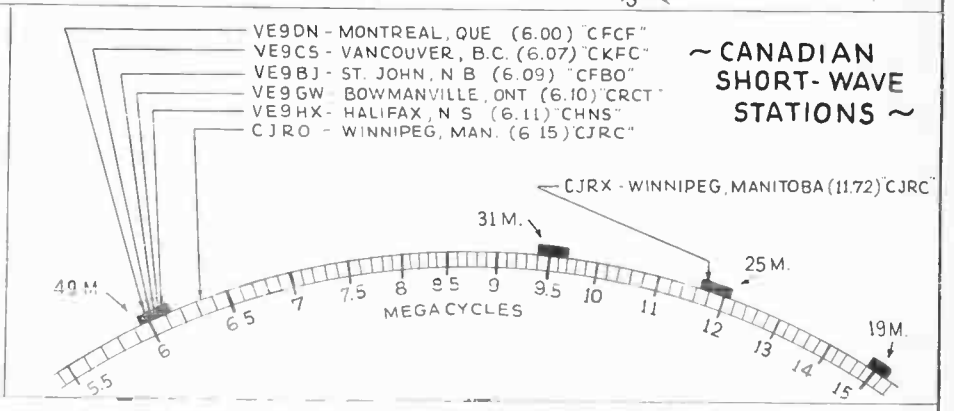
There are 3 important factors to keep in mind tuning in short-wave stations, especially the distant ones, viz. the quality of the receiver used; the type of antenna, and thirdly—the fine art of knowing "how to tune" in S-W stations. These points are discussed in the present article.

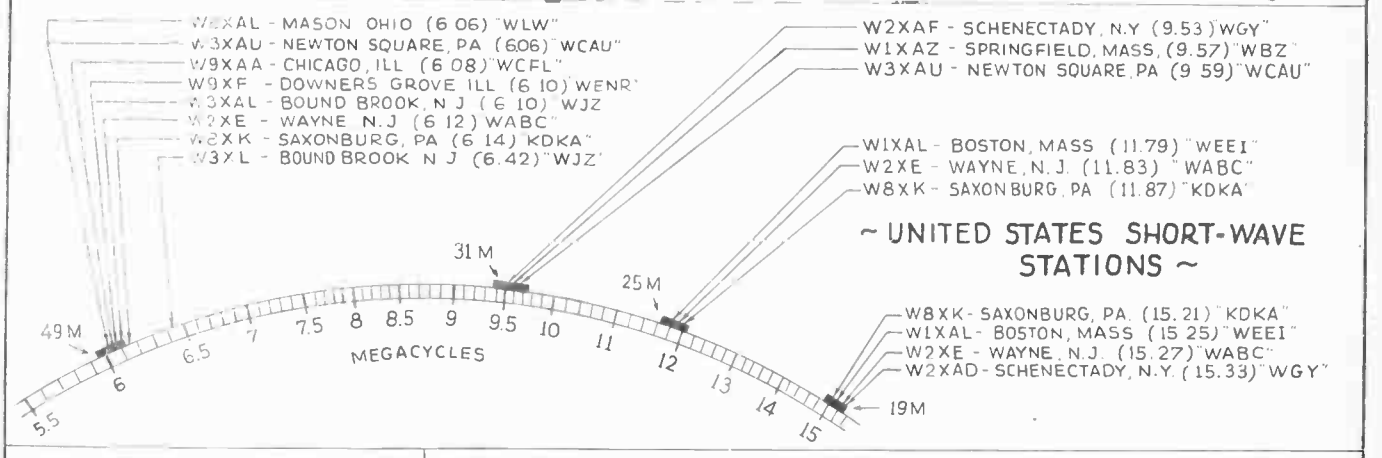
Do not make the mistake of turning the volume of the receiver all the way up when first searching for stations, because in many cases the background noise will over-ride the stations themselves. Adjust the volume control on the receiver until a moderate amount of noise is present in the loud speaker, showing that the set is "alive." Then rotate the tuning dial very, very slowly until a station is heard. Many times there is no music or speech being transmitted and in this case just a very slight "rushing" or hissing noise will be heard in the receiver. This, of course, applies to receivers of the non-regenerative types, namely superheterodynes. It is advisable to either remain on one of these continuous rushing sounds until some voice or modulation is heard, or else to make a note of the dial settings, so that you may return to this point when there is something coming over that particular carrier or frequency channel. When a station is heard, especially on the superheterodyne and on most other types of receivers, adjust the dial so that the clearest and most pleasing sound is heard. The voice and music can very easily be distorted

(*Continued on page* 47)



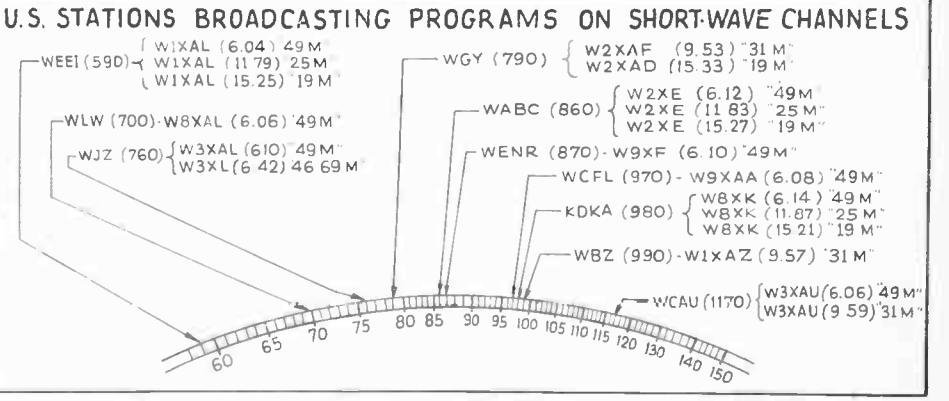
Where to Find S-W Stations on Your Dial





When To Tune and Where

● Until you have had considerable experience in short wave tuning, it is well to confine your efforts to the four black bands marked on the dial. These may look small, compared to the total length of the dial, but they contain the best "plums" among the foreign stations and many faint ones which, at first, you will probably pass unnoticed until you learn to tune **slowly** and **carefully**, intent upon identifying each slight "swish", which may be a station.



Do not be surprised if stations come in on your dial at different points than those indicated in log books. Thus, for example, Station EAQ, Madrid, sometimes announces that it is transmitting on 30 meters (10.00 m.c.), but it is received on 30.4 meters (9.87 m.c.).

Notice on the Chart of European Stations that England and Germany each have at least one station in each short-wave band.

Tokyo... Calling!

Short-wave telephone service was recently opened between Japan and America, using wavelengths between 14 and 55 meters; the wavelength is varied in accordance with changes in time, season and ether conditions. The short-wave channel between Tokyo and San Francisco—5,130 miles across the broad Pacific—was used in a recent short-wave "Japan-America" program broadcast over the Columbia network. One of the S.W. transmitters at Nazaki is used for daily short-wave program broadcasts.

By GEORGE G. BREED
AMERICAN TELEPHONE & TELEGRAPH COMPANY

	CORRESPONDING SPOKEN SOUNDS (READ DOWN)
お	O
出	DE
に	NI
な	NA
り	RI
ま	MA
し	SHI
た	TA
、	(COMMA)
お	O
話	HANA
し	SHI
下	KUDA
さ	SA
い	I
。	(PERIOD)

The Japanese characters above, reading vertically downward, are shown with their equivalent sounds at right and mean — "The connection is made; kindly converse"!

ODENI narimashita; ohanashi kudasai" meaning, when translated, "the connection is made; kindly converse."

Very musical sounds, too, if you were to hear one of the Tokyo operators say them as she reached your party for you. Indeed, they are in a language of which a noted traveller and student of languages once said: "The genius of man has never invented any machinery so perfect for converting thoughts into sounds."

Contact with Japan was inaugurated with several interesting ceremonies. At Washington, on Saturday, Dec. 7, Secretary of State Cordell Hull and other government officials, Vice President A. W. Page of the A. T. & T. and others from the Bell System, exchanged greetings with Foreign Minister Koki Hirota and other government and telephone officials in Tokyo. Immediately afterward the heads of American press associations and several correspondents of Japanese newspapers, in New York, conversed with newspaper executives and correspondents in Tokyo, with Vice President T. G. Miller of the A. T. & T. as master-of-ceremonies at New York.

The next afternoon the two countries exchanged broadcasts, Miss Grace Kelly, chief operator of the Foreign Service unit at New York, greeting the Japanese radio audience from the studios of the Columbia Broadcasting System. She was followed by Freddie Rich and Patti Chapin, well-known Columbia artists, who rendered some of the airs current on Broadway. The American program was preceded by a greeting from Miss Andow, Japanese Traffic operator, and selections by Ichimaru, Geisha singer, accompanied by native Japanese instruments.

Voice From Tokyo Gives Thrill!

The last decade has witnessed technical developments which have shown that Jules Verne was, after all, a person of limited imagination. Yet I must confess that my lips still quiver with an "Oh yeah?" when I hear "This is Mr. Gilman, in Tokyo." And while it seem rational enough to have a difference of an hour in Eastern and Central time, my imaginative processes are not yet quite adjusted to having someone in Tokyo call me up of an evening and tell me what was happening there tomorrow morning.

This state of suspended incredulity from which the Extreme Youth of today probably do not suffer is reasonable enough, if we hark back to our first dealings with Japan, which took place less than eighty years ago.

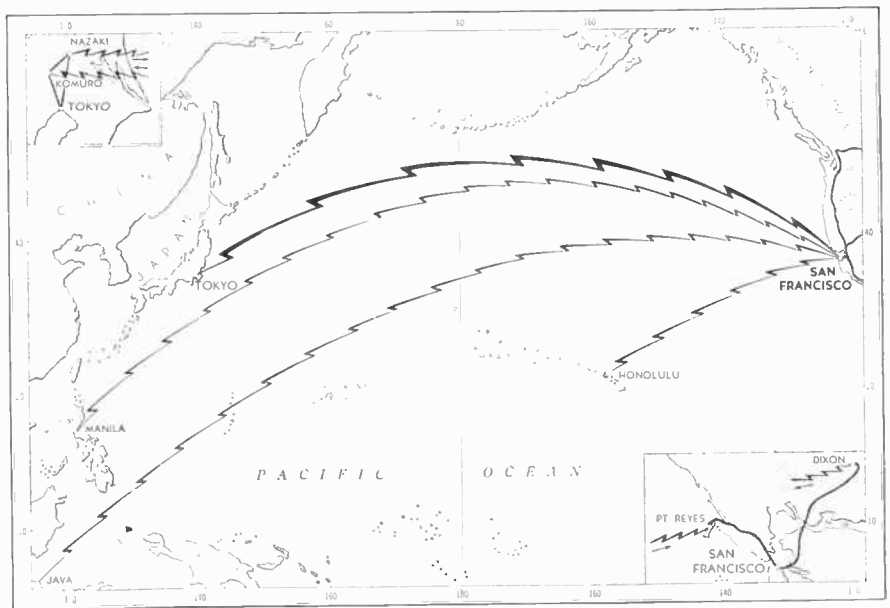
It was September 4, 1856. Townsend Harris, first American consul to Japan, stood watching the steam frigate San Jacinto fill away and disappear out of the harbor of Shimoda. He had left America nearly a year before and had only just landed, to take up his very important duties of arranging for commercial relations under the treaty obtained by Commodore Perry in 1854.

Six months elapsed before another American ship appeared off Shimoda. At last, early in March, 1857, the barque "Messenger Bird" out of Boston, anchored in the harbor, and Mr. Harris got the latest news from his homeland: Buchanan had just been elected President. The news was four months old, but the latest newspapers brought by the "Messenger Bird" were dated November 8, 1856.

Fast steamships did much to cut down this great interval of time. But it remained for the electric impulse to close the gap.

"Shigai" is what you ask for when you want Long Distance in Japan. Whereupon you are connected with a toll operator who inquires: "Dochirae okakede gozaimasuka?" (What place do you wish to reach, please?) If you know the answer to this and a few other questions, you will ultimately be told "Shochi itashimashita" — It will be done.

If your friend in the distant city happens to be out you will be told "kaiwasha o de ni nari masen"—which means, of course, "honorable subscriber does not respond to ringing of bell." If, on the other hand, he is at home, the operator says "odeni narimashita; ohanashi kudasai," which we learned in Lesson One at the beginning of this article. You will at once exclaim "moshimoshi!" the Japanese equivalent for "hello."



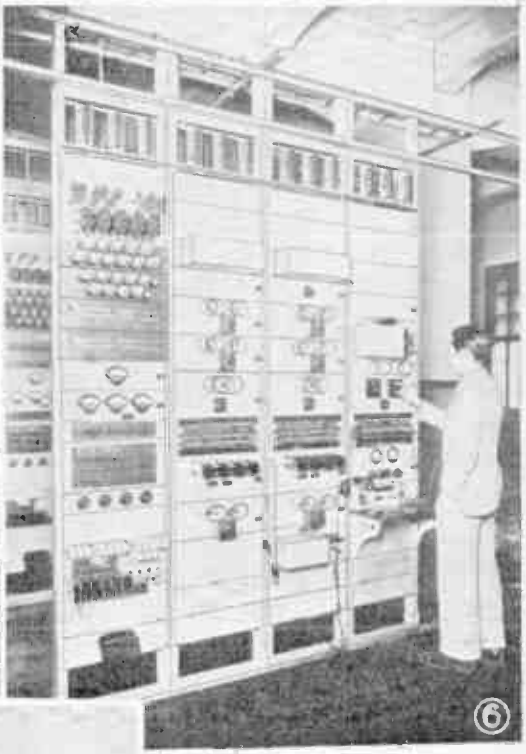
By means of a short-wave radio telephone channel, Bell and Bell connecting telephones in the United States, Canada, Cuba, and Mexico, are interconnected with the telephones in Hondo, the principal island of the Japanese Archipelago. This is the fourth radio telephone circuit to be set up connecting Bell subscribers with countries on the other side of the Pacific.

Snapshots of the Tokyo-America Short-Wave Phone Link

Left—Fig. 1 shows interesting close-up view of the powerful short-wave transmitter units installed at Nazaki, Japan. The ladies and the baby just dropped in for a casual inspection of the marvelous new Trans-Pacific transmitting station.

Fig. 2, below, shows Miss Ai Esashika, Tokyo telephone operator at the International Toll Board, holding one of the powerful water-cooled tubes.

Fig. 3, at right, shows Miss Chizuru Kashiwagi, one of the Tokyo operators.



Left—Fig. 4, shows one of the American girl operators at San Francisco in the act of talking to the Tokyo operator over the 5,130 mile short-wave channel stretching across the Pacific. The operators use stop-watches in "clocking" the calls. The American operators have only to speak English, as the 22 Tokyo girl operators speak English also.

Above, Fig. 6, shows Masao Sugiyama, American born Japanese technical operator, adjusting one of the controls on the "vodas", the clever voice-operated device which switches your telephone circuit to the radio transmitter or receiver automatically as you converse with another person thousands of miles away.

Another very clever engineering device using a number of vacuum tubes and special circuits serves to "scramble" the speech, so that if picked up by an ordinary short-wave receiver all that is heard are unintelligible sounds.

Fig. 5, at left, shows the short-wave transmitting station located at Dixon, Calif. At the left may be seen the poles carrying the transmission line joining the transmitter to the antenna located some distance away.

● The above photographs surely indicate a marvelous installation of radio equipment and the operation of this new short-wave circuit should go a great way toward firmly cementing international relationships between the nations concerned. Recently Mayor La Guardia of New York held a very interesting conversation with the Mayor of Tokyo over this new Trans-Pacific short-wave telephone system, An American business man having commercial interests in the Orient can now pick up a phone anywhere in the United States and, by pre-arranging for the phone call, speak directly with his associate or another merchant in the land of the Nipponese.

The Unusual Romance that Blossomed Between a Short-Waves

"The best laid plans of mice and men,
Are enjoyed by both—now and then."

● THIS may or may not be the correct quotation, but at any rate, it won't make much difference, as you will find out later. It just goes to show that a little knowledge may be dangerous. On the other hand, again, it may not. But there doesn't seem to be much sense in taking up valuable time by foolish philosophizing so I will cut the nonsense short and we will now begin with the story.

* * * *

The beautiful Spanish song *"La Violetera"* had come to a tantalizing end as sung by the full and rich, as well as sympathetic voice of Señorita Dolores de la Punta, the well known Venezuelan soprano. In fact, she had sung the song in the English version, too, *"Will You Buy My Violets,"* for the edification of her North American short wave listeners, her voice having been wafted all the way from Caracas, Venezuela, by way of short wave station *Estacion de Radiodifusion Venezolana* YV5RA. In front of his loudspeaker in a New York suburb was planted young and hopeful Johnny Spencer, age 18, who had been following breathlessly the song of his favorite radio singer some 2,155 miles away.

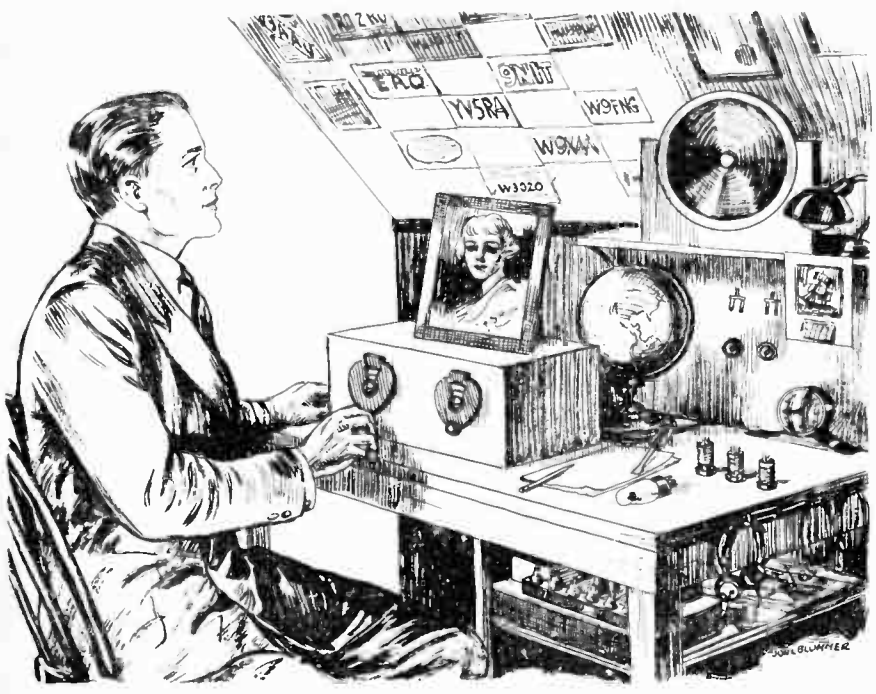
By the rapt look in his face, a careful observer would no doubt have immediately come to the conclusion that young Johnny was completely "daffy" over the *señorita* from Caracas. Indeed, since he had acquired his new five-tube *Interplanetarian DX*-5 short wave set, there had not been a single evening that he had not listened to Señorita Dolores de la Punta when she went on the air with her theme song promptly at 9 P.M. (Eastern Standard Time) on Tuesdays and Fridays.

Tonight, the *señorita* had been especially gracious and had blown kisses to her unseen American audience after singing in English with her cute Spanish accent, which made her even more endearing to her rapidly extending circle of young *Americanos*.

Right then and there young Johnny Spencer could stand it no longer. He had been a silent listener all too long and he now felt a mighty urge welling up in his breast that craved immediate satisfaction. A gushy fan letter of which I will spare you the details, was composed immediately. Johnny spoke of her marvelous sympathetic voice in flowing rhapsody and in admiring terms that could not be misunderstood. He literally poured out his entire young heart, to the no doubt beautiful Dolores and begged of her to honor him with her autographed photograph which he promised he would have suitably framed and hung neatly in his radio shack up in the attic. He was careful also to enclose an International Reply Coupon to be sure that his request would not be overlooked. He then rewrote the letter about four odd times to be certain that the epistle was letter-perfect and A No. 1 as to penmanship, grammar and the rest of the trimmings in order to duly impress the South American singer. The letter was dispatched by air mail, which cost an extra pretty penny, but which also meant speed.

During the interim, every Tuesday and every Friday, rain or shine, all engagements were cancelled so that Johnny could hover around the loudspeaker at 9 o'clock *pronto* and give himself up to the riotous feeling that was his when Dolores came on the air with *"La Violetera."* Johnny had been fussing around with directive aerials and various other gadgets and he had constructed the "fundamental" of his aerial in such a manner that the Caracas station on 6,045 kilocycles was not received better at any point in the whole United States than in Johnny's radio shop. Every bit of man-made static had been cancelled out by special impedances, and by having the antenna tuned as accurately as radio engineering could make it today, it had finally become possible for him never to miss a single solitary program; not only that, for weeks at a time he didn't lose as much as a note, not even a crumb of an overtone that might mar the rich voice of Señorita Dolores. Indeed, Johnny's father—who also of necessity was his mother whom Johnny had never known—was a frequent visitor to the radio shack. He very often brought friends to listen to Johnny's short-wave radio doings, and the excellence of his short-wave programs, unmarred by extraneous noises always evoked applause and admiration from the visitors.

Finally the great day arrived. When Johnny came home, there was a bulky foreign stamped envelope which he opened with a trembling hand. Reverently he pulled out the photograph. To say that he almost swooned away is putting it rather mildly. The shock of her exquisite beauty, her crown of golden



Every Tuesday and Friday night, rain or shine, all engagements were cancelled so that Johnny could hover around the loudspeaker at 9 o'clock "pronto" and give himself up to the riotous feeling that was his when Dolores came on the air.

Short-Wave Fan and a Beautiful Señorita in Caracas

By Heart

By HUGO GERNSBACK

hair, her vivacious eyes, her finely arched mouth, was too much for Johnny to stand. Tears actually rolled down his cheeks as he gazed and contemplated the photograph for several hours at a stretch until finally, exhausted, he had to seek his bed. The next day the photograph was framed in a beautiful golden frame with a standing easel and placed directly on top of the five-tube short-wave set, which certainly gave it all the prominence that the beautiful *Señorita* herself could possibly have demanded.

Of course, he could have carried the photograph around with him, but that he thought would not do because in the first place it was too bulky, and secondly, it might be damaged. He did, however, have a miniature made, which he carefully cemented on the inside lid of his watch that had been given to him by his grandfather. And there Johnny, even in class, when the professor wasn't looking, would gaze steadily at the rapturous features of his distant love.

Of course, in the meanwhile, Johnny had dispatched a letter of thanks in even more glowing terms than his first one, and having exhausted the dictionary for terms of her tantalizing beauty he had to invent some of his own, which—in order not to arouse the jealousy of any female who might read this story—I had better omit.

In due time, a regular correspondence developed between our friends. In the third letter, the *señorita* hinted that she would not be averse at all to receiving a photograph in return from the young *señor*, as, after all, she had sent him her photograph and there was no reason why she should not be similarly honored. Here was a delicate point. After critically studying his own countenance in the mirror, Johnny came to the conclusion that even at his 18 years he would probably be much too young for Dolores. There was not even a vestige of a mustache, and Johnny felt particularly sensitive on this point because he knew that all the South American young men sported cute little mustachios and he felt that he could not possibly compete with the charms of the local young Caracas *señors*. What to do? A brilliant idea struck him, as they sometimes do in young heads. Unbeknown to his father, he secured an old photograph when his dad was about 25 years old and flourished a young and lusty mustache into the wind. He had a copy made of the photograph so that it would not look like an old picture, and had an artist friend of his touch up certain parts to modernize it a little more. When the old picture had then been re-photographed, at the local studio, it looked like the real thing. Indeed, Johnny did not feel that he was doing anything wrong because, after all, he *was* the image of his dad, and one day would look exactly like him, so where could the harm be?

. . . her exquisite beauty, her crown of golden hair, her vivacious eyes, her fin. arched mouth, were too much for Johnny!

The photograph was dispatched in due time and was acknowledged by Dolores, also in due time. Johnny thought he could detect between the lines some rather nice remarks about his own countenance by the *señorita*, who evidently was well pleased with his photograph.

The curtain now drops over a period of a lean depression year, when things in general were dull, but not for Johnny, and for that matter, not for Dolores either. The correspondence had become warmer and warmer, and finally it reached such a temperature that danger signals were sent flying. The danger signals were duly observed by the elder Spencer, who noticed that Johnny was getting thinner by the day, that his appetite and his studies suffered, and that in general he presented a rather wobegone and unhealthy picture. On several occasions, Spencer the First, when walking by Johnny's radio shack had found him reverently kissing Dolores' photograph while she was singing to him in far-away Caracas.

Being both father and mother, as I remarked before, the elder Spencer found that something had to be done about this affair, and wisely he hoped that his son could be disillusioned if perhaps Johnny saw Dolores himself. So one evening he announced that they were going to take a South American cruise on the *Belgenland*, which would bring them as far as Caracas, Venezuela.

When Johnny heard this he executed a war dance which would have done credit to the best of the Apache chiefs, and indeed it probably would have gone them several steps better. Johnny was overcome with joy and he counted the days when they would finally leave. As everything must finally end, so the long wait ended in due time and the cruise began. And if you know Johnny at all you have guessed by this time that his *Interplanetary DX-5* went along too, because even on the cruise he could not forego the pleasure of hearing his sweetheart's singing and blown kisses to him before she signed off. Of course, he knew that the kisses were for *him* because she had particularly written him and told him that when she was doing so she *only* thought of him.

It is to be recorded at this point that it is perhaps a good thing that television

(*Continued on Page 46*)

Win This Silver Trophy

For the Best "Listening Post Photo"

Announcement of Trophy Award Will Be Made in the Next Issue

The handsome Silver Trophy, illustrated above, will be awarded to the person sending in what appears to be to the judges the most interesting photograph of their short-wave listening post. The rules for this contest provide that the Trophy shall be awarded only for the BEST photo of listening post apparatus or set-up, and is not concerned with amateur TRANSMITTING stations. Those owning transmitting stations may enter such photos in the monthly contest sponsored by SHORT WAVE CRAFT magazine. This Trophy is a handsome specimen of the silversmith's art and was designed by a leading New York Trophy Manufacturer. This beautiful silver trophy stands 16 inches high and is symbolic of the art of short-wave listening.

Rules For Short Wave "Listening Post" Trophy Contest

THE editors of the OFFICIAL SHORT WAVE LISTENER magazine feel sure that our readers will be greatly pleased with this announcement of a brand new "Trophy Cup" Contest, in which the handsome silver trophy here illustrated, will be awarded to that Short Wave Listener who submits the best "Listening Post" photo.

Here are some of the points on which the "Listening Post" photos will be judged by the editorial staff: The photo must be clear and preferably not smaller than 5 x 7 inches, although 4 x 5 inches will do if the photo is particularly clear.

If possible try to have the photo show the owner or operator of the "Listening Post" appear in the same picture with the receiving apparatus, although a separate photo of yourself will do, of course.

Not only will the photo be judged for the quality of the photograph itself, but also for the ingenuity shown by the owner of the station in a neat and orderly arrangement of the receiving apparatus.

Do not write descriptions on the back of the photo, but simply place your name and address on the back of it or on the photo mounting.

All descriptions of Short-Wave "Listening Posts" should be typewritten or else written in ink, well spaced so that the editors can read them quickly. Do not send "pencil-written" descriptions and moreover keep the description of the station and the results you have obtained as **brief** as possible; usually 300 words is plenty.

Here is a brand new contest which will cost you practically nothing to enter and you have a very fine chance of winning this handsome Silver Trophy. The editors will award one of these Silver Trophies for the best "Listening Post" photo submitted by the readers of the OFFICIAL SHORT WAVE LISTENER magazine. Please remember that the photos must be as large as possible and they absolutely must be "clear"!

Describe your aerial briefly with its dimensions, and particularly tell in what geographic direction it points, north, south, etc. Also mention where it is located such as above any roofs, trees, or other objects, and what form of lead-in you employ.

The announcement of the first Trophy Award for the best Short-Wave "Listening Post" photo will be made in the next issue of this magazine. Entries for the first contest will be accepted up until March 20th, 1935.

The editors will not be responsible for any photographs or descriptions of "Listening Posts" which may be lost in the mail or otherwise, and return postage should be included with the photos if they are to be returned.

All members of the OFFICIAL SHORT WAVE LISTENER MAGAZINE'S editorial and business staff are excluded from this contest, as well as any members of their families.

In the event of a "tie" between two or more contestants, the judges will award a similar trophy to each contestant so tying. Please remember that this contest for the best Short-Wave "Listening Post" photo is purely an amateur or experimenter's proposition, and all commercial short-wave receiving stations are excluded.

The best "Listening Post" photo will also be judged not because of the fact that a handsome array of expensive short-wave receiving apparatus has been assembled for the picture, but the "pedigree" or "DX" reception results will also be carefully scrutinized by the judges. The board of judges for this contest will be the Editors of the Official SHORT WAVE LISTENER magazine.

Address all entries to this contest to: LISTENING POST CONTEST, care of OFFICIAL SHORT WAVE LISTENER MAGAZINE, 99-101 Hudson Street, New York.

SHORT WAVE FAN LISTENING POSTS

The handsome Silver Trophy shown on the opposite page will be awarded for the best short-wave Listening Post photo—this contest is for short-wave "receiving" stations only.

JAMES SUTTON'S LISTENING POST

Herewith is a photo of my Short-wave Receiving Station. I use a two-tube converter, coupled with a 5-tube super-het broadcast receiver. Solid enameled wire, "T" type antenna, 100 ft. long, and lead-in 35 feet long. The three dials on top of the panel are: 1 inductance tuning coil, coupled between two variable plate condensers in series with antenna used for tuning it from 60 to 550 meters. The panel is an old battery receiver. Most of the diagrams used in construction of this receiver were taken from SHORT WAVE CRAFT. I received the following stations on the loudspeaker: VK3ME, J1AA, RV15, RV59, GKU, LSA, LSY, PRAG, YVQ, YV1BC, YV2AM, LGN, GSE, GSF, GSB, GSA, GSD, DJB, DJD, DJC, DJA, OXY, HKF, TGX, TGW, CMCI, XDA, XETTE, XEW, PHI, HIX, FYA, Pontoise, T14NRH, CGA, VE9JR, VE9GE, VE9-CL, VE9DR, RABAT, and practically all S.W. broadcasting stations in U. S. I have also "logged" 87 police. 743 hams in U. S., 35 in Canada, 4 in Mexico. 1 in Peru, 1 in Venezuela, and 1 in Honolulu. My greatest pleasure is "DX-ing," both phone and code. At present I am learning code in preparation for "exams" for a government transmitting license.

James Sutton has picked up Short-Wave "broadcasting" station in all parts of the world.

JAMES B. SUTTON
306 Keefer St.
Willard, Ohio

The charming lady "short-wave listener" in the above picture is Mrs. D. R. D. Wadia of Bombay, India. Short-wave "broadcasting" stations all over the world have been "logged" at this listening post.

OSCILLODYNE 1-TUBER BRINGS IN "FLOCK" OF STATIONS

I want to tell you about the excellent results I get from my two-tube S.W. set, built from a description in an old issue of SHORT WAVE CRAFT.

The set is a one-tube **Oscillodyne** with a one-tube stage of audio-amplification added. This is located in a separate box to one side of the set. Reception is mostly on earphones, although a great many "foreigns" can be heard on the loud-speaker.

I have received "verifications" from the following stations: PRA3, HBP, EAQ, YV5BMO, HJ4ABE, DJA, DJB, DJC, XETE, HCJB, DJB, I2RO, YV3BC, G6RX, HC2RL, CTIAA, and the best of all, CNR. I have also received VK2ME, VK3ME, and HVJ.

WALTER STEAD
211 Maple Avenue Hamilton, Ont., Canada

Above, Bill Fritsch of Allentown, Pa.—He sure is a "go-getter" when it comes to "veris," as witness the collection on the wall.

BILL FRITSCH HAS 550 QSL CARDS

The "rig" is a two tuber, employing a 233 audio amplifier and a 232 detector. To date I have some 550 veris and they are still coming in. I've been interested in amateur radio for about a year and a half and hope to go on the air in the near future.

In the rack in the lower left-hand corner of the photo are approximately 150 veris, all from the United States.

I have put all veris from other countries up on the walls. Since the picture was taken I have filled two more walls and am still on the look-out for more wall paper and wall space!

Directly beside the earphones is a drawer in which all coils are kept. I also save photos, having pictures of amateurs with whom I correspond from Australia, England, Germany, Mexico, Canada, and the United States.

BILL FRITSCH
1432 Linden St. Allentown, Penna.

Walter Stead of Hamilton, Canada, has heard a host of "foreigns" on the 1-tube Oscillodyne.

Fig. 1—This is the control panel for the phonograph renditions.

High Fidelity Programs . . . Now Broadcast

W2XR Is Equipped to Broadcast High Fidelity Programs as Well as Television Programs; the Frequency of the Station is 1550 Kilocycles and Will be Found Just Below the Regular Broadcast Band.

● **HIGH FIDELITY** seems to be the topic of the day, so far as radio receiving sets are concerned; however we have heard little regarding the transmission of truly high fidelity programs by broadcasting stations. Mr. John V. L. Hogan, famous New York radio engineer, has spent much of his time in the development of this high fidelity broadcast and television station and has achieved some really remarkable results. The call letters of this station are W2XR and it operates by authority of the Federal Communications Commission, on a frequency of 1550 kilocycles. W2XR can be heard daily just below the regular broadcast band, transmitting either high fidelity programs or television images. This station has a flat frequency characteristic of from 20 to 15000 cycles; this covers around 9½ octaves of the musical scale. Needless to say, the quality of the music sent over this station having such a broad frequency response should be absolutely perfect. In order to obtain high fidelity music and speech, crystal microphones and pick-up devices are used. These instruments are widely known for their faithful reproduction. Even with an ordinary receiver not designed specially for high fidelity reproduction, a vast difference will be noticed in listening to this station because of the "life-like" quality of the programs broadcast. Of course with a modern high fidelity receiver. one should obtain a naturalness of tone which heretofore has not been

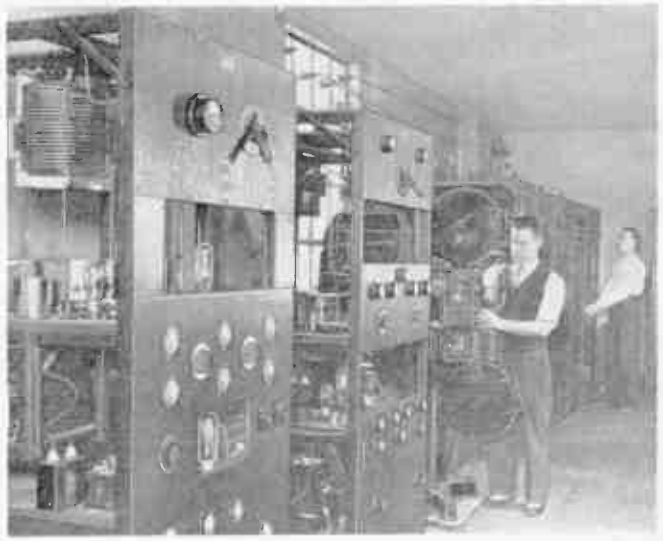


Fig. 2—Complete transmitting station of W2XR.

Fig. 3—Keeping a visual check on the program by the use of Cathode-Ray Tubes.

obtainable with any type of electrical reproducing apparatus. While the station W2XR is licensed to use a power of one thousand watts, the output never exceeds 350. Nevertheless this station has been heard over great distances, covering the middle Western United States, Seattle, and the state of Washington. Reports received from listeners have indicated that the quality was excellent, with very fine volume.

The complete bank of transmitters is shown in Fig. 2. This station is so well designed that in radio circles it has been termed a "model broadcast station." Mr. Hogan and his staff of engineers have left no stone unturned in the designing of the equipment.

In Fig. 1 it will be noted that a Cathode-Ray tube is incorporated in the pick-up control panel, in order that a visual check can be made upon the music being broadcast.

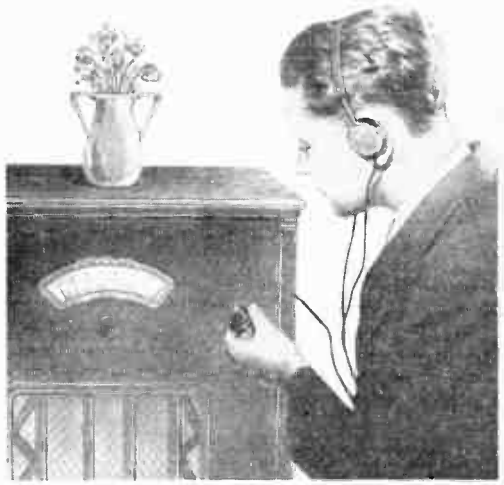
In Fig. 3 we see the Cathode-Ray monitors, which are used during every transmission, so as to keep a perfect check upon the character of the signals being transmitted.

If you desire a real treat sometime, just tune your receiver to 1550 KC. and listen to some of the excellent quality programs broadcast by W2XR.

It is also interesting to note that the original broadcast from the studio requires no loading or tone controls of any description. The whole system, from the microphones to antenna, is so well designed and the frequency range so wide and flat, that no special compensation is necessary.

How to Use Earphones on Standard Receivers

Many readers desire to listen to short-wave programs and go DX hunting in the wee small hours of the morning and for this reason they do not desire to have the loud speaker going full blast. In this article we endeavor to show methods of using commercially available adapters for applying earphones to short-wave receivers which are not already equipped for them.



Listening in this way with earphones will not disturb other members of the family.

● VERY few **all-wave** receivers if any are equipped with provisions for earphone operation. However, there are numerous ways of using earphones on one of these sets without materially damaging or changing the wiring of the set. This can be accomplished by the use of simple adapters, which can be purchased from any reliable radio store. These adapters are fitted over the prongs of the power amplifier tube and the earphone connections made to small terminals which are brought out at the side of the wafers or adapters.

In Fig. 1 we show the circuit drawing for using one of these adapters on a type 45, 71 or any other three-element "filament-type" tube. One side of the earphones is connected through a .1 mf. 600 volt condenser to the plate prong of the tube. The other connection from the earphones goes direct to the metal chassis or ground connection on the receiver.

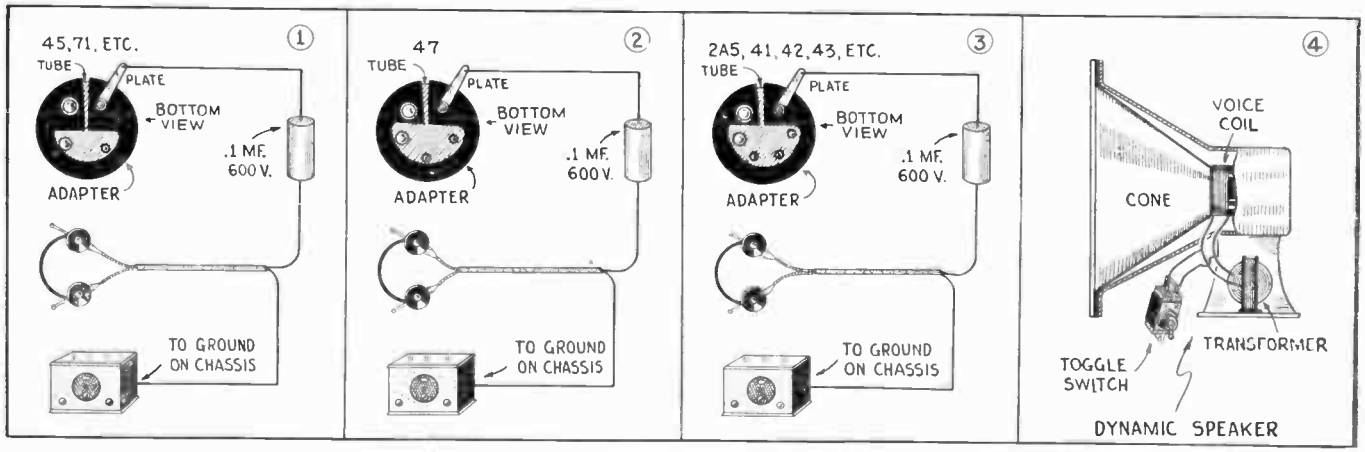
In Fig. 2, we have essentially the same connection, but the tube is a five-prong affair known as the pentode with directly heated filaments. In Fig. 3 the circuit shows the connections for a heater-cathode type tube such as the 2A5, 41, 42, and 43.

All of the tubes mentioned so far are the power tubes of the receiver and it is really necessary that you have a circular or some other piece of literature describing the positions of the various tubes in your set in order that the proper one may be selected for the connection of the earphones.

If your receiver uses "class B" audio amplification **by all means** do not connect the phones to these tubes. The instruction pamphlet with the receiver will reveal that there is another tube known as the "driver" tube. In the circuit diagram of the receiver this tube comes before the "class B" amplifier and it is on this tube that the adapter should be placed. Make doubly sure that the condenser you are using is of reliable manufacture; otherwise if it should short due to the high voltage, there will be a direct short circuit between the plate of one of the tubes and the B negative and either destroy the earphones or one of the amplifier transformers.

So far we are using the earphones and the loudspeaker is still operating. In order to quiet the speaker it is necessary to connect a switch across the voice coil of the speaker in order that it can be short circuited. Just an ordinary single pole single throw toggle switch is all that is necessary. This should be connected across the points indicated in diagram 4. When the voice coil is "shorted" the speaker will be quiet. However, it is not advisable to turn the volume control on the set too far advanced as there is not the proper load on the audio amplifier tubes and it is not really an ideal condition under which to operate them. However, as we said before if the volume control is not advanced too far, and it won't be if you are obtaining normal earphone volume, there is no danger of damaging either the tubes or the transformers.

When asking your local radio dealer for an earphone adapter it is advisable to first obtain the information regarding the tube arrangement of your receiver. Then explain that you wish to connect earphones to the audio amplifier of your receiver. If you do not feel capable of making the proper installation, the best method would be to obtain the services of a local serviceman and have him install the proper adapter and shorting switch for the loud speaker. Most servicemen today are familiar with all wave receivers and with the job properly done you will obtain excellent earphone reception.



Diagrams for connecting phones and quieting speaker. Warning: don't attach phones to sets having "Class B" amplifiers. Also do not "short" the voice coil, otherwise the amplifier tubes and transformers may be damaged.

Building a Good S. W. Aerial

What constitutes a good short-wave receiving antenna? In the present article various types of short-wave aerials are discussed and after reading this clearly written article, you will be able to select the aerial best suited to your requirements. A good aerial will improve reception with any set.

● IT'S an old saying but true, that "A radio receiver is no better than the aerial with which it is used." It is also true that a good receiver will work, after a fashion, on almost any kind of an antenna—even a short piece of wire a few feet long.

Since short-wave broadcasting has come into being, we have found it necessary to improve on our aerial systems. There are two major features in short-wave antenna construction. First, it must be clear of all surrounding objects; those which may create interference, such as electrically operated machinery, power lines, etc. Second, it should be as high above the ground as possible. In the drawing we find that Fig. 1 shows the usual antenna system, consisting of a single bent wire from 50 to 100 feet in over-all length. This aerial, if mounted in the clear, well away from electrical disturbances as mentioned before, will undoubtedly prove as satisfactory as any other type of antenna that can be put up, that is for general all-wave or short-wave reception.

However, we do not all live out in the country where space is not at a premium and we are forced to make use of some of the later developments, such as commonly termed "noise-reducing" antennas, which will be described later. If your present aerial is the type shown in Fig. 1 and it proves to have too much "pick up" or if you feel it desirable to shorten its length, this can easily be done, simply by incorporating a variable condenser as indicated in Fig. 2. Varying the capacity of this condenser from zero to maximum, will have the effect of lengthening and shortening your aerial.

In Fig. 3 we have provisions for pre-

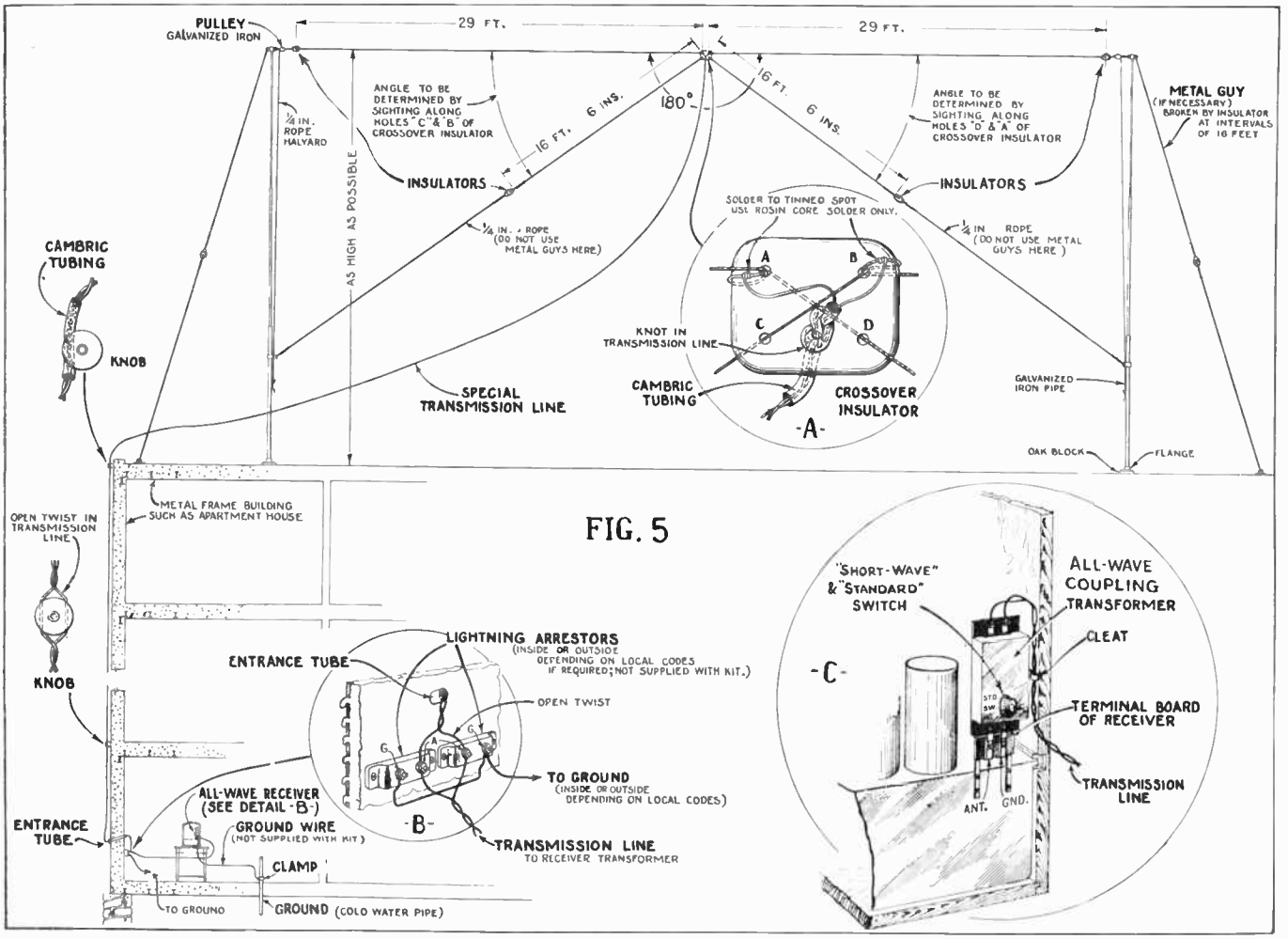


FIG. 5

The RCA double doublet antenna. A—is the "crossover" insulator used in the center of the antenna. B—shows the method of arranging the lightning arrester; C—the antenna transformer with switch for standard and short-wave reception.

SHORT-WAVE MAP of the World

BEAUFORT SEA
BAFFIN BAY
GREENLAND SEA
BARENTS SEA
Kara Sea
DEVON I.
VICTORIA ISLAND
BAFFIN ISLAND
Davis Strait
Denmark Strait
NORTH
DOMINION OF CANADA
Hudson Bay
Gulf of Alaska
Great Lakes
UNITED STATES
AMERICA
PACIFIC
OCEAN
ATLANTIC
OCEAN
NORTH
SOUTH
AMERICA
SOUTH
ATLANTIC
OCEAN
EUROPE
UNION OF SOVIET SOCIALIST REPUBLICS
U.S.S.R.
AFRICA
ASIA
CHINESE
REPUBLIC
INDIAN OCEAN
ANTARCTIC
OCEAN
SOUTH
OCEAN
AUSTRALIA
CORAL SEA
China Sea
Japan Sea
Aral Sea
Caspian Sea
Black Sea
Mediterranean Sea
Red Sea
Arabian Sea
Bay of Bengal
Caribbean Sea
Gulf of Mexico
Madeira
Canary Islands
Cape Verde Islands
Falkland Is.
South Georgia
South Orkneys
South Shetlands
Hawaiian Is
Marquesas Is.
Society Is.
Samoa
Tonga Is.
Fiji Is.
Solomon Is.
Chatham Is.
Auckland I.
Campbell I.
Mauritius I.
Réunion
Gometran I.

KHABAROVSK RV15-4273
Sakhalin I.
Aleut.
Kuril Is.
CHINA
CHOSEN
JAPAN
Philippine Is.
NORTH BORNEO
BRUNEI
SAWAK
BORNEO
CELEBES
JAVA
NEW GUINEA (Netherland)
N.E. NEW GUINEA (British)
PAPUA
BANDOENG YDA-6120
NORTHERN AUSTRALIA
WESTERN AUSTRALIA
CENTRAL AUSTRALIA
QUEENSLAND
SOUTH AUSTRALIA
NEW SOUTH WALES
VICTORIA
TASMANIA
SYDNEY VK2ME-9590
MELBOURNE VK3ME-9510
NEW ZEALAND
New Hebrides
New Caledonia

VANCOUVER VE9CS-6070
CHICAGO, ILL. W9XAA-6080 W9XF- 6100
WINNIPEG CJRO- 6150 CJRX-11720
BOWMANVILLE VE9GW-6095
SCHENECTADY, N. Y. W2XAD-15330 W2XAF- 9530
MONTREAL VE9DN-6005
ST. JOHN VE9BJ-6090
HALIFAX VE9HX-6110
BOSTON, MASS. W1XAL- 6040 W1XAL-11790 W1XAZ- 9570
PITTSBURGH, PA. W8XK- 6140 W3XK-11870 W8XK-15210 W8XK-21540
CINCINNATI, O. W8XAL-6060
WAYNE N.J. W2XE- 6120 W2XE-11830 W2XE-15270
BOUND BROOK, N.J. W3XAL- 6100 W3XAL-17780
PHILADELPHIA, PA. W3XAU-6060 W3XAU-9590
MIAMI, FLA. W4XB-6040
HAVANA COC 6010 COH-9428
MEXICO CITY XEBT-6000
STO. DOMINGO HIX 6065
BOGOTA HKE-7220 HJ3ABD 7400
QUITO HCJB-4110
RIOBAMBA PRADO-6620
GUAYAQUIL HC2RL-6666
LIMA OA4AD-5792
CARACAS YV2RC-6112 YV3RC-6160
MARACAIBO YV5R-5850
BARRANQUILLA HJ1ABB-6447
RIO DE JANEIRO PRF5-9500
LA PAZ CP5- 6080 CP5-15300

DAVENTRY (London) GSA- 6050 GSB- 9510 GSC- 9580 GSD-11750 GSE-11860 GSF-15140 GSG-17790 GSH-21470
SKAMLEBACK (Copenhagen) OXY-6060 OXY-9520
HUIZEN PHI-11730 PHI-17775
BERLIN DJA- 9560 DJB-15200 DJC- 6020 DJD-11770
PARIS FYA-11705 FYA-11885 FYA-15243
GENEVA H8L- 9595 HBO-12030 HBP-7797
MOSCOW RNE-12000 RV59-6000
VATICAN CITY HVJ- 5968 HVJ-15120
VIENNA OER2- 6072
MADRID EAQ-9860
LISBON CT1AA- 9600
RABAT CNR-12930
ROME 12RO-11811.1 12RO- 9780 12RO- 6085
CALCUTTA VUC-6110
BOMBAY VUB-9565
SINGAPORE ZHI-6012
NAIROBI VQ7LO-6060
JOHANNESBURG ZTJ-6122

Base Map Copyright by HAGSTROM COMPANY, INC., N. Y. C., Map Makers, Map Publishers

The stations shown on the map are those which should give best results from the point of view of both reception and entertainment. There are many other stations, such as police radio stations, amateur and commercial short-wave stations, etc., which may be heard.

REGULAR BROADCAST PROGRAMS 540 to 1500 Kilocycles

SHORT WAVE BROADCAST PROGRAMS
6000 to 6150, 9500 to 9600, 11700 to 11900, 15100 to 15350, 17750 to 17800, 21450 to 21550, 25600 to 26600 Kilocycles

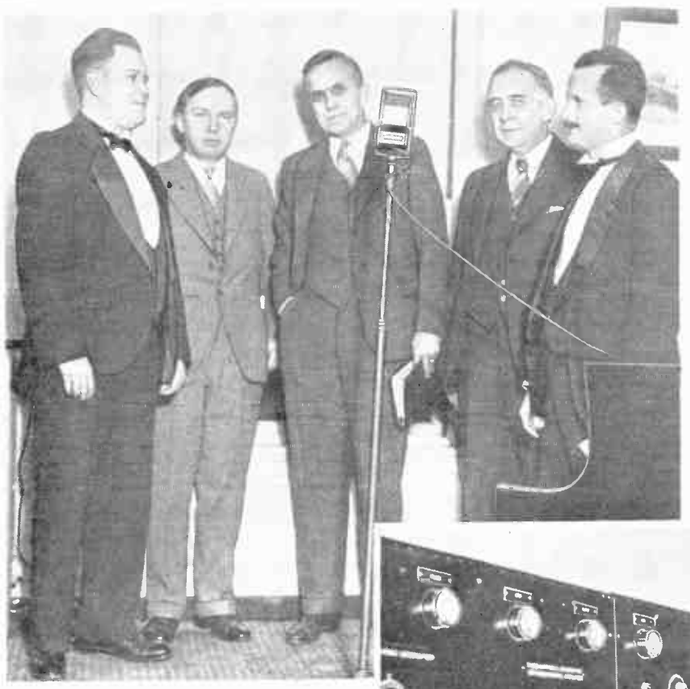
POLICE RADIO STATIONS
1555 to 1712, 2412 to 2508 Kilocycles

AIR CRAFT RADIO
2300 to 3500, 4100 to 5700 Kilocycles

AMATEUR PHONE RADIO
1800 to 2000, 3900 to 4000, 14150 to 14250, 28000 to 28500, 56000 to 60000 Kilocycles

Have You Heard WIXAL'S EDUCATIONAL S. W. PROGRAMS?

College Lectures via Short Waves



In the photo above—reading from left to right: Walter S. Lemmon, president, World-Wide Broadcasting Corporation; Dr. Harlow Shapley, Harvard Observatory; Dr. Kirtley F. Mather, Harvard University; Mr. James A. Moyer, Director University Extension for the State of Massachusetts. Mr. Lemmon is the Educational Director of the World-Wide Broadcasting Corporation.

● COUNTLESS numbers of radio listeners from every state in the Union, Canada, and foreign countries are writing the international short-wave station W1XAL, with studios at the University Club, Boston, to say that the new "educational broadcasts" are being heard and appreciated. This "fan mail" differs greatly from that received by commercial broadcasters. College presidents, superintendents of schools, supervisors of art and music, and educators everywhere are expressing their interest and approval. They are also asking for free copies of the schedule of programs, which is sent upon request.

Mr. Walter S. Lemmon of New York, president of the World-Wide Broadcasting Corporation, owners of W1XAL, believes that music as the common denominator of radio broadcasting can be just as educational as straight lectures and discussions. Therefore, the co-operation of the New England Conservatory of Music, the Malkin Conservatory of Music, and the Boston Conservatory of Music, all of Boston, has been secured. These organizations provide a varied musical program in connection with educational talks on various subject.

Above—a view of the 5,000 watt short-wave transmitting equipment installed at station W1XAL, from which the new and very ambitious "higher education" programs are being broadcast. Mr. Lemmon is shown at the right of the picture, inspecting an electrical transcription record.

venting the lead-in from picking up noise. It must be remembered though, that this lead-in will not reduce the over-all noise "pick-up" of the antenna. The point in constructing an antenna of this type is to mount the **flat-top** section far enough out of the field of noise producing currents or fields, in order that it will not pick up the crackling and buzzing sounds sometimes heard in short-wave receivers. The **lead-in** can then be brought in through the field of noise without serious effects. Here again you should be cautious not to run the **lead-in** too near electrical devices or electric wires. The down lead can be any length. This must be connected to the receiver through some sort of coupling transformer. These transformers can be purchased on the market today and will give very satisfactory results.

In Fig. 4 we have what is known as the **doublet** antenna. This is essentially the same as the one shown at Fig. 3, except that it consists of two sections in the flat-top rather than one. The lengths of the flat-top sections can be anywhere from 30 to 50 feet and the length of the lead-in is not at all critical. In this antenna as well as the one shown in Fig. 3, we use transposition blocks to support the lead-in and transpose the wires every 15 or 20 inches. The diagram Fig. 4 shows the method of running the wires through the transposition blocks. Here again a transformer is necessary to couple the lead-in to the receiver.

In Fig. 5 we have a recently designed R.C.A. **double-doublet**; the dimensions are all given so far as the length of the wires are concerned. This is put up in "kit" form by the manufacturers. The transformers used are of special design and it is not recommended that the reader attempt to build them. This antenna works remarkably well on all the lower wave lengths, as well as in the broadcast (200 to 550 meter) band.

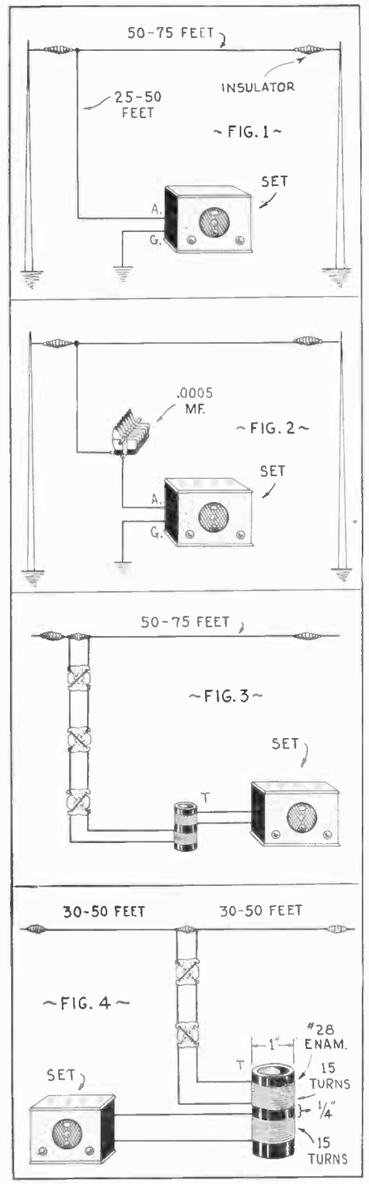
In Fig. 4 we have a method of constructing a simple coupling transformer which can be used on almost any of the doublet antennas consisting of a one-inch diameter bakelite or cardboard tubing with two windings, consisting of 15 turns each, of number 28 enameled copper wire. The spacing between the two windings should be about ¼ of an inch. The lead-in is connected across one coil and two leads of the other coil should be connected to the **aerial** and **ground** posts on the receiver. This transformer may not match all receivers and it is advisable that you experiment with the number of turns in the winding which you connect to the receiver.

More About the "Double Doublet"

The RCA World-Wide Antenna System was developed with two important objects in mind. First, a system was desired which reduced the effects of man-made static. Second, a maximum of signal pick-up over the entire short-wave spectrum was wanted.

It is well known that a half-wave doublet is a most efficient collector of short-wave signals. However, it is at its best only at or near its resonance point. Obviously, if two dissimilar doublets can be connected to the same transmission line without either harming the performance of the other, the overall performance of the combination will be good over a wider range of frequencies than that of a single doublet.

The secret is the much-discussed "cross-connection." That is, the left arm on the longer doublet connects to the same side of the transmission line as the right arm on the short doublet. The connection must be made in this way in order for the output of the short doublet to be additive to the output of the long doublet at a frequency midway between their resonance points.



The above figures show various methods of constructing "doublet" antennas.

In order to understand this apparent paradox, consider the fact that the long and short arms connected to a given side of the line form a single and nearly straight wire which is resonant in the half-wave mode at the frequency mentioned.

The long doublet is resonant in the half-wave mode at about 8 MC and in the 3/2 mode at 24 MC. The short doublet is resonant at about 14 MC. The response of the combination is relatively flat over the important part of the short-wave spectrum.

There is a popular misconception that to have a good short-wave antenna, one must use enamel wire. This idea has absolutely no basis. Bare wire has been specified because it is more practical. It has a better appearance and is easier to handle.

The Coupling Transformer

It is very important to note that the noise-eliminating feature of the system depends entirely on the design of the transformer which couples the line to the set. The purpose of this transformer is to eliminate "in-phase" signals but pass "out-of-phase" signals. The expression "in-phase" means that the voltages of the two sides of the line (lead in) go positive together and then go negative together. Obviously, this type of signal will produce no current in the primary of the transformer, it simply changes its potential. "Out-of-phase" signals are those which cause one side of the line to go negative when the other goes positive and then the reverse. This type of signal does not produce primary current. The mere presence of a transformer does not eliminate the "in-phase" signals (or noise), because if there is capacity coupling, the noise will be transmitted to the set through that capacity.

Static Shield in Transformer

In the transformer under discussion a special and highly efficient static shield is used, completely eliminating capacity coupling. As a result, the "in-phase" signals and noise picked up by the line are eliminated while the "out-of-phase" signals picked up by the antenna are transmitted to the receiver. The Circuit diagram of the complete antenna system is shown in Figure 5.

When the switch is on position marked "SW," operation is as described above. When the switch is on "STD" position the antenna and lead-in both act as antenna, that is, both "in-phase" and "out-of-phase" signals are transmitted together.

Locating the Antenna

When choosing a noise-free area in which to locate the "Double-Doublet" antenna, it is well to keep in mind the generally accepted theory that the strength of noise interference varies inversely as the square of the distance from the source of noise.

Miss Ella Munsterberg of the Massachusetts School of Art, Boston, who lectures over WIXAL. One of her lectures given recently was entitled, "Inspirations of Yesterday and Today—Leonardo da Vinci."

Miss Edith Moses of the Department of Speech, Wellesley College, gives educational talks over the well-known Boston short-wave station WIXAL. These short-wave lectures are rapidly becoming very popular.

W1XAL 6040 KC PROGRAM SCHEDULE FEBRUARY, 1935

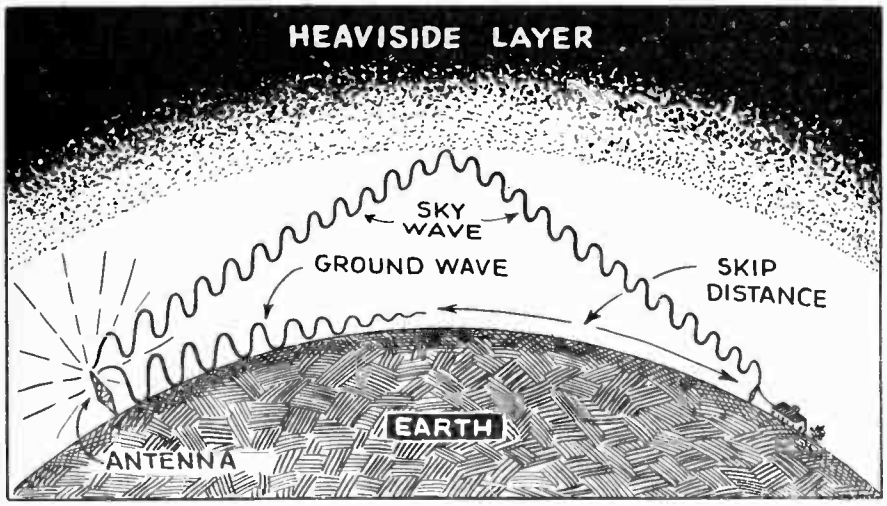
TIME	PROGRAM
	Thursday, Feb. 14
7:30 P. M.	Musical program. J. Raymond Walsh and Edgar Gordon.
7:40 P. M.	World Wide News.
7:45 P. M.	The Human Machine Series—Talk No. 3—The Glands of Internal Secretion. Dr. E. S. Gordon, Massachusetts General Hospital, Boston.
8:00 P. M.	Musical program continued.
8:15 P. M.	History of Art, Illustrated. Talk No. 2—The Pictured Tombs of Egypt. Dr. H. H. Powers, Pres. Bureau of University Travel. The ten pictures for this talk will be sent in advance upon receipt of fifteen cents.
8:30 P. M.	Musical program continued.
8:45 P. M.	Popular Law Series. Talk No. 5—What Everyone Should Know about the Law. Miss Bessie N. Page, Portia Law School, Boston.
	Sunday, Feb. 17
5:00 P. M.	Musical program. Master Choristors of Cambridge. Haggerty, Director.
5:15 P. M.	Devotional Period.
5:30 P. M.	Musical program continued.
5:45 P. M.	Music for Fun. Mrs. James A. Moyer.
6:00 P. M.	Musical program continued.
6:15 P. M.	The People's Lobby—Mr. Harold S. Buttenheim, Publisher, American City,—A Sane Housing Problem.
6:30 P. M.	Musical program continued.
6:45 P. M.	Is Peace Desirable?—A Reply to Mussolini's Sermon from the Roman Forum. J. Roscoe Drummond, Executive Editor, Christian Science Monitor.
	Tuesday, Feb. 19
7:30 P. M.	Musical program. Brighton-Allston Community Chorus, Haggerty, Director.
7:40 P. M.	World Wide News.
7:45 P. M.	Modern Art. Talk No. 2—Modern Sculpture. Miss Ella Munsterberg, Massachusetts School of Art.
8:00 P. M.	Musical program continued.
8:15 P. M.	Dramatics for Adult Life Enrichment. Talk No. 3—How to Choose Amateur Plays. Robert E. Rogers, Professor of English, Massachusetts Institute of Technology.
8:30 P. M.	Musical program continued.
8:45 P. M.	Keeping up with Science. Dr. Kirtley F. Mather and Family at their Fireside.
9:00 P. M.	Educational Opportunities in City Life. Zelda Lyons.
	Thursday, Feb. 21
7:30 P. M.	Musical program. Faelton Pianoforte School, Boston.
7:40 P. M.	World Wide News.
7:45 P. M.	Social Credit Talk No. 2—More Money with Lower Prices and Fewer Taxes. New Economics Group of Boston.
8:00 P. M.	Musical program continued.
8:15 P. M.	History of Art, Illustrated. Talk No. 3—The Art of the Pharaohs. Dr. H. H. Powers, Pres. Bureau of University Travel.*
8:30 P. M.	Musical program continued.
8:45 P. M.	Dictators of Europe. Prof. William A. Frayer. Talk No. 2—Mussolini and His Corporate State.
	Sunday, Feb. 24
5:00 P. M.	Musical program. Francoise Mereminske, Directress of Music, Norfolk House Centre, and Oliver Daniel, Pianists.
5:15 P. M.	Devotional Period.
5:30 P. M.	Musical program continued.
5:45 P. M.	Settlement Work: Its Outlook and Objectives. Dr. Frederick J. Soule, Director, Norfolk House Centre, Boston.
6:00 P. M.	Musical program continued.
6:15 P. M.	The People's Lobby. Dr. Harry W. Laidler, Director, League for Industrial Democracy, Former President National Bureau for Economic Research. Who Pays for Watered Stock?
6:30 P. M.	Massachusetts Council of Churches.
	Tuesday, Feb. 26
7:30 P. M.	Musical program.
7:40 P. M.	World Wide News.
7:45 P. M.	Unification of Italy—Cavour—Frederick W. Hocing, Dept. of History, Harvard University.
8:00 P. M.	Musical program continued.
8:15 P. M.	Dramatics for Adult Life Enrichment—Talk No. 4—The appeal of the Drama to the Imagination. Henry W. L. Dana, formerly Professor of Comparative Literature, Columbia University.
8:30 P. M.	Musical program continued.
8:45 P. M.	Dramatic Sketch. Leland Powers School of the Theatre, Boston.
	Thursday, Feb. 28
7:30 P. M.	Musical program. Longy School of Music, Cambridge, Mass.
7:40 P. M.	World Wide News.
7:45 P. M.	What the Saar Vote Means to Europe. Francis H. Russell, Boston Attorney and Lecturer for International Affairs Courses, State Dept. of Education.
8:15 P. M	History of Art, Illustrated. Talk No. 4—Via Crete to Greece. Dr. H. H. Powers, Pres. Bureau of University Travel.*
8:30 P. M.	Musical program continued.
8:45 P. M.	Popular Law Series. Talk No. 6. What Everyone Should Know about the Law. Miss Bessie N. Page, Portia Law School, Boston.

*The ten pictures for this talk will be sent in advance upon receipt of fifteen cents.

Fading and "Skip-Distance" Explained

By George A. Scoville*

Mr. Scoville has very ably explained in a clear and easily understood manner, just why it is that short-wave signals sometimes "fade"; also the reason why short-wave signals sometimes skip over a considerable area, in which even the "most sensitive" receiving set cannot hear a signal!



The drawing above shows in a general way the effect of the highly ionized Heaviside layer on the propagation of short waves over the earth's surface. Note that a station may pick up a signal on the ground wave at a certain distance from the transmitter, while beyond this certain distance a receiving station may not hear the signal at all! This area falls within what is known as the "skip" distance. Beyond this "skip" distance the transmitted signal may again be heard on the "sky" wave, reflected by the Heaviside layer as the diagram shows. In some cases, the distant receiving station picks up both the "ground" wave and the reflected "sky" wave, and when these two waves arrive out of synchronism, peculiar effects are obtained, the voice being all broken up, and in the case of television transmission "ghost" images frequently appear on the receiving screen.

● Let's consider why short-wave radio transmissions behave as they do. If direct current electricity is flowing through a wire from some generator or storage device, it can be shown that the current is evenly distributed throughout any cross section of the wire and, if you were to cut off a portion or hollow out the wire, you would reduce the amount of current that the wire would carry in the same proportion as the amount of metal taken away.

Now, if you put some sort of alternator machine in the circuit to change the direction of the current (thus changing the direct current into alternating current), the electricity begins to congregate around the outside surface of the wire, particularly when the alternator is turning at high speed, so that the inside could be removed without much change in current. Indeed, as the alternator is speeded up to rather high frequencies, we find that a portion of the electrical energy tries to jump off of the wire and is radiated in one form or another of electrical waves.

* Vice-President, Stromberg-Carlson Telephone Mfg. Co.

Starting from direct current, if we turn our alternator slowly and gradually speed it up, we first pass through the A.C. frequencies used for commercial power and lighting circuits, usually 25 or 60 cycles. Before we reach the 60 cycle frequency, however, our wire is already conducting what we radio men know as "audio frequency" currents (about 40 cycles to about 10,000 cycles per second), so called because if we employ some mechanical or thermal means to transform them into air vibrations, the human ear can hear them.

Long Wave Radio

Already, at these higher frequencies in the audio frequency range a small amount of radiation is beginning to occur. If we increase the speed of the alternator still further into super-audible frequencies of about 100,000 cycles, these radiations become stronger and we are in the region of "Long Wave" radio.

Most of the original work and early discoveries in radio development occurred in this long wave region and, indeed, for many years it was believed that the longest radio waves were the best for long distance transmission. Naturally, all the commercial radio-telegraph companies and various government services wanted these long wave lengths for themselves, so the radio amateurs and, later on, the broadcasters, were pushed down into the wave lengths around 200 meters, which were then believed to be useful only for local service.

Strangely enough, these radio amateurs, transmitting with only 5 to 1,000 watts of power and below 200 meters, began to cover tremendous distances at certain hours of the day. Broadcasting stations, too, could be heard up to 10 times as far away at night as during the day.

These developments upset the former ideas as to the nature and behavior of radio waves and called for a new theory to explain them.

Two Kinds of Radio Waves

The one theory which seems to answer all of the conditions that experimenters have observed is that advanced by Professors Kennelley and Oliver Heaviside, which has come to be known as the "Heaviside Layer" theory. According to this theory, there are two kinds of radio waves. One of them, the so-called "earth" or "ground" wave, follows the curvature of the earth. It is rapidly absorbed by the earth and its metal deposits, hills, trees, steel buildings and bodies of water, yet it is steady and reliable in character and travels about the same distance day or night. Anyone able to receive the "earth" waves from a station is said to be in its "reliable service area", and is assured of good reception in daylight or darkness. This is the type of radio wave that the early experimenters had been dealing with, as most of the energy radiated at long wave lengths is of this "earth" wave type.

Relation to Light, Heat, etc.

Now, if we increase the speed of our current alternator to produce waves of a higher frequency or a shorter wave length, less and less of the radiated energy is transformed into "earth" waves (or perhaps it is absorbed faster by the earth, at higher frequencies) and more and more of it into a second kind of radio wave, known as "sky" waves. These apparently do not follow the surface of the earth but travel in straight lines and behave more like light and radiant heat and other types of electrical waves. In fact, there is a close relationship between them. As we increase the speed of our alternator,

If you are a beginner or layman in the realm of short waves — then you will find this article by Mr. Scoville most enlightening and authoritative. He answers such interesting and important questions as: — Which frequencies are practically free of static disturbances? Which frequencies are most free from disturbances caused by automobile ignition systems? At what wavelength do signals start to penetrate the Heaviside layer? Why do most set manufacturers refrain from making their sets tune down to 7 or 8 meters? What is the difference between the "earth" and the "sky" wave? Is the Heaviside layer a solid reflecting surface like a mirror, or is it a series of layers of different gases? What are the four principal short-wave bands in use for long distance transmission?

we pass through the "short wave" radio spectrum into "ultra-short" waves (at which television and two-way police radio transmission experiments are now being carried on), then to radiant heat, infra red, visible light, ultra violet, X-rays, etc., to the cosmic rays, which are at present the limit of our knowledge of electrical waves or radiations. Thus, it is apparent that the only difference between radio "sky" waves and visible light is a matter of frequency and we can expect them both to have certain characteristics in common.

Kilocycles Versus Meters

The speed at which all radiated electric waves travel is practically the same as the speed of light: 186,000 miles a second or approximately 300,000,000 meters a second. Thus, we have a fixed mathematical relationship between the two means of reference commonly used to define a particular wave; namely, the "frequency", measured in cycles, kilocycles or megacycles, and the "wave length", measured in meters, centimeters or millimeters. The wave length method deals with the distance in metric units from any point of one radio wave to the same corresponding point on the next wave radiated. For most radio transmissions, this distance is measured in meters; it is only in the ultra-short radio and light wave regions, where wave-lengths are less than a meter, that centimeter and millimeter units are used. The other reference deals with the "frequency" or number of waves leaving the transmitting aerial every second in kilocycles or megacycles.

Inasmuch as any wave, regardless of its frequency or wave length, will travel the same distance as a light wave in a second, the number of frequencies or waves which follow it in that second, and the distance or wave length between them, are related. Thus,

$$\frac{\text{300,000,000 (the speed of light in meters per second)}}{\text{f (the frequency in cycles)}} = \text{W (wave-length in meters)}$$

or

$$\frac{\text{300,000}}{\text{f (frequency in kilocycles)}} = \text{W (meters)}$$

or

$$\frac{\text{300,000}}{\text{W (Wave-length in meters)}} = \text{f (k.c.)}$$

EFFECT OF TIME OF DAY AND SEASONAL YEAR ON SHORT WAVE RECEPTION

(Time and Season apply to transmitting station)

Wave Length Band	Ground Wave Range (Miles)	Mid-Summer Sky Wave Approx. Range (Miles)		Mid-Winter Sky Wave Approx. Range (Miles)	
		Noon	Midnight	Noon	Midnight
49 Meters	75	100-200	250-5,000	200-600	400 and up
31 Meters	60	200-700	1,000 and up	500-2,000	1,500 and up
25 Meters	50	300-1,500	1,500 and up	600-3,000	2,000 and up
19 Meters	35	400-2,000	2,500 and up	900-4,000	X

X Ordinarily cannot be heard.

The above table shows clearly how the transmitting ranges of the different wavelengths change from midsummer to mid-winter and vice versa. Although not commonly known to the layman, this matter of making a change in wavelength or frequency is not only made use of for the changes in the seasons and temperature, etc., but in such important short-wave transmission as that across the Ocean, where daily public telephone service is conducted by the A. T. & T. Company, for example, the wavelength is frequently changed several times during a short period extending over a few hours. These frequency changes are made by the engineers without disturbing the conversation being carried on by the radio telephone subscriber. The frequency is constantly being checked back and forth across the Atlantic, and the best one selected at all times for the "toll" message.

Heaviside Layer Aids Short-Wave Transmission

These radio "sky waves", shooting out from the earth in all directions, are thought to encounter a resisting layer of ionized gases in the earth's atmosphere. These gases reflect or bend a portion of the "sky wave" energy from a straight course. They also absorb a portion, and perhaps allow some of this energy to pass straight through, but it is the bent or reflected portion which interests us. This Heaviside layer is not a solid reflecting surface like a polished mirror, but rather a series of layers of gases, some light, some heavy, which gradually bend the waves, much as light would be bent in passing through successive layers of air, glass and water.

Explanation of "Fading"

One interesting part of this type of reflection is that the higher frequency waves seem to penetrate farther into the Heaviside layer and are therefore reflected differently from waves of lower frequency. In this regard, they are like the difference between a single rifle bullet ricocheting from the surface of a pool of water, as compared to perhaps the one-hundredth bullet in a stream of machine gun bullets which, following its predecessors, would penetrate farther into the water. Thus, the very low frequency or longest wave radio signals are almost entirely absorbed or pass through the Heaviside layer with practically no reflection. In the broadcast band, there is considerable reflection of the "sky" waves back to listeners located in the "reliable service" area, wherein listeners also receive the "earth" waves. This sometimes causes a fading or distortion of the "earth" wave signals at times when the "sky" wave reflections arrive a little later in time (having travelled a greater distance) and hence "out of phase" with the "earth" wave signals. These "sky" waves are also reflected to listeners located outside of the "reliable service" area of the station, especially at night, and thus enlarge its night-time service range.

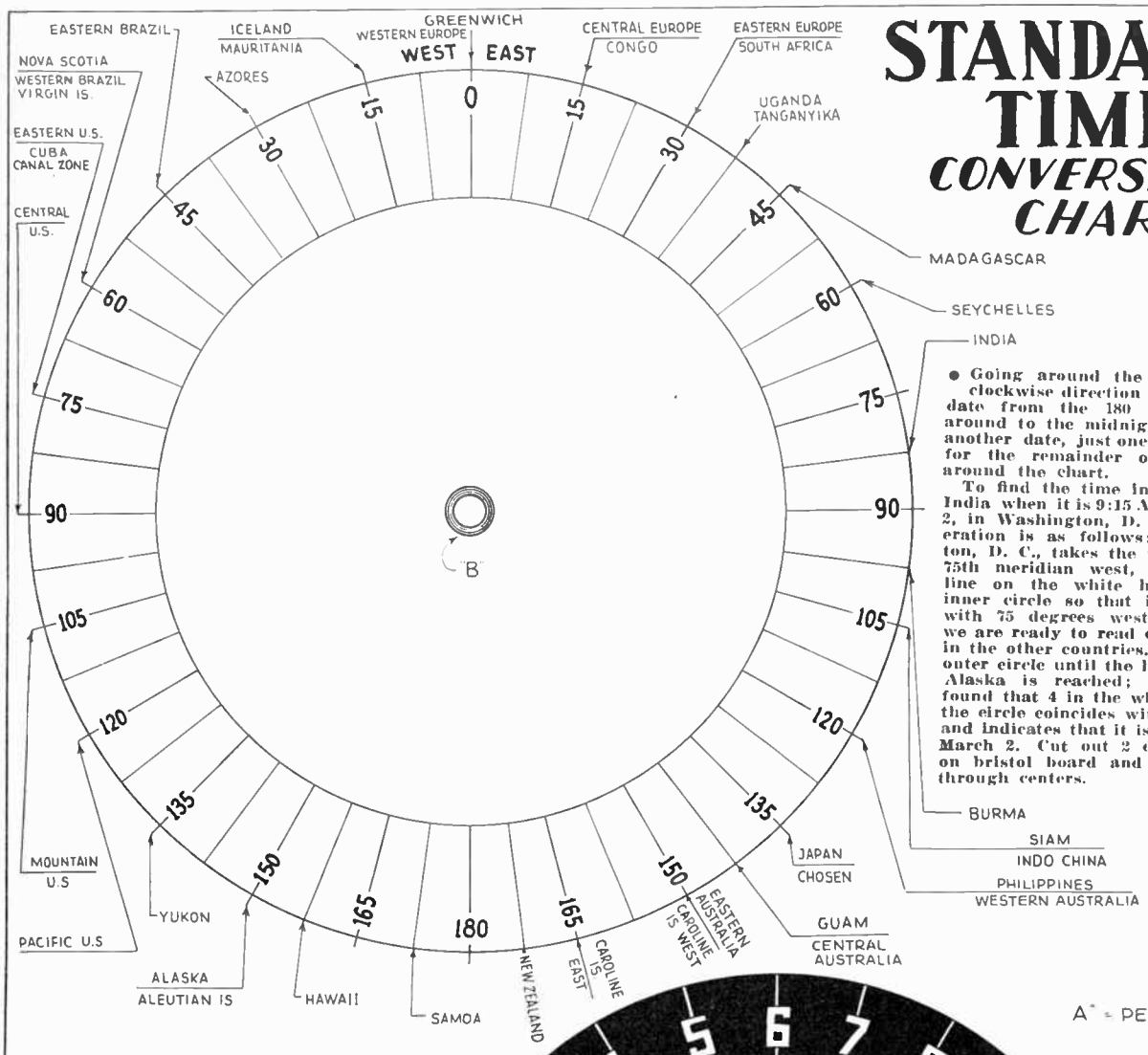
"Skip Distance" on Short Waves

In short-wave radio transmission, the frequencies are such that almost no "sky" waves are reflected back to earth at points close to the transmitting station, but only at a distance from it and, in fact, there is usually a "skip distance" area of listeners who are too far away from the station to receive the "earth" waves and too close to it to receive the reflected "sky" waves, whereas listeners beyond this "skip distance" may get good reception from the distant transmitter.

The Heaviside layer is not a smooth spherical shell but rather a turbulent collection of gases that are almost constantly in motion and that rise and fall with relation to the earth, particularly under the influence of the sun, but also

(*Continued on Page* 47)

STANDARD TIME CONVERSION CHART

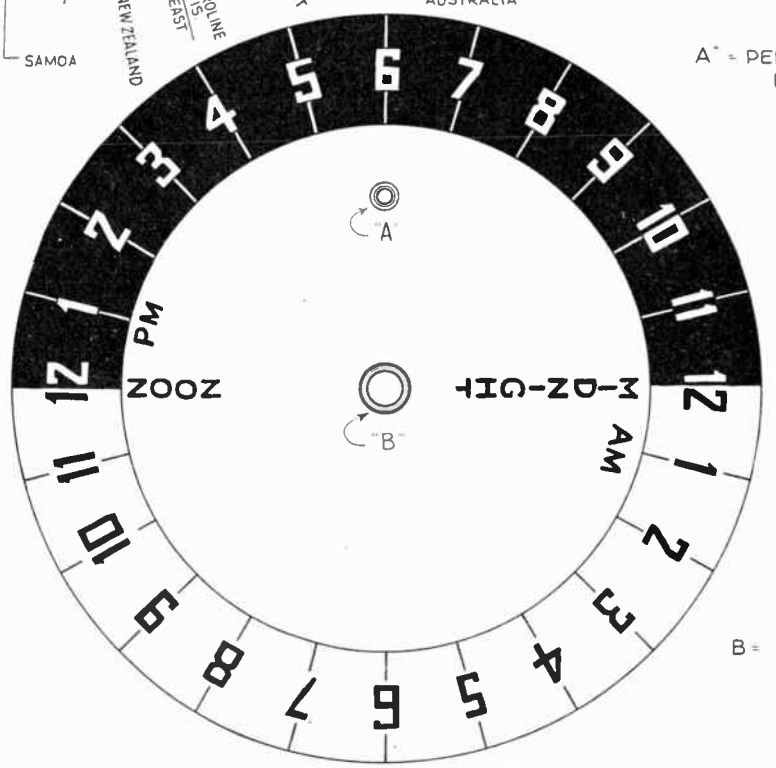


● Going around the chart in a clockwise direction there is one date from the 180 degree line around to the midnight line and another date, just one day earlier, for the remainder of the way around the chart.

To find the time in Alaska or India when it is 9:15 A. M., March 2, in Washington, D. C., the operation is as follows: Washington, D. C., takes the time of the 75th meridian west, setting the line on the white half of the inner circle so that it coincides with 75 degrees west longitude, we are ready to read off the time in the other countries. Follow the outer circle until the longitude of Alaska is reached; it will be found that 4 in the white half of the circle coincides with this line and indicates that it is 4:15 A. M., March 2. Cut out 2 discs, paste on bristol board and put eyelet through centers.

● A person knowing the standard time and longitude of any particular place on the earth, using this chart, can find the corresponding standard time at any other place. The inner circle of this chart is marked with the hours of the day; the white half for forenoon (A. M.) and the black half for afternoon (P. M.), while the outer circle is marked in degrees east and west of Greenwich. By glancing at the two scales it will be seen that the time changes one hour for every 15 degrees change of longitude.

To obtain the time at any place in relation to time at any other place it is only necessary to set the time on the inner circle, to the longitude of the place where the time is known, and read the time indicated at the longitude of the other place; the 180 degree meridian corresponds to the international date line. Crossing this line from east longitude to west a day is LOST; in the other direction a day is GAINED. Therefore a place just east of this line is one day later than a place immediately west of this line. There is also a change in date in passing the midnight line in the circle of this chart, it being a day later as one passes 12, midnight.



Courtesy U. S. Dept. of Commerce

Local Time Throughout the World

The table below may be used to determine the time, at any other place in the world, corresponding to your own time, provided you know its location.

Pick out your own time zone; it is a good idea to rule a red line on each side of it, across the page, for convenience in consulting it. Take the hour at your own locality, and run your finger directly up or down till you find the zone in which the station you are looking up is located. If necessary, consult the map. Read the hour, above or below your own, and add the minutes. If, in going up or down, you cross the (MN) (midnight) line, then change the date accordingly—to the day before, if you are going down, or the day after, if you are going up. The hours given as G. M. T., or G. C. T., should be read from the central line, between black cross rules.

M IS NOON; LIGHT FACE FIGURES, A. M.; BLACK FACE FIGURES, P. M.

READING UP—TIME LATER

App. Longitudes of Zone		MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN
180° -172½° E.	Date Line—Fiji Islands	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN
172½°-157½° E.	New Zealand	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11
157½°-142½° E.	Eastern Australia	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10
142½°-127½° E.	Japan—W. Australia	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9
127½°-112½° E.	Philippines—China	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8
112½°- 97½° E.	Siam—Annam	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7
97½°- 82½° E.	India—East	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6
82½°- 67½° E.	India—West	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5
67½°- 52½° E.	Persia	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4
52½°- 37½° E.	Arabia	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3
37½°- 22½° E.	Russia—Egypt	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2
22½°- 7½° E.	Germany—Italy	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M	1
7½° E. - 7½° W.	England, France - Greenwich	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11	M
7½°- 22½° W.	W. Africa—Iceland	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10	11
22½°- 37½° W.	Atlantic Ocean	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9	10
37½°- 52½° W.	Greenland—Brazil	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8	9
52½°- 67½° W.	E. Can.—Argentine	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7	8
67½°- 82½° W.	U.S. Eastern—Peru	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6	7
82½°- 97½° W.	U.S. Central—Mex.	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5	6
97½°-112½° W.	U.S. Mountain	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4	5
112½°-127½° W.	U.S. Pacific	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3	4
127½°-142½° W.	Eastern Alaska	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2	3
142½°-157½° W.	Central Alaska*	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1	2
157½°-172½° W.	Western Alaska	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN	1
172½°-180° W.	Date Line—Samoa	MN	1	2	3	4	5	6	7	8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	MN

READING DOWN—TIME EARLIER

*Hawaii is in a special time zone; so are Holland, Java, and other countries; consult Time Zone Map.

EXAMPLE: What time is it in Sydney, Australia, if it is 8:20 p. m. Monday in San Francisco? Put a finger on the blackface 8, opposite "U. S. Pacific" and run straight up the column till opposite "Eastern Australia." You cross an "MN", going up; so the time in Australia is Tomorrow; the 2 is blackface, so the hour is afternoon. Allowing for the extra minutes, it is 2:20 p. m. Tuesday in Sydney.

The hour is the same, in each of the Date Line Half Zones, but the date is a day later, on the west side of the line. The boundaries of time zones are only approximately north and south, as they follow political divisions.

Keeping a Short Wave Log

By Lee McCanne*

The author described how a worthwhile short-wave "log" sheet or card should be kept. These "log sheets" may prove valuable if you ever expect to enter a short-wave "Trophy Contest." Further, your records may frequently prove of value to various short-wave stations when you report on their programs.

● The simplified design of dial and controls of the modern short-wave receiver makes the logging of short-wave stations a fairly easy matter. Remember that many of the short-wave transmitting stations are still in an experimental stage, and may be received at a slightly different frequency or wave-length than that indicated in printed "log books". After a little experience, the locations on the dial of most of the important foreign stations will be known. It is suggested that you record them on the appended "Simplified Short Wave Log Sheet". Thereafter, tuning these stations will be as direct as the tuning of local or distant "standard wave" broadcasting stations.

While good short-wave reception from foreign stations is fairly regular, there are times when atmospheric conditions prevent the signals from affectively reaching your antenna. This element of uncertainty adds a sporting interest to short-wave listening, especially if an occasional record is made of the quality and strength of the short wave programs and of the atmospheric conditions at the time. A suggested form for this "Complete Short-Wave Log Sheet" is also shown.

Short-wave transmissions are affected by so many natural phenomena, some of which are known to us only by conjecture, that observers all over the world are keeping logs such as the "Complete Short Wave Log Sheet" in an attempt to establish the relationship between short wave reception and different phases of the moon, the sun spot cycle, etc. For this purpose, a day-to-day record of reception conditions on the same few stations is preferable to a general list of total stations heard. The Stromberg-Carlson Engineering Department is keeping a file of such log sheets, sent in by owners of their short wave receivers, with a view to compiling short wave information for the general use of all listeners. Logs are desired from listeners having average and poor reception conditions, as well as those more fortunately situated.

For uniformity, certain entry columns on this "Complete Short Wave Log Sheet" should be filled in as follows:

"Dial Reading": estimate in tenths of divisions as well as actual complete divisions as marked on the dial.

"Strength of Signal": enter as Faint, Weak, Medium, Strong, or Very Strong.

"Quality of Signal": enter as Clear, Fading, Mushy or Fluttering.

"Receiving Conditions": enter as Quiet, Slight Noise, Moderate Noise, Bad Noise.

"Weather Conditions": enter as Fair, Cloudy, Fog, Rain or Snow.

"Thermometer": Outdoor temperature in Fahrenheit, at time of listening.

The spaces for information on the receiving antenna used, location of the antenna with respect to the earth and nearby buildings, etc., should be filled in, also notes on changes in antenna system, date, etc., as well as date of changes in receiver, etc.

*Manager, Te-lek-tor Division, of Stromberg-Carlson Telephone Mfg. Co.

SIMPLIFIED SHORT-WAVE LOG SHEET

NAME OF LISTENER _____ ADDRESS, CITY _____ STATE ____

DATE	TIME OF DAY	DIAL READING	STATION CALL LETTERS	STATION LOCATION	STRENGTH OF SIGNAL	QUALITY OF SIGNAL	RECEIVING CONDITIONS

Above is a very good layout or style for a simplified short-wave "log sheet," as recommended by Mr. McCanne. If you are a regular short-wave "Fan" you will probably find it the best idea to purchase a quantity of cards of uniform size and place them in a box, ruling the cards as shown above.

COMPLETE SHORT-WAVE LOG SHEET

LOCATION OF RECEIVERS
☐ DOWNTOWN ☐ BUSINESS BLOCK
☐ SUBURBS ☐ APARTMENT BLDG
☐ COUNTRY ☐ SEPARATE HOUSE
REMARKS: _____

NAME OF LISTENER _____
ADDRESS; CITY _____ STATE _____

MAKE OF RECEIVER _____
TYPE OR CODE Nº _____ SERIAL Nº _____

ANTENNA:
☐ L TYPE, ☐ VERTICAL, ☐ DOUBLET
TOTAL LENGTH OF ANTENNA ____ FT
HEIGHT ABOVE EARTH ____ FT.
HEIGHT ABOVE BUILDING ____ FT
DIRECTION _____
TYPE OF LEAD IN _____ LENGTH ____ FT
TYPE OF GROUND _____ LENGTH ____ FT

DATE	TIME OF DAY	DIAL READING	ASSIGNED MEGACYCLES	STATION CALL LETTERS	STATION LOCATION	STRENGTH OF SIGNAL	QUALITY OF SIGNAL	RECEIVING CONDITIONS	WEATHER CONDITIONS	BAROMETER	THERMOMETER (F)	

A more elaborate short-wave record chart or "log sheet" as suggested by Mr. McCanne is shown in the drawing above. As previously recommended for the smaller "simplified" log sheet, shown above in the right-hand column, the editors strongly recommend that if you intend to keep a set of these complete log sheets, like that shown above, that you purchase a set of cards of suitable size and keep them in a metal or wooden box.

How You Can Identify Foreign Stations by "Signatures"

Nearly all short-wave broadcasting stations in operation today use what is known as the "characteristic" or "interval" signal, which may consist of various oral phrases or musical notes. These are used solely for the benefit of the listener, enabling him to readily identify the station, even though he may not hear the call letters clearly. For instance FYA, Pontoise, France, plays the "Marseillaise" at the beginning and the end of each broadcast; CT1AA, Lisbon, Portugal, uses three calls of the cuckoo. If you hear a constant "ticking" as of a clock, you will know that this is HVJ of the Vatican City, Italy. Many other signals and phrases are used and they are given in the following list.

Mtrs.	M. C.	Call.	Location.	Identification.
13.97	(21.4)	GSH	Daventry, England	(See 31.55 GSB).
14.47	(20.7)	LSY	Buenos Aires, Argentina	(See 16.70 LSY).
16.55	(18.1)	LSY	Buenos Aires, Argentina	(See 16.70 LSY).
16.56	(18.1)	PMC	Bandoeng, Java	(See 16.81 PLF).
16.70	(18.0)	LSY	Buenos Aires, Argentina	Begins transmissions by sounding E,E,G sharp, and A, on xylophone.
16.81	(18.0)	PLF	Bandoeng, Java	Begins transmissions with three tone auto horn. Notes are F,D,C.
16.86	(17.8)	GSG	Daventry, England	(See 31.55 GSB).
16.89	(17.8)	IAC	Piza, Italy	(See 35.8 IAC).
17.12	(17.5)	DFB	Nauen, Germany	Sounds three tone whistle at beginning of transmissions. Notes are D,C,G.
19.64	(15.3)	W2XE	Wayne, New Jersey	(See 49.02 W2XE).
19.73	(15.2)	DJB	Zeesen, Germany	(See 19.83 DJC).
19.88	(15.2)	FYA	Pontoise, France	(See 25.63 FYA).
19.84	(15.1)	HVJ	Vatican City, Italy	(See 50.26 HVJ).
19.82	(15.1)	GSF	Daventry, England	(See 31.55 GSB).
23.32	(12.8)	CNR	Rabat, Morocco	(See 37.33 CNR).
25.20	(11.9)	FYA	Pontoise, France	(See 25.63 FYA).
25.30	(11.9)	GSE	Daventry, England	(See 31.55 GSB).
25.36	(11.8)	W2XE	Wayne, New Jersey	(See 49.02 W2XE).
30.67	(9.83)	I2RO	Rome, Italy	Woman announcer announces "Radio Roma Napoli."
25.49	(11.8)	DJD	Zeesen, Germany	(See 19.83 DJC).
25.53	(11.8)	GSD	Daventry, England	(See 31.55 GSB).
25.57	(11.7)	PHI	Huizen, Holland	Announces "This is Huizen."
25.63	(11.7)	FYA	Pontoise, France	Plays the "Marseillaise" at beginning and end of transmissions.
29.04	(10.3)	ORK	Brussels, Belgium	Plays Belgium national hymn at close of programs.
30.43	(9.9)	EAQ	Madrid, Spain	Announces "Ay-ah-coo, transradio Madrid."
31.25	(9.6)	CT1AA	Lisbon, Portugal	Sounds three cookoo calls between selections.
31.28	(9.6)	VK2ME	Sydney, Australia	Laugh of Kookaburra bird at beginning and end of transmissions.
31.27	(9.6)	HBL	Geneva, Switzerland	(See 38 47 HBP).
31.38	(9.6)	DJA	Zeesen, Germany	(See 19 83 DJC).
31.31	(9.5)	GSC	Daventry, England	(See 31.55 GSB).
31.55	(9.5)	VK3ME	Melbourne, Australia	Opens programs with clock chimes.
31.55	(9.5)	GSB	Daventry, England	Big Ben Chimes on quarter hours. Announces "London calling on—(stations and wavelengths)." Begins and ends transmissions by playing "God Save The King." This song has the same tune as our "America."
35.80	(8.4)	IAC	Piza, Italy	Calls "Pronto, pronto—(name of ship)."
36.65	(8.2)	PSK (PRA3)	Rio de Janeiro, Brazil	Plays chimes like the NBC chimes when signing off.
37.33	(8.0)	CNR	Rabat, Morocco	Announces "Radio Rabat dans Maroc." Uses metronome between selections.
38.47	(7.8)	HBP	Geneva, Switzerland	Announces "Hillo, hillo, radio nations."
44.44	(6.75)	TIEP	San Jose, Costa Rica	Announces "La Voz del Tropico."
45.00	(6.7)	HC2RL	Guayaquil, Ecuador	Plays the Ecuadorian National Anthem at beginning and end of transmissions.
45.31	(6.6)	PRADO	Riobomba, Ecuador	Announces "Estacion el Prado, Riobomba, Ecuador."
46.53	(6.5)	HJ1ABB	Barranquilla, Co'ombia	Announces "Achay-hota-uno-ah-bay-bay."
46.10	(6.5)	HJ5ABD	Cali, Colombia	Announces "Achay-hota-thinko-ah-bay-day."
47.8	(6.3)	HI1A	Santo Domingo	Plays "Anchors Aweigh" at start and finish of programs.
48.76	(6.2)	YV3RC	Caracas, Venezuela	Announces "Ee-vay-trays-erray-say." Plays bells on the hour.
49.02	(6.1)	W2XE	Wayne, New Jersey	Announces in English, German, French, Spanish and Italian.
49.08	(6.1)	YV2RC	Caracas, Venezuela	Announces "Ee-vay-dos-erray-say." Sounds four strokes on chimes every fifteen minutes.
49.10	(6.1)	VE9HX	Halifax, Nova Scotia	Sounds four strokes on a gong at beginning of transmissions.
49.10	(6.0)	OXY	Skamleback, Denmark	Midnight chimes at 6 P. M. E. S. T.
49.42	(6.0)	VE9CS	Vancouver, B. C.	Sounds two bells between selections.
49.59	(6.0)	GSA	Daventry, England	(See GSB).
49.83	(6.0)	DJC	Zeesen, Germany	Announces in German, and English. Eight notes of old German song played over and over at beginning of transmissions.
49.91	(6.03)	XEBT	Mexico City, Mexico	Sounds auto horn after each selection.
50.00	(6.0)	RV59	Moscow, U. S. S. R.	"International" is played at beginning and end of transmissions.
50.26	(6.0)	HVJ	Vatican City, Italy	Announces "Pronto, pronto, radio Vaticano." Clock ticking.
50.50	(5.9)	TGX	Guatemala City, S. A.	Two tone high frequency signals.
51.28	(5.85)	YV5RMO	Maracaibo, Venezuela	Strikes gong before announcing.
73.00	(4.0)	HCJB	Quito, Ecuador	Sounds 2-tone chime after announcements.

Best Short-Wave Stations

This list of short-wave relay broadcasting, commercial and experimental stations is the result of several years of work. Names and addresses are included wherever possible so that you may know where to write. The blank spaces are for the dial settings of your own set.

★Stars designate the most active and best heard stations. Times are Eastern Standard
C—Commercial phone. B—Broadcast service. X—Experimental service.

Station	Dial
21540 kc. W8XK -B- 13.93 meters WESTINGHOUSE ELECTRIC PITTSBURGH, PA. 7 a. m.-2 p. m.; relays KOKA	
20700 kc. LSY -C- 14.49 meters MONTE GRANDE, ARGENTINA Tests irregularly	
19650 kc. LSN5 -C- 15.27 meters HURLINGHAM, ARGENTINA Calls Europe, daytime	
19600 kc. LSF -C- 15.31 meters MONTE GRANDE, ARGENTINA Tests irregularly, daytime	
19355 kc. FTM -C- 15.50 meters ST. ASSISE, FRANCE Calls Argentine, mornings	
18830 kc. PLE -C- 15.93 meters BANDOENG, JAVA Calls Holland, early a. m.	
18620 kc. GAU -C- 16.11 meters RUGBY, ENGLAND Calls N. Y., daytime	
18345 kc. FZS -C- 16.35 meters SAIGON, INOO-CHINA Phones Paris, early morning	
18340 kc. WLA -C- 16.36 meters LAWRENCEVILLE, N. J. Calls England, daytime	
18135 kc. PMC -C- 16.54 meters BANDOENG, JAVA Phones Holland, early a. m.	
18115 kc. LSY3 -C- 16.56 meters MONTE GRANDE, ARGENTINA Tests irregularly	
17810 kc. PCV -C- 16.84 meters KOOTWIJK, HOLLAND Calls Java, 6-9 a. m.	
17790 kc. GSG -B- 16.86 meters BRITISH BROAD. CORP. DAVENTRY, ENGLAND	
17780 kc. ★W3XAL -B- 16.87 meters NATIONAL BROAD. CO. BOUND BROOK, N. J Relays WJZ, 10 a m.-4 p. m. every day	
17760 kc. DJE -B- 16.89 meters BROADCASTING HOUSE BERLIN, GERMANY Irregular 8 a. m.-2 p. m.	

Station	Dial
17760 kc. IAC -C- 16.89 meters PIZA, ITALY Calls ships, 6:30-7:30 a m.	
17310 kc. W3XL -X- 17.33 meters NATIONAL BROAD. CO. BOUND BROOK, N. J. Relays WJZ Irregularly	
17120 kc WOO -C- 17.52 meters A. T. & T. CO., OCEAN GATE, N. J. Calls ships	
17080 kc. GBC -C- 17.56 meters RUGBY, ENGLAND Calls Ships	
16233 kc. FZR3 -C- 18.48 meters SAIGON, INOO-CHINA Calls Paris and Pacific Isles	
15880 kc. FTK -C- 18.90 meters ST. ASSISE, FRANCE Phones Saigon, morning	
15810 kc. LSL -C- 18.98 meters HURLINGHAM, ARGENTINA Calls Brazil and Europe, daytime	
15760 kc. JYT -X- 19.04 meters KEMIKWA-CHO, CHIBA- KEN, JAPAN Irregular in late afternoon and early morning	
15660 kc. JVE -C- 19.16 meters NAZAKI, JAPAN Phones Java 3-5 a. m.	
15620 kc. JVF -C- 19.2 meters NAZAKI, JAPAN Phones U. S., 5 a. m. & 8 p. m.	
15415 kc. KWO -C- 19.46 meters OIXON, CAL. Phones Hawaii 2-7 p. m.	
15355 kc. KWU -C- 19.53 meters DIXON, CAL. Phones Pacific Isles and Japan	
15340 kc. DJR -X- 19.56 meters BROADCASTING HOUSE BERLIN, GERMANY Testing Irregularly	
15330 kc. ★W2XAD -B- 19.56 meters GENERAL ELECTRIC CO. SCHENECTAOY, N. Y. Relays WGY daily, 2:30-3:30 p. m.	
15280 kc. DJQ -B- 19.63 meters BROADCASTING HOUSE BERLIN, GERMANY 12:30-2 a. m. daily	

Station	Dial
15270 kc. ★W2XE -B- 19.65 meters ATLANTIC BROADCASTING CORP. 485 Madison Av., N.Y.C. Relays WABC daily, 11 a. m.-1 p. m.	
15250 kc. W1XAL -B- 19.67 meters BOSTON, MASS. Irregular, in morning	
15243 kc. ★FYA -B- 19.68 meters "RADIO COLONIAL" PARIS, FRANCE Service de la Radiodiffusion 103 Rue de Grenelle, Paris 7:00-11 a. m.	
15220 kc. PCJ -X- 19.71 meters N. V. PHILIPS' RADIO EINDHOVEN, HOLLAND Broadcasts 8-11 a. m., relaying PHI	
15210 kc. ★W8XK -B- 19.72 meters WESTINGHOUSE ELECTRIC & MFG. CO. PITTSBURGH, PA. 10 a. m.-4:15 p. m. Relays KOKA	
15200 kc. DJB -B- 19.73 meters BROADCASTING HOUSE BERLIN, GERMANY 12:30-2 a. m., 3:45-7:15 a. m.	
15140 kc. ★GSF -B- 19.82 meters BRITISH BROAD. CORP. DAVENTRY, ENGLAND	
15120 kc. HVJ -B- 19.83 meters VATICAN CITY ROME, ITALY 5:00 to 5:15 a. m., except Sun- day. Also Sat. 10-10:30 a. m.	
15090 kc. RKI -C- 19.88 meters MOSCOW, U.S.S.R. Phones Tashkent near 7 a. m. and relays RNE on Sundays Irregularly	
15055 kc. WNC -C- 19.92 meters HIALEAH, FLORIDA Calls Central America, daytime	
14980 kc. KAY -C- 20.03 meters MANILA, P. I. Phones Pacific Isles	
14950 kc. HJB -C- 20.07 meters BOGOTA, CO. Calls WNC, daytime	
14590 kc. WMN -C- 20.56 meters LAWRENCEVILLE, N. J. Phones England morning and afternoon	
14535 kc. HBJ -B- 20.64 meters RADIO NATIONS, GENEVA, SWITZERLAND Broadcasts Irregularly	

Station	Dial
14500 kc. LSM2 -C- 20.69 meters HURLINGHAM, ARGENTINA Calls U. S. evening	
14485 kc. TIR C- 20.71 meters CARTAGO, COSTA RICA Phones Cen. Amer. & U.S.A. Daytime	
14485 kc. HPF -C- 20.71 meters PANAMA CITY, PAN. Phones WNC daytime	
14485 kc. TGF -C- 20.71 meters GUATEMALA CITY, GUAT. Phones WNC daytime	
14485 kc. YNA -C- 20.71 meters MANAGUA, NICARAGUA Phones WNC daytime	
13610 kc. JYK -C- 22.04 meters KEMIKAWA-CHO, CHIBA- KEN, JAPAN Phones California till 11 p. m.	
13585 kc. GBB -C- 22.08 meters RUGBY, ENGLAND Calls Egypt & Canada, afternoons	
12840 kc. WOO -C- 23.36 meters OCEAN GATE, N. J. Calls ships	
12825 kc. CNR -B, C- 23.39 meters DIRECTOR GENERAL Telegraph and Telephone Stations, Rabat, Morocco Broadcasts, Sunday, 7:30-9 a. m.	
12800 kc. IAC -C- 23.45 meters PIZA, ITALY Calls Italian ships, mornings	
12780 kc. GBC -C- 23.47 meters RUGBY, ENGLAND Calls ships	
12290 kc. GBU -C- 24.41 meters RUGBY, ENGLAND Calls N.Y.C., afternoons	
12000 kc. ★RNE -B- 25 meters MOSCOW, U. S. S. R. Sat. 10-11 p. m. Sunday, 6-7 a. m., 10-11 a. m.	
11991 kc. FZS2 -C- 25.02 meters SAIGON, INDO-CHINA Phones Paris, morning	
11950 kc. KKQ -X- 25.10 meters BOLINAS, CALIF. Tests, irregularly, evenings	
11940 kc. FTA -C- 25.13 meters STE. ASSISE, FRANCE Phones CNR morning, Hurlingham, Arge., nights	

Station	Dial
11875 kc. ★FYA -B- 25.25 meters "RADIO COLONIAL" PARIS, FRANCE 11:15 a.m.-2-15 p.m., 3-6 p.m.	
11870 kc. ★W8XK -B- 25.26 meters WESTINGHOUSE ELECTRIC & MFG. CO. PITTSBURGH, PA. 4:20-10:00 p. m. Sat. till 1 a. m. Relays KDKA	
11860 kc. ★GSE -B- 25.29 meters BRITISH BROAD. CORP. DAVENTRY, ENGLAND	
11855 kc. DJP -X- 25.31 meters BROADCASTING HOUSE BERLIN, GERMANY Tests irregularly	
11830 kc. ★W2XE -B- 25.36 meters ATLANTIC BROADCASTING CORP. 485 MADISON AVE., N. Y. C. 3-5 p. m. Relays WABC	
11811 kc. I2RO -B- 25.4 meters E.I.A.R. Via Montello 5 ROME, ITALY Reported on at 8 a. m.	
11795 kc. DJO -X- 25.43 meters BROADCASTING HOUSE BERLIN, GERMANY Tests irregularly	
11790 kc. W1XAL -B- 25.45 meters BOSTON, MASS. Irregularly in the evening	
11770 kc. DJD -B- 25.49 meters BROADCASTING HOUSE, BERLIN, GERMANY 12-4:30 p. m.	
11750 kc. ★GSD -B- 25.53 meters BRITISH BRDAD. CORP. DAVENTRY, ENGLAND	
11730 kc. ★PHI -B- 25.57 meters HUIZEN, HOLLAND Daily ex. Tue. & Wed. 8:00-10 a. m; Sat till 10:30; Sun. till 11 a. m.	
11720 kc. ★CJRX -B- 25.6 meters WINNIPEG, CANADA Daily, 8 p. m.-12 m. Sunday, 3-10:30 p. m.	
11720 kc. FYA -B- 25.6 meters "RADIO COLONIAL" PARIS, FRANCE 7-10 p. m. 11 p. m.-1 a. m.	
11680 kc. KIO -X- 25.68 meters KAHUKU, HAWAII Tests in the evening	
10740 kc. JVM -C- 27.93 meters NAZAKI, JAPAN Phones California evenings	
10675 kc. WNB -C- 28.1 meters LAWRENCEVILLE, N. J. Calls Bermuda, daytime	
10660 kc. JVN -C- 28.14 meters NAZAKI, JAPAN Tests 2-7 a. m.	

Station	Dial
10520 kc. VLK -C- 28.51 meters SYDNEY, AUSTRALIA Calls Rugby, early a. m.	
10430 kc. YBG -C- 28.76 meters MEDAN, SUMATRA 5:30-6:30 a. m., 7:30-8:30 p. m.	
10420 kc. XGW -C- 28.79 meters SHANGHAI, CHINA Calls Manila and England, 6-9 a. m. and California late evening	
10410 kc. PDK -C- 28.80 meters KOOTWIJK, HOLLAND Calls Java 7:30-9:40 a. m.	
10410 kc. KES -X- 28.80 meters BOLINAS, CALIF. Tests evenings	
10350 kc. ★LSX -C- 28.98 meters MONTE GRANDE, ARGENTINA Tests irregularly 8 p. m.-12 midnight. Used in Byrd Broadcasts	
10330 kc. ★ORK -C- 29.04 meters RUYSSELEDE, BELGIUM Broadcasts 2:45-4:15 p. m.	
10290 kc. DIQ -X- 29.16 meters KONIGSWUSTERHAUSEN, GERMANY Broadcasts irregularly	
10260 kc. PMN -C- 29.24 meters BANDOENG, JAVA Calls Australia 5 a. m.	
10250 kc. LSK3 -C- 29.27 meters HURLINGHAM, ARGENTINA Calls Europe and U. S., afternoon and evening	
10055 kc. ZFB -C- 29.84 meters HAMILTON, BERMUDA Phones N. Y. C. daytime	
9950 kc. GCU -C- 30.15 meters RUGBY, ENGLAND Calls N.Y.C. evening	
9890 kc. LSN -C- 30.33 meters HURLINGHAM, ARGENTINA Calls New York, evenings	
9870 kc. WON -C- 30.4 meters LAWRENCEVILLE, N. J. Phones England, evening	
9860 kc. ★EAQ -B- 30.43 meters P. O. Box 951 MADRID, SPAIN Daily except Saturday, 5:15-7 p. m.; Saturday, 1-3 p. m., 5:15-7:30 p m.; Tues., Thurs. and Sun. 5:15-7:30 p. m.	
9840 kc. JYS -X- 30.49 meters KEMIKAWA-CHO, CHIBA-KEN, JAPAN Irregular, 4-7 a. m.	
9800 kc. LSE -C- 30.61 meters MONTE GRANDE, ARGENTINA Test irregularly	
9790 kc. GCW -C- 30.64 meters RUGBY, ENGLAND Calls N. Y. C., evening	

Station	Dial
9780 kc. ★I2RO -B- 30.67 meters E.I.A.R. ROME, ITALY Daily, 2:30-5 p m. Thur. and Sat. 9:45-10:30 p. m.	
9760 kc. VLJ-VLZ2 -C- 30.74 meters AMALGAMATED WIRELESS OF AUSTRALIA SYDNEY, AUSTRALIA Phones Java and N. Zealand early a. m.	
9750 kc. WOF -C- 30.77 meters LAWRENCEVILLE, N. J. Phones England, evening	
9710 kc. GCA -C- 30.89 meters RUGBY, ENGLAND Calls Arge. & Brazil, evenings	
9600 kc ★CT1AA -B- 31.25 meters LISBON, PORTUGAL Tues. and Friday, 4:30-7 p. m.	
9595 kc. ★HBL -B- 31.27 meters LEAGUE OF NATIONS GENEVA, SWITZERLAND Saturdays, 5:30-6:15 p m.	
9590 kc. ★VK2ME -B- 31.28 meters AMALGAMATED WIRELESS LTD., 47 YORK ST. SYDNEY, AUSTRALIA Sundays 1-3, 5-11 a. m.	
9590 kc. W3XAU -B- 31-28 meters NEWTOWN SQUARE, PA. Relays WCAU 12 noon-7:50 p. m.	
9580 kc. GSC -B- 31-32 meters BRITISH BROAD. CORP. DAVENTRY, ENGLAND	
9580 kc. ★VK3LR -B- 31.32 meters Research Section, Postmaster Gen'ls. Dept., 61 Little Collins St., MELBOURNE, AUSTRALIA 3:15-7:30 a.m. except Sun.	
9570 kc. ★W1XAZ -B- 31.35 meters WESTINGHOUSE ELECTRIC & MFG. CO. SPRINGFIELD, MASS. Relays WBZ, 7 a. m.-1 a. m.	
9560 kc DJA -B- 31.38 meters BRDADCASTING HOUSE, BERLIN 8-11:30 a. m., 5:15-9-15 p. m.	
9540 kc. ★DJN -B- 31.45 meters BROADCASTING HOUSE, BERLIN, GERMANY 3:45-7:15 a. m., 8-11:30 a. m. 5:30-10:45 p. m.	
9540 kc. LKJ1 -B- 31.45 meters JELDY, NORWAY Relays Oslo 5-8 a. m.	
9530 kc. ★W2XAF -B- 31.48 meters GENERAL ELECTRIC CO. SCHENECTADY, N. Y. Relays WGY 7:25-11 p. m. Sundays, 7:25 p. m.-12:30 a. m.	
9510 kc. ★GSB -B- 31.55 meters BRITISH BRDAD. CORP. DAVENTRY, ENGLAND	

Station	Dial
9510 kc. ★VK3ME -B- 31.55 meters AMALGAMATED WIRELESS, Ltd. G. P. O. Box 12721, MELBOURNE, AUSTRALIA Wed., 5-6:30 a. m..; Saturday, 5:00-7:00 a. m.	
9500 kc. ★PRF5 -B- 31.58 meters RIO DE JANEIRO, BRAZIL Daily except Sun. 5:30-6-15 p. m.	
9428 kc. ★COH -B- 31.8 meters 2 B ST., VEDADO, HAVANA, CUBA 10-11 a.m., 5-6, 8-9 p.m.	
9415 kc. PLV -C- 3187 meters BANDOENG, JAVA Phones Holland, 7:40-9:40 a m.	
9330 kc. CJA2 -C- 32.15 meters DRUMMONDVILLE, CANADA Phones England irregularly	
8185 kc. PSK -C- 36.65 meters RIO DE JANEIRO, BRAZIL 7-7:30 p. m. irregularly Relays PRA3	
8036 kc. CNR -B- 37.33 meters RABAT, MDRDCCO Sunday, 2:30-5 p. m.	
7880 kc. JYR -B- 38.07 meters KEMIKAWA-CHO, CHIBA-KEN, JAPAN 4-7:40 a. m.	
7799 kc. ★HBP -B- 38.47 meters LEAGUE OF NATIONS, GENEVA, SWITZERLAND 5:30-6:15 p. m., Saturday	
7400 kc. HJ3ABD -B- 40.54 meters P. O. Box 509 BOGOTA, CDLDMBIA Daily 12-2 p. m.; 7-11 p. m. Sunday, 5-9 p. m.	
7220 kc. HKE -B- 41.55 meters BOGOTA, CDL., S. A. Tue. and Sat. 8-9 p. m.; Mon. & Thurs. 6:30-7 p. m.	
7140 kc. HJ4ABB -B- 42.02 meters MANIZALES, CDL., S. A. P. O. Box 175 Mon. to Fri. 12:15-1 p. m.; Tues. & Fri. 7:30-10 p. m.; Sun. 2:30-5 p. m.	
6905 kc. GDS -C- 43.45 meters RUGBY, ENGLAND Calls N.Y.C. evening	
6860 kc. KEL -X- 43.70 meters BOLINAS, CALIF. Tests irregularly	
6755 kc. WOA -C- 44-41 meters LAWRENCEVILLE, N. J. Phones England, evening	
6750 kc. ★JVT -X- 44.44 meters NAZAKI, JAPAN Relays 10AK Tokio 2-7:45 a. m.	
6666 kc. ★HC2RL -B- 45.00 meters P. O. BOX 759, GUAYAQUIL, ECUADOR, S. A. Sunday, 5:45-7:45 p. m. Tues., 9:15-11:15 p. m	

Station	Dial
6660 kc. ★TIEP -B- 45.05 meters LA-VOZ DEL TROPICO SAN JOSE, COSTA RICA Irregular in evening	
6620 kc. ★PRADO -B- 45.30 meters RIOBAMBA, ECUADOR Thur. 9-11:30 p. m.	
6500 kc. HI4D -B- 46.14 meters SANTO DOMINGO, DOMINICAN REP. Mon. and Sat., 4:40-7:40 p. m.	
6490 kc. HJ5ABD -B- 46.22 meters MANIZALES, COL. 12-1:30 p. m., 7-10 p. m.	
6447 kc. HJ1ABB -B- 46.53 meters BARRANQUILLA, COL., S. A. P. O. BOX 715, 11:30 a. m.-1 p. m.; 5-10 p. m.	
6425 kc. W3XL -X- 46.70 meters NATIONAL BROADCASTING CO. BOUND BROOK, N. J. Tests Irregularly	
6375 kc. YV4RC -B- 47.06 meters CARACAS, VENEZUELA 7:30-9:30 p. m.	
6316 kc. HIZ -B- 47.5 meters SANTO DOMINGO DOMINICAN REPUBLIC Daily except Sat. and Sun. 4:40-5:40 p. m.; Sat., 9:40-11:40 p. m.; Sun., 11:40 a. m.-1:40 p. m.	
6272 kc. HI1A -B- 47.84 meters P. O. BOX 243, SANTIAGO, DOMINICAN REP. 11:40 a. m.-1:40 p. m. 7:40-9:40 p. m.	
6175 kc. HJ2ABA -B- 48.58 meters TUNJA, COL. 1-2 p. m., 7:30-10 p. m.	
6160 kc. ★YV3RC -B- 48.7 meters CARACAS, VENEZUELA Generally 4:00-10:00 p. m.	
6150 kc. ★CJRO -B- 48.78 meters WINNIPEG, MAN., CANADA 8 p. m.-12 m. Sun. 3-10:30 p. m.	
6140 kc. ★W8XK -B- 48.86 meters WESTINGHOUSE ELECTRIC & MFG. CO. PITTSBURGH, PA. Relays KDKA 4:30 p. m.-1 a. m.	

Station	Dial
6130 kc. ZGE -B- 48.92 meters KUALA LUMPUR, FED. MALAY STATES Sun., Tue., and Fri., 6:40-8:40 a. m.	
6122 kc. JB -B- 49 meters JOHANNESBURG, SOUTH AFRICA Daily except Sat and Sun., 11:45 p. m.-12:30 a. m., 4-7 a. m., 9 a. m.-3:30 p. m. Sat., only, 4-7 a. m., 9 a. m.-4:45 p. m. Sun., only, 11:45 p. m.-12:30 a. m., 8-10:30 a. m., and 12:30-3 p. m.	
6120 kc. ☆YDA -B- 49.02 meters N.I.R.O.M. BANDOENG, JAVA 10:40 p. m.-1:40 a. m. 5:40-9:40 a. m.	
6100 kc. HJ1ABD -B- 49.18 meters CARTAGENA, COL. 11:30 a. m.-12:30 p. m.; 7-9 p. m.	
6100 kc. ★W3XAL -B- 49.18 meters NATIONAL BROADCASTING CO. BOUND BROOK, N. J. Relays WJZ Monday, Wednesday, Saturday, 5:30 p. m.-1 a. m.	
6100 kc. ☆W9XF -B- 49.18 meters DOWNERS GROVE, ILL. Relays WENR, Chicago Daily except Mon., Wed. & Sat., 2:30 p. m.-2 a. m.	
6095 kc. ★VE9GW -B- 49.22 meters BOWMANVILLE, ONTARIO, CANADA Sun. 1-9 p. m. Mon.-Wed., 3 p. m.-12 m. Thurs.-Sat., 7 a. m.-12 m.	
6090 kc. VE9BJ -B- 49.26 meters SAINT JOHN, N. B., CAN. 7-8:30 p. m.	
6085 kc. ★I2RO 49.3 meters E.I.A.R. Via Montello 5, ROME, ITALY Mon., Wed., Fri., 6-7:35 p. m.	
6080 kc. CP5 -B- 49.34 meters LAPAZ, BOLIVIA 7-10:30 p. m.	
6080 kc. W9XAA -B- 49.34 meters CHICAGO FEDERATION OF LABOR CHICAGO, ILL. Relays WCFL Sunday 11:30 a. m.-9 p. m. and Tues., Thurs., Sat., 4 p.m.-12 m.	

Station	Dial
6079 kc. DJM -X- 49.35 meters BROADCASTING HOUSE BERLIN, GERMANY Tests Irregularly	
6072 kc. OER2 -B- 49.41 meters VIENNA, AUSTRIA 9 a. m.-5 p. m. daily	
6070 kc. VE9CS -B- 49.42 meters VANCOUVER, B. C., CANADA Sun. 1:45-9 p. m., 10:30 p. m.-1 a. m.; Tues. 6-7:30 p. m., 11:30 p. m.-1:30 a. m. Daily 6-7:30 p. m.	
6060 kc. OXY -B- 49.50 meters SKAMLEBOAEK, DENMARK 1-6:30 p. m.; also 11 a. m.-12 m. Sunday	
6060 kc. ★W8XAL -B- 49.50 meters CROSLEY RADIO CORP. CINCINNATI, OHIO 7:30 a. m.-8 p. m.; 11 p. m.-1 a. m. Relays WLW	
6060 kc. VQ7LO -B- 49.50 meters NAIROBI, KENYA, AFRICA Mon., Wed., Fri., 5:45-6:15 a. m., 11 a. m.-2 p. m. Tues., 3-4 a. m., 11 a. m.-2 p. m., Thurs., 8-9 a. m., 11 a. m.-2 p. m., Sat., 11 a. m.-3 p. m. Sun., 10:50 a. m.-2 p. m.	
6060 kc. W3XAU -B- 49.50 meters NEWTOWN SQUARE, PA. Relays WCAU, Philadelphia 8 p. m.-11 p. m.	
6050 kc. ☆GSA -B- 49.59 meters BRITISH BROADCAST. CORP. DAVENTRY, ENGLAND	
6040 kc. W1XAL -B- 49.67 meters BOSTON, MASS. Tues., Thurs., Sun., 7:30-9 p.m.	
6020 kc. ★DJC -B- 49.83 meters BROADCASTING HOUSE, BERLIN 12 N. 4:30 p. m., 5:30-10:45 p. m.	
6012 kc. ZHI -B- 49.9 meters RADIO SERVICE CO., 20 ORCHARD RD., SINGAPORE, MALAYA Mon., Wed., Thurs., 5:40-8:10 a. m.; Sat., 12:10-1:10 a. m., 10:40 p. m.-1:10 a. m. (Sunday)	
6010 kc. ☆COC -B- 49.92 meters P. O. BOX 98 HAVANA, CUBA Daily 9:30-11 a.m., 4-6 p.m. Sat. also at 11:30 p. m.	

Station	Dial
6005 kc. ★VE9DN 49.96 meters MONTREAL, CAN. Saturday 11:30 p.m.-12:30 a.m.	
6000 kc. RW59 -B- 50 meters MOSCOW, U. S. S. R. Daily 3-6 p. m.; Sat. 10-11 p. m.; Sun. 5:15-8 a. m.; 10-11 a. m.	
5980 kc. HIX -B- 50.17 meters SANTO DOMINGO DOMINICAN REPUBLIC Tues., and Fri., 8-10 p. m.; Sun., 7:45-10:40 a. m., 3-5 p. m.; Sat., 10:40-11:40 p. m.	
5970 kc. HJ2ABC -B- 50.27 meters CUCATA, COL. 11 a. m.-12 n.; 6-9 p. m.	
5968 kc. HVJ -B- 50.27 meters VATICAN CITY (ROME) 2-2:15 p. m., daily; Sun., 5-5:30 a. m.	
5965 kc. ★XEBT -B- 50.29 meters MEXICO CITY, MEX. P. O. Box 79-44 7 p. m.-1 a. m.	
5940 kc. TGX -B- 50.5 meters SR. M. NOVALES, GUATEMALA CITY, GUAT. Daily except Sun, 8-10 a.m., 1-2:30 p.m., 8 p.m.-12 m.	
5930 kc. HJ4ABE -B- 50.6 meters MEDELLIN, COLOMBIA Mon., 7-11 p. m.; Tues., Thurs., Sat., 6:30-8:00 p. m.; Wed. and Fri., 7:30-11:00 p. m.	
5850 kc. ★YV5RMO -B- 51.28 meters MARACAIBO, VENEZUELA 5:15-9 p. m.	
5792 kc. OAX4D -B- 51.8 meters RADIO DUSA LIMA, PERU Wed. and Sat. 9-11:30 p. m.	
5660 kc. HJ5ABC -B- 53 meters CALI, COLOMBIA 11 a. m.-12 N. Tues. and Thurs. 8-10 p. m. Sun. 12 N.-1 p. m.	
4273 kc. RW15 -B- 70.20 meters KHABAROVSK, SIBERIA U. S. S. R. Daily, 3-9 a. m.	
4107 kc. HCJB -B- 73 meters QUITO, ECUADOR 7:14-10:15 p. m., except Monday	

"R" Audibility System

Use the "Q, R, & T" systems together to give the clearest reports on signals. Thus: "Ur R7 but QSA3 & T2."

R1—Faint signals; just readable.

R2—Weak signals; barely readable.

R3—Weak signals; but can be copied.

R4—Fair signals; easily readable.

R5—Moderately strong signals.

R6—Good signals.

R7—Good strong signals, that come thru QRM & QRN.

R8—Very strong signals; heard several feet from the fones.

R9—Extremely strong sigs.

Amateur Abbreviations

The following tables are in constant use by the transmitting amateurs. The "Q" table is strictly a readability system and should not be used to indicate signal strength. The "R" system is for this purpose and should not be governed by the readability of a signal. In other words a signal could be QSA5—very good signals; perfectly readable, but still weak. This would be a QSA5 R3 signal.

The "T" system is used mostly in foreign countries but is a very accurate method of reporting tone quality and should be used more extensively. The other abbreviations are used during direct conversation and it will be noticed that with a few exceptions most of the vowels are eliminated from the words.

"Q" Readability System

QSA1—Hardly perceptible; unreadable.

QSA2—Weak; readable only now and then.

QSA3—Fairly good; readable with difficulty.

QSA4—Good readable signals.

QSA5—Very good signals; perfectly readable.

"T" Tone System

T1—("Ur tone 1, R6") Poor 25 or 60 cycle AC tone.

T2—Rough 60 cycles AC tone.

T3—Poor RAC tone. Sounds like no filter.

T4—Fair RAC, small filter.

T5—Nearly DC tone, good filter, but has key thumps, or back wave, etc.

T6—Nearly DC tone. Very good filter; keying OK.

T7—Pure DC tone, but has key thumps, back wave, etc.

T8—Pure DC, not equal to T9.

T9—Best steady, pure, crystal controlled DC tone.

Television Stations

Television transmission at the present time is highly experimental in nature, and for this reason it is difficult to give operating hours, scanning speeds, lines per second, etc., with any degree of accuracy.

2000-2100 kc. 142.9-150 m.

Dial:

W9XAK—Kansas State College
Manhattan, Kans.
125 watts

W2XR —Radio Pictures, Inc.
Long Island City, N. Y.
1000 watts.

W9XAO—Western Television Corp.
Chicago, Ill.
500 watts.

W9XK —Iowa State University
Iowa City, Iowa
100 watts.

W8XAN—Sparks-Withington Co.
Jackson, Mich.
100 watts

W6XAH—Pioneer Mercantile Co.
Bakersfield, Cal.
1000 watts.

2750-2850 kc. 105.3-109.1 m.

Dial:

W9XAL—First National Television Corp.
Kansas City, Mo.
500 watts

W9XG —Purdue University
W. Lafayette, Ind.
1500 watts.

W2XAB —Atlantic Broadcasting Corp.
New York, N. Y.
500 watts. (not oper.)

Police Radio Alarm Stations

CGZ	Vancouver, B. C.	2452 kc.
CJW	St. Johns, N. B.	2416 kc.
CJZ	Verdeen, Que.	2452 kc.
KGHG	Las Vegas, Nev.	2474 kc.
KGHK	Palo Alto, Cal.	1674 kc.
KGHM	Reno, Nev.	2474 kc.
KGHO	Des Moines, Iowa	1682 kc.
KGHX	Santa Ana, Cal.	2430 kc.
KGHY	Whittier, Cal.	1712 kc.
KGHZ	Little Rock, Ark.	2406 kc.
KGJX	Pasadena, Cal.	1712 kc.
KGLX	Albuquerque, N. M.	2414 kc.
KGOZ	Cedar Rapids, Iowa	2466 kc.
KGPA	Seattle, Wash.	2414 kc.
KGPC	St. Louis, Mo.	1706 kc.
KGPD	San Francisco, Cal.	1674 kc.
KGPE	Kansas City, Mo.	2422 kc.
KGPG	Vallejo, Cal.	2422 kc.
KGPH	Oklahoma City, Okla.	2450 kc.
KGPI	Omaha, Neb.	2466 kc.
KGPJ	Beaumont, Tex.	1712 kc.
KGPK	Sioux City, Iowa	2466 kc.
KGPL	Los Angeles, Cal.	1712 kc.
KGPM	San Jose, Cal.	1674 kc.
KGPN	Davenport, Iowa	2466 kc.
KGPO	Tulsa, Okla.	2450 kc.
KGPP	Portland, Ore.	2442 kc.
KGPQ	Honolulu, T. H.	2450 kc.
KGPR	Minneapolis, Minn.	2430 kc.
KGPS	Bakersfield, Cal.	2414 kc.
KGPW	Salt Lake City, Utah	2406 kc.
KGPX	Denver, Colo.	2442 kc.
KGPY	Baton Rouge, La.	1574 kc.
KGPZ	Wichita, Kans.	2450 kc.
KGZA	Fresno, Calif.	2414 kc.
KGZB	Houston, Tex.	1712 kc.
KGZC	Topeka, Kans.	2422 kc.
KGZD	San Diego, Cal.	2490 kc.
KGZE	San Antonio, Tex.	2482 kc.
KGZF	Chanute, Kans.	2450 kc.
KGZG	Des Moines, Iowa	2466 kc.
KGZH	Klamath Falls, Ore.	2382 kc.
KGZI	Wichita Falls, Tex.	2458 kc.
KGZJ	Phoenix, Ariz.	2430 kc.
KGZL	Shreveport, La.	1712 kc.
KGZM	El Paso, Tex.	2414 kc.
KGZN	Tacoma, Wash.	2414 kc.
KGZO	Santa Barbara, Cal.	2414 kc.
KGZP	Coffeyville, Kans.	2450 kc.
KGZQ	Waco, Tex.	1712 kc.
KGZR	Salem, Ore.	2442 kc.
KGZS	McAlester, Okla.	2458 kc.
KGZT	Santa Cruz, Cal.	1674 kc.
KGZU	Lincoln, Neb.	2490 kc.
KGZW	Lubbock, Tex.	2458 kc.
KGZX	Albuquerque, N. Mex.	2414 kc.
KGZY	San Bernardino, Cal.	1712 kc.
KMFE	Duluth, Minn.	2382 kc.
KSW	Berkeley, Cal.	1658 kc.
KVP	Dallas, Tex.	1712 kc.
VYR	Montreal, Can.	1712 kc.
VYW	Winnipeg, Man.	2452 kc.
WCK	Belle Island, Mich.	2414 kc.
WEY	Boston, Mass.	1558 kc.
WKDT	Detroit, Mich.	1558 kc.
WKDU	Cincinnati, Ohio	1706 kc.
WMDZ	Indianapolis, Ind.	2442 kc.
WMFP	Niagara Falls, N. Y.	2422 kc.
WMJ	Buffalo, N. Y.	2422 kc.
WMO	Highland Park, Mich.	2414 kc.
WMP	Framingham, Mass.	1666 kc.
WPDA	Tulare, Cal.	2414 kc.
WPDB	Chicago, Ill.	1712 kc.
WPDC	Chicago, Ill.	1712 kc.
WPDD	Chicago, Ill.	1712 kc.
WPDE	Louisville, Ky.	2442 kc.
WPDF	Flint, Mich.	2466 kc.
WPDG	Youngstown, Ohio	2458 kc.
WPDH	Richmond, Ind.	2442 kc.
WPDI	Columbus, Ohio	2430 kc.
WPDK	Milwaukee, Wis.	2450 kc.
WPDL	Lansing, Mich.	2442 kc.
WPDM	Dayton, Ohio	2430 kc.
WPDN	Auburn, N. Y.	2382 kc.
WPDO	Akron, Ohio	2458 kc.
WPDP	Philadelphia, Pa	2474 kc.
WPDR	Rochester, N. Y.	2382 kc.
WPDS	St. Paul, Minn.	2430 kc.
WPDT	Kokomo, Ind.	2490 kc.
WPDU	Pittsburgh, Pa.	1712 kc.
WPDV	Charlotte, N. C.	2458 kc.
WPDW	Washington, D. C.	2422 kc.
WPDX	Detroit, Mich.	2414 kc.
WPDY	Atlanta, Ga.	2414 kc.
WPDZ	Fort Wayne, Ind.	2490 kc.
WPEA	Syracuse, N. Y.	2382 kc.
WPEB	Grand Rapids, Mich.	2442 kc.
WPEC	Memphis, Tenn.	2466 kc.
WPED	Arlington, Mass.	1712 kc.
WPEE	New York, N. Y.	2450 kc.
WPEF	New York, N. Y.	2450 kc.
WPEG	New York, N. Y.	2450 kc.
WPEH	Somerville, Mass.	1712 kc.
WPEI	E. Providence, R. I.	1712 kc.
WPEK	New Orleans, La.	2430 kc.
WPEL	W. Bridgewater, Mass.	1666 kc.
WPEM	Woonsocket, R. I.	2466 kc.
WPEP	Arlington, Mass.	1712 kc.
WPES	Saginaw, Mich.	2442 kc.
WPET	Lexington, Ky.	1706 kc.
WPEW	Northampton, Mass.	1666 kc.
WPFA	Newton, Mass.	1712 kc.
WPFC	Muskegon, Mich.	2442 kc.
WPFE	Reading, Pa.	2442 kc.
WPFG	Jacksonville, Fla.	2442 kc.
WPFH	Baltimore, Md.	2414 kc.
WPFI	Columbus, Ga.	2414 kc.
WPFJ	Hammond, Ind.	1712 kc.
WPFK	Hackensack, N. J.	2430 kc.
WPFL	Gary, Ind.	2470 kc.
WPFM	Birmingham, Ala.	2382 kc.
WPFN	Fairhaven, Mass.	1712 kc.
WPFO	Knoxville, Tenn.	2474 kc.
WPFP	Clarksburg, W. Va.	2490 kc.
WPFQ	Swathmore, Pa.	2474 kc.
WPFR	Johnson City, Tenn.	2470 kc.
WPFS	Asheville, N. C.	2474 kc.
WPFU	Portland, Me.	2422 kc.
WPFV	Pawtucket, R. I.	2466 kc.
WPFX	Palm Beach, Fla.	2442 kc.
WPFZ	Miami, Fla.	2442 kc.
WPGA	Bay City, Mich.	2466 kc.
WPGB	Port Huron, Mich.	2466 kc.
WPGC	S. Schenectady, N. Y.	1658 kc.
WPGD	Rockford, Ill.	2458 kc.
WPGF	Providence, R. I.	1712 kc.
WPGG	Findlay, Ohio	1596 kc.
WPGH	Albany, N. Y.	2414 kc.
WPGI	Portsmouth, Ohio	2430 kc.
WPGJ	Utica, N. Y.	2414 kc.
WPGK	Cranston, R. I.	2466 kc.
WPGL	Binghamton, N. Y.	2442 kc.
WPGN	South Bend, Ind.	2490 kc.
WPGO	Huntington, N. Y.	2490 kc.
WPGQ	Columbus, Ohio	1596 kc.
WPGS	Mineola, N. Y.	2490 kc.
WPGT	New Castle, Pa.	2470 kc.
WPGU	Boston, Mass.	1712 kc.
WPGW	Mobile, Ala.	2382 kc.
WPGX	Worcester, Mass.	2466 kc.
WPHC	Massilon, Ohio	1596 kc.
WPHD	Steubenville, Ohio	2458 kc.
WPHF	Richmond, Va.	2450 kc.
WPHJ	Charleston, W. Va.	2490 kc.
WPHK	Wilmington, Ohio	1596 kc.
WRBH	Cleveland, Ohio	2458 kc.
WRDQ	Toledo, Ohio	2474 kc.
WRDR	Grosse Pt. Village, Mich.	2414 kc.
WRDS	E. Lansing, Mich.	1666 kc.

AIR LINE DISTANCES OVER THE SURFACE OF THE EARTH

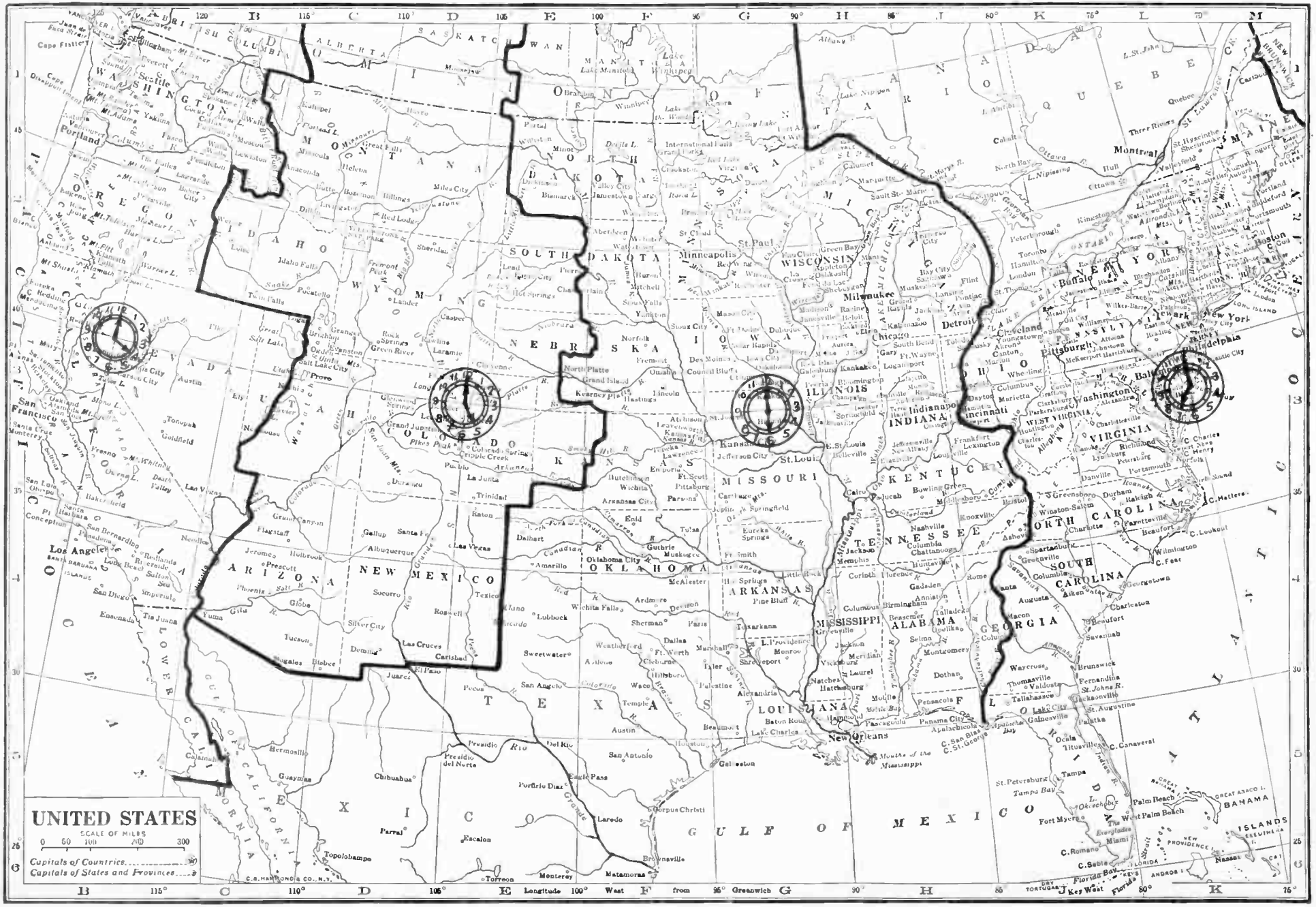
Everyone who has studied geography is familiar with the map called "Mercator's Projection," which for more than three centuries has been the basis for all world maps. Since the earth is round and a map is flat, all ordinary maps give a very distorted idea as to the actual geographical relationship existing between distant countries, and as a distance and direction guide for the short wave fan they are altogether useless. If you want to know the real airline distances between important places, use a string and measure them on the face of a globe, or refer to the more convenient chart below. This is easily consulted and saves the radio fan the trouble of figuring the distance according to the somewhat cramped scale on the globe.

Space limitations make it impractical to include many small cities. However, the places shown are scattered in such a manner that approximate distances to nearby places may readily be calculated.

	NORTH AMERICA				SOUTH AMERICA	AFRICA	EUROPE			EUROPE-ASIA	ASIA		OCEANA
FROM ↗ TO ↙	Montreal, Que. New York, N. Y.	Pittsburgh, Pa. Chicago, Ill.	Winnipeg, Man. Denver, Colo.	Los Angeles, Cal. San Francisco, Cal.	Rio de Janeiro, Brazil Buenos Aires, Argentina	Cairo, Egypt Cape Town, U. of S. A.	Madrid, Spain London, England	Paris, France Rome, Italy	Vienna, Austria Stockholm, Sweden	Leningrad, U.S.S.R. Moscow, U.S.S.R.	Calcutta, India Bandoeng, Java	Manila, P. I. Tokyo, Japan	Melbourne, Victoria Sydney, New So. Wales
Montreal, Que. New York, N. Y.	314	429 671 313 711	1000 1528 1271 1628	2278 2298 2446 2568	5117 5742 4766 5352	5469 7891 5586 7695	3398 3164 3477 3320	3477 4062 3555 4180	3984 3555 4141 3789	3906 4219 4102 4453	7578 9766 7773 10039	8144 6434 8580 7717	10440 10031 10522 10111
WORLD	Pittsburgh, Pa. Chicago, Ill.	411	1128 1320 670 918	2135 2264 1741 1855	4922 5430 5312 5703	5820 7969 6172 8477	3789 3633 4141 3906	3867 4492 4141 4805	4414 3789 4687 4180	4414 4727 4492 4814	7930 10273 8047 10117	8320 6484 8008 6133	10039 9687 9648 9219
	DISTANCES	Winnipeg, Man. Denver, Colo.	800	1486 1402 828 946	3937 6328 5781 5898	6094 8984 6836 9180	4258 3867 4922 4648	4141 4805 4844 5508	4648 3984 5394 4766	4258 4570 5000 5352	7344 9023 7891 9453	7305 4219 5742 5742	9713 8904 8834 8398
 1523	Tampico, Mexico Balboa, Canal Zone	ARE	Los Angeles, Cal. San Francisco, Cal.	345	6250 6133 6475 6328	7578 8922 7500 10078	5742 5508 5703 5273	5769 6475 5664 6314	6094 5352 6055 5273	5706 6156 5504 5928	7930 8828 7695 8633	7345 5504 7041 5182	7930 7500 7891 7461
2266 3711 2148 3398	 703	Victoria, B. C. Saskatoon, Sask.	GIVEN	Rio de Janeiro, Brazil Buenos Aires, Argentina	1250	6172 3750 7344 4219	5039 5703 6250 6875	5703 5742 6836 6953	6055 6680 7266 7852	7109 7148 8281 8281	9414 9727 10234 9453	11250 11446 11326 11655	8279 8435 7285 7441
1953 3203 1914 2539	859 156 2187 1145	 1563	Regina, Sask. Ottawa, Ont.	ABOVE	Cairo, Egypt Cape Town, U. of S. A.	1492	2148 2227 5273 5977	1992 1367 5742 5234	1484 2227 5547 6184	2109 1836 6523 6211	3477 5547 6055 5859	5508 5781 7461 9062	8398 8760 6289 6719
2344 2734 2422 2773	2305 1562 2656 1875	1445 430 1797 586	 117	Quebec, Que. Moncton, N. B.	THIS	Madrid, Spain London, England	742	625 859 273 898	1055 1641 820 977	1953 2031 1328 1484	5273 7578 4922 7305	7031 6184 6562 5781	10781 10859 10547 10508
3711 5117 1992 1094	2695 3477 3750 2969	3516 4766 2969 1914	1922 5312 1953 1953	 3703	Honolulu, Hawaii San Juan, Porto Rico	LINE;	Paris, France Rome, Italy	690	586 1016 352 1289	1367 1445 1484 1367	4805 7187 1414 6719	6602 5898 6250 5977	10360 10602 9945 10091
2070 3594 1953 3437	273 898 352 586	816 810 570 715	2422 2734 2109 2422	2539 3672 2852 3398	 352	Portland, Ore. Spokane, Wash.	DISTANCES	Vienna, Austria Stockholm, Sweden	781	1094 1016 352 664	4219 6562 4141 6562	5976 5625 5789 5021	9609 9766 9570 9570
1406 2930 820 898	820 859 1641 1328	781 1888 1250 1397	1953 2305 1602 1875	3008 3281 3711 3437	664 547 1523 1328	 862	Salt Lake City, Utah Oklahoma City, Okla.	BETWEEN	Leningrad, U. S. S. R. Moscow, U. S. S. R.	344	3711 6172 3516 5937	4570 4531 4570 4570	9141 9180 8945 9023
625 1797 1094 2383	1797 1523 1523 1094	1328 2656 820 1055	1641 1914 1289 1602	3789 2070 3867 2187	1680 1484 1484 1211	977 188 922 293	 460	Ft. Worth, Tex. Kansas City, Kans.	NORTH	Calcutta, India Bandoeng, Java	2422	2070 3125 1758 3633	5469 5547 3086 3203
1250 2422 1562 2656	1523 1016 1406 781	664 1094 547 859	1094 1484 1055 1523	3906 2227 3789 2422	1328 1094 1367 1094	952 469 988 692	640 180 870 413	 235	Des Moines, Iowa Minneapolis, Minn.	AMERICAN	Manila, P. I. Tokyo, Japan	1875	1445 1406 5156 4922
1172 2227 1094 1992	1758 1211 1914 1406	1016 898 1211 937	1289 1445 1172 1445	4023 2031 4258 1758	1680 1406 1797 1562	1158 456 1390 602	568 238 643 472	270 464 523 695	 253	St. Louis, Mo. Nashville, Tenn.	RADIO	Melbourne, Victoria Sydney, New S. Wales	430
1328 2187 1055 1758	1914 1367 2227 1719	1172 664 1523 937	898 1172 1172 1367	4297 1836 4414 1484	1875 1602 2148 1914	1450 755 1580 753	839 541 750 675	509 603 738 905	308 239 467 218	 368	Cincinnati, Ohio Atlanta, Ga.	CENTERS	
1797 2461 1562 2070	2070 1406 2305 1680	1211 156 1484 469	430 742 625 820	4648 1875 4805 1523	2070 1707 2305 2031	1701 1117 1845 1150	1221 862 1240 943	762 733 895 936	662 626 710 567	392 695 403 542	 290	Buffalo, N. Y. Washington, D. C.	BELOW
1719 2148 1914 2461	2383 1724 2397 1678	1770 386 1979 301	586 703 273 430	4883 1484 5041 1680	2422 2148 2500 2148	1923 1256 2099 1490	1324 1037 1574 1250	972 985 1159 1125	808 683 1036 941	501 663 737 933	278 122 398 392	 268	Philadelphia, Pa. Boston, Mass.
Tampico, Mexico Balboa, Canal Zone	Victoria, B. C. Saskatoon, Sask.	Regina, Sask. Ottawa, Ont.	Quebec, Que. Moncton, N. B.	Honolulu, Hawaii San Juan, Porto Rico	Portland, Ore. Spokane, Wash.	Salt Lake City, Utah Oklahoma, Okla.	Ft. Worth, Texas Kansas City, Kans	Des Moines, Iowa Minneapolis, Minn.	St. Louis, Mo. Nashville, Tenn.	Cincinnati, Ohio Atlanta, Ga.	Buffalo, N. Y. Washington, D. C.	Philadelphia, Pa. Boston, Mass.	FROM ↖ TO ↙
MEXICO, ETC.	CANADA			UNITED STATES				UNITED STATES					

STANDARD TIME ZONES OF THE UNITED STATES

And adjacent parts of Canada and Mexico



Grand Short-Wave Station List

● *This Grand List of Short-Wave Stations of the World is a carefully edited one, and especially compiled by the editors. Only those short-wave stations which the average listener is likely to hear have been included in this list. A special "Quick Reference" list appears elsewhere in the magazine, giving the "Star" short-wave broadcasting stations, while another specially edited list contains the "Television" and "Police" station call letters.*

The editors will be glad at all times to receive corrections from our readers, and particularly any additional information on new stations not found in this list. In giving this information, please write such data on a separate sheet if the letter contains references to any other subject, so that these corrections can be handed directly to the editor of this department. A post-card will frequently serve the purpose for sending us such information.

Short Wave Broadcasting Stations By Order of Frequency in Megacycles

Megacycles	Meters	Station
3.040	98.62	CFQ, Edmonton, Alta. (B-Z) (Edmonton Journal, Ltd.)
		CGE, Calgary, Alta. (B-34)
		CKS, Calgary, Alta. (B-34) (Portable)
3.070	97.66	CJU, Winnipeg, Man. (G-45)
3.093	96.94	KGM, Ketchikan, Alaska (Alaska Pacific Salmon Co.) (KIAX-KIAY)
		KICI, View Cove, Dall Island, Alaska
		....., Uganik Bay, Alaska (San Juan Fishing & Packing Co.)
		....., Willow Creek Mines, Alaska (W. E. Dunkle)
3.152	95.12	CGM, Montreal, P. Q.
		CGY, Yamachiche, P. Q.
3.190	93.99	KIGP, Egushik, Alaska (Libby McNeill & Libby)
		KIIK, Circle, Alaska
		KIIL, Fort Yukon, Alaska
		KIIM, Hot Springs, Alaska
		KIIN, Eagle, Alaska
		KIIO, McGrath, Alaska
		....., Peril Straits, Alaska (Peril Straits Packing Co.)
3.265	91.83	KIIT, St. Michael, Alaska (Territorial Govt. of Alaska)
		....., Kadiak Island, Alaska (Kadiak Fisheries Co.)
		....., Port Conclusion, Alaska (Northwestern Herring Co.)
		....., Shearwater Bay, Alaska (Kadiak Fisheries Co.)
		....., Washington Bay, Kuiu Island, Alaska (Sorrfold & Grondahl Packing Co.)
3.268	91.74	CGP, Prince Rupert, B. C.
3.340	89.77	CGD, Drummondville, P. Q.
		CGM, Montreal, P. Q.
3.385	88.57	KIIU, Marshall, Alaska (Territorial Govt. of Alaska)
3.387	88.50	KGYA, Longmire, Wash.
		KGYB, Longmire, Wash.
		KGYC, Paradise, Wash.
		KGYD, Sunrise, Wash.
		KGYE, White River, Wash.
		KGYF, Carbon, Wash.
		KGYG,-H,-I, Portables
3.410	87.92	WRJ, Poe Reef Lighthouse, Mich.
		WST, Dry Tortugas Lighthouse, Fla.
		WWAJ, Manitou Island Lighthouse, Mich.
		WWAL, Passage Island Lighthouse, Mich.
		WWAM, Rock of Ages Lighthouse, Mich.
		WWAO, Huron Island Lighthouse, Mich.
		WWE, Fourteen Foot Shoals, Mich.
		WWG, Cheboygan Range, Mich. (Lighthouse)
		WWH, Stannard Rock Lighthouse, Mich.
		WWM, Marquette Lighthouse, Mich.
		WWN, Detroit River Lighthouse, Mich.
		WWR, Detroit, Mich. (Lighthouse)
		WWZ, Key West, Fla. (Lighthouse) (These lighthouses are operated by the United States Department of Commerce Bureau of Lighthouses.)
3.423	87.59	WOZ, New York, N. Y. (American Telephone & Telegraph Co.)
3.452	86.85	CJU, Winnipeg, Man.
3.490	85.96	PKIWK, Bandoeng, Java
3.500 to 4.000	74.96 to 85.66	Amateur band Phone band from 3.900 to 4.000 megs.
3.543	84.67	CR7AA, Lourenco Marques, Mozambique, E. Africa
3.600	83.5	CT2AJ, Ponta Delgada, Sao Miguel, Azores
3.750	79.95	CT1CT, Lisbon, Portugal
4.098	73.16	WND, Hialeah, Fla.
4.107	73.00	HCJB, Quito, Ecuador
4.124	72.70	KIFM, Fairbanks, Alaska (Pacific Alaskan Airways, Inc.)
4.253	70.50	WKF, Lawrenceville, N. J.
		WOG, Ocean Gate, N. J.
4.273	70.65	RV15, Khabarovsk, USSR
		WOO, Ocean Gate, N. J.
		WOY, Lawrenceville, N. J.
4.276	70.11	WIR, Rocky Point, N. Y.
4.283	70.00	HC2JSB, Guayaquil, Ecuador, S. A.
4.307	69.60	WTDV, Virgin Island
		WTDW, Virgin Island
4.320	69.40	DAF, Norden, Germany
		G6RX, Rugby, England
		GDB, Rugby, England
4.348	68.96	CGA9, Drummondville, P. Q.
4.465	67.14	CFA2, Drummondville, P. Q.
4.467	67.11	YID, Bagdad, Iraq
4.505	66.55	CGO, Ocean Falls, B. C.
		CZO, Prince George, B. C.
		CZP, Claydon Bay, B. C.
4.513	66.43	ZFS, Nassau, Bahamas
4.550	65.89	WDN, (W2XBJ) Rocky Point, N. Y.
4.713	63.62	EDP, Palma de Mallorco, Balearic Islands
4.753	63.08	WOO, Ocean Gate, N. J.
		WOY, Lawrenceville, N. J.
4.755	63.05	CFU, Rossland, B. C. (Consolidated Mining & Smelting Co. of Canada, Ltd.)
4.785	66.66	CZA, Drummondville, P. Q.
4.835	62.00	GDW, Rugby, England
4.865	61.63	CGT, Campbell River, B. C.
4.972	60.30	G6RX, Rugby, England
4.975	60.27	GBC, Rugby, England
5.045	59.42	ZFA, Hamilton, Bermuda
5.143	58.30	PMY, Bandoeng, Java
5.263	56.96	WQN, Rocky Point, N. Y.
5.344	56.10	EDP, Palma de Mallorco, Balearic Isl.
5.405	55.47	CGP, Prince Rupert, B. C.
		CZQ, Anyox, B. C.
5.505	54.46	WQN, Rocky Point, N. Y.
5.660	53.00	CFD, Kenora, Ont. (Ont. Dept. of Lands and Forests)
		CFJ, Red Lake, Ont. (Ont. Dept. of Lands and Forests)
		CFU, Rossland, B. C. (Consolidated Mining & Smelting Co. of Canada, Ltd.)
		KBTY, Butte, Mont.
5.660	53.00	KJ5ABC, Cali, Colombia
5.678	52.80	VK3LR, Melbourne, Australia
5.694	52.65	HCK, Quito, Ecuador
5.714	52.5	HCK, Quito, Ecuador, S. A.
5.765	52.01	KZGF, Manila, P. I. (Philippine Long Distance Telephone Co.)
5.766	52.00	XAM, Merida, Yucatan, Mexico
5.780	51.87	CMB, Havana, Cuba
5.792	51.80	OAX4D, Lima, Peru
5.795	51.74	KZGH, Iloilo, P. I. (Philippine Long Distance Telephone Co.)
5.825	51.47	HJA2, Bogota, Colombia, S. A.
		KZGG, Cebu, P. I. (Philippine Long Distance Telephone Co.)
		WQN, Rocky Point, N. Y.
5.845	51.30	KRO, Kahuku, Hawaii
5.850	51.28	YV5RMO, Maracaibo, Venezuela
5.853	51.25	WOB, Lawrenceville, N. J.
5.930	50.60	HJ4ABE, Medellin, Colombia
5.940	50.5	TGX, Guatemala City, Guat
5.965	50.29	XEBT, Mexico City, Mex.
5.968	50.27	HVJ, Vatican City, Rome, Italy
5.970	50.27	HJ2ABC, Cucuta, Col. S. A.
5.980	50.17	HIX, Santo Domingo, Dominican Rep.
6.000	50.	RW59, Moscow, USSR.
6.005	49.96	VE9DN, Montreal, Can.
6.010	49.92	COC, Havana, Cuba
6.012	49.9	ZHI, Radio Service Co., Singapore, Malaya
6.020	49.83	DJC, Broadcasting House, Berlin, Ger.
6.030	49.75	HP5B, P. O. Box 910, Panama City, Pan.
6.040	49.67	YDB, Socrabaia, Java
6.040	49.67	W1XAL, Boston, Mass.
6.050	49.59	GSA, British Broadcast. Corp., Daventry, Eng.
6.060	49.50	W3XAU, Newtown Square, Pa.
		VQ7LO, Nairobi, Kenya, Africa
		W8XAL, Crosley Radio Corp., Cincinnati, Ohio
		OXY, Skamleboaek, Denmark
6.070	49.42	VE9CS, Vancouver, B. C., Can.
6.072	49.41	OER2, Vienna, Austria
6.079	49.35	DJM, Broadcasting House, Berlin, Ger.
6.080	49.34	W9XAA, Chicago Fed. of Labor, Chicago, Ill.
6.080	49.34	CP5, Lapaz, Bolivia, S. A.
6.085	49.3	2RO, E. I. A. R., Rome, Italy
6.090	49.26	VE9BJ, St. John, N. B., Can.
6.095	49.22	VE9GW, Bowmanville, Ont., Can.
6.100	49.18	W9XF, Downers Grove, Ill.
		W3XAL, National Broadcasting Co., Bound Brook, N. J.
		HJ1ABD, Cartagena, Col., S. A.
6.110	49.10	VUC, Calcutta, India
6.110	49.10	VE9HX, Halifax, Nova Scotia
6.112	49.08	YV2RC, Caracas, Venezuela
6.115	49.05	HJ1ABE, Cartagena, Col., S. A.
6.120	49.02	W2XE, Atlantic Broadcasting Corp., Wayne, N. J.
		YDA, Bandoeng, Java
		JB, Johannesburg, So. Africa
6.122	49.	ZGE, Kuala Lumpur, Fed Malay States
6.130	48.92	W8XK, Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.
6.140	48.86	CJRO, Winnipeg, Man., Can.
6.150	48.78	YV3RC, Caracas, Venezuela
6.160	48.7	HJ2ABA, Tunja, Colombia, S. A
6.175	48.58	HI1A, Santiago, Dominican Rep.
6.272	47.84	HIZ, Santo Domingo, Dominican Rep.
6.316	47.5	YV4RC, Caracas, Venezuela
6.375	47.06	W3XL, National Broadcasting Co., Bound Brook, N. J.
6.425	46.70	HJ1ABB, Barranquilla, Col., S. A.
6.447	46.53	HJ5ABD, Manizales, Col., S. A
6.490	46.22	HI4D, Santo Domingo, Dominican Rep.
6.500	46.15	RW72, Moscow, USSR.
6.611	45.38	WMEP, Suffield, Ohio
6.615	45.32	WMEU, St. Petersburgh, Fla.
		WMEV, Opa Locka, Fla. (Goodyear Zeppelin Base)
6.618	45.31	WVD, Seattle, Wash. Phones Alaska

Mega-cycles	Meters	Station
6.620	45.30	PRADO, Riobamba, Ecuador, S.A.
6.650	45.1	IAC, Piza, Italy
6.660	45.05	TIEP, San Jose, Costa Rica
6.666	45.00	HC2RL, Guayaquil, Ecuador, S.A.
6.662	45.00	WXH, Ketchikan, Alaska
6.670	44.95	KNRA, "Seth Parker"
6.672	44.94	YVQ, Maracay, Venezuela
6.675	44.91	DGK, Nauen, Germany
6.690	44.82	CGA6, Drummondville, P. Q., Can.
6.710	44.68	YNCRG, Granada, Nicaragua (Radio Club of Granada)
6.718	44.62	WDB, Rocky Point, N. Y.
6.720	44.62	CFU, Rossland, B. C. (Consolidated Mining & Smelting Co. of Canada, Ltd.)
6.725	44.57	WQO, Rocky Point, N. Y.
6.733	44.53	KEQ, Kahuku, Hawaii
6.740	44.48	WEJ, Rocky Point, N. Y.
6.750	44.44	JVT, Nazaki, Japan
6.755	44.38	WOA, Lawrenceville, N. J.
6.760	44.35	CJA6, Drummondville, P. Q., Can.
6.790	44.16	CMB, Havana, Cuba
6.800	44.12	HIH, San Pedro de Macoris, Dominican Rep.
6.813	44.00	DEL, Nauen, Germany
6.860	43.71	KEL, Bolinas, Calif.
6.880	43.58	CGA7, Drummondville, P. Q., Can.
6.900	43.45	GDS, Rugby, England
		IMA, Rome, Italy
6.928	43.27	WEZ, Rocky Point, N. Y.
6.935	43.23	WEB, Rocky Point, N. Y.
6.950	43.13	WKP, Rocky Point, N. Y.
6.958	43.09	WEO, Rocky Point, N. Y.
6.966	43.04	EDO, Madrid, Spain
		EDQ, Madrid, Spain
7.000 to 7.300	41.07 to 42.83	Amateur Band. Foreign amateurs use phone in this band; U. S. A. and Canada, code only.
7.140	42.02	HJ4ABB, Manizales, Col., S. A.
7.175	41.78	CR6AA, Lobito, Portuguese West Africa
7.205	41.61	EA8AB, Santa Cruz de Tenerife, Canary Isds.
7.220	43.86	HAT, Budapest, Hungary
7.220	41.55	HKE, Bogota, Col., S. A.
7.370	40.67	KEB, Bolinas, California
		WJN, Rocky Point, N. Y.
7.384	40.60	ZLT, Wellington, N. Z.
7.400	40.51	WEM, Rocky Point, N. Y.
7.400	40.54	HJ3ABD, Bogota, Colombia, S.A.
7.415	40.43	WEG, Rocky Point, N. Y.
7.465	40.16	HJP, Bogota, Colombia, S. A.
7.520	39.87	KDK Kahuku, Hawaii
		KKH, Kahuku, Hawaii
		RKI, Moscow, USSR.
7.550	39.71	CFQ, Edmonton, Alta., The Edmonton Journal Ltd.
		CGE, Calgary, Alta.
		CKS, Calgary, Alta. Portable
7.565	39.63	KWY, (6XN), Dixon, Calif.
7.575	39.58	XGO, Shanghai, China
7.610	39.40	KWX, Dixon, Calif.
7.620	39.34	RIM, Irkutsk, USSR.
7.685	39.01	TIR, Cartago, Costa Rica
7.715	38.86	KEE, Bolinas, Calif.
7.770	38.59	FTF, Ste. Assise, France
7.797	38.47	HBP, Geneva, Switzerland, "Radio Nations"
7.830	38.29	PDV, Kootwijk, Holland
7.900	38.07	JYR, Kemikawa-Cho, Chiba-Ken, Japan
7.940	37.76	VK2ME, Sydney, Australia
7.960	37.67	CMB, Havana, Cuba
		XGL, Shanghai, China
7.980	37.57	HSJ, Bangkok, Siam
8.515	35.21	CZA, Drummondville, P. Q., Can.
8.560	35.03	WOO, Ocean Gate, N. J.
		WOY, Lawrenceville, N. J.
8.630	34.74	CMA, Havana, Cuba
8.646	34.56	GBC, Rugby, England
8.760	34.34	PNI, Macassar, Celebes
8.770	34.19	HSZ, Irkutsk, USSR.
8.820	33.99	KNRA, "Seth Parker"
8.940	33.92	KNRA, "Seth Parker"
8.930	33.57	WAD, Rocky Point, N. Y.
		WEC, Rocky Point, N. Y.
8.940	33.54	KZGG, Cebu, P. I. (Philippine Long Distance Telephone Co.)
		WKL, Rocky Point, N. Y.
8.950	33.50	WEL, Rocky Point, N. Y.
8.980	33.59	VWY, Kirkee, Poona, India
9.010	33.28	KEJ, Bolinas, Calif.
9.014	33.26	GCS, Rugby, England
9.104	32.93	LST, Buenos Aires, Argentina
9.120	32.88	CP5, La Paz, Bolivia, S. A.
9.168	32.70	YVR, Maracay, Venezuela
9.170	32.70	KZGF, Manila, P. I. (Philippine Long Distance Telephone Co.)
9.170	32.70	WNA, Lawrenceville, N. J.
9.273	32.33	GCB, Rugby, England
9.332	32.13	CGA4, Drummondville, P. Q., Can.
9.340	32.10	XDC, Mexico City, Mexico
9.375	31.97	XDA, Mexico City, Mexico
9.410	31.86	PLV, Bandoeng, Java
9.428	31.8	COH, Havana, Cuba
9.448	31.74	WES, Rocky Point, N. Y.
9.460	31.79	WKJ New Brunswick, N. J.
9.470	31.55	WET, Rocky Point, N. Y.
9.480	31.63	PLW, Bandoeng, Java
		WDA, Rocky Point, N. Y.
9.490	31.59	KZGH, Iloilo, P. I. (Philippine Long Distance Telephone Co.)
		WEF, Rocky Point, N. Y.
9.500	31.58	PRF5, Rio de Janeiro, Brazil, S. A.
9.510	31.55	VK3ME, Amalgamated Wireless, Ltd., Melbourne, Australia
9.510	31.55	GSB, British Broad. Corp., Daventry, England
9.530	31.48	W2XAF, General Electric Co., Schenectady, N. Y.
9.540	31.45	DJN, Broadcasting House, Berlin, Ger.
		LKJ1, Jeloy, Norway
9.560	31.38	DJA, Broadcasting House, Berlin, Ger.
9.565	31.36	VUB, Bombay, India
9.570	31.35	W1XAZ, Westinghouse Electric & Mfg. Co., Springfield, Mass.
9.580	31.32	VK3LR, 61 Little Collins St., Melbourne, Australia
		GSC, British Broad. Corp., Daventry, Eng.
9.590	31.28	W3XAU, Newtown Square, Pa.
		PCJ, N. V. Philips' Radio, Eindhoven, Holland
		VK2ME, Amalgamated Wireless Ltd., Sydney, Australia
9.595	31.27	HBL, League of Nations, Geneva, Switzerland
9.600	31.25	CT1AA, Lisbon, Portugal
9.609	31.20	DGU, Nauen, Germany
9.690	30.94	CMA, Havana, Cuba
9.702	30.90	GCA, Rugby, England
		LQA, Buenos Aires, Arg.
9.740	30.78	CMA, Havana, Cuba
9.750	30.75	VLJ, Sydney, Australia
		WOF, Lawrenceville, N. J.
9.772	30.68	EAM, Madrid, Spain
9.780	30.67	I2RO, Rome, Italy
9.798	30.60	GCW, Rugby, England
9.823	30.52	IRM, Rome, Italy
9.830	30.50	LSI, Buenos Aires, Argentina
9.840	30.47	FTI, Ste. Assise, France
9.862	30.40	EAQ, Madrid, Spain
		JYS, Tokio, Japan
9.870	30.38	WON, Lawrenceville, N. J.
9.890	30.32	LSA, Buenos Aires, Argentina
9.895	30.30	LSN, Buenos Aires, Argentina
9.928	30.20	HJY, Bogota, Colombia
9.942	30.15	GCU, Rugby, England
9.990	30.01	KAZ, Manila, P. I.
9.993	30.00	LSL, Buenos Aires, Argentina
10.014	29.84	SUV, Cairo, Egypt
10.020	29.92	CMA, Havana, Cuba
10.060	20.80	ZFB, Hamilton, Bermuda
10.135	29.58	OPM, Leopoldville, Belgian Congo
10.164	29.79	EHY, Madrid, Spain
10.212	29.35	PSH, Rio de Janeiro, Brazil
10.250	29.25	PMN, Bandoeng, Java
10.285	29.15	DIQ, Zeesen, Germany
10.290	29.14	HPC, Panama City, Panama
10.296	29.12	LSL, Buenos Aires, Argentina
10.330	29.02	ORK, Brussels, Belgium
10.335	29.01	ZFD, Hamilton, Bermuda
10.350	28.97	LSX, Buenos Aires, Argentina
10.370	28.91	WCG, Rocky Point, N. Y.
10.400	28.83	KEZ, Bolinas, Calif.
10.410	28.80	KES, Bolinas, Calif.
		PDK, Kootwijk, Holland
		YBG, Medan, Sumatra
10.435	28.73	EHZ, El Tablero, Tenerife, Canary Isl.
10.465	28.64	WKC, Rocky Point, N. Y.
10.520	28.50	CFA4, Drummondville, P. Q.
		VLR, Sydney, Australia
10.550	28.42	WOK, Lawrenceville, N. J.
10.610	28.25	WEA, Rocky Point, N. Y.
10.613	28.25	EDN, Madrid, Spain
		EDX, Madrid, Spain
10.630	28.20	WED, Rocky Point, N. Y.
10.670	28.10	CEC, Santiago, Chile
10.761	27.86	GBP, Rugby, England
10.840	27.66	KWV Dixon, Calif.
10.850	27.63	DFL, Nauen, Germany
10.890	27.53	CMA, Havana, Cuba
10.962	27.35	OC1, Lima, Peru
10.980	27.30	ZLT, Wellington, New Zealand
11.111	26.98	XFD, Mexico City, Mexico
11.187	26.80	XAM, Merida, Mex.
11.360	26.39	CWG, Montevideo, Uruguay
11.560	25.94	CMB Havana, Cuba
11.644	25.75	PPQ, Rio de Janeiro, Brazil
11.680	25.67	KIO, Kahuku, Hawaii
		YVQ, Maracay, Venezuela
11.720	25.6	FYA, Paris, France
11.720	25.6	CJRX, Winnipeg, Can.
11.730	25.57	PHI, Huizen, Holland
11.750	25.53	GSD, British Broad. Corp., Daventry, Eng.
11.770	25.49	DJD, Berlin, Germany
11.790	25.45	W1XAL, Boston, Mass.
11.795	25.43	DJO, Berlin, Germany
11.811	25.4	I2RO, Rome, Italy
11.830	25.36	W2XE, Atlantic Broad. Corp. N.Y.C.
11.855	26.31	DJP, Berlin, Germany
11.860	25.29	GSE, British, Broad. Corp., Daventry, Eng.
11.870	25.26	W8XK, Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.
11.875	25.25	FYA, Paris, France
11.935	25.12	FTA, Ste. Assise, France
11.950	25.08	KKQ, Bolinas, Calif.
11.983	25.02	FZS, Saigon, Indo-China
12.000	24.99	RNE, Moscow, USSR.
12.051	24.88	PDV, Kootwijk, Holland
12.100	24.78	CJA, Drummondville, P. Q.
12.148	24.68	GBS, Rugby, England
12.223	24.53	CT1CT, Lisbon, Portugal
12.241	24.41	GBU, Rugby, Eng.
12.290	24.40	PLM, Bandoeng, Java
12.394	24.19	DAF, Norden, Germany
12.660	23.68	CZA, Drummondville, P. Q.
12.780	23.46	GBC, Rugby, England
12.785	23.45	IAC, Coltano, Italy
12.820	23.38	CNR, Rabat, Morocco
12.830	23.36	HJA3, Barranquilla, Colombia
12.840	23.35	WOO, Ocean Gate, N. J.
		WOY, Lawrenceville, N. J.
12.930	23.18	WAW, Hialeah, Fla.
13.074	22.94	JYK, Tokio, Japan
13.200	22.71	CFU, Rossland, B. C. (Consolidated Mining & Smelting Co. of Canada, Ltd.)
		KNRA, "Seth Parker"
13.285	22.56	GGA3, Drummondville, P. Q.
13.337	22.48	YVQ, Maracay, Venezuela
13.390	22.39	WMA, Lawrenceville, N. J.
13.420	22.34	WHR, Rocky Point, N. Y.
13.435	22.31	WKD, Rocky Point, N. Y.
13.450	22.28	WEX, Rocky Point, N. Y.
13.465	22.26	WKC, Rocky Point, N. Y.
13.480	22.24	WAJ, Rocky Point, N. Y.
13.500	22.09	GBB, Rugby, England
13.671	21.93	HAS, Budapest, Hungary
13.690	21.90	KKZ, Bolinas, Calif.
13.780	21.75	KKW, Bolinas, Calif.
13.816	21.70	SUZ, Cairo, Egypt
13.840	21.66	WPE, Rocky Point, N. Y.
13.855	21.63	WQU, Rocky Point, N. Y.
13.870	21.61	WIY, Rocky Point, N. Y.
13.900	21.57	WQP, Rocky Point, N. Y.
13.915	21.54	WQS, Rocky Point, N. Y.
13.984	21.44	GBA, Rugby, Eng.
14.000 to 14.400	20.82 to 21.42	Amateur band. Phones from 14.150 to 14.250 megs.
14.450	20.75	GBW, Rugby, Eng.
14.470	20.72	WMF, Lawrenceville, N. J.
14.480	20.70	LSN, Buenos, Aires, Arg.
		YNA, Managua, Nicaragua
14.530	20.65	LSA, Buenos Aires, Arg.
14.545	20.69	HPF, Panama City, Panama
		TGF, Guatemala City, Guatemala
		TIN, Cartago, Costa Rica
		TIU, Cartago, Costa Rica
14.550	20.60	HBJ, Geneva, Switzerland "Radio Nations"
14.590	20.55	WMN, Lawrenceville, N. J.
14.630	20.50	XDA, Mexico City, D. F.
14.682	20.42	PSF, Rio de Janeiro, Brazil
14.800	20.26	WQV, Rocky Point, N. Y.
14.815	20.23	WQL, Rocky Point, N. Y.
14.830	20.21	WKU, Rocky Point, N. Y.
14.930	20.08	HJD, Bogota, Colombia
14.969	20.03	EDQ, Madrid, Spain
14.980	20.01	KAY, Manila, P. I.
15.040	19.93	WQG, Rocky Point, N. Y.
15.055	19.91	WNC, Hialeah, Fla.
15.090	19.88	RKI, Moscow, USSR.
15.104	19.85	RAU, Tashkent, USSR.
15.120	19.83	HVJ, Vatican City, Rome, Italy
15.140	19.82	GSF, British Broad. Corp., Daventry, Eng.
15.200	19.73	DJB, Berlin, Germany
15.210	19.72	W8XK, Westinghouse Electric & Mfg. Co., Pittsburg, Pa.
15.220	19.71	PCJ, N. V. Philips' Radio, Eindhoven, Holland
15.243	19.68	FYA, Paris, France
15.250	19.67	W1XAL, Boston, Mass.
15.270	19.65	W2XE, Atlantic Broadcast. Corp.

Mega-cycles	Meters	Station
15.280	19.63	DJQ, Berlin, Germany
15.330	19.56	W2XAD, General Electric Co., Schenectady, N. Y.
15.340	19.56	DJR, Berlin, Germany
15.355	19.52	KWU, Dixon, Calif.
15.415	19.45	KWO, Dixon, Calif.
15.445	19.41	WKW, Rocky Point, N. Y.
15.505	19.34	CMA1, Havana, Cuba
15.760	19.02	JYT, Kemikawa-Cho, Chiba-Ken, Japan
15.810	18.96	LSL, Buenos Aires, Arg.
15.821	18.95	OCJ, Lima, Peru
15.860	18.90	CEC, Santiago, Chile
15.863	18.90	FTK, Ste. Assise, France
15.950	18.80	PLG, Bandoeng, Java
15.970	18.77	WKO, Rocky Point, N. Y.
16.015	18.72	WQR, Rocky Point, N. Y.
16.030	18.71	KKP, Kahuku, Hawaii
16.150	18.56	GBX, Rugby, England
16.162	18.55	PSA, Rio de Janeiro, Brazil
16.200	18.51	FZR, Saigon, Indo-China
16.270	18.48	WLK, Lawrenceville, N. J.
16.380	18.30	XGN, Shanghai, China
17,080	17.55	GBC, Rugby, England
17.122	17.51	HAT, Budapest, Hungary
17.120	17.51	WOO, Ocean Gate, N. J.
		WOY, Lawrenceville, N. J.
17.260	17.37	CMA1, Havana, Cuba
		DAF, Norden, Germany
17.310	17.32	CZA, Drummondville, P. Q.
		W3XL, Bound Brook, N. J.
17.512	17.12	DFB, Nauen, Germany
17.533	17.10	VWZ, Kirkee, Poona, India
17.710	16.93	CJAS, Drummondville, P. Q.
17.720	16.92	HSP, Bangkok, Siam
17.760	16.88	IAC, Coltane, Italy
17.760	16.89	DJE, Berlin, Ger nany
17.780	16.87	W3XAL, National Broad. Co., Bound Brook, N. J.
17.790	16.86	GSG, British Broad. Corp., Daventry, Eng.
17.830	16.82	PCV, Kootwijk, Holland
17.850	16.80	PLF, Bandoeng, Java
17.860	16.78	WQC, Rocky Point, N. Y.
17.880	16.76	WQI, Rocky Point, N. Y.
17.900	16.75	WLL, Rocky Point, N. Y.
17.920	16.73	WQF, Rocky Point, N. Y.
17.940	16.71	WQB, Rocky Point, N. Y.
18.020	16.64	KQJ, Bolinas, Calif.
18.116	16.55	LSY, Buenos Aires, Arg.
18.170	16.50	PMC, Bandoeng, Java
18.180	16.49	CGA, Drummondville, P. Q.
18.193	16.48	GAW, Rugby, Eng.
18.237	16.44	FTE, Ste. Assise, France
18.296	16.39	YVR, Maracay, Venezuela
18.304	16.38	GAS, Rugby , England
18.340	16.35	FZS, Saigon, Indo-China
18.350	16.34	WLA, Lawrenceville, N. J.
18.400	16.29	PCK, Kootwijk, Holland
18.444	16.25	HJY, Bogota, Colombia
18.450	16.25	HBH, Geneva, Switzerland "Radio Nations"
18.600	16.12	PDM, Kootwijk, Holland
18.611	16.11	GAU, Rugby, England
18.620	16.10	GBJ, Bodmin, England
		PLT, Malabar, Java
18.670	16.06	OCI, Lima, Peru
18.690	16.04	XGK, Shanghai, China
18.820	15.93	PLE, Bandoeng, Java
18.856	15.90	ZSS, Capetown, Union of So Africa
18.860	15.89	WKM, Rocky Point, N. Y.
18.880	15.88	WQH, Rocky Point, N. Y.
18.900	15.86	WDS, Rocky Point, N. Y.
18.920	15.84	WQE, Rocky Point, N. Y.
18.940	15.83	WTT, Rocky Point, N. Y.
18.958	15.82	LSR, Buenos Aires, Arg.
18.960	15.81	WQD, Rocky Point, N. Y.
18.963	15.81	GAG, Rugby, England
18.980	15.79	WFX, Rocky Point, N. Y.
19.121	15.68	LSM, Buenos Aires, Arg.
19.182	15.63	ORG, Brussels, Belgium
19.220	15.60	WKF, Lawrenceville, N. J.
19.240	15.58	DFA, Nauen, Germany
19.270	15.57	PPU, Rio de Janeiro, Brazil
19.282	15.55	FTM, Ste. Assise, France
19.400	15.45	FRO, Ste. Assise, France
19.418	15.44	EDQ, Madrid, Spain
19.468	15.40	PMA, Malabar, Java
19.500	15.38	LSQ, Hurlingham, Buenos Aires, Arg.
19.506	15.37	IRW, Rome, Italy
19.519	15.36	EDN, Madrid, Spain
		EDX, Madrid, Spain
19.596	15.30	LSF, Buenos Aires, Arg.
19.680	15.24	CEC, Santiago, Chile
19.684	15.23	EAQ, Madrid, Spain
19.820	15.13	WKN, Lawrenceville, N. J.
19.830	15.12	FTD, Ste. Assise, France
19.895	15.07	LSG, Buenos Aires, Arg.
19.950	15.04	DIH, Nauen, Germany
19.980	15.01	KAX, Manila, P. I
20.028	14.97	DHO, Nauen, Germany
		OPL, Leopoldville, Belgian Congo
20.100	14.91	WQY, Rocky Point, N. Y.
20.140	14.88	DWG, Nauen, Germany
20.180	14.85	WQX, Rocky Point, N. Y.
20.260	14.79	WQQ, Rocky Point, N. Y.
20.368	14.72	GAA, Rugby, England
20.606	14.55	PMB, Bandoeng, Java
20.820	14.40	LSY, Buenos Aires, Arg.
20.849	14.38	EDM, Madrid, Spain
		EHY, Madrid, Spain
21.020	14.27	LSN, Buenos Aires, Arg.
21.060	14.24	KWN, Dixon, Calif.
		WKA, Lawrenceville, N. J.
21.069	14.23	PSA, Rio de Janeiro, Brazil
21.128	14.19	LSM, Buenos Aires, Arg.
21.220	14.13	WQA, Rocky Point, N. Y.
21.240	14.12	WQJ, Rocky Point, N. Y.
21.260	14.10	WBU, Rocky Point, N. Y.
21.300	14.07	WQW, Rocky Point, N. Y.
21.410	14.00	WKK, Lawrenceville, N. J.
21.470	13.96	GSH, Daventry, England
21.540	13.92	W8XK, Pittsburg, Pa.
22.291	13.45	GBU, Rugby, England
24.380	12.29	VE9GW, Bowmanville, Ont. Can.

AMATEURS, AMATEUR PHONES ARE HEARD BETWEEN:

1.875 and 2.000 megs.
3.900 and 4.000 megs.
7.000 and 7.300 megs. (Foreign only)
14.150 and 14.250 megs.

Alphabetical List

(Frequencies given are in megacycles.)

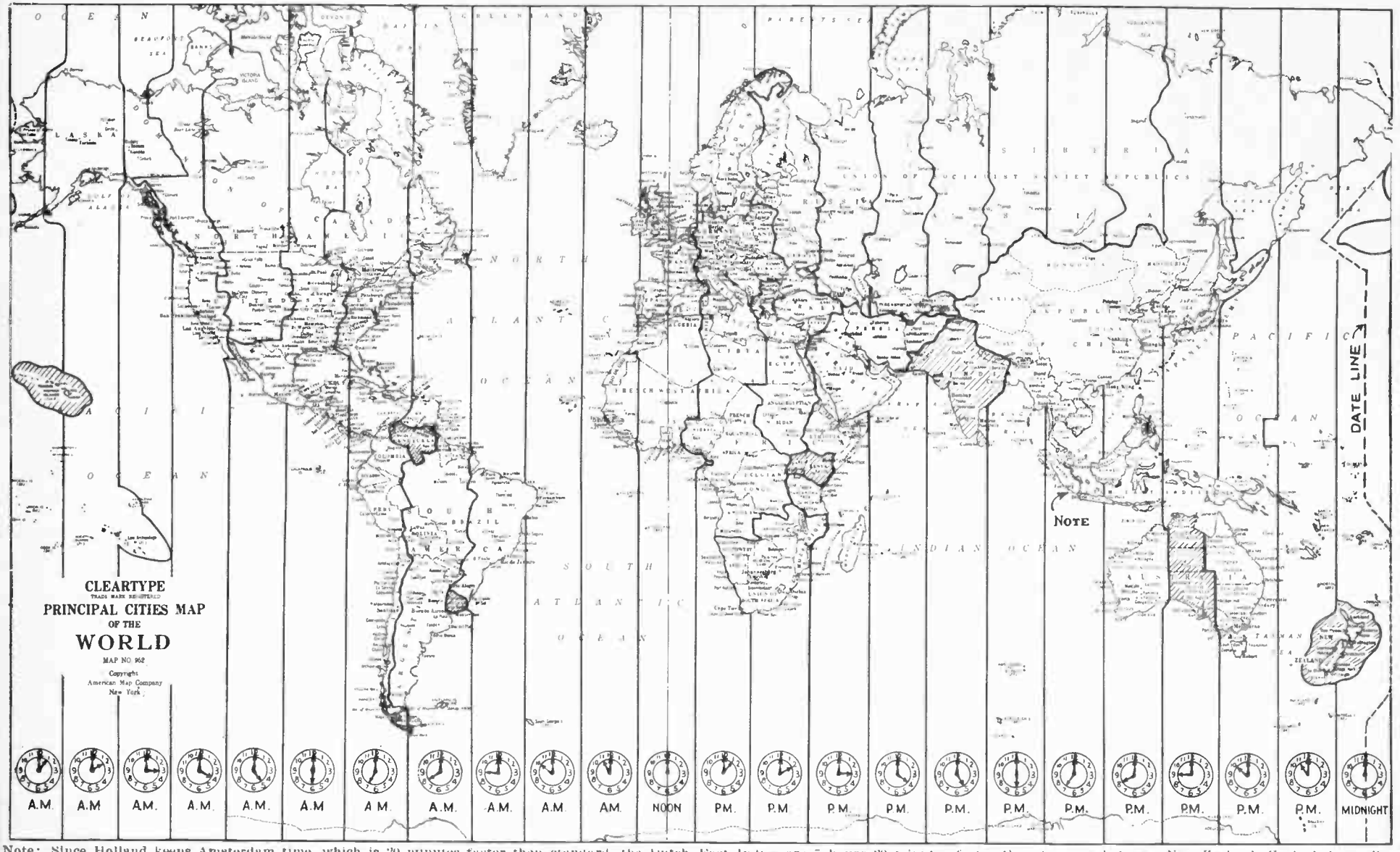
CEC, La Granja, Chile (Santiago) 10.670; 15.860; 19.680 megacycles.
CFA2, Drummondville P. Q., (Montreal) 4.465
CFA4, Drummondville, P. Q. (Montreal) 10.520
CFD, Kenora, Ontario
CFJ, Red Lake, Ontario, 5.660
CFQ, Edmonton, Alta., 3.040; 7.550
CFU, Rossland, B. C., 4.755; 5.660; 6.720; 13.200
CGA, Drummondville, P. Q. (Montreal) 18.180
CGA3, Drummondville, P. Q. (Montreal) 13.285
CGA4, Drummondville, P. Q. (Montreal) 9.332
CGA6, Drummondville, P. Q. (Montreal) 6.690
CGA7, Drummondville, P. Q. (Montreal) 6.880
CGA9, Drummondville, P. Q. (Montreal) 4.348
CGD, Drummondville, P. Q. (Montreal) 3.340
CGE, Calgary, Alta., 3.040; 7.550
CGM, Montreal, P. Q., 3.152; 3.340
CGO, Ocean Falls, B. C., 4.505
CGP, Prince Rupert, B. C., 3.268; 5.405
CGT, Campbell River, B. C., 4.865
CGY, Yamachiche, P. Q., 3.152
CJA, Drummondville, P. Q. (Montreal) 12.100
CJA3, Drummondville, P. Q. (Montreal) 17.710
CJA6, Drummondville, P. Q. (Montreal) 6.760
CJRO, Winnipeg, Man. (Middlechurch), 6.150
CJRX, Middlechurch, Man. (Winnipeg), 11.720
CJU, Winnipeg, Man., 3.070; 3.452
CKS, Calgary, Alta., 3.040; 7.550
CMA, Havana, Cuba, 8.630; 9.690; 9.740; 10.020; 10.890
CMA1, Havana, Cuba, 15.505; 17.260
CMB, Havana, Cuba, 5.780; 6.790; 7.960; 11.560
CMB1, Havana, Cuba, 5.900
CNR, Rabat, Morocco, 12.820
COC, Havana, Cuba, 5.996
COH, Havana, Cuba, 6.428
CP5, La Paz, Bolivia, 6.081; 9.120; 15.300
CQN, Macao, Macao, 6.020
CR6AA, Lobito, Portuguese West Africa, 7.175
CT1AA, Lisbon, Portugal, 9.600; 15.350
CT1CT, Lisbon, Portugal, 3.750; 12.223
CWG, Cerrito, Uruguay (Montevideo), 11.360
CZA, Drummondville, P. Q. (Montreal), 4.785; 6.285; 8.515; 12.660; 17.310
CZG, Prince Rupert, B. C., 6.425
CZO, Prince George, B. C., 4.505
CZP, Claydon Bay, B. C., 4.505
CZQ, Anyox, B. C., 5.405
DAF, Norden, Germany, 4.320; 8.461; 12.394; 17.260
DEL, Nauen, Germany, 6.813
DFA, Nauen, Germany, 19.210
DFB, Nauen, Germany, 17.512
DFL, Nauen, Germany, 10.850
DGK, Nauen, Germany, 6.675
DGU, Nauen, Germany, 9.609
DHO, Nauen, Germany, 20.028
DIH, Nauen, Germany, 19.950
DIQ, Zeesen, Germany, 10.285
DJA, Zeesen, Germany, 9.560
DJB, Zeesen, Germany, 15.200
DJC, Zeesen, Germany, 6.020
DJD, Zeesen, Germany, 11.770
DJE, Zeesen, Germany, 17.760
DJM, Zeesen, Germany, 6.079
DJN, Zeesen, Germany, 9.510
DJO, Zeesen, Germany, 11.785
DJP, Zeesen, Germany, 11.855
DJQ, Zeesen, Germany, 15.280
DJR, Zeesen, Germany, 15.340
DWG, Nauen, Germany, 20.140
EAM, Aranjuez, Spain (Madrid), 9.772
EAQ, Aranjuez, Spain (Madrid), 9.862; 19.681
EA8AB, Santa Cruz de Tenerife, Canary Islands, 7.205
EDM, Madrid, Spain, 20.849
EDN, Madrid, Spain, 10.613; 19.519
EDO, Madrid, Spain, 6.966
EDP, Palma de Mallorco, Balaeric Islands, 4.713; 5.344; 6.475
EDQ, Madrid, Spain, 6.966; 8.017; 14.969; 19.418
EDX, Madrid, Spain, 10.613; 19.519
EHY, Madrid, Spain, 10.164; 20.849
EHZ, El Tablero, Tenerife, Canary Islands, 10.435
FRO, Ste. Assise, France, 19.400
FTA, Ste. Assise, France, 11.935
FTD, Ste. Assise, France, 19.830
FTE, Ste. Assise, France, 18.237
FTF, Ste. Assise, France, 7.770
FTI, Ste. Assise, France, 9.840
FTK, Ste. Assise, France, 15.863
FTM, Ste. Assise, France, 19.282
FYA, (See "Radio Coloniale.")
FZR, Saigon, French Indo-China, 16.200
FZS, Saigon, French Indo-China, 11.983; 18.342
GAA, Rugby, England, 20.380
GAB, Rugby, England, 18.040; 18.970
GAP, Rugby, England, 19.160
GAS, Rugby, England, 18.310
GAU, Rugby, England, 18.620
GAW, Rugby, England, 18.200
GBA, Rugby, England, 13.990
GBB, Rugby, England, 13.585
GBC, Rugby, England, 4.975; 8.646; 12.780 17.080
GBJ, Rugby, England, 13.415
GBP, Rugby, England, 10.000
GBS, Rugby, England, 12.148
GBU, Rugby, England, 12.290
GBW, Rugby, England, 14.450
GCA, Rugby, England, 9.702
GCB, Rugby, England, 9.273
GCS, Rugby, England, 9.014
GCU, Rugby, England, 9.942
GCW, Rugby, England, 9.798
GDB, Rugby, England, 4.320; 6.790
GDS, Rugby, England, 6.900
GDW, Rugby, England, 4.835
GSA, Daventry, England (London), 6.050
GSB, Daventry, England (London), 9.510
GSC, Daventry, England (London), 9.580
GSD, Daventry, England (London), 11.750
GSE, Daventry, England (London), 11.860
GSF, Daventry, England (London), 15.140
GSG, Daventry, England (London), 17.790
GSH, Daventry, England (London), 21.470
G6RX, Rugby, England, 4.320; 4.972
HAS, Skekesfehevar, Hungary (Budapest), 13.671
HAT, Skekesfehevar, Hungary (Budapest), 7.220; 17.120
HBH, Prangins, Switzerland (Geneva), 18.450
HBJ, Prangins, Switzerland (Geneva), 14.550
HBL, Prangins, Switzerland (Geneva), 9.595
HBP, Prangins, Switzerland (Geneva), 7.797
HCJB, Quito, Ecuador, 4.107
HCK, Quito, Ecuador, 5.694
HC2RL, Guayaquill, Ecuador, 6.659
HIH, San Pedro de Maeoris, Dominican Republic
HIX, Santo Domingo, Dominican Rep.
HIZ, Santo Domingo, Dominican Rep.
HI1A, Santiago de los Caballeros, Dominican Rep., 6.272
HJA2, Bogota, Colombia, 14.930
HJP, Bogota, Colombia, 7.465
HJY, Bogota, Colombia, 9.928; 18.444
HJ1ABB, Barranquilla, Colombia, 6.451
HJ1ABD, Cartagena, Colombia, 6.100
HJ1ABE, Cartagena, Colombia, 6.115
HJ2ABA, Tunja, Colombia, 6.175

HJ2ABC, Cucuta, Colombia, 5.970
HJ3ABD, Bogota, Colombia, 7.400
HJ4ABB, Manizales, Colombia, 7.140
HJ4ABE, Medelin, Colombia, 5.930
HJ5ABB, Cali, Colombia, 6.500
HJ5ABC, Cali, Colombia, 6.660
HKE, Bogota, Colombia, 7.090
HKI, Bogota, Colombia, 7.402
HKN, Medelin, Colombia, 7.138
HPC, Panama City, Panama, 10.290
HPF, Panama City, Panama, 14.545
HSJ, Bangkok, Siam, 7.980
HSP, Bangkok, Siam, 17.720
HVJ, Vatican City, 5.986; 15.120
IAC, Coltano, Italy (Pisa), 6.648; 12.785; 17.770
IAF, Fiumicino, Italy, 29.803
IAG, Golfo Aranci, Sardinia, 30.593
IMA, Rome, Italy, 6.900
IRM, Rome, Italy, 9.823
IRW, Rome, Italy, 19.506
I2RO, Rome, Italy, 5.555; 5.610; 5.660; 5.725; 6.065; 6.085; 6.160; 6.980; 9.600; 9.635; 9.780; 11.811
JYK, Kemikawa-Cho, Chiba-Ken, Japan (Tokio), 13.07
JYS, Kemikawa-Cho, Chiba-Ken, Japan (Tokio), 9.840
JYT, Kemikawa-Cho, Chiba-Ken, Japan (Tokio), 15.760
KAX, Manila, Philippine Islands, 19.980
KAY, Manila, Philippine Islands, 14.980
KAZ, Manila, Philippine Islands, 9.990
KDK, Kahuku, Hawaii (Honolulu), 7.520 (Receiver at Kokohead)
KEB, Bolinas, Calif. (San Francisco), 7.370 (Receiver at Point Reyes)
KEE, Bolinas, Calif., 7.715
KEJ, Bolinas, Calif. (San Francisco), 9.010
KEL, Bolinas, Calif. (San Francisco), 6.860
KEQ, Kahuku, Hawaii (Honolulu-Kokohead), 6.733
KES, Bolinas, Calif., 10.410
KEZ, Bolinas, Calif., 10.400
KGM, Ketchikan, Alaska, 3.093
KGXU, Port Armstrong, Alaska, 2.994
KGYA, Longmire, Wash., 3.387
KGYB, Longmire, Wash., 3.387
KGYC, Paracide, Wash., 3.387
KGYD, Sunrise Wash., 3.387
KGYE, White River, Wash., 3.387
KGYF, Carbon, Wash., 3.387
KGYG, Portable in Washington, 3.387
KGYH, Portable in Washington, 3.387
KGYI, Portable in Washington, 3.387
KIAX, Ketchikan, Alaska, 3.093
KIAY, Ketchikan, Alaska, 3.093
KICI, View Cove, Dall Island, Alaska, 3.093
KIFM, Fairbanks, Alaska, 4.124
KIGP, Egushik, Alaska, 3.190
KIIK, Circle, Alaska, 3.190
KIIL, Fort Yukon, Alaska, 3.190
KIIM, Hot Springs, Alaska, 3.190
KIIN, Eagle, Alaska, 3.190
KIIO, McGrath, Alaska, 3.190
KIIT, St. Michael, Alaska, 3.265
KIIU, Marshall, Alaska, 3.385
KIO, Kahuku, Hawaii, 11.680
KKH, Kahuku, Hawaii, 7.520
KKP, Kahuku, Hawaii, 16.030
KKQ, Bolinas, Calif., 11.950
KKW, Bolinas, Calif., 13.780
KKZ, Bolinas, Calif., 13.690
KNRA, Schooner "Seth Parker," 6.160; 6.660; 6.670; 8.230; 8.820; 8.840; 13.200
KQJ, Bolinas, Calif., 18.020
KRO, Kahuku, Hawaii, 5.845
KWN, Dixon, Calif., 21.060
KWO, Dixon, Calif., 15.415
KWU, Dixon, Calif., 15.355
KWV, Dixon, Calif., 10.840
KWX, Dixon, Calif., 7.610
KWY, Dixon, Calif., 7.565
KZGF, Manila, Philippine Islands, 5.765; 9.170
KZGG, Cebu, Philippines, 5.825; 8.940
KZGH, Iloilo, Philippines, 5.795; 9.490
LQA, Hurlingham, Argentina (Buenos Aires), 9.600; 9.702
LSA, Hurlingham, Arg. (Buenos Aires), 9.890; 14.530
LSF, Hurlingham, Arg. (Buenos Aires), 19.596
LSG, Monte Grande, Arg. (Buenos Aires), 19.895
LSI, Monte Grande, Arg. (Buenos Aires), 9.830
LSL, Hurlingham, Arg. (Buenos Aires), 9.993; 10.296; 15.810
LSM, Hurlingham, Arg. (Buenos Aires), 19.121; 21.128
LSN, Hurlingham, Arg. (Buenos Aires), 9.895; 14.480; 21.020
LSQ, Hurlingham, Arg. (Buenos Aires), 19.500
LSR, Hurlingham, Arg. (Buenos Aires), 18.958
LST, Olivos, Arg. (Buenos Aires), 9.104
LSX, Monte Grande, Arg. (Buenos Aires), 10.350
LSY, Monte Grande, Arg. (Buenos Aires), 18.116; 20.820
OCI, Valverde, Peru (Lima), 10.962; 18.670
OCJ, Valverde, Peru (Lima), 15.821
OCM, Lima, Peru, 6.233
OER2, Vienna, Austria, 6.075
OPL, Leopoldville, Belgium Congo, 20.028
OPM, Leopoldville, Belgium Congo, 10.135
ORG, Ruysselede, Belgium (Brussels), 19.182
ORK, Ruysselede, Belgium (Brussels), 10.330
OXY, Skamlebaek, Denmark (Copenhagen), 6.060; 9.520
PCJ, Eindhoven, Holland, 9.590; 15.220
PCK, Kootwijk, Holland, 18.400
PCM, The Hague, Holland, 6.430
PCV, Kootwijk, Holland, 17.830
PDK, Kootwijk, Holland, 10.140
PDM, Kootwijk, Holland, 18.600
PDV, Kootwijk, Holland, 7.830; 12.051
PHI, Hilversuum, Holland (Huizen), 11.725; 17.775
PK1WK, Bandoeng, Java, 3.490
PLE, Bandoeng, Java, 18.820
PLF, Bandoeng, Java, 17.850
PLG, Bandoeng, Java, 15.950
PLM, Bandoeng, Java, 12.290
PLT, Malabar, Java, 18.620
PLV, Bandoeng, Java, 9.410
PLW, Bandoeng, Java, 9.480
PMA, Malabar, Java, 19.468
PMB, Bandoeng, Java, 20.606
PMC, Bandoeng, Java, 18.170
PMN, Bandoeng, Java, 10.250
PMY, Bandoeng, Java, 5.143
PNI, Macassar, Celebes, 8.760
PPQ, Rio de Janeiro, Brazil, 11.644
PPU, Rio de Janeiro, Brazil, 19.270
PRF5, Rio de Janeiro, Brazil, 9.500
El Prado, Riobamba, Ecuador, 6.618
PSA, Rio de Janeiro, Brazil, 16.162; 21.069
PSF, Rio de Janeiro, Brazil, 14.682
PSH, Rio de Janeiro, Brazil, 10.212
PSK, Rio de Janeiro, Brazil, 8.180
Rabat, Morocco, 8.218; 12.820
Radio Coloniale, Pontoise, France (Paris), 11.705; 11.875; 15.243
RAU, Tashkent, USSR., 15.104
REN, Moscow, USSR., 6.433
RIM, Irkutsk, USSR., 7.621
RKI, Moscow, USSR., 7.520; 15.090
RNE, Popoff, USSR. (Moscow), 12.000
RSZ, Irkutsk, USSR., 5.770
RV15, Khabarovsk, USSR. (Siberia), 4.273
RV59, Moscow, USSR., 6.000
SUV, Abu Zabal, Egypt (Cairo), 10.014
SUZ, Abu Zabal, Egypt (Cairo), 13.816
TGF, Guatemala City, Guatemala, 14.545
TIN, Cartago, Costa Rica (San Jose), 14.545
TIR, Cartago, Costa Rica (San José), 7.685
TIU, Cartago, Costa Rica (San Jose), 14.545
VE9BJ, St. John, N. B., 6.090
VE9CS, Vancouver, B. C., 6.070
VE9DN, Drummondville, P. Q. (Montreal), 6.005
VE9DR, Montreal, P. Q., 6.005
VE9GW, Bowmanville, Ont. (Toronto), 6.095
VE9HX, Halifax, N. S., 6.110
VK2ME, Pennent Hills, N.S.W., Australia (Sydney), 9.590
VK3LR, Melbourne, Victoria, Australia, 5.678; 9.580
VK3ME, Braybank, Vic., Australia (Melbourne), 9.510
VQ7LO, Nairobi, Kenya Colony, 6.060
VUC, Calcutta, India, 6.112
VWY, Kirkee, Poona, India, 8.980
VWZ, Kirkee, Poona, India, 17.533
WAD, Rocky Point, N. Y., 8.930
WAJ, Rocky Point, N. Y., 13.480
WAW, Hialeah, Fla., 12.930
WBU, Rocky Point, N. Y., 21.260
WCG, Rocky Point, N. Y., 10.370
WDA, Rocky Point, N. Y., 9.480
WDB, Rocky Point, N. Y., 6.718
WDN, Rocky Point, N. Y., 4.550
WDS, Rocky Point, N. Y., 18.900
WEA, Rocky Point, N. Y., 10.610
WEB, Rocky Point, N. Y., 6.935
WEC, Rocky Point, N. Y., 8.930
WED, Rocky Point, N. Y., 10.630
WEF, Rocky Point, N. Y., 9.490
WEG, Rocky Point, N. Y., 7.415
WEJ, Rocky Point, N. Y., 6.740
WEL, Rocky Point, N. Y., 8.950
WEM, Rocky Point, N. Y., 7.400
WEO, Rocky Point, N. Y., 6.958
WES, Rocky Point, N. Y., 9.448
WET, Rocky Point, N. Y., 9.470
WEX, Rocky Point, N. Y., 13.510
WEZ, Rocky Point, N. Y., 6.928
WFX, Rocky Point, N. Y., 18.980
WHR, Rocky Point, N. Y., 13.420
WIR, Rocky Point, N. Y., 4.276
WIY, Rocky Point, N. Y., 13.870
WJN, Rocky Point, N. Y., 7.370
WKA, Lawrenceville, N. J., 21.060
WKC, Rocky Point, N. Y., 10.465, 13.465
WKD, Rocky Point, N. Y., 13.435
WKDL, Miami, Fla., 3.070; 5.405
WKF, Lawrenceville, N. J., 4.253; 19.220
WKJ, New Brunswick, N. J., 9.460
WKK, Lawrenceville, N. J., 21.410
WKL, Rocky Point, N. Y., 8.940
WKM, Rocky Point, N. Y., 18.860
WKN, Lawrenceville, N. J., 19.820
WKQ, Rocky Point. N. Y., 15.970
WKP, Rocky Point, N. Y., 6.950
WKU, Rocky Point, N. Y., 14.830
WKW, Rocky Point, N. Y., 15.445
WLA, Lawrenceville, N. J., 18.350
WLK, Lawrenceville, N. J., 16.270
WLL, Rocky Point, N. Y., 17.900
WMA, Lawrenceville, N. J., 13.390
WMDU, San Juan, Porto Rico, 3.070; 3.076; 5.405
WMEP, Suffield, Ohio, 6.615
WMEU, St. Petersburg, Fla., 6.615
WMEV, Opa Locka, Fla., 6.615
WMF, Lawrenceville, N. J., 14.470
WMN, Lawrenceville, N. J., 14.590
WNA, Lawrenceville, N. J., 9.170
WNC, Hialeah, Fla., 15.055
WND, Hialeah, Fla., 4.098
WOA, Lawrenceville, N. J., 6.755
WOB, Lawrenceville, N. J., 5.850
WOF, Lawrenceville, N. J., 9.750
WOG, Ocean Gate, N. J., 4.253
WOK, Lawrenceville, N. J., 10.550
WON, Lawrenceville, N. J., 9.870
WOO, Ocean Gate, N. J., 4.273; 4.753; 8.560; 12.840; 17.120
WOY, Lawrenceville, N. J., 4.273; 5.753; 8.560 12.840; 17.120
WOZ, New York, N. Y., 3.423
WPE, Rocky Point, N. Y., 13.840
WQA, Rocky Point, N. Y., 21.220
WQB, Rocky Point, N. Y., 17.940
WQC, Rocky Point, N. Y., 17.860
WQD, Rocky Point, N. Y., 18.960
WQE, Rocky Point, N. Y., 18.920
WQF, Rocky Point, N. Y., 17.920
WQG, Rocky Point, N. Y., 15.040
WQH, Rocky Point, N. Y., 18.880
WQI, Rocky Point, N. Y., 17.880
WQJ, Rocky Point, N. Y., 21.240
WQL, Rocky Point, N. Y., 14.815
WQN, Rocky Point, N. Y., 5.263; 5.505; 5.825
WQO, Rocky Point, N. Y., 6.725
WQP, Rocky Point, N. Y., 13.900
WQQ, Rocky Point, N. Y., 20.260
WQR, Rocky Point, N. Y., 16.015
WQS, Rocky Point, N. Y., 13.915
WQU, Rocky Point, N. Y., 13.855
WQV, Rocky Point, N. Y., 14.800
WQW, Rocky Point, N. Y., 21.300
WQX, Rocky Point, N. Y., 20.180
WQY, Rocky Point, N. Y., 20.100
WRDQ, Toledo, Ohio, 2.470
WRJ, Poe Reef Lighthouse, Mich., 3.410
WST, Dry Tortugas Lighthouse, Fla., 3.410
WTDV, Virgin Islands, 4.307
WTDW, Virgin Islands, 4.307
WTT, Rocky Point, N. Y., 18.940
WVD, Seattle, Wash., 2.604; 5.995; 6.618
WWAJ, Manitou Island Lighthouse, Mich., 3.410
WWAL, Passage Island Lighthouse, Mich., 3.410
WWAM, Rock of Ages Lighthouse, Mich., 3.410
WWAO, Huron Island Lighthouse, Mich., 3.410
WWE, Fourteen Foot Shoals, Lighthouse, Mich., 3.410
WWG, Cheboygan Range, Lighthouse, Mich., 3.410
WWH, Stannard Rock Lighthouse, Mich., 3.410
WWM, Marquette Lighthouse, Mich., 3.410
WWN, Detroit River Lighthouse, Mich., 3.410
WWR, Detroit, Mich., Lighthouse, 3.410
WWZ, Key West, Fla., Lighthouse, 3.410
WXH, Ketchikan, Alaska, 6.662
W1XAL, Boston, Mass., 6.040; 11.790; 15.250; 21.460
W1XAZ, Millis, Mass. (Springfield), 9.570
W2XAD, Schenectady, N. Y., 15.340
W2XAF, Schenectady, N. Y., 9.530
W2XE, Wayne, N. J. (New York City), 6.120; 11.830; 15.270
W3XAL, Bound Brook, N. J. (New York City), 6.100; 17.780
W3XAU, Newtown Square, Pa. (Philadelphia), 6.060; 9.591
W3XL, Bound Brook, N. J., 6.425; 17.310
W4XB, Collins Island (Miami, Fla.), 6.040
W8XAL, Mason, Ohio (Cincinnati), 6.060
W8XK, Saxonburg, Pa. (Pittsburg), 6.140; 11.870; 15.210; 21.540
W9XAA, Chicago, Ill., 6.080
W9XF, Downers' Grove, Ill. (Chicago), 6.100
W9XQ, Downers' Grove, Ill. (Chicago), 6.100
XAM, Merida, Yuc., Mexico, 5.766; 11.187
XDA, Mexico City, D. F., 5.879; 9.375; 14.630
XDC, Mexico City, D. F., 9.340
XDM, Mexico City, D. F., 11.760
XDS, Mexico City, D. F., 11.760
XEBT, Mexico City, D. F., 5.965
XFD, Mexico City, D. F., 9.091; 11.111
XGK, Shanghai, China, 18.690
XGL, Shanghai, China, 7.960
XGN, Shanghai, China, 16.380
XGO, Shanghai, China, 17.575
YBG, Shanghai, China, 10.410
YID, Bagdad, Iraq, 4.467
YNA, Managua, Nicaragua, 14.480
YVQ, Maracay, Venezuela (Caracas), 6.672; 11.680
YVR, Maracay, Venezuela (Caracas), 13.337; 9.168; 18.296
YV2RC, Caracas, Venezuela, 6.112

(*Continued on Page* 47)

STANDARD TIME ZONES OF THE WORLD AND OUTLINE CHART OF THE WORLD'S COUNTRIES

NOTE: USE MAGNIFYING GLASS TO READ CITIES.



Note: Since Holland keeps Amsterdam time, which is 20 minutes faster than standard, the Dutch East Indies are 7 hours 20 minutes faster than Greenwich time. New Zealand, Central Australia, Kenya, Uruguay, Venezuela, and the Hawaiian Islands are on half-hour standards, intermediate between the zones whose boundaries they cross; and China, Persia, Arabia, Abyssinia, etc., have no standard time. India is on a half-hour schedule, in the west; and Calcutta is 7 minutes slower than standard.

Time, at any moment, is reckoned one hour later, or faster, for each zone we cross toward the east, or right side of the page; and one hour earlier, or slower, for each one going west. The clocks show the time, at each place in the world, when the day is ending at the Date Line at the right of the page. Add the difference in time (as shown between the zone clocks) between your position and any station east of you, to your own time, to determine the time at that station; but subtract the difference in time from your own time, if the station is west of you; or consult the Time Conversion Table on another page.

The Listener Asks

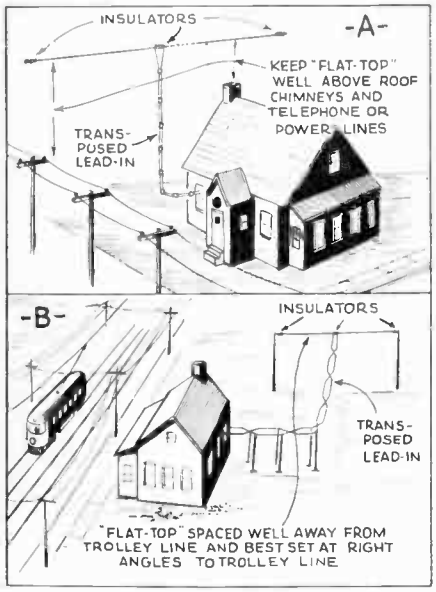
Only questions of general "Listener" interest will be answered here. No queries can be answered by mail. No diagrams of a technical or involved nature will be given here—only those which the Editors feel will be of value to the average "Short-Wave Listener."

BEST AERIAL AND LEAD-IN

H. W. Smith, Hoboken, N. J.

(Q) In your opinion which do you think is the best type of aerial to use for general short-wave reception and also what kind of a lead-in would you suggest? Is the "doublet" really more efficient than the older type single wire affair? If so, why? Should a ground be used with the doublet antenna?

(A) If you are contemplating erecting a new antenna, there is probably no one who can answer your questions clearly, unless they have an opportunity to investigate your particular case insofar as available room and surrounding buildings are concerned. However, if you are located in a more or less congested area, one might easily assume that the doublet antenna would be superior. On the other hand, in "rural" locations almost any kind of long, high, antenna will serve very nicely. There is one important point to remember in erecting antennas and that is: They must be as high above the ground as possible and clear of all surrounding objects which may possibly cause interference, such as electrical machinery and power lines. The doublet antenna exhibits its noise reducing capabilities only when the flat-top portions are located **out** of the field of noise. The lead-in has been found to be little affected with noises caused by electrical machinery, etc. If you do not make an effort to keep the flat-top of the antenna out in the clear, the doublet will offer practically no advantages. In another section of this magazine you will find a complete article describing short-wave antennas.



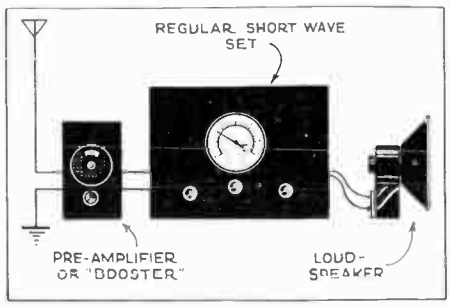
The above drawing gives a general idea of how the "doublet" antenna should be situated in relation to power lines, electric railways, or highways which may be the "source" of much interference.

PRE-AMPLIFIERS

James Skilley, Pittsburgh, Pa.

(Q) Do pre-amplifiers really offer the advantages which are claimed for them by the various manufacturers? Some of these reputed advantages are increased signal strength, and also decrease in noise-level.

(A) Unquestionably pre-amplifiers or boosters, if well designed, do offer considerable advantages. These are namely: The elimination, or partial elimination, of "repeat" points on superheterodynes—that is, cases where a station can be heard on more than one point, one of these points being known as an "image." On tuned R.F. (Radio frequency) receivers the only advantage is the increase in sensitivity. About the noise reduction—that has always been a rather controversial subject. In many cases we have found that an improvement could be noticed in the ratio of signal to noise. This may be accounted for by the slight increase in selectivity of the high frequency portion of the set, where an increase in selectivity should naturally result in less noise.



A booster or pre-amplifier is connected between the antenna and the receiver with which it is used. The drawing above illustrates the position occupied by instruments of this type.

SKIP DISTANCE

Thomas Mullin, Boston, Mass.

(Q) What is "skip distance," and what are its causes? Also is there any known method of overcoming fading of short wave stations?

(A) "Skip distance" is a term given to the area over which a station cannot be heard when it is possible to hear this station at a further distance. The explanation which has been offered by various scientists is that the signal traveling up to the Heaviside Layer, is reflected back to earth again at an angle, leaving a "dead" area between the point where it returns to earth and the station. We do receive this signal, depending upon its frequency, at various distances nearby the station. This is what is known as the "ground wave," so the "skip distance" is really considered as the distance between the point where the "ground wave" diminishes and where the "sky wave" first returns to earth. See article elsewhere in this issue.

DO ONE-TUBE SETS REALLY GET EUROPE?

Henry Moscowitz, Brooklyn, N. Y.

(A) ABSOLUTELY!! Any one-tube regenerative receiver under average conditions will pick up (on headphones) not only European stations, but nearly any other station that can be brought in on the most expensive receivers. This is because of the fact that when a vacuum tube detector is operated close to the oscillating point, it is unquestionably the most sensitive arrangement that can be obtained, although we do not make any claim that a one-tube receiver will perform as well as any other receiver using various circuits and a multiplicity of tubes.

ALL WAVE OR SPECIAL S.W. SETS

J. T. Phinney, Philadelphia, Pa.

(Q) Which is the best type of receiver, "all-wave" affairs or one designed especially for short-wave reception?

(A) With modern equipment such as we have today, including highly specialized radio laboratories and precision manufacturing machinery, we see no reason why it is not possible to build an "all-wave" set which will give just as good results on short waves as one specially designed for short-wave reception. Too, we have the advantage of being able to listen to the regular broadcast programs on long waves at will; all by the twist of a simple switch.

has, as yet, not been perfected because if, on the last Friday before the boat got to Caracas, Dolores de la Punta had seen Johnny, perhaps she would not have thought of blowing kisses to him. Instead, she might have tried to hand him a glass of water—by television of course—for poor Johnny was in no mood that night to listen to her. And as for kisses—ugh! He had vainly tried to listen, but the wiles of Neptune had gotten him, and the wily god had sent for his messengers who clutched at Johnny's vitals and made him unfit even to think of love. All he wanted to do was die; at least, that is the way he felt when he got into the throes of seasickness. But even this passes, and I have to report as a truthful chronicler once more that in due time the excursion ship made port and Spencer senior and junior left immediately on a sightseeing tour of Caracas, they both having arrived early in the morning, and it was thought best not to rush to the radio station too early.

Johnny had nursed the desire for a colossal surprise, and he had been careful not to write, cable, or telephone by ocean telephone to Dolores of his coming. It was all going to be a great surprise. Indeed, the gods had been good to him because it was on a Tuesday that he landed, and was she not to sing tonight at 10 P.M. (9 P.M. New York time) as usual? When evening came around, Johnny made sure to put on his best suit, nattiest tie, snappiest hat, and various other accoutrements to complete the sartorial splendor of the young and well bred *señor* from *Nueva York*.

If you are a discerning reader, which no doubt you are, you have guessed by this time that Johnny was on pins and needles all day long, and that the beautiful scenic sights along the ocean roads overlooking the Atlantic did not particularly interest him. But he was vitally interested when he saw the tall radio towers of the *Estacion de Radiodifusion Venezolana*. Evening finally rolled around, and the studio was reached fully a half an hour before the time that Dolores was to go on the air. Johnny made himself known to the technical staff, who graciously conducted him around, and when he announced that he was a good friend of Dolores de la Punta, the young attendant, whose English was none too good, slightly raised his eyebrows at this, but politely refrained from making comments. Finally, Johnny and his father took seats in the ante-room and waited for the appearance of the *señorita*.

A few minutes before nine the door opened and a buxom matron in the early forties breezed in. The attendant at the desk jumped up and introduced Johnny.

"This is Señorita de la Punta." Johnny gave an audible gasp and would have fainted if his father had not supported him. Impossible, thought he, Señorita Dolores is a young girl. How can this be?

It should be chronicled here that Dolores, of course, did not know Johnny, but she heard the name and she said, "Johnny Spencer? I know such a man from the United States. Do you know him?" and then she gave the address. Johnny could not believe his ears. He stammered, crestfallen, that he was the man, that *he* was THE Johnny Spencer with whom *she*, Dolores, had been corresponding all these months.

SHORT WAVES BY HEART

(*Continued from Page* 17)

At this, the buxom *señorita*, who really was not difficult to look at, burst out in a tremendous laugh. *Por Dios!* This is certainly a strange situation. Why did you not tell me that you were coming on a visit? Why must you surprise me? And, indeed, *Señor* YOU are not the man on the photograph at all you must be his brother!"

The totally crestfallen and even more crushed Johnny shamefacedly then had to admit that the photograph which he had sent was really not his own but his father's. At this Dolores could not constrain herself and guffawingly admitted that she had been guilty of a similar crime. But in her case she had sent him a photograph when she was a young girl.

But when she saw what a terrible effect all this had on Johnny she sat down by him and stroked his hand and told him that, after all, she was a professional singer and received many letters and requests for photographs, and that the management of the *Estacion* always had thought it best to send a more flattering portrait, for which, of course, no one could blame them. Come to think of it I can't blame her myself.

But now the time had come for her evening broadcast, which she must do, and she asked her friends to wait until she was finished. As in a bad dream, Johnny was listening to her in the anteroom, where through the studio loudspeaker, her usual voice came wafting to him. Still the same voice, still the same rich tones, but somehow, all life had gone from Johnny, he was totally disillusioned, crushed, beaten, and all the other states which a much more able author than I could describe far better.

When Dolores finally stepped from the broadcast studio, she was rather serious because she had realized that it is not well to laugh at wounded and fallen heroes nor is it in good taste. Besides, it hurts them! So with a twinkle in her eye, she asked the two *señores*, would they not care to come for coffee and liqueur to her home? On the way she would try to explain most of the situation. Would the two *señores* accept? The two *señores* would, with many *gracias*.

Dolores de la Punta owned her own car and she undertook to take our American friends to her home. An interested observer, who had not been as badly crushed as Johnny, would perhaps have noticed that the elder Spencer was rather impressed with the buxom Dolores and began to cast admiring glances at her from time to time. On the way to her suburban home, Dolores explained that she was a widow and besides giving music lessons, she broadcast twice a week over the famous Caracas station, and that, indeed, she had many distant friends, not only in her own country, but in many other South American countries as well as in North America.

Finally Johnny screwed up enough courage to ask, "But Dolores, how could you possibly send me those glowing letters and lead me on for all these months?" To which the *señorita* laughingly replied:

"*Que cosa!* How could *you?* Did you not fly under false colors, too, and did you not lead me to believe that you were a much more mature man than you actually are?" Johnny felt the full force of this argument and became morosely silent as is befitting crushed and thoroughly squashed heroes.

"But here we are!" exclaimed Dolores in her rich and pearly voice. "*Bienvenidos señores*—welcome, my friends, to my modest home." They ascended the short flight of stairs when suddenly the door was thrown open, and for the second time that day Johnny experienced a tremendous shock, only this time it was a rapturous one. For framed in the doorway stood the very counterpart of the photograph which he had treasured for so many months. Indeed, the young lady who had opened the door was far more beautiful than the photograph, and if space and time would permit, I would be happy to paint you a really masterful picture of her overwhelming and titanic beauty, but being an intelligent reader, you perhaps can supply the details readily yourself. Also, for the second time that day Johnny almost swooned when he saw the apparition, for such he thought it was, and would have fallen to the floor if his father had not steadied him. He, too, was surprised, or should I say flabbergasted?

Finally Johnny found his voice and came out of his trance. He started to splutter some words which did not make much sense. The Senorita Dolores de la Punta seemed to have divined all this, for she broke the spell by, "May I be allowed to introduce to the American señores my daughter Margarita de la Punta." In turn she introduced the two gentlemen. Now, it was the turn of Señorita Margarita to be flabbergasted. She almost came near swooning herself, but a kindly doorknob steadied her. She extended her hand to Johnny, but exclaimed "*Pero . . . pero . . .* but ze photograph," in a fairly good English, "is not Johnny Spencer much older, and has he not got ze mustachio?"

With a laugh Dolores explained the situation to her daughter, who, in turn, was convulsed with laughter. She reextended her hand to Johnny, and made him welcome, in a voice that thrilled our young hero to the core, wherever that is located, anatomically. After all were seated, explanations were, of course, in order. Senorita Dolores de la Punta, had much correspondence, which her daughter graciously took off her hands and the letters that had passed between Johnny and Dolores really had been received by her daughter who answered them, and having been smitten herself

with Johnny's photograph, she was in real earnest in her correspondence with him.

At this crucial point, I could go into reams of details as to the rest of the plot of the story, but you, as a discerning reader are probably miles ahead of me already. Of course, you guessed by this time that Johnny and Margarita were soon betrothed and you probably also guessed that the elder Spencer and Dolores were not slow in following suit.

What I am not going to tell you is of the ensuing relationships between the father and son. For instance, the double marriage was a direct cause in making Johnny's father his own father-in-law, and here I am going to stop. The rest is too complicated, and if you can figure it all out, you are better than I am.

At the end of the chapter, we find our heroes and heroines duly returned and ensconced in their New York suburban home. And believe it or not, radio is a wonderful thing, for on an evening after their return, we find Señorita Dolores de la Punta, now Señora Albert Spencer, seated in Johnny's radio shack listening to Caracas. At 9 P.M. as usual, Señorita Dolores de la Punta goes on the air, yes there is the theme song, *"La Violetera,"* and she sings it with her usual gusto. Dolores herself sits 2,000 miles away from Caracas and listens to her own broadcast. Yes, you have guessed that too. Before she left Caracas, the station made excellent phonograph records of the famous *señorita*, and whether she is in Caracas or in New York, her voice still thrills thousands of short-wave listeners every Tuesday and every Friday promptly at 9 P.M. (Eastern Standard Time.)

Grand S-W Station List

(*Continued from Page 43*)

YV3RC,	Caracas, Venezuela, 6.160
YV4RC,	Caracas, Venezuela, 6.475
YV5RMO,	Maracaibo, Venezuela, 5.850
ZFA,	St. George, Bermuda (Hamilton), 5.045
ZFB,	St. George, Bermuda (Hamilton), 10.060
ZFD,	St. George, Bermuda (Hamilton), 10.335
ZFS,	Nassau, Bahamas, 4.513
ZGE,	Kuala Lampur, Federated Malay States 5.996
ZHI,	Singapore, Federated Malay States, 6.060
ZLT,	Wellington, New Zealand, 7.381; 10.990
ZSS,	Capetown, Union of South Africa, 18.856

Tuning in S-W Stations

(*Continued from Page 12*)

by not properly adjusting the receiver tuning control. The dial should be set exactly on the center of the carrier wave in order that "side-band cutting" will not be encountered. When the station is properly tuned in, adjust the volume control until the best ratio of "noise" to "wanted signal," music or voice, is obtained; don't turn the volume control all the way up, trying to obtain a tremendously loud signal! In most cases it will just about be useless, insofar as ability to understand the signal is concerned. It is much better to have the signal only loud enough to be comfortably heard a short distance from the speaker. This will be a condition where minimum background noise is present. One other adjustment that is really very important, is the tone control. After we have tuned the station in this far, adjust the tone control until you obtain the clearest signal. The tone control when adjusted to deepen the tone of the set will reduce hissing and scratching noises.

Identifying S-W Stations

(*Continued from Page 4*)

2. Consult an up-to-date log book to see what station it is likely to be.

3. If the program appears to be of domestic or local origin, switch to the standard broadcast band on your dial and tune quickly to see if you can find the same program repeated on an NBC Red or Blue Network station, or on the Columbia Broadcasting System. Also try the other standard broadcast stations that have auxiliary short wave transmitters, such as KDKA, WEEI, WCAU, WBZ, WENR, WCFL, etc.

Fading and "Skip-Distance" Explained

(*Continued from Page 29*)

responding to attraction of the moon and other heavenly bodies; also Northern Lights, sun-spots, etc.

A further natural phenomenon is that the 19 meter band is usually quite free of static disturbances, so much so that a good, sensitive receiver may sometimes seem to be "dead" at the higher frequencies until a station is tuned in, and the other Short Wave bands are not so much affected by natural thunderstorm static as are broadcast transmissions, although interference from man-made static-generating devices, particularly automobiles, may be more troublesome at 49 and 31 meters than they are at longer or shorter wave lengths.

These ultra short waves, from about 10 meters to .001 meter, are not now useful and cannot be received efficiently using standard types of radio tubes. They are not included in the best all-wave and short-wave receivers built to sell on performance and entertainment value. A few radio manufacturers, seeking "exclusive" claims to more dial coverage even though it may be useless, are marking their dials down to seven or eight meters. If there were any stations transmitting at these frequencies, they could only serve a small local audience, and probably could not be heard on sets using standard tubes.

OFFICIAL DOERLE SHORT-WAVE GLOBE GIRDLING RECEIVER

COMPLETE $25.95
nothing else to buy

LISTEN IN with this AMAZING 5-TUBE DE-LUXE A. C. Short-Wave RADIO

Guaranteed RECEPTION of Foreign Speech and Music

Has Features Found Only in More Expensive Receivers

Before you buy any other Short-Wave Receiver, be sure to take advantage of our FREE *five day trial offer*, explained below.

Satisfy yourself, in your own home and at your own leisure, that this IS one of the greatest values in radio. You will then agree with us, that it *does* have features which are found only in more expensive receivers. Note the ease with which foreign stations and other short wave broadcasts come rolling in. Note how smoothly it regenerates and how pleasant the tone is, and how much reserve power there is for the more distant stations.

Once you get the "feel" of this wonderful receiver, you will never want to be without it. It is because we are so confident of the excellent fool-proof performance of this *Doerle Five-Tube De-Luxe Radio* that we are able to make this outstanding offer.

"HAS ENVIABLE FOREIGN STATION RECORD"

During its initial test, in one sitting, this receiver tuned in on its loud speaker, at good room volume, the following enviable log: Speech and music from *DJA, DJB and DJC, Zeesen, Germany;* diplomatic speeches from *HBL and HBP, Geneva;* commercial broadcast from *VE9GW, Ontario, Canada;* other interesting broadcasts from *V9DN, Quebec; GE9DR, Montreal; VE9HX, Halifax; XETE, Mexico City; YUIBX, YV3BC, Caracas; CP5, Bolivia; LSN, Buenos Aires; COC, Havana; EAQ, Madrid; WIXA, WIXAZ, Boston; W3XAL, Bound Brook, N. J.; W8CAL, Cincinnati; WQO and WEF testing with the Byrd Expedition and a whole flock of amateurs in practically every radio district of the United States.* After that, we could no longer keep our eyes open so we "signed off" to bed.

Tests on following evenings brought equally gratifying results. And if we can get these remarkable results in our poor location, in the heart of the business district of New York City, you can do even better in your residential district. These receivers come to you fully equipped for immediate use. There is nothing else you need buy. Merely attach your antenna and ground, plug in the line cord and "go to it."

This instrument is mounted in a beautiful, black crystalline-finished metal cabinet, with full-vision illuminated dial and patterned speaker grill. *The Official Doerle Short-Wave Receiver name plate is affixed to the front panel for your protection.* FREE 7-page pamphlet of instructions and diagrams with each set. Shipping weight 35 lbs.

No. L-5000. "Doerle AC-5" Short-Wave Receiver, Complete with tubes, speaker and 8 coils covering 15 to 200 meters. Completely wired and tested. (NOT SOLD IN KIT FORM.) **YOUR PRICE** **$25.95**

Nation-Wide TESTIMONIALS Praise These DOERLE SETS

Gentlemen:

This 1935 model is one of the smoothest and best operating sets I have ever operated both on amateur and foreign reception. I have heard practically all of the South American stations, Russia, Spain, and of course France, Germany, Japan and lots of others. This little receiver is just as you say it is. The best for the money. I have seen sets selling for lots more, that don't come in a mile of this Doerle.

S. L. SMITH, Colorado, Texas.

* * *

Dear Sirs:

As I have had sufficient time now to give the Doerle a real test here are my results: HJ7ABB, PHI, DJB, TSE, GSB, GSF, YV1BC, KNRA, XETE, VE9JR, PSK, EAQ, G6RK, HJ4ABB, FYA, HJB, YV3BC, LSX, HC2RL, CGA, VK3ME, GBB, VK2ME, KKP, 12RO, KIO, EHY, GCB, RNE, LSG, LSA, XEDC, and CQN in Macao, China. Airport, amateurs and police stations are too numerous to mention. I have used several well known makes of receivers but never had such good results.

GLENN L. THOMPSON, Chicago, Ill.

TECHNICAL DESCRIPTION

Uses either short-wave doublet or standard antenna ● Tunes from 15 to 200 meters ● 12,500 mile tuning range ● Built in dynamic speaker ● Head Phone jack ● 8-low-loss ribbed plug in coils ● Two tuned stages, regenerative detector, 3 AF stages with powerful 41 pentode output matched to speaker ● Uses 1-6D6, 1-6F7, (actually two tubes in one), 1-37, 1-41 and 1-80 full-wave rectifier ● Single dial control, with full-vision airplane dial ● Earphone switch cuts out dynamic speaker when using phones.

FREE!

Large 52-page book of short-wave facts, data, diagrams, circuits and illustrations. "WRITE TODAY" Send 5c in coin or new U. S. stamps for postage. Book sent by return mail.

USE THIS COUPON for ~ FREE 5-DAY TRIAL

Gentlemen: RADIO TRADING COMPANY, NEW YORK, N. Y.

I enclose herewith ..... dollars ..... cents, for your new Doerle 5-Tube De-Luxe Short-Wave Receiver on a five day free trial basis. I am to prove to my own satisfaction that it will give me world-wide reception and that your guarantee means exactly what it says. If, at the end of five days after the receipt of the radio, I am not perfectly satisfied, I will write you accordingly, whereupon you will send me shipping instructions. Upon your receipt of the radio, you will refund me the full purchase price. I agree to pay express charges one way and you the other.

C. O. D. shipment. I enclose herewith ..... dollars ..... cents deposit, balance of ..... C. O. D.

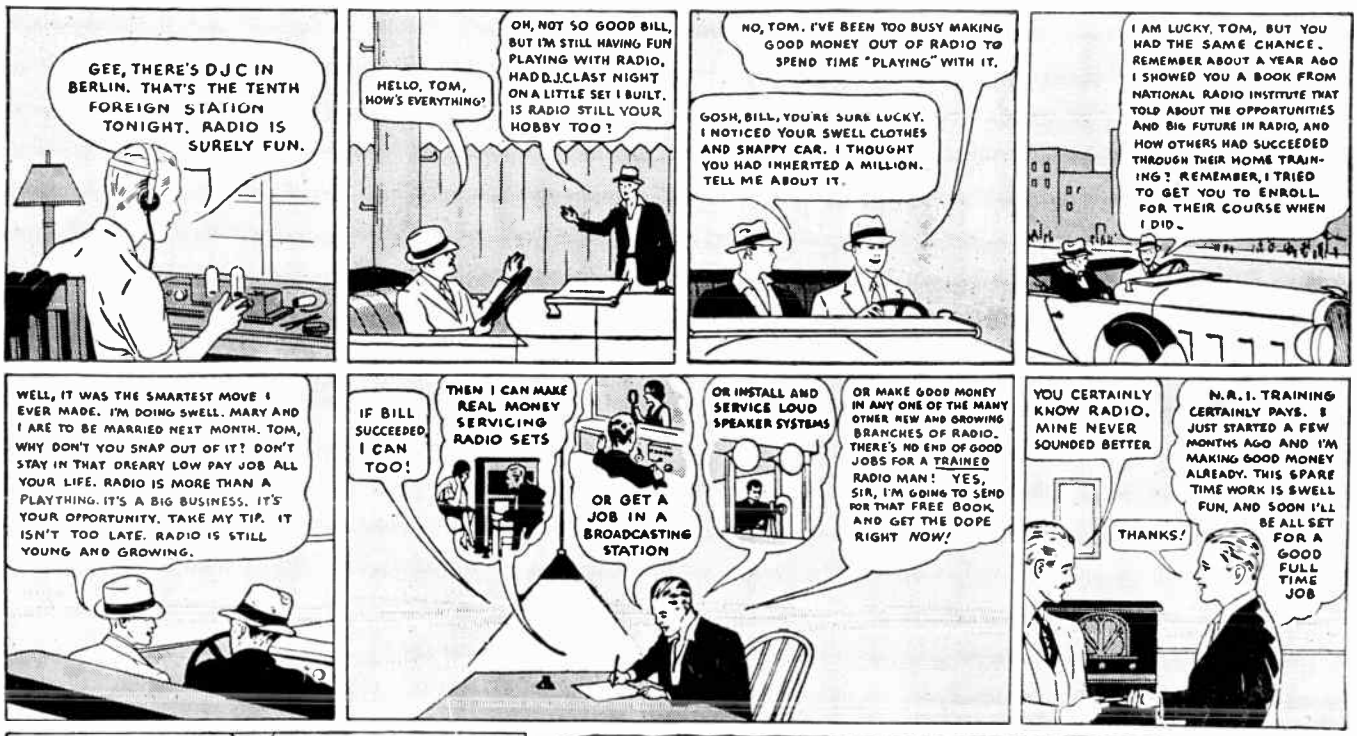
PRINT NAME .....

ADDRESS .....

TOWN..... STATE.....

Radio Trading Co. 103-A Hudson St., New York City.

How a "Tip" got Tom a Good Job



. . . . . I will help you start a spare time or full time Radio service business Without Capital

HERE'S PROOF THAT N.R.I. MEN MAKE GOOD MONEY

"Made $6,000 in 2 Years"

"Soon after the depression started, I found myself without a job, but I was well protected with N. R. I. training. I swung right to full time Radio servicing and I have made over $6,000 in a little over two years."—Wm. Spartivent, Sparty Radio Service, 93 Broadway, Newark, N. J.

"$500 a Year in Spare Time"

"Although doing spare time Radio work only, I have averaged about $500 a year extra in addition to my regular income. Full time Radio work would net me many times that amount."—Edw. H. Fawcett, Slough Rd., Ladner, B. C., Canada.

Many Radio Experts Make $40, $60, $75 a Week

The world-wide use of Radio sets has made hundreds of opportunities for good spare time or full time Radio businesses. Many of the seventeen million Radio sets are only 25% to 40% efficient. I will show you how to cash in on this condition. I will show you how to install and service all types of receiving sets in spare time. I'll show you how to make enough money while learning Radio to start your own service business. Clip the coupon. Get my free book, "Rich Rewards in Radio." Read how hundreds of N. R. I. men have made good money in spare time or full time businesses.

Many Make $5, $10, $15 a Week Extra in Spare Time While Learning

The day you enroll I start sending you Extra Money Job Sheets which quickly show you how to do Radio repair jobs common in most every neighborhood. I give you plans and ideas that have made good spare time money—$200 to $1000 a year—for hundreds of fellows. My Course is famous as "the Course that pays for itself."

Get Ready Now for a Business of Your Own and for Jobs Like These

In just about 15 years, Radio's growth has created over 300,000 jobs. Thousands more jobs will be opened by new Radio developments. Broadcasting stations use engineers, operators, station managers and pay up to $5,000 a year. Manufacturers employ testers, inspectors, foremen, engineers, servicemen, buyers, for jobs paying up to $7,500 a year. Dealers and jobbers employ servicemen, salesmen, buyers, managers, and pay up to $100 a week. My Free Book tells about these and other opportunities

Television, Short Wave, Loud Speaker Systems Included

There is opportunity for you in Radio. Its future is certain. Television, short wave, loud speaker systems, ship Radio, police Radio, automobile Radio, aviation Radio—in every branch, developments and improvements are taking place. Here is a real future for thousands of men who really know radio—men with N. R. I. training. Get the training that opens the door to good pay and success in this growing industry.

Find Out What Radio Offers You

I am so sure N. R. I. can train you satisfactorily that I agree in writing to refund every penny of your tuition if you are not satisfied with my Lesson and Instruction Service upon completion. Get my 64-page book of facts. It's free to any ambitious fellow over 15 years of age. It tells you about Radio's opportunities; about my Course; what others are doing and making. Find out what Radio offers you. No obligation. ACT NOW! Mail coupon in an envelope, or paste it on a 1c postcard.

J. E. SMITH, President
Nat'l Radio Institute, Dept. 5DH1
Washington, D. C.

FREE LESSON
ON RADIO SET SERVICING AND REBUILDING

Let me PROVE my Course is clear, easy to understand, fascinating to study. Send coupon for free lesson, "Direct Stage by Stage Elimination Method of Trouble Shooting". This interesting lesson gives many ways to correct common Radio troubles. I am willing to send it to prove you too can master Radio with my training—just as thousands of others have done. Many men without even a grammar school education, and no Radio or technical experience, have become Radio experts and now earn two or three times their former pay. MAIL COUPON NOW.

J. E. SMITH, President
National Radio Institute, Department 5DH1
Washington, D. C.

Dear Mr. Smith: Without obligation, send me the sample lesson and your free book about spare time and full time Radio opportunities and how I can train for them at home in spare time. (Please print plainly.)

NAME.....AGE.....

ADDRESS.....

CITY.....STATE.....

"39"

MAIL THIS for FREE 64 page book

Invisible Hands Magically Assure WORLD-WIDE HIGH FIDELITY RECEPTION *with This Amazing New*

MIDWEST 16-TUBE ALL-WAVE Radio!

(ALL FIVE WAVE BANDS)

SAVE UP TO 50% *Direct from Midwest Laboratories!*

THE almost magical performance of this super radio is startlingly human! As domestic and foreign stations are brought in, many automatic adjustments are constantly being made inside the set. It might be said that a number of "Invisible Hands" enable you to bring in and hold any station you desire from the whole world of broadcast ...regardless of fading and interfering conditions. Before you buy any radio, write for the new FREE Midwest "Fifteenth Anniversary" catalog and see how you can save from 1/3 to 1/2 by buying direct from Midwest laboratories. Learn why Midwest outperforms sets costing up to $200.00 and more. Now save 30% to 50%. Never before so much radio for so little money! Midwest gives you triple protection with: **One-Year Guarantee, Foreign Reception Guarantee, Money-Back Guarantee.**

ONLY RADIO COVERING 9 TO 2,400 METERS.
12,000 MILE TUNING RANGE
WORLD'S GREATEST RADIO VALUE
$57.50 *with New Deluxe Auditorium-Type* SPEAKER
(AXIS TYPE)

TERMS as low as **$5.00** DOWN

Only Midwest Offers Multi-Function Dial

This exclusive dial is not an ordinary airplane dial—but a many-purpose unit that performs exclusive functions. Send for FREE miniature dial showing these outstanding advantages:

1. Dial calibrated in Kilocycles, Megacycles and Meters;
2. Call Letters of American Broadcast Stations printed on Dial and Illuminated;
3. Slow-Fast, Smooth-Action Tuning;
4. Station Group Locator;
5. Simplified Tuning Guide Lights;
6. Automatic Select-O-Band Indicator;
7. Illuminated Pointer Indicator;
8. Silent Shadow Tuning;
9. Centralized Tuning.

50 ADVANCED FEATURES

Exclusive "Invisible Hands" features include: High Level Automatic Volume Control Action, Discriminating Automatic Tone Control, Multi-Function Dial, Micro-Tenmator, Fidel-A-Stat, etc. Only Midwest covers a tuning range of 9 to 2400 meters (33 megacycles to 125 kC)—enabling you to easily and successfully tune in even low-powered foreign stations up to 12,000 miles away. All 5 Wave Bands enable you to enjoy today's finest High Fidelity American programs. In addition, you get Canadian, police, amateur, airplane broadcasts...commercial and ship signals...and delight in exciting world-wide broadcasts from England, France, Germany, Spain, Italy, Russia, Australia, etc. Send today for money-saving facts!

SENSATIONAL HIGH FIDELITY RECEPTION

This bigger, better, more powerful, clearer-toned, super-selective, 16-tube "Invisible Hands" radio gives you absolute realism—assures you of life-like, crystal-clear tone, unlike anything you have ever experienced before. You will hear one more octave—overtones—that cannot be brought in with ordinary radios. Now, hear every instrument, every note, every shade and inflection of speech.

New Style Consoles

The Midwest 36-page catalog pictures a complete line of beautiful, artistic de luxe consoles and chassis to your order. Write for new FREE catalog today!

Midwest long-range radios are priced as low as ... $27.50

DEAL DIRECT WITH LABORATORIES

Increasing costs are sure to result in higher radio prices soon. Buy before the big advance ...NOW...while you can take advantage of Midwest's sensational values. No middlemen's profits to pay! You can order your Midwest High Fidelity radio from the new Midwest catalog with as much certainty of satisfaction as if you were to select it in our great radio laboratories. You save 30% to 50% when you buy the popular way—you get 30 days FREE trial...as little as $5.00 down puts a Midwest radio in your home. Foreign Reception, One-Year and Money-Back GUARANTEES protect you! Write for FREE catalog NOW—TODAY!

SAVE UP TO 50%

Hears His Native Country

Newport, Mass.—I tuned in CTIAA, Lisbon, Portugal, my birthplace...clear as a bell. Heard news, music and songs of my country. This alone is worth more than low price I paid for my Midwest. Also tuned in GSB, England; 12RO, Rome; DJA, Germany and many other foreign stations. Aniball N. Ferreira.

MAIL COUPON TODAY! FOR FREE MINIATURE DIAL..... FREE 30-DAY TRIAL OFFER.. FREE CATALOG

MIDWEST RADIO CORP.
Dept. 159-A Cincinnati, Ohio.

User-Agents Make Easy Extra Money. Check Box for Details.

Name .....
Address .....
Town ..... State .....

Check here if interested in Midwest World Wide Battery Sets.

MIDWEST RADIO CORP.
DEPT. 159-A—CINCINNATI, OHIO, U. S. A.
Established 1920 Cable Address Miraco.... All Codes