

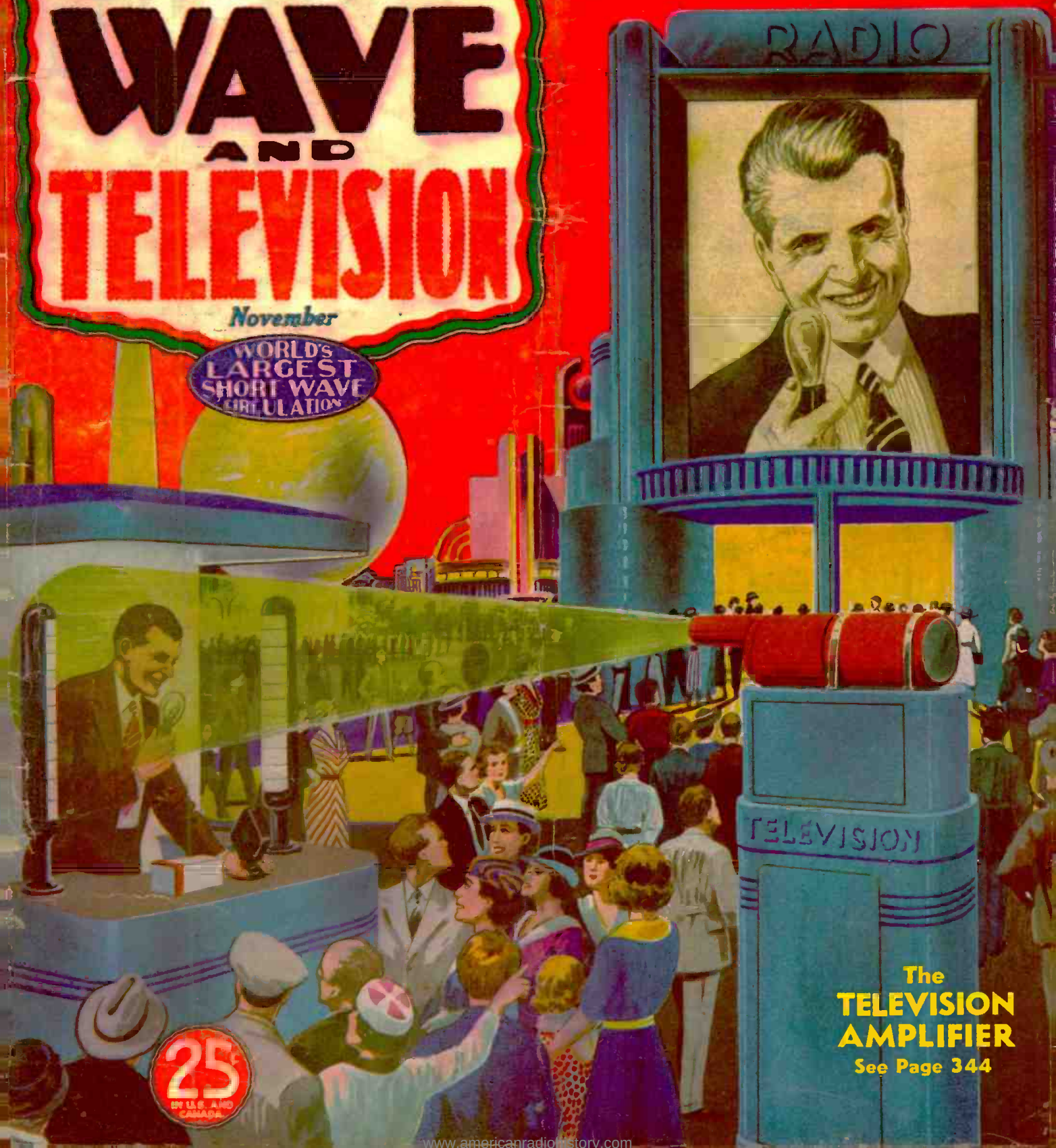
THE RADIO EXPERIMENTER'S MAGAZINE

HUGO GERNSBACK
Editor

SHORT WAVE AND TELEVISION

November

WORLD'S
LARGEST
SHORT WAVE
CIRCULATION



The
**TELEVISION
AMPLIFIER**
See Page 344

**RCA ALL
THE WAY**

RCA Radio News

RCA Manufacturing Company, Inc. • Camden, New Jersey
A Service of the Radio Corporation of America

**EVERYTHING IN
RADIO-MICROPHONE
TO LOUDBEAKER**

To the consumer, RCA means high quality performance at low cost...To the radio man, RCA means easier selling, higher profits

A SHORT WAVE SENSATION

RCA Victor Overseas Dial Brings New Ease to Tuning of Short Wave Stations

**Thousands Laud New Extra-
Value Features of 1938
RCA Victor Radios**

**"Push A Button—There's Your
Station" With Electric Tuning
and Armchair Control**

Now it's as easy to tune for short-wave stations as it is to tune for domestic ones! That's why short-wave fans are acclaiming the new RCA Victor Overseas Dial.

This revolutionary tuning device carries names of foreign stations on dial scales. Each of the band scales are $9\frac{1}{2}$ " wide. Compare this with the usual $\frac{1}{4}$ " or narrower segments on most short-wave dials and you will see for yourself that short-wave stations are spread 50 times wider apart on the Overseas Dial. As a result, tuning for foreign stations is much easier than ever before. Large, easy-to-read dials are one of the important features of all new RCA Victor radios.

Another RCA Victor tuning device in the new sets is Electric Tuning. Push a button—there's your station. That's all

you have to do to get any one of your eight favorite stations. You can have Electric Tuning with Armchair Control—an ingenious device which permits push-button tuning from across the room, another room, or any place else that's convenient.

In all, the 1938 RCA Victor line provides 55 great features, including Sonic-Arc Magic Voice, Magic Brain, Magic Eye, RCA Metal Tubes. Ask your local RCA Victor dealer to tell you about all the features. Buy your radio the wise way—on proof. There are 39 new models with prices to suit you. All RCA Victor radios are available on C.I.T. easy payment terms.



RCA Victor Model 813K featuring new Overseas Dial and Electric Tuning. 13 tubes, new Sonic-Arc Magic Voice, Magic Brain, Magic Eye, RCA Metal Tubes. Covers standard broadcast band and 49, 31, 25 and 19 meter bands of international entertainment. Armchair Control available at slight extra cost. Yours for \$15 down.

Amateurs Get Instrument They've Always Wanted— At Low Price



New, 16-tube communication receiver provides plus performance at low price.

Its performance shouts "custom-built"—yet you can afford its price! That's the ACR-111, RCA's new communication receiver. This exceptional instrument has every desirable feature for communication service. Meets every requirement of modern high frequency communication—takes the most trying conditions in its stride.

The ACR-111 provides exceptional sensitivity, limited only by the tube noises common to all signal-input tube circuits. An efficient antenna coupling system is provided to permit the use of receiver's inherent sensitivity.

Selectivity is the maximum consistent

with requirements of communication service. Unusual frequency stability and reliability have been achieved by careful electrical circuit design and the use of rugged circuit components.

Among its outstanding features are the constant-percentage electrical band-spread system, noise suppressor, 2 r. f. and i. f. stages.

Cabinet, or rack mounting, models for only \$189.50 at the factory. Free descriptive folder available without cost, from your supplier.

NOTE THESE FEATURES:

16 Tubes (14 All-Metal, 2 Glass) . . . 540-32,000 kcs. Continuous . . . 2 Tuned R-F Stages, 2 I-F Stages . . . Constant-Percentage Electrical Band-Spread . . . Noise Suppressor . . . Noise Limiter . . . Quartz Crystal I-F Filter . . . Electron-Ray Tuning Tube and Signal-Strength Indicator . . . 3 Magnetite Core I-F Transformers . . . Delayed and Amplified A.V.C. . . . Unique Stand-by Pilot Light . . . All Controls on Front Panel . . . Separate Dust-proof 8-inch Dynamic Speaker . . . Band Change by Self-cleaning Switch . . . Handsome, Rugged Metal Cabinet . . . Individual Dial for Each Range . . . Dial Calibrated in Megacycles . . . Separate Calibration-Spread Dial . . . High Signal-to-Noise and Image Ratio . . . Large Tuning Knobs with Crank Handles.

Free Central Phone Number Plan Uncovers RCA Check-Up Prospects

RCA Pays All Costs of Most Spectacular Check-Up Promotion Ever Offered Radio Service Dealers

RCA has introduced a new way of making the famous Check-Up Plan produce extra profits for radio service dealers! Thousands have profitably hooked up to the Check-Up through a central telephone number!

This spectacular promotion again proves that wise dealers make money when they handle RCA Tubes. For RCA is always behind them—helping them sell with consumer promotions. Here's how this latest promotion worked: All RCA Tube Check-Up advertising in newspapers featured a central telephone number—having no connection with either distributor or dealer. People desiring an RCA Check-Up called this number and an operator relayed the call to the consumer's nearest qualified RCA Tube dealer. Prospects no longer wondered where to call, whom to see when



**Put new life in your
OLD RADIO!**

**RCA's 10-Point Check-Up will make
it Live Again! Costs only \$1.50**

CALL (Phone) **0000** now! For your nearest Authorized RCA Service Engineer. He recommends RCA Radio Tubes.

they needed a radio Check-Up. One number, easy to remember did the trick.

Attention-getting, hard-selling, 4-inch ads like the one above appeared on the radio page of newspapers three times a week. These Check-Up convicers produced amazing results—bringing radio service dealers job after job.

RCA also provided free sales helps, including post-cards, check-up tags, direct mail letters, and many others—all of which helped create new business and many profitable sales.

Everyone with a radio set over a year old is a prospect for the RCA 10-Point Radio Check-Up. Not only does the Check-Up give you a worth-while service profit margin but it also makes prospects pay for being discovered—for it reveals to you the people who need new radios, electric irons, refrigerators and the varied other electrical appliances you carry. See any RCA or Cunningham tube distributor for further details.



J. E. SMITH
President
National Radio
Institute
Established 1914
The man who has
directed the
home study train-
ing of more men
for the Radio In-
dustry than any
other man in
America.

I WILL TRAIN YOU TO START A SPARE TIME OR FULL TIME RADIO SERVICE BUSINESS WITHOUT CAPITAL

HERE ARE A FEW EXAMPLES
OF THE KIND OF MONEY
I TRAIN MY MEN TO MAKE



\$200 TO \$300 A MONTH IN OWN BUSINESS

"For the last 18 months I have been in business for myself, making between \$200 and \$300 a month. I have N.R.I. to thank for my start in this field."—ARLIE J. FROEHLER, 224 W. Texas Ave., Goose Creek, Texas.

OVER \$1,000 BEFORE GRADUATING

"Before completing half the N.R.I. Course I was servicing sets, and I made \$1,000 to \$1,200 before graduating. I am doing Radio service work for myself now."—ASHLEY G. ALDRIDGE, 1228 Shepherd St., Petersburg, Va.



CHIEF OPERATOR BROADCASTING STATION

"When I completed 20 lessons, I obtained my Radio Broadcast Operator's license and immediately joined Station WMPC, where I am now Chief Operator."—HOLLIS F. HAYES, 85 Madison St., Lapeer, Mich.

EARNINGS TRIPLED BY N.R.I. TRAINING

"I have been doing nicely, thanks to N.R.I. Training. My present earnings are about three times what they were before I took the Course. I consider N.R.I. Training the finest in the world."—BERNARD CONTA, 201 Kent St., Brooklyn, N. Y.



Get My LESSON on Radio Servicing Tips FREE

I'll prove that my Training gives practical, money-making information, that it is easy to understand—that it is just what you need to master Radio. My sample lesson text, "Radio Receiver Troubles—Their Cause and Remedy" covers a long list of Radio receiver troubles in A. C., D. C., battery, universal, auto, T. R. F., super-heterodyne, all-wave, and other types of sets. And a cross reference system gives you the probable cause and a quick way to locate and remedy these set troubles. A special section is devoted to receiver check-up, alignment, balancing, neutralizing, testing. You can get this lesson Free by mailing the coupon.



MAIL
COUPON
NOW

The Tested WAY
to BETTER PAY

Do you want to make more money? The world-wide use of Radio has made many opportunities for you to have a spare time or full time Radio service business of your own. Three out of every four homes in the United States have Radio sets which regularly require repairs, servicing, new tubes, etc. Servicemen can earn good commissions selling new sets to owners of old models. I will train you at home in your spare time to sell, install, service, all types of Radio sets to start your own Radio business and build it up on money you make in your spare time while learning. Mail coupon for my 64-page book. It's Free—it shows what I have done for others—what I am ready to do for you.

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

Almost every neighborhood needs a good spare time serviceman. The day you enroll I start sending you Extra Money Job Sheets. They show you how to do Radio repair jobs, how to cash in quickly. Throughout your training I send you plans and ideas that have made good spare time money—from \$200 to \$500 a year—for hundreds of fellows. I send you special Radio equipment and show you how to conduct experiments and build circuits which illustrate important Radio principles. My training gives you PRACTICAL EXPERIENCE while learning.

There's a Real Future in Radio For Well Trained Men

Radio already gives jobs to more than 300,000 people. And in 1936, Radio enjoyed one of its most prosperous years. More than \$500,000,000 worth of sets, tubes and parts were sold—an increase of more than 60% over 1935. Over a million Auto Radios were sold, a big increase over 1935. 24,000,000 homes now have one or more Radio sets, and more than 4,000,000 autos are Radio equipped. Every year millions of these sets go out of date and are replaced with newer models. More millions need servicing, new tubes, repairs, etc. A few hundred \$30, \$50, \$75 a week jobs have grown to thousands in 20 years. And Radio is still a new industry—growing fast!

Get Ready Now for Your Own Radio Business and for Jobs Like These

Radio broadcasting stations employ engineers, operators, station managers and pay up to \$5,000 a year. Spare time Radio set servicing pays as much as \$200 to \$500 a year—full time jobs with Radio jobbers, manufacturers and dealers, as much as \$30, \$50, \$75 a week. Many Radio Experts own and operate their own full time or part time Radio sales and service businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to \$6,000 a year. Radio operators on ships get

good pay, see the world besides. Automobile, police, aviation, commercial Radio, loud speaker systems are newer fields offering good opportunities. Television promises to open many good jobs soon. Men I trained are holding good jobs in these branches of Radio. Read their statements in my 64-page book. Mail the coupon.

I GIVE YOU A PROFESSIONAL SERVICING INSTRUMENT



Here is the instrument every Radio expert needs and wants—an All-Wave, All-Purpose, Set Servicing Instrument. It contains everything necessary to measure A.C. and D.C. voltages and current; test tubes, resistance; adjust and align any set, old or new. It satisfies your needs for professional servicing after you graduate—can help you make extra money servicing sets while training.

Save Money—Learn At Home Money Back Agreement Protects You

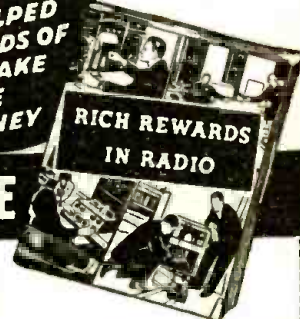
I am sure I can train you at home successfully. I will agree in writing to refund every penny you pay me if you are not satisfied with my Lessons and Instruction Service when you finish my Course. I'll send you a copy of this agreement with my book.

Find Out What Radio Offers You Get My 64-Page Book Free Now

Act Today. Mail the coupon now for my Free Lesson and my book, "Rich Rewards in Radio." Both are free to anyone over 16 years old. My book points out Radio's spare time and full time opportunities and those coming in Television; tells about my Training in Radio and Television; shows you letters from men I have trained, telling what they are doing and earning. Find out what Radio offers YOU! MAIL THE COUPON in an envelope, or paste it on a penny post card—NOW!

J. E. SMITH, President
National Radio Institute,
Dept. 7MB3
Washington, D. C.

THIS
FREE BOOK
HAS HELPED
HUNDREDS OF
MEN MAKE
MORE
MONEY



GOOD FOR BOTH 64 PAGE BOOK FREE SAMPLE LESSON FREE

J. E. SMITH, President, National Radio Institute, Dept. 7MB3.

Without obligating me, send your Lesson "Radio Receiver Troubles—Their Cause and Remedy" and free book about spare time and full time Radio opportunities and how I can train for them at home in my spare time—about the N.R.I. Set Servicing Instrument you give me. I am particularly interested in the branch of Radio checked below.

- ☐ Radio Service Business of My Own
☐ Spare Time Radio Service Work
☐ Retail Sales of Radio Sets and Equipment
☐ Service Expert for Retail Stores
☐ Broadcasting Station Operator
☐ Aviation Radio Operator
☐ Ship Radio Operator

- ☐ Loud Speaker Systems, Installations and Service
☐ Auto Radio Installation and Service
☐ Television Station Operator
☐ Service Expert with Radio Factory
☐ Commercial Radio Station Operator
☐ All-around Servicing Expert

(If you have not decided which branch you prefer—mail coupon now, for information to help you decide.)

NAME _____ AGE _____

ADDRESS _____ 14X1

Please mention SHORT WAVE & TELEVISION when writing advertisers

IN THIS ISSUE: PROMINENT SHORT-WAVE AND TELEVISION AUTHORS

Baird • Schrage • Cisin • Shuart • Kirk • Secor • Miller

HUGO GERNSBACK
Editor



H. WINFIELD SECOR
Managing Editor

GEORGE W. SHUART,
W2AMN
Associate Editor

Combined With
Official SHORT WAVE LISTENER

Contents for November, 1937

Editorial—Television and the Motion Picture, by James Logie Baird.....	341
How S-W's Could Have Saved Miss Earhart, by Ted Rogers	342
Short-Wave Pictorial.....	343
The Television Amplifier, by William Schrage.....	344
Broadcast Via Short Waves from Kentucky Hills.....	345
1910 "Ham" Station.....	345
How to Choose a Short-Wave Receiver, by H. W. Secor.....	346
Reflecting Layer Heights Automatically Recorded.....	348
Short Waves and Long Raves.....	349
World-Wide S-W Review, Edited by C. W. Palmer.....	350
Short-Wave Scouts—Forty-third Trophy Winner.....	351
The 4-in-2 Midget Space-Explorer, by H. G. Cisin, M.E.....	352
The 1938 5-T All-Wave Receiver, by H. Georges.....	354
All-Wave "Grid-Dip" Oscillator, by Jim Kirk, W6DEG.....	355
DeLuxe Five-Meter Mobile Station, by George W. Shuart, W2AMN.....	356
"Going to Town" on the 5-40-400 Transmitter, by Arthur H. Lynch, W2DKJ.....	358
What's New in Short-Wave Apparatus.....	359
Let's Listen In With Joe Miller.....	362
World S-W Station List, by M. Harvey Gernsback.....	363
How to Identify Short-Wave Stations.....	366
Short Wave League—When to Listen In, by M. Harvey Gernsback	368
\$5.00 for Best S-W Kink.....	370
Short Wave Question Box.....	372
Book Review.....	399

Features in the December Issue

Europe Points the Way in Television, by Allen B. Du Mont.

A new compact "Desk Type" All-band transmitter, by George W. Shuart, W2AMN.

A crystal-filter unit for the S. W. & T. Communications receiver.

A Fixed-Band 9-Tube de Luxe Super, by Raymond P. Adams.

A Good 100-Watt 5-meter Transmitter.

Certified Circuits



● **SHORT WAVE & TELEVISION** goes to a large expense in verifying new circuits. When you see this seal it is your guarantee that such sets have been tested in our laboratories, as well as privately, in different parts of the country. Only "Constructional-Experimental" circuits are certified by us.

When you see our certified seal on any set described, you need not hesitate to spend money for parts, because you are assured in advance that the set and circuit are bona fide and that this magazine stands behind them.

SHORT WAVE & TELEVISION is the only magazine that certifies circuits and sets.

OUR COVER

● **THIS** month the cover illustration shows a new television amplifier. By the time the New York World's Fair is in full swing, television demonstrations such as this will undoubtedly be in operation at the fair. The image can be easily magnified to great size by this new system. See page 344.

COPYRIGHT, 1937, BY H. GERNSBACK

Published by **POPULAR BOOK CORPORATION**

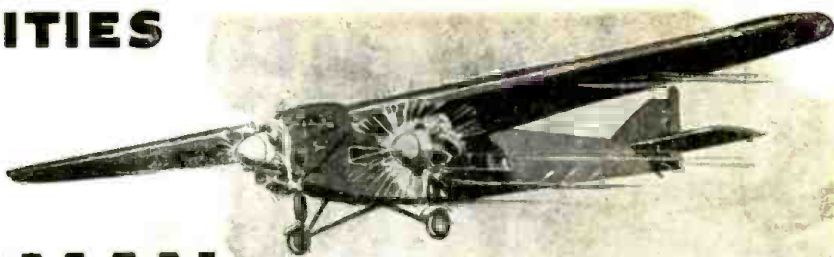
404 N. Wesley Avenue, Mount Morris, Ill.

Editorial and Executive Offices - - - 99-101 Hudson St., New York, N. Y.
HUGO GERNSBACK, President - - - H. W. SECOR, Vice-President
EMIL GROSSMAN - - - - - Director of Advertising
European Agent: Gorrington's American News Agency, 9A Green St., Leicester Square, London W. C. 2

Australian Agents: MCGILL'S AGENCY, 179 Elizabeth St., Melbourne

SHORT WAVE & TELEVISION—Monthly, Entered as second-class matter May 7, 1930, at the post office at Mount Morris, Illinois, under the act of March 3, 1879. Trademarks and copyrights by permission of H. Gernsback. 99-101 Hudson St., N. Y. C. Text and illustrations of this magazine are copyrighted and must not be reproduced without permission. **SHORT WAVE & TELEVISION** is published on the 1st of every month. Twelve numbers per year. Subscription price is \$2.50 a year in the United States and possessions and Canada. Foreign countries, \$3.00 a year. Single copies 25c. Address all contributions for publication to Editor **SHORT WAVE & TELEVISION**, 99-101 Hudson St., New York, N. Y. Publishers are not responsible for lost manuscripts. Contributions cannot be returned unless authors remit full postage. **SHORT WAVE & TELEVISION** 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.

MANY OPPORTUNITIES FOR THE COYNE TRAINED RADIO MAN



Are You Ready for a Better Job—More Pay?

Don't be an untrained man. Let me show you how to get your start in Radio — a fast growing, live money-making industry.

Prepare for jobs as Assembler, Inspector and Tester—Radio Sales or Service and Installation Work—Broadcasting Station Operator—Wireless Operator on a Ship or Airplane or Sound Work — HUNDREDS OF OPPORTUNITIES for a real future in radio!

12 Weeks of Shop Training

We don't teach by book study. We train you on a great outlay of Radio, Television and Sound equipment—on scores of modern Radio Receivers, actual Broadcasting equipment, Television apparatus and Sound Reproduction equipment, Code and Telegraph equipment, etc. You don't need advanced education or previous experience. We give you — RIGHT HERE IN THE COYNE SHOPS — the actual practice and experience you'll need for your start in this great field. And because we cut out all useless theory and only give that which is necessary you get a practical training in 12 weeks. Mail coupon for all facts about my school and training methods.



TELEVISION *and* PUBLIC ADDRESS

Television is sure to come as a commercial industry. Rapid progress is now being made in developing this new field. It will offer opportunities to the man who is trained in Radio. Here at Coyne you learn Television principles, and work on actual Television equipment. Public Address Systems offer opportunities to the Trained Radio Man. Here is a great new Radio field which is rapidly expanding. Prepare NOW for these wonderful opportunities! Learn Radio Sound Work at COYNE on actual Sound Reproduction equipment. Not a home study course.

SEND FOR DETAILS OF MY "PAY AFTER GRADUATION" PLAN

Mail the Coupon below and I'll tell you about my "Pay After Graduation" Plan which has enabled hundreds of others to get Coyne training with very little money. On this plan you can get your training first, then take 18 months to complete your small monthly tuition payments starting 5 months after you begin training.

Mail the coupon for all details of this "Tuition Payment Plan."

PRACTICAL WORK at COYNE in Chicago

ACTUAL. PRACTICAL WORK. You build and service radio sets. You get training on real Broadcasting equipment. You construct Television Receiving Sets and actually transmit your own Television images over our Television equipment. You work on real Sound equipment. You learn Wireless Operating on Actual Code Practice apparatus. We don't waste time on useless theory. We give you the practical training you'll need for your start in Radio—in 12 short weeks. If you desire code, this requires additional time for which there is no extra charge.

Mail Coupon Today for All the Facts

H. C. LEWIS, Pres. RADIO DIVISION Founded 1899

Coyne Electrical School
500 S. Paulina St., Dept. 87-2K, Chicago, Ill.

ELECTRIC REFRIGERATION AIR CONDITIONING AUTOMOBILE ELECTRICAL WORK

Instruction now included at no extra cost. Here is your opportunity to learn these valuable allied lines without extra tuition charge.

PART TIME EMPLOYMENT TO HELP YOU "EARN WHILE LEARNING"

If you are short of money and need part time employment to help pay for your room and board while training, my Employment Department will help you get a part time job.



GET THE FACTS

Don't let lack of money prevent your sending in the Coupon. Mail the Coupon today and I Will send you the Big FREE Coyne Book full of FACTS.

H. C. LEWIS, Pres.

Radio Division, Coyne Electrical School

500 S. Paulina St., Dept. 87-2K, Chicago, Ill.

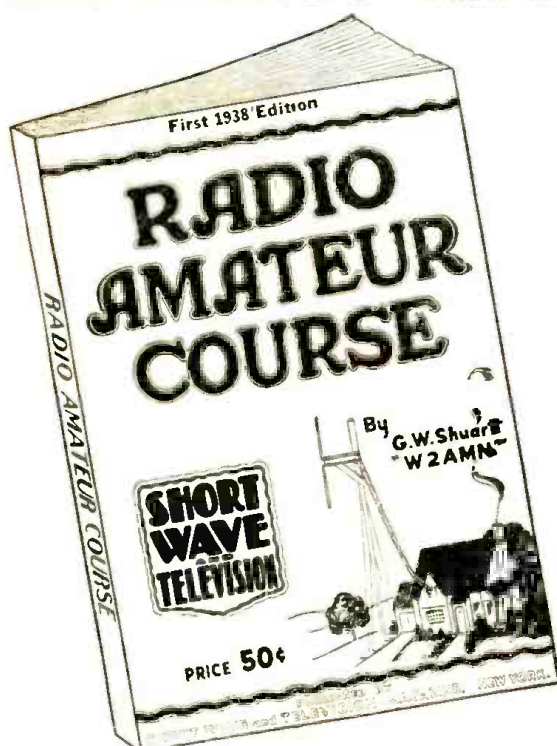
Dear Mr. Lewis:—Send me your Big Free Radio Book, and all details of your "Pay After Graduation" Plan including valuable instruction in Electric Refrigeration, Air Conditioning and Automobile Electrical Work.

Name.....

Address.....

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

AT LAST! The Book You Have Been Waiting For



A new book that will appeal to tens of thousands—
An essential book for all beginners—
The foundation of a radio education.

In the past few years we received thousands of requests from our readers in this and foreign countries urging us to issue a popular priced book that will describe in SIMPLE LANGUAGE the FUNDAMENTAL PRINCIPLES of short wave receivers and transmitters.

George W. Shuart, W2AMN, the author of this book, is well known to the short wave fraternity through the hundreds of outstanding *constructional articles* that appeared in SHORT WAVE CRAFT and SHORT WAVE & TELEVISION during the past five years. His articles have been frequently reproduced by many foreign magazines.

Through the "Question Box," edited monthly by Mr. Shuart in SHORT WAVE & TELEVISION, *thousands of problems* are solved for our readers. He knows what information is needed in order that they may have a thorough working knowledge of the art of Short Waves and thereby obtain the greatest enjoyment from their hobby.

No other book heretofore published contains so much valuable data, diagrams and illustrations.

This book covers EVERYTHING—from the theory of alternating current electricity to the complete short wave transmitting and receiving apparatus.

THIS BOOK DESERVES A PLACE IN YOUR LIBRARY

GET YOUR COPY NOW! ON SALE AT THE FOLLOWING DEALERS

ARIZONA

Sam's Cigar Store,
127 N. First Ave.,
Phoenix.

CALIFORNIA

Scott Wholesale Radio Co.,
344 E. Fourth Street,
Long Beach.
Offenbach Electric Co., Ltd.,
1452 Market Street,
San Francisco.
Zack Radio Supply Co.,
1426 Market Street,
San Francisco.

CONNECTICUT

Radio Inspection Service Co.,
227 Asylum Street,
Hartford.
Stern Wholesale Parts, Inc.,
Stern Bldg., 210 Chapel St.,
Hartford.

OREGON

Portland Radio Supply Co.,
1300 W. Burnside St.,
Portland.

PENNSYLVANIA

Radio Distributing Co.,
1124-26 Market St.,
Harrisburg.

UTAH

O'Loughlin's Wholesale Radio Supply
315 South Main Street,
Salt Lake City.

WISCONSIN

Radio Parts Co., Inc.,
536-538 W. State St.,
Milwaukee.

TEXAS

Amarillo Electric Co.,
111 East 8th Ave.,
Amarillo.

ILLINOIS

Allied Radio Corporation,
833 West Jackson Blvd.,
Chicago.

INDIANA

Van Sickle Radio, Inc.,
54 West Ohio Street,
Indianapolis.

MASSACHUSETTS

Springfield Radio Co.,
397 Dwight St.,
Springfield.

MISSOURI

Modern Radio Company,
409 No. Third St.,
Hannibal.

Burstein-Applebee Co.,
1012-14 McGee St.,
Kansas City.

Van Sickle Radio Co.,
1113 Pine St.,
St. Louis.

MICHIGAN

Rissi Brothers, Inc.,
5027 Hamilton Avenue,
Detroit.

NEW YORK

Eagle Radio Co.,
84 Cortlandt Street,
New York City.
Federated Purchaser, Inc.,
23-25 Park Place,
New York City.
Terminal Radio Corp.,
80 Cortlandt Street,
New York City.
Thor Radio Corp.,
65 Cortlandt St.,
New York City.
Wholesale Radio Service Co., Inc.,
100 Sixth Avenue,
New York City.
Radio Parts & Equipment Co.,
244 Clinton Avenue No.,
Rochester.

M. Schwartz & Son,
710-712 Broadway,
Schenectady.

NEBRASKA

Radio Accessories Company,
2566 Farnam Street,
Omaha.

NEW HAMPSHIRE

Radio Service Laboratory,
1187 Elm Street,
Manchester.

OHIO

Canton Radio & Supply Co.,
1140 Tuscarawas St., W.,
Canton.

United Radio, Inc.,
1103 Vine St.,
Cincinnati.

The Hughes-Peters Electric Corp.,
178-180 N. Third Street,
Columbus.

CANADA

Canadian Electrical Supply Co., Limited,
285 Craig Street W.,
Montreal, Que.
The T. Eaton Co., Ltd.,
Winnipeg,
Man.
Metropolitan News Agency,
1248 Peel Street,
Montreal, Que.

CUBA

The Diamond News Co.,
Palacio Asturiano, Por San Jose,
Habana.

ENGLAND

Gorrings's American News Agency,
9a, Green Street, Leicester Square,
London, W.C.2.

MEXICO

American Book Store, S. A.,
Avenida Madero 25,
Mexico City.

IF YOUR DEALER DOES NOT HAVE THE "RADIO AMATEUR COURSE" IN STOCK YOU MAY ORDER DIRECT FROM US BY FILLING OUT THE COUPON BELOW AND SHIPMENT WILL BE MADE IMMEDIATELY.

SHORT WAVE & TELEVISION, SW-11
99 Hudson Street, New York City.

Gentlemen: I enclose herewith my remittance for 50¢ for which please send me my copy of the "RADIO AMATEUR COURSE" postpaid.

Name

Address

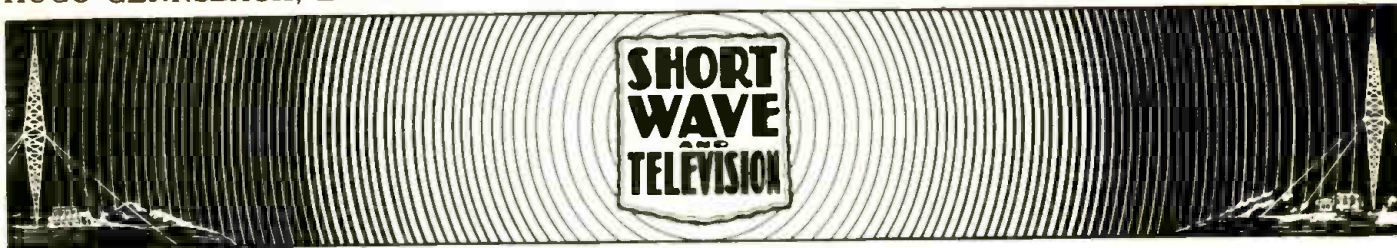
City State

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

Be sure to see future copies of Short Wave & Television for additional names of dealers handling this book.

SHORT WAVE & TELEVISION, 99 HUDSON ST., NEW YORK CITY

Please mention SHORT WAVE & TELEVISION when writing advertisers



TELEVISION and the Motion Picture

By James Logie Baird

Baird Television Limited, London.

● THE last few years have seen very rapid advances in television and the pictures received today compare not unfavorably with the home movie in detail and clarity, although the size of the picture is still less than that usually obtainable with the home projector. The size of the television picture, however, is being rapidly increased.

In the past, the picture size has been increased by increasing the size of the cathode ray tube, and tubes up to 22" in diameter can be constructed successfully. The difficulties of making very large cathode ray tubes however, have turned attention to an alternative means of producing a large picture, i.e., by using a small cathode ray tube and projecting a picture from this small tube on to a screen. By this means, the size of the picture is limited only by the amount of light available from the cathode ray tube. For home receivers, a picture two feet square is adequate and there is little difficulty in obtaining sufficient light for a picture of this size. Where, however, the cinema or movie is concerned, an enormous increase of brilliancy is necessary and considerable technical difficulties arise. Very high voltages are necessary, and the life of the screen becomes a problem of increasing seriousness. Images, however, have already been projected 6 ft. by 8 ft., and rapid progress is being made.

The motion-picture angle of television has not received the same amount of public attention as television for the home, nor is it in the same state of development. Already in London we have regular television service, and most of the large radio concerns are marketing television receivers, but although a number of demonstrations have been given of large-screen television, there is still no regular public service.

The future of motion-picture television is none the less of paramount importance, and may prove of even greater importance than television for the home. The future cinema will be a *Telecinema*, the present screen being replaced by a *television* screen; films, plays and topical events being broadcast direct to the vari-

ous cinemas and theatres from central studios. The movie theatre proprietor will have the option of different programs from different centers.

I cannot say, however, how long this will take to come about, but I am sure it will come.

There is one unfortunate limitation and that is the radius of the transmission, which, owing to the physical properties of ultra-short waves, cannot be received with complete reliability beyond a radius of approximately 25 miles. London is, however, fortunate, is being free from skyscrapers and being in many ways an ideal center for the broadcasting of television by ultra-short waves. Even a 25 mile radius covers a stupendous number of potential *lookers-in*.

Recent progress in cable manufacture has provided cables capable of carrying the very high frequencies for television, so that it has now become possible to send high-definition television images by land line over considerable distances and, by erecting ultra-short wave transmitters to cover each center of population it will be possible to send the same program over the whole country, the various radio transmitters being linked by a land line.

The radio set of the future will be a *Televisor*, every receiver having its television screen. It is customary to think of television as an adjunct to sound broadcasting, but I think that finally sound will be regarded rather as the complement of the picture, just as it is in the motion picture. We have come to associate sound with broadcasting, because unlike the cinematograph, (motion-picture projector) sound came before vision. None the less, *vision* is, in my opinion, the more important. We may recall how for many years the silent movie entertained its millions.

The radio industry were inclined at first to view television with suspicion and fear as a rival which would diminish or even destroy their sales, but now this attitude has changed, and every leading manufacturer is looking to television to give a fillip to the radio trade and increase instead (Continued on page 394)



James Logie Baird, member of the Board of Joint Managing Directors of Baird Television, Limited, London. Mr. Baird is well-known for his early demonstrations of television in England. His first work was done with scanning discs, and he was one of the first to demonstrate the possibility of television in color, as well as third dimension or relief images. Mr. Baird is now active in perfecting details on a new type of television receiver and he has done a great deal of work on large image television.

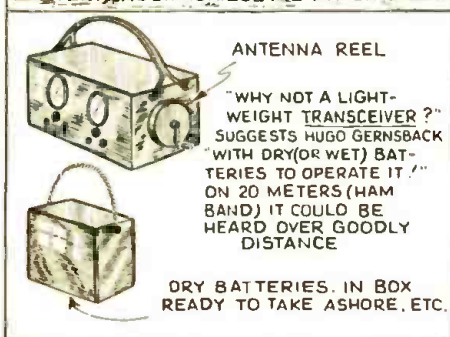
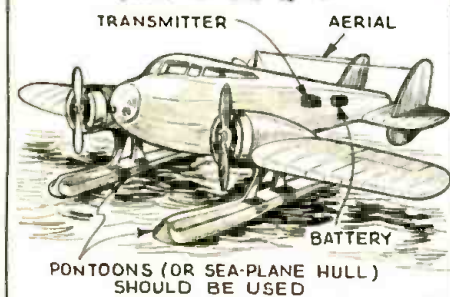
Eleventh of a Series of "Guest" Editorials

SHORT WAVE & TELEVISION IS PUBLISHED ON THE 1st OF EVERY MONTH

This is the November, 1937 Issue.—Vol. VIII, No. 7. The Next Issue Comes Out November 1

SHORT WAVE & TELEVISION, Published monthly at Mount Morris, Ill.

EDITORIAL and EXECUTIVE Offices, 99 Hudson St., New York City

RIGHT!

The pictures above show how pontoons fitted to a plane like Amelia Earhart's would have kept the radio in operating condition even though the plane had alighted on the water.

● THE mystery, resulting from failure to maintain radio contacts when the critical moment of emergency arose, surrounding the fate of Amelia Earhart and her substitute navigator, Captain Fred Noonan, has brought up a number of questions pertaining to expeditionary radio equipment which seem to have been overlooked completely in the past.

In the interests of speed Miss Earhart sacrificed all elements of safety, at least so far as her radio equipment was concerned. Not only was it a physical impossibility for her to operate her radio in case of a forced descent at sea, but when she took off for Honolulu she junked a most important part of her equipment, her 500-kilocycle antenna!

Miss Earhart held only a third-class radio-telephone license, the easiest of all licenses to get, and the knowledge requirements for which are practically nil. Captain Noonan had no license at all, and was not even qualified for third-class phone. Neither knew the first thing about code transmission or reception, and apparently all either knew of the technical side of radio was that you throw a switch one way to turn it on, and the other way to shut it off.

The plane had no pontoons, because Miss Earhart decided they would retard her flying speed.

When the "Flying Laboratory" was built it was equipped with a 50-watt crystal-controlled Type 13-C Western

How Short Waves Could Have Saved Miss Earhart

By Ted Rogers

Future flight adventurers may well follow the suggestions made by Mr. Rogers, Short-Wave Editor of The World-Telegram, and carry transmitters operating on a broad "ham" band, such as 20 meters. Thousands of Hams would have heard distress calls on this frequency. Hugo Gernsback, the editor, suggests that on such flights as Miss Earhart's, a portable "battery-operated" S-W transmitter be carried, which could be used on the plane or on land.

Electric transmitter, operating on three frequencies: 500 kilocycles, 3.105 megacycles, and 6.21 megacycles. On that basis of power it would have been difficult to improve on the plane's radio equipment, except for two most important details!

Pontoons Would Have Helped

First is the lack of pontoons. Although its route was largely over water the "Flying Laboratory" was strictly a land plane with no facilities whatever for landing, in emergency or otherwise, on water. Thus it would be impossible for its radio to continue to function for more than a very few minutes after a forced landing at sea; no longer, in fact, than the brief time it would take the plane to settle to the point where its radio equipment would get wet!

Even before the plane itself hit the surface of the sea its 500-KC equipment would be out of commission; it operated with a trailing antenna which would short-circuit itself automatically the instant its tip touched the water. So perhaps no charge of negligence could be made against Miss Earhart for tossing that antenna overboard, especially as 500 kilocycles is strictly a continuous-wave code frequency—and Miss Earhart knew nothing of code, and thus could not have operated on that frequency even while in the air.

When things go wrong in the air, they go wrong in a hurry! Seldom is there any time to establish radio contact in the brief interval between the time when something first seems amiss and when the actual crack-up occurs. A plane flying over water must have, if its radio is to be of any value when most needed, equipment which will keep it afloat and dry.

It may be argued that pontoons on a plane are not classifiable as radio equipment, but if operation of the radio in emergency is absolutely dependent upon pontoons, it may equally be argued that the radio is not complete without pontoons.

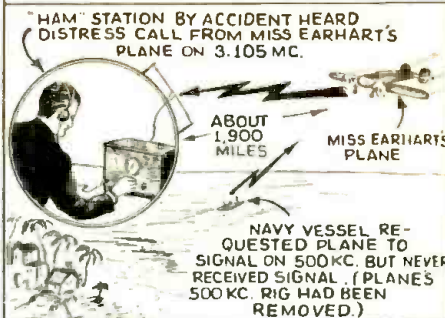
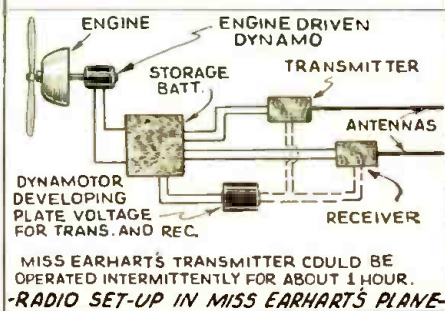
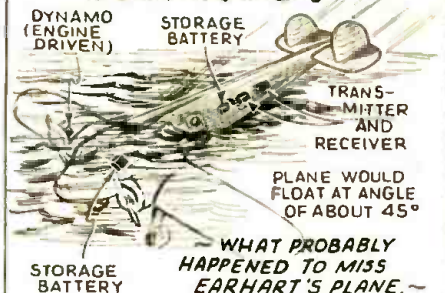
Miss Earhart's contention that pontoons were unnecessary and would result only in cutting her flying speed certainly does not seem to have been borne out by subsequent facts; she never came in sight of her goal.

Another deficiency in the Earhart radio facilities against which severe criticism has been directed is that neither of her two short-wave frequencies—3.105 megacycles and 6.21 megacycles—is in a band that is constantly

and competently monitored by receiving stations.

"Ham" Station Hears Earhart SOS on 3.105 mc.

Evidence supporting this criticism is found in the fact that although several land stations were supposed to be monitoring Miss Earhart, when the emergency arose none of them heard her call for help or was able to contact her later! The only really authentic call for aid was picked up by accident by an amateur (Continued on page 384)

WRONG!

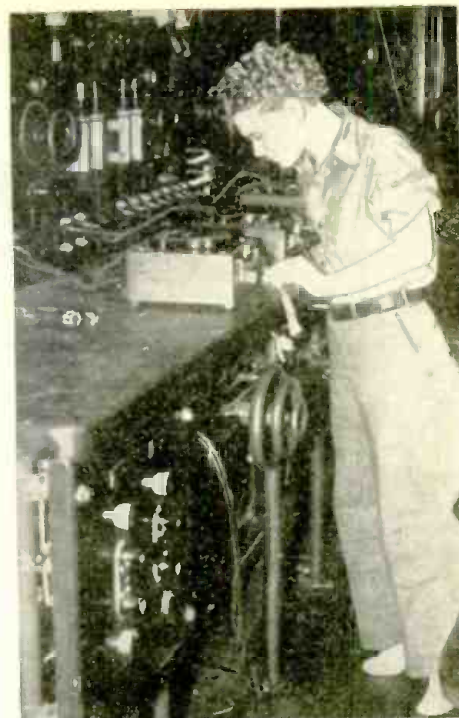
What probably happened to Miss Earhart's plane—with no pontoons the dynamo and probably the storage batteries also were quickly put out of commission. A "ham" heard the only authentic distress call on 3.105 mc.

Short-Wave PICTORIAL



The pretty young miss at the right is Alice Churchill, 21, the first woman electrical engineer to enter the famous G.E. Test Course for electrical engineers. Miss Churchill is a graduate of Iowa State College and holds a B. Sc. degree in electrical engineering. (Photo Courtesy Gen. Elec. Co.)

A peek into the television studio of the Farnsworth Co., at Philadelphia. The young lady's face is being made up for a televised scene, with the special colors found best for television reproduction. Image pick-up camera is seen at right of photo.



Below, Chief William H. Funston of the Schenectady Police Dept. pointing to the new two-way police radio installed in his car. The three young ladies are members of Phil Spittain's "Hour of Charm" program.



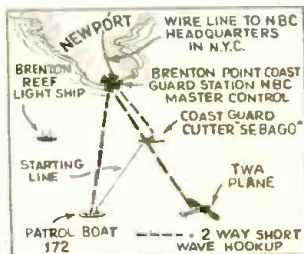
Above—Two stars who are heard over the "Caracas" station at Venezuela, S.A.—The two young ladies are Conchita Ascanio and Carmen Serrano de Alfonso. They are well-known to American S-W listeners.



Bernardine Flynn, who will be heard over NBC's S-W station W3XAL, on their new foreign short-wave program. She plays the part of "Sade" in the radio serial "Vic and Sade."

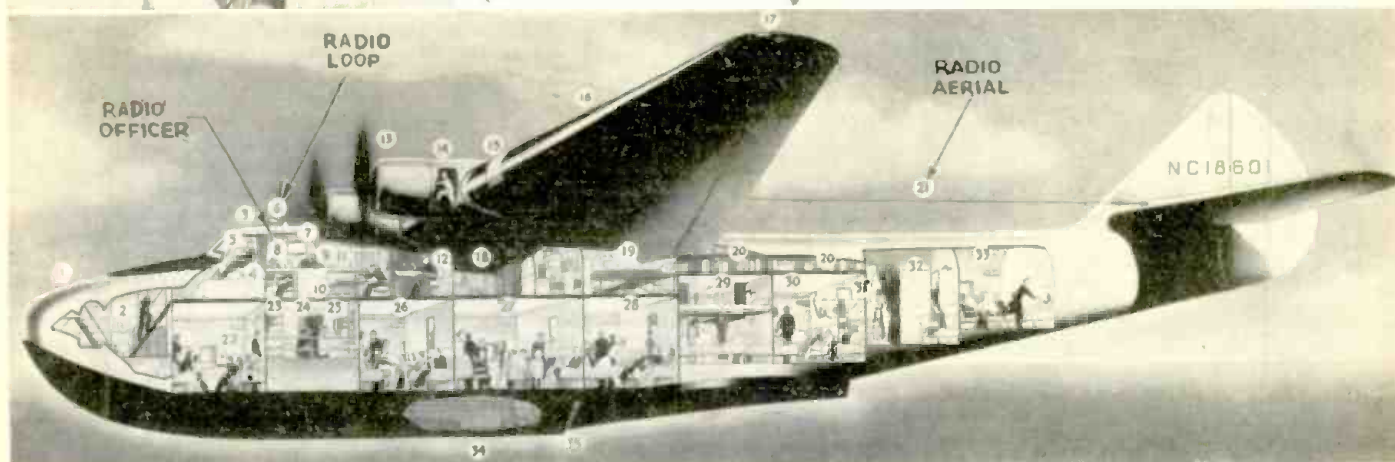


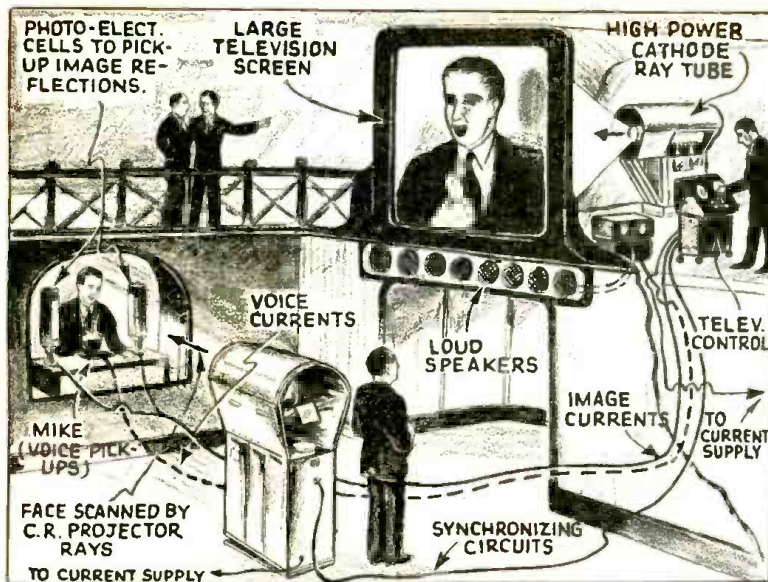
Photo Courtesy Gen. Electric Co.



At left and above—Short-wave activities at the International Yacht races. Diagram shows "two-way" short-wave hook-up between observation boat, airplane and land station which carried description of the races to station networks.

- New Boeing Pan-American "Clipper" for "trans-Atlantic" trips
- (1) Anchor Hatch. (2) Seaman's Compartment. (3) Bridge (where flying controls are located). (4) First Pilot. (5) Second Pilot. (6) Radio Direction Finder "Loop." (7) Navigation Cabin. (8) Radio Officer. (9) Chart Room—Navigator's Post. (10) Map Case. Marine Library. Drift-Sight Bombs. Flares and Navigational Instruments. (11) Engineering Officer—and the Mechanical Engine and Aircraft Controls. (12) Captain's Office. (13) 1500 H.P. Wright "Cyclone" engines. (14) Mechanic's Wing Station. (15) Controllable Landing Lights. (16) Wing Spread 152 ft. (17) Navigation Lights. (18) Main Cargo hold which extends into wing. (19) Crew's Sleeping Quarters. (20) Luggage Holds. (21) Overall Length of Ship 109 ft. (Height 28' 6"). (22) First Passenger Compartment—10 persons. (23) Spiral Staircase to bridge. (24) Men's Retiring Room. (25) Galley. (26) Second Passenger Cabin—10 persons. (27) Dining Lounge—15 passengers. (28) Third Passenger Cabin—10 persons. (29) Fourth Passenger Compartment—10 persons. (30) Fifth Passenger Cabin—10 persons. (31) Ladies' Dressing Room. (32) Sixth Compartment. (33) Private Cabin Suite. (34) Fuel pumps. (35) Auxiliary Hold.



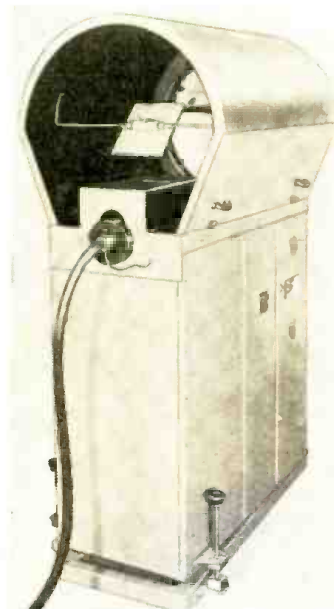


The new Telefunken television amplifier system—the scanning light illuminates the face of the subject and photo-electric cells pick up the reflected light rays, which are amplified and passed into the cathode tube behind the large image screen.

● A SENSATIONAL television invention which seems destined to revolutionize present methods of lecturing and stage performance, has recently been demonstrated by the Telefunken Company (the German RCA) upon the occasion of the Berlin Radio Show. The fundamental object of the newly developed television magnifying device is to present a large screen image of a speaker or actor, while he is addressing an audience in person in addition to his personal appearance on the platform.

This new system of electrical magnification of images consists of an intricate scanning system constructed by means of cathode ray tubes which operate with plate voltages as high as 20,000 volts; electron-projectors for large size presentation of images; and, last but not least, of a translucent projection screen with such power of illumination as to permit its application in medium bright illuminated rooms. In short, the new television apparatus is an optical counterpart of the acoustical public-address or sound-amplifying system. It performs optically exactly the same trick that the loudspeaker does with the speaker's voice, i.e., it magnifies the speaker's image to many times his actual size, while the loudspeaker system amplifies his voice into powerful sound waves of penetrating power.

The introduction of sound amplification was an important step toward relief for those hard of hearing. Now the same assistance is given to the eye. Considering the well-known fact that about 40 per cent of our population is handicapped by a more or less impaired power of sight, one does not need a lengthy explanation to appreciate the great importance of this new and interesting optical amplifier.



Above—The cathode ray scanner which is installed in front of the speaker. The C. R. tube is mounted vertically and a mirror projects the scanning light onto the subject's face.

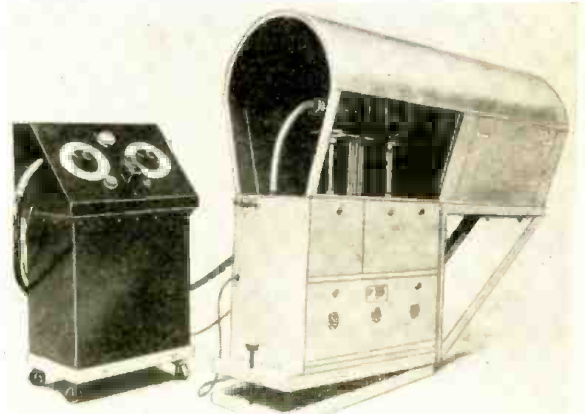
Left—Actual photo of reproduced image of the speaker's face. The lines visible in the photo are not noticeable in the actual image.

The TELEVISION AMPLIFIER

This month's cover

By William E. Schrage

Our front cover illustration this month shows the newest Telefunken television amplifying system, whereby the image of a demonstrator or lecturer may be projected to a distance and greatly enlarged. A special scanning method is used; the voice is simultaneously amplified and reproduced by a loudspeaker placed near the large image screen.



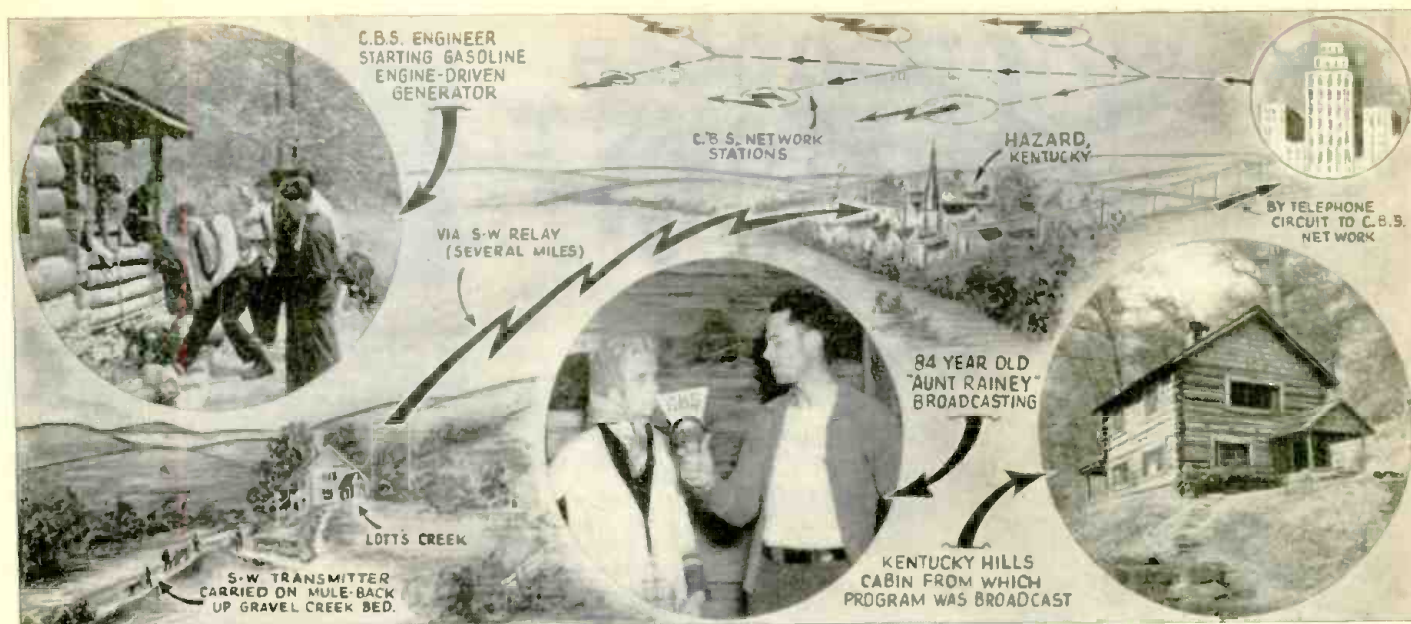
Special television image projector, with control unit at the left. It employs a plate potential of 20,000 volts and a powerful lens projects the image from the end of the tube onto the large screen.

However, its application is not restricted to stage or speaker platforms only. A much larger field of application seems to exist in the very important field of advertising. One may easily conceive that in time to come demonstrators, for example, will use the newly developed television system to "sell" their products to the large audiences customary at great expositions and fairs. See our front cover.

There are many schools, universities and colleges which will now have the long desired means of instructing their students much more efficiently, because the new method of instruction does not only aid the ear, but also the eye.

Let's see how the new television magnifier apparatus operates in detail. The diagram tells the complete story. In front of the speaker's platform we see a gun-like device which shoots a flickering ray onto the face of the speaker, and behind the platform but above the speaker's head there is a movie screen of the translucent type. A large size (electron gun) image projector installed behind the screen throws the greatly enlarged image of the speaker on to it.

The most important detail of the entire outfit is the gun-like device mounted in front of the speaker's platform. This device projects a very fine and concentrated beam of practically invisible light towards the platform. (Continued on page 388)



Above—Several interesting angles of a recent short-wave broadcast pick-up which originated at Lott's Creek, Kentucky. As no electric light or power lines were available, a gasoline engine and dynamo supplied power for the short-wave transmitter, which served to relay the broadcast to the CBS network.

Broadcast via S-W's from Kentucky Hills

● ONE of the last strongholds of primitive America gave way before the onslaughts of civilization when engineers of the Columbia Broadcasting System recently took their microphones and short-wave equipment deep into the hills of Kentucky, to reveal to the outer world what a "listening center system" is.

A portable short-wave transmitter was carried in on mule-back, up an old gravel creek bed. The broadcast was short-waved to the nearest telephone line at Hazard, Kentucky, several miles away, where a receiver picked up the program and fed it to the telephone lines and thence to the network. A gasoline engine drove a small electric generator to furnish power for the transmitter.

The postoffice on Lott's Creek, near the cabin where Columbia's broadcast originated, is named Cordia and con-

sists of a three house settlement. The log cabin, from which the broadcast was made, forms the nucleus of the Lott's Creek Community Center, an activity under the leadership of a Miss Alice Stone.

They went to Lott's Creek, one of twenty-five locations which the University of Kentucky has developed as points where isolated mountain folk may hear the broadcasts of education, culture and recreation which radio has to offer. The central transmitting point is the University's studios in Lexington and daily it sends to Lott's Creek, and to twenty-four other listening areas, a complete school curriculum by air.

The importance of the system was emphasized when the Institute for Education by Radio, convening at Ohio State University, made Columbia's program a special feature of the meeting.

Lott's Creek, as described during the broadcast by David M. Young, a University of Kentucky geologist, is without electric light or power, telephones or medical service, and receives mail by horse-back three times a week, *if the weather is good!* It is "eight miles from what the world calls modern civilization. It lies in about eight miles of nature's most impenetrable barriers."

"Though people are hemmed in by this harsh and rugged beauty," said Young, "in spite of its panoramic grandeur, the modern miracle of radio has become man's ally to overcome the natural obstacles which have isolated these people from the fast and moving world outside."

Young described a "listening center" as a "radio receiving set operated by a dry cell battery set up under the supervision of community leaders." These were set up, (Continued on page 374)

Shades of Heinrich Hertz!

● WITH a mighty crashing spark, the dot and dash Ham message in 1910 started winging its way through space. Today, even though a Ham station is a powerful one, no noise will be heard from "crashing spark gaps" whenever the key is manipulated to make the dots and dashes. The accompanying picture shows a station which, according to the caption written on the back of the photo, belonged in those palmy days to one H. C. Briggs, of Berwyn, Ill.

In 1910 rotary spark gaps were not used as extensively as they were at a later date, and fixed gaps were common. One of these fixed spark gaps can be seen in the ac-



Here is a Ham station, vintage of 1910. Yep, 27 years ago this was considered a typical American "Ham" station.

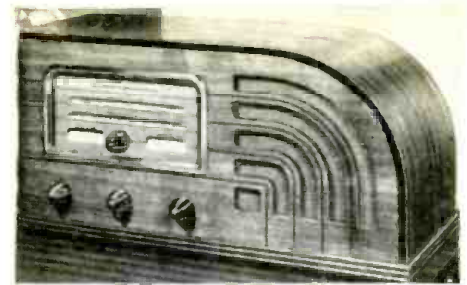
companying picture. The louder the spark in those days, the more powerful the station, and the more respect all visitors had for the operator of that particular "wireless" station. Vacuum tubes or audions were used here and there, but most of the reception was done with crystals, such as galena, copper pyrites, etc.

Ham stations often displayed a vast amount of electrical and other scientific apparatus, which of course, created a very awesome impression on those who entered the radio sanctum. It was undoubtedly true that many amateurs in those days, after visiting a station which had a (Continued on page 374)

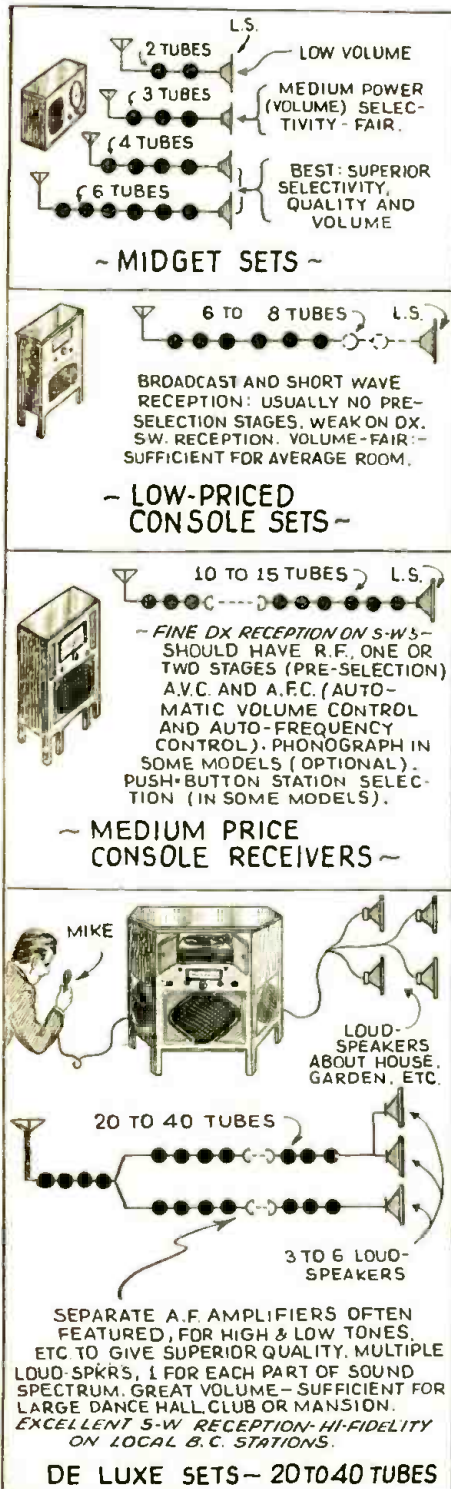
How to Choose a Short-Wave Receiver

Including "All-Wave" Sets

By H. W. Secor



Speaking of combination Broadcast and S-W midget sets—here is a swell design, both from the clear-reading dial arrangement, as well as the modernistic design of cabinet. It is large enough to provide space for a fair-size loud-speaker, so as to obtain good tone quality. Refer to No. 654.



The diagram above shows some of the general features of different types of Short-Wave and also combination "broadcast" and short-wave receivers, with the number of tubes indicated for different sizes of sets.

● **CHOOSING** a short-wave or combination broadcast and short-wave receiver is quite a problem for the average man, who is not familiar with the technical aspects of radio set design. By and large, it may be safely said that where one is considering the purchase of a standard make of set, the purchaser gets just about what he pays for. In other words, if you are considering the purchase of a *midget* receiver covering the broadcast and short-wave bands, with your mind hovering between two sets, one costing say \$9.00 and the other \$29.00, you can rest assured that the more expensive set will give you better quality and general all-around performance than the cheaper set.

Short-Wave *Fans* often ask the question—"What is the difference between a midget receiver costing \$9.98 and one costing \$30.00 to \$40.00?"

As the accompanying diagram shows, there are all kinds of *midget* sets, utilizing anywhere from 2 tubes up to 5 or 6 tubes.

Some prospective buyers simply ask to hear a set demonstrated and if it sounds fairly good, they are satisfied—especially if the price is very low. Many of the writer's friends, however, have been deeply disappointed in some of these midget sets, which they have purchased at *bargain* prices; some of the reasons are as follows:

A midget broadcast and short-wave receiver to sell for \$7.00 to \$8.00 or \$9.00 will usually not be a superheterodyne, with its attendant sharp tuning. These cheaper midget sets usually do not have very much volume and another bad feature often encountered is the broad tuning. Also, if you spend such a small amount for a midget to cover the *broadcasting* and *short-wave* bands, you will usually find that the set has very poor pick-up on the distant (over-sea's) short-wave stations. The more powerful foreign s-w stations—such as Berlin, London and Rome—may be heard, but for a real short-wave "Fan" such a set would not usually give anything like complete satisfaction.

So, as far as midget sets are concerned, and considering that you are contemplating the purchase of a well-known make of set, you will get what you pay for.

If you pay \$20.00 to \$25.00 for a midget set, you will undoubtedly find that you have a superheterodyne circuit incorporated in the receiver; also that the selectivity is sharp enough so that numerous stations can be tuned in. Furthermore, a reasonable amount of volume will be available on the loudspeaker, without a severe amount of distortion.

Medium Price Console Sets—6 to 8 Tubes

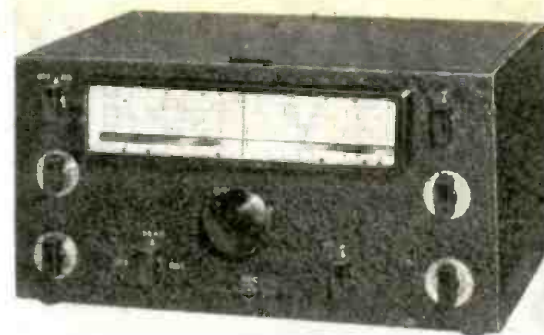
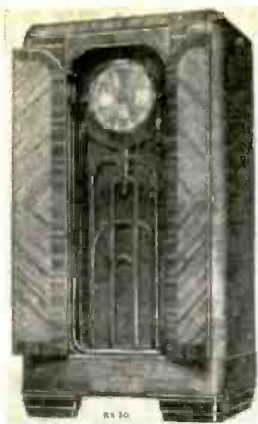
Leaving the field of *midget* receivers, we come to the person looking for a reasonably priced console set. Price, of course, is ever an important factor and the average customer does not want to be "sandbagged" into buying a \$100.00 set, if he really has started out to look at sets in the \$45.00 range. The prospective purchaser of a low-priced console ordinarily finds several attractive models available and having from 6 to 7 tubes in them, with a superheterodyne circuit, plus good quality and volume sufficient for any average room. Of course, at a price of say \$40.00 to \$45.00, one does not expect to obtain the new automatic frequency control (A.F.C.), push-button selection of 8 to 16 favorite stations, electric phonograph, etc. But taking the set as it stands, there are a number of good console receivers on the market now selling at prices around \$40.00 to \$50.00.

One of the leading companies makes a very good six-tube superhet, using the new metal tubes, and the writer has had a chance to observe several of these in the homes of his friends, and they have given excellent satisfaction. The quality has been noted as being very good, and on the *short-wave* band they have brought in the more prominent stations in Germany, England, Italy, etc. Of course, with a limited number of tubes and circuits at the disposal of the engineers who have designed these sets, they cannot make as good a showing on the short-wave band as a large console set having 10 to 12 tubes or more, but they do amply satisfy the average S-W "Fan" who cannot afford a higher priced model. The sets in this class have been made available in very beautiful cabinets and the loudspeakers fitted in them give surprisingly good quality.

10 to 15 Tube Sets

A great many short-wave enthusiasts today are contemplating the purchase possibly of a better grade, combined *broadcast* and *short-wave* receiver of the console type having anywhere from 10 to 15 tubes. Assuming that the prospective purchaser intends to pay anywhere from \$80.00 to \$200.00 for the set—what should he expect for his money?

In the first place, these higher priced sets are housed in a better grade of cabinet and also a larger one than the low-priced console sets previously discussed. With 10 to 15 tubes available, the engineers have provided in most of these sets, one or possibly two stages of *pre-amplification* or *pre-selection*. These stages help to improve the gener-



Left—The handsome cabinet with folding doors houses one of the new de luxe 20-tube Midwest chassis. Tuning is greatly simplified by the large illuminated dial; 3 loudspeakers provided.

New "communications" type receiver, the National model NC-80X. This 10-tube receiver has crystal filter and it covers the "broadcast" station band, and also the "short-wave" bands.

al selectivity or sharpness of tuning, especially on distant short-wave stations, and also reduce the possibility of images or repeat spots on the dial (i.e., hearing the station at two points on the dial). They also amplify weak distant stations before detection and boost your DX range.

Regarding metal tubes, with which many of the best receivers are now fitted, the objections raised in some quarters a few years ago are practically groundless today, as experience has shown that metal tubes can and do stand up very well. So far as the writer is concerned, there is no choice between the metal and glass tubes, but for the same reason that two persons will never agree on the same points, whether it is buying automobiles or radio sets, each may have some reason or argument he may have heard which will cause them to have a preference for metal or glass tubes. But, broadly speaking, one need not fear metal tubes now as they have been in use in thousands of sets for several years and the manufacturers of these tubes have cleared up any defects which may have occurred in the earlier manufacture of these tubes.

Considering a set costing anywhere from \$100.00 to \$200.00 and having 10 to 15 tubes, the choice of a phonograph built into the set is frequently optional. Personally, the writer would not be interested in a console set with a phonograph attached—even if it cost \$500.00—so this is a matter of personal taste. If you happen to like phonograph recordings of fine vocal or instrumental selections, then you are in for a real treat, for the radio-phonograph combinations today give a much more "life-like" reproduction from the phonograph records than was ever heard in the old days from mechanical phonographs. The new high-quality records are now played by means of a magnetic pick-up, and the voice currents are passed through some of the amplifier stages (or else through a special amplifier in some models) and are reproduced through the high fidelity dynamic loudspeaker in the radio console cabinet. A very delightful reproduction of phonograph records is thus attained.

The purchaser of a set in this class will usually find that the circuit includes one, or possibly two stages of pre-amplification; automatic volume control (A.V.C.) and today, the new feature is of course *automatic frequency control* (A.F.C.). This new A.F.C. feature means that the set will be automatically tuned to perfect resonance with the station, even if the operator does not tune the set directly on the station.

Many of the new models in the better class consoles now provide push-

button tuning. In some of these models the buttons are mounted on the front panel near the main tuning dial, and if you are tired and do not feel like tuning in a station, all you have to do is to push one of eight buttons (up to 16 buttons in some models) each labeled with the call letters of your favorite station and in "pops" the station. *Armchair* tuning has only been available on quite expensive models, costing several hundred dollars until recently. Now a leading manufacturer has provided this very welcome feature at a cost of about \$15.00, for any of the sets they make. The writer has to confess, while he used to think that "armchair" push-button tuning of a set situated across a room was something akin to "painting the lily," he has come to the conclusion that the public would really appreciate this very interesting new feature at the low price at which it is now available. The push-button control consists of a small block about the size of a book, which is placed on the arm of your favorite easy chair and its nine or more wires connect to the console receiver by means of a flat rubber cable which runs under the rug. The push-button control panel for the armchair may be placed at any reasonable distance across a room from the console.

In the better class of console receivers for B.C. and short-wave reception which we are here considering, there is also a new model which will appeal to many—the new *end table* type set. These are indeed very convenient and some of these receivers are made with a glass top so that the cabinet can be used as a coffee table or for other purposes. The tuning dial on these sets is placed very conveniently on the top of the set, and a liberal size loudspeaker is mounted behind a suitably arranged grill. They plug into the nearest floor receptacle and the antenna wires may pass through an $\frac{1}{8}$ " hole drilled in the floor or it may also be taken out of a receptacle of the new *aerial-ground* type.

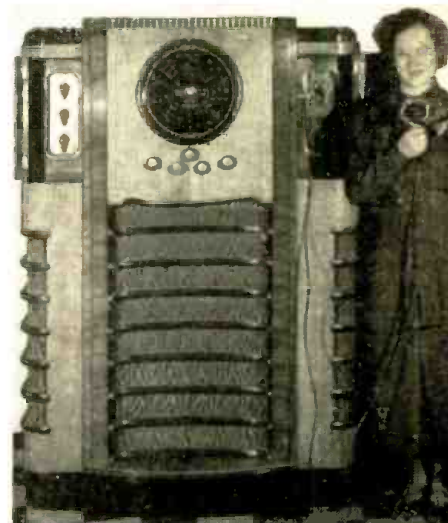
Another feature in some of the better class receivers is a fair amount of *band-spread* provided on the dials for the short-wave tuning; at least one well-known make of receiver has an extraordinary amount of band-spread. All in all, the design of the modern console receiver in the \$100.00 to \$250.00 class has advanced remarkably, so that today we not only have plenty of volume available from these sets, even for dancing in a large living room, but we also have hair-like selectivity, automatic control of the volume so as to keep it at a practically constant loudness level, coupled with superior quality of voice and music. Some of the new sets now feature two or three loudspeakers, the theory being that much bet- (Continued on page 393)



This very handy RCA "End Table" all-wave superhet has five tubes. Tuning range covers American "broadcast" stations, also the 49, 31, 25, 19 and 16 meter S-W bands, as well as Police and Amateur Calls.



Extra-wide "band-spread" is featured on this new multi-dial RCA console, known as the "Overseas" model. Push-button selection of stations is provided; it may also be "push-button" tuned from an armchair.



This Crosley \$1,500.00 "WLW" model has everything! The 37 tubes and six loudspeakers provide volume sufficient for the largest mansion or dance hall; it also has a public-address system.

REFLECTING LAYER HEIGHTS AUTOMATICALLY RECORDED



Fig. 4. New automatic recorder and short-wave receiver used by the U. S. Bureau of Standards for recording continuously the signals reflected from the constantly shifting layers of the ionosphere. The unit at the right is the power-supply, that on the left is the first of two sections of the multi-frequency transmitter-receiver system.

● A decade ago radio experts were not so familiar with the behavior of short waves and the reflection from the various layers in the ionosphere, so that the particular frequency to be used for a transmitter to cover a specified distance was more or less of a gamble.

Today, thanks to the very fine research carried out at the laboratories of the U. S. Bureau of Standards by T. R. Gilliland, G. W. Kenrick and others, it is possible to obtain a check-up on the probable performance of the ionosphere and the reflections taking place for a certain frequency at a given time. We are particularly indebted to the new automatic recorder which gives a continuous height record of the shifting reflecting layers in the ionosphere.

One of the accompanying diagrams (fig. 1) shows the various paths by which a short-wave signal may arrive at a receiving station and of course, there may be other paths as well.

One of the graphs (charts) received on the new automatic recorder and which shows the heights reached by the waves of different frequencies is shown in the accompanying picture, fig. 2. The original automatic recorder is shown in

The latest apparatus for automatically recording varying heights of the different reflecting layers in the ionosphere permit the determination of the optimum frequency for transmission over a certain distance at a specified time. In short-wave design this matter of how and where the waves are reflected is the predominant problem, and an example is given of how this factor is now determined.

fig. 3, while the photos figs. 4, and 5, show the new recording system now installed in the Bureau of Standards.

The unit on the right in fig. 4 is the power-supply. The unit on the left is the first of two sections of the multi-frequency transmitter-receiver system. This section contains the receiver in the top and covers two frequency bands, 520-1300 kc. and 3000-6000 kc. The second section, now almost complete, will be placed next to the first section and will cover the frequency bands 1300-3000 kc. and 6000-15,000 kc. When the second system is completed, the band from 520 to 15,000 kc. will be swept through in fifteen minutes!

Tuning is accomplished by cam-operated variable condensers. The system is arranged so that the sections operate alternately, i.e., while one section is operating, the other section is switching bands, so that there is no interruption. Part of the variable length antenna mechanism can be seen in the rear. As the frequency is changed the length of the antenna changes to keep the length at $\frac{1}{4}$ wavelength at those frequencies above 3,000 kc. The receiving set consists of a National NC-5 converter, followed by a Stromberg-Carlson TRF broadcast set for the I.F. amplifier. The recorder is the same as for the early system described in Research paper No. 373.

How Oscillograph is Connected

The galvanometer-oscillograph is connected in series with the moving coil of the loud-speaker. The chopper, which pulses the transmitter, is on the

same shaft as the revolving mirror of the oscillograph, so that the pulse pattern remains stationary on the oscillograph screen. The moving film moves over the pattern so that the virtual heights are recorded continuously during the change of frequency. In order to maintain the receiving set accurately in time with the transmitter, the latter is provided with two oscillators, one variable and the other fixed. The fixed oscillator is set at a value equal to the intermediate frequency of the receiving set. The output frequency from the antenna is either the sum or difference frequency, depending on which band is

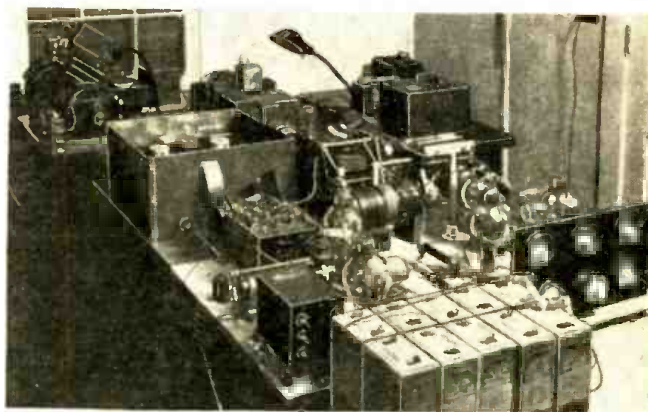


Fig. 3. A preliminary multifrequency automatic recorder of ionosphere heights and critical frequencies, originated at the National Bureau of Standards in 1932.

being used. The variable oscillator of the transmitter serves also as the oscillator for the receiving set. Thus only the detector of the receiving set is required to be tuned and this tuning is not critical. (See Gilliland, Ionospheric Investigations, *Nature*, London, Sept. 8, 1934, p. 379.)

Records Made During 24 Hours

In practice the system is automatically turned on once each hour and allowed to sweep through the band. The transmitter is (Continued on page 391)

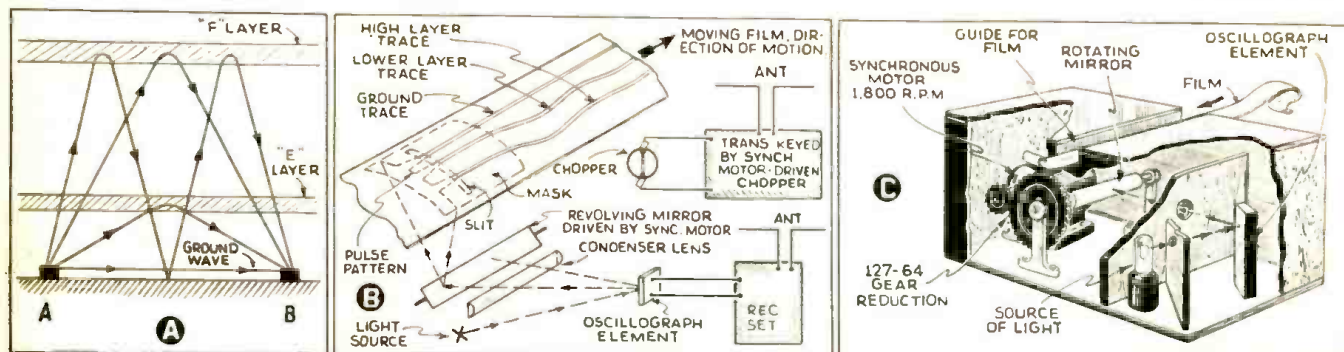


Fig. 1, at the left, shows various paths by which an S-W signal may arrive at a receiving station. Center, schematic diagram of system used with automatic layer-height recorder. Right—The assembled recorder with film driver and film container omitted.

SHORT WAVES and LONG RAVES

Our Readers Forum

The Kuleck Brothers Won 2 "Scout" Trophies



The Kuleck brothers—Alfred K. at left, Walter J. at right, who both won a "Short Wave Scout" Trophy. In each listening test the Philco 660-X, 10 tube set shown, was used.

HERE'S AN AUSTRALIAN CONTACT FOR YOU!

Editor, SHORT WAVE & TELEVISION:

Being an Australian reader of your fine magazine I am writing to give my views of *Short Wave & Television*.

The Joe Miller department always proves very interesting, giving all the latest DX news and views, and describing and illustrating the type of QSL card to be expected from numerous world-wide stations.

The *Question Box* and *S-W Kinks* also hold me very interested, not to mention the fine circuits one always finds published. The *Television* articles are sure "tops" with us boys over here, all being interested in the world's latest invention. There are no magazines whatsoever printed on television over here, and it sure is a welcome sight to have *Short Wave & Television* on sale over here.

I have a S-W Listening Post and a QSL card of my own, and will exchange cards with any American S-W Listening Post. I am always glad to send a list of Australian Amateur Stations and addresses to any "Fan" at all.

I use two receivers in my shack, one being a 7-tube Super, and the other a 2-tube choke-coupled job, using a 6C6 and 43. Both are 100% DXers.

Wishing the *Short Wave & Television* staff further success, I close this short letter and say, Cheerio.

Your Australian friend,
John E. Behnke,
16 Perry Street,
Bundaberg,
Queensland, Australia

● HERewith a photo of our short-wave "Listening Post," showing the two beautiful *Short Wave Scout* trophies, together with the 1936 Philco 660X model, 10-tube receiver and a few of our trophy-winning verification cards.

It was an unusual happening when we two brothers Alfred K. (seated) and Walter J. won two Scout Trophies with the same set. It was amazing, but true!

The trophies are really the finest work of art we have ever seen. A truly remarkable trophy, which will grace any home. These trophies certainly attract the attention of everyone and you are to be complimented for awarding such beautiful trophies.

Although only DXing for approximately two years we are considered as pretty good DXers. We both have heard every continent on several occasions. Our slogan is "What's on—We get"; we are sure that if all DXers adopt such a slogan they will improve their go-getting catches on the elusive DX stations.

We are desirous of hearing from listeners living in foreign countries. All mail will be answered.

We have read and enjoyed *Short Wave & Television* for a number of years, because of the interesting, up-to-date and outstanding articles, written by well-known writers. A magazine that fits all the DXer's needs and wants. More power and the best of luck for the future. Greetings to all!

Alfred K. & Walter J. Kuleck, 57 E. Parker St., Scranton, Pa.

LIKES JOE MILLER'S DEPT.

Editor, SHORT WAVE & TELEVISION:

I have been reading your fine magazine ever since I became interested in short-wave DXing. Joe Miller's Column, "Listening In" is very exact and fine. I find his information is kept very up to date and prepared in an interesting way.

My receiver is a Sky-Buddy, which is coupled to a 20 meter half-wave doublet. I also have another antenna which runs NW-SE. It is especially useful in logging Asia and Australia.

I am a member of the *Short Wave League*, *R9 Listeners League*, and the *New Zealand DX Radio As'n*.

I would like very much to exchange photos and SWL cards with anyone caring to do so. I will answer all mail received.

Wishing your magazine every success.

Baker Young,
Box 263, Parma, Idaho.

MR. SHUART'S "BOOSTER" ROLLS 'EM IN

Editor, SHORT WAVE & TELEVISION:

After finishing the FB booster described by George W. Shuart, W2AMN, in the July issue, I felt that it was only fair that I should write and tell you how it works.

I hooked up the booster to my "permanent set" the "Gainer" (also built from *Short Wave & Television*, then called *Short Wave Craft*) which uses a 57 as regenerative detector, 56 as first audio, 2A5, pentode output and 80 as rectifier. Boy, did the stations roll in! EAQ, DJD, GSC, GSD, COC, and many other stations that used to be heard in the phones, now are heard on the loudspeaker, at room volume!

It also spreads the 20 meter phone band over 30 percent more space on the dial.

How about some dope on a metal tube set? It seems to me that Mr. Shuart or somebody should be able to dope out a new set using some metal tubes.

Also, how about some FICTION? Boy, did I enjoy those stories like "A HAM AT

(Continued on page 396)

A "BOUQUET" FROM IRELAND

Editor, SHORT WAVE & TELEVISION:

May I take this opportunity of expressing my appreciation of the way in which your *Short Wave & Television* magazine has helped me in my hobby, Short-wave listening.

I enjoy *World Short Wave Station List* which helps a lot, and Joe Miller's (Short Wave D. X. editor) department.

I am sending a photograph of my listening post. The receiver is home constructed, comprising an untuned H. F. Pen. Triode Detector, L. F. and a pen. output, Rola moving-coil speaker. I use two aeriols, dipole 36 ft. high north and south and the other 36 ft. long, approximately, (vertical).

HUGH CARMICHAEL, 56 Ashley Drive,
Lisburn Road,
Belfast,
Northern Ireland.



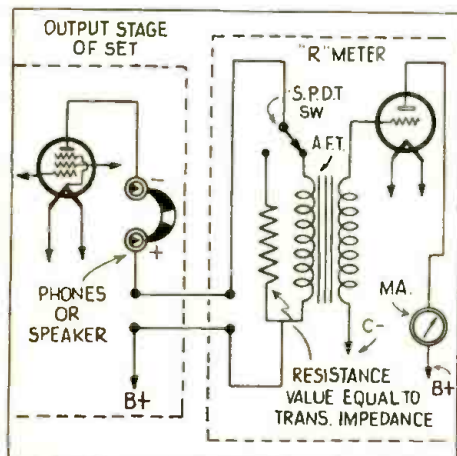
Hugh Carmichael's listening post in Belfast, Ireland.

WORLD-WIDE SHORT-WAVE REVIEW

—Edited By C. W. PALMER

An "R" Signal Meter

● IN setting the strength of received signals, hams ordinarily use the system of setting an "R" designation—R1, R2, etc., depending on the comparative strength of the signals. Little has been done to standardize such "R" signals, however, and it is usually up to the "volume sense" of the



A simple circuit for constructing an "R" signal meter.

amateur's ears to determine whether a certain signal is R5 or R9.

A meter—based on the V.T. voltmeter principle—which will give a visual indication of the "R" value was described in *Practical and Amateur Wireless* (London) recently.

The meter does not give absolute values of "R," since no standards have been set by which such a meter can be calibrated in absolute units, but it does permit the ham to be consistent in his quotations, which certainly justifies the existence of the instrument.

The tube should be a power triode, such as the 45, with an ordinary low-ratio audio transformer coupling it to the output of the receiver, in series with the phones or speaker in the output circuit.

A resistance is provided—of equal value to the primary impedance (reflected impedance) of the transformer, as the presence of the transformer winding in the output circuit of the set tends to spoil the quality, so that it is desirable to have a snap-switch for checking the "R" of a signal whenever desired.

In calibrating the instrument, some time is required in picking up signals which are first mentally set as to their "R" strength, after which the milliammeter reading is taken, by closing the snap switch. After a little experience with this "game" it will be possible to make a chart of "R" numbers against readings on the meter and once the chart is made, the meter will al-

ways give the same reading for a given signal strength.

It is desirable to use a separate power supply for the "R" meter—either a separate power unit or batteries.

A Tuned S-W Aerial

● MUCH has been written about the advantages of using an aerial for short-wave reception which resonates near the band to be received. The signal strengths resulting from such a practice may be many times greater than those received on aperiodic antenna systems.

Obviously, an aerial system which is tuned over a wide range of frequencies would be a vast improvement over most of the aerials which are used for reception by amateur listeners.

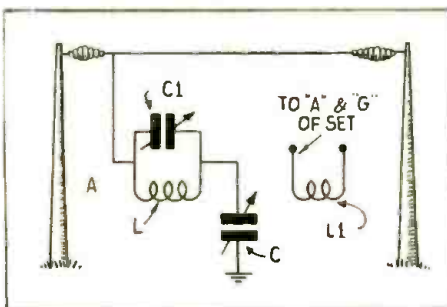
Such an aerial was described in a recent issue of *The Australasian Radio World* (Sydney). It consisted of stranded aerial wire of a length of 75 ft. between points A and B in the accompanying sketch. The ground lead is as short as possible—C1 is 250 mmf.; C is 500 mmf.; L consists of 20 turns of 20 D.C.C. and L1 of 10 turns of 20 D.C.C. wire on a 1 in. diameter form. A space of $\frac{1}{4}$ inch between coils is needed.

This aerial operates as follows: On the 49 meter band the aerial is used as a Hertzian aerial, tuned by setting condenser C to minimum capacity and tuning to resonance with C1. On the 31 meter band the aerial functions as a $\frac{1}{4}$ -wave Marconi aerial by setting C to half capacity and tuning to resonance with C1.

On the 25 meter band the aerial is used also as a $\frac{1}{4}$ -wave Marconi system by setting C1 to minimum and tuning with C. On the 19 meter broadcast band the tuning set-up is the same as for the 25 meter band.

While no noise-reducing advantages were claimed in the article in the above-mentioned magazine, it is evident that if the aerial is always at resonance, the signal-to-noise ratio will be greatly improved since the actual signal voltage of received signals will be higher.

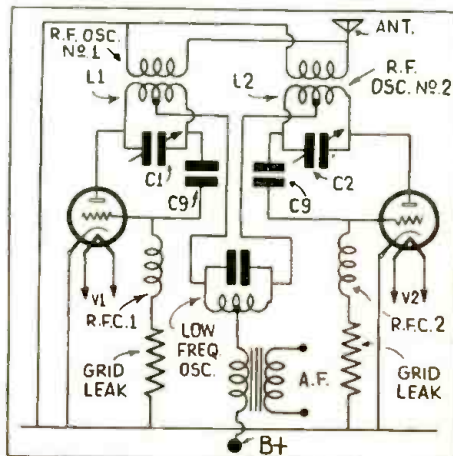
The only disadvantage of the system is the added controls which must be manipulated in tuning for distant stations—but this is a minor defect.



A simple, yet effective tuned short-wave aerial system.

A Push-Pull Super-Regenerative Set

● THE unusually high sensitivity which can be obtained with the super-regenerative type of circuit on the ultra-high frequencies is well known, but equally well known is the reputation of this type of cir-



Speaking of super-regenerative receiving circuits, here is a novel push-pull idea.

cuit for having both high noise-level and poor selectivity.

A recent attempt to overcome these shortcomings of an otherwise very useful circuit was described in the Dutch radio magazine *Radio-Centrum* (Hague) recently.

Two tubes are used as shown in the schematic circuit here. The aerial is coupled to each of the tuned input circuits which are, in the case of both tubes, connected between the grid and plate. The tuned circuit of the suppressor-oscillator is connected between the center taps of the two R.F. tuned circuits. This low-frequency oscillator is thus connected so that its output goes to the two R.F. tubes alternately, so that a sort of push-pull arrangement results.

The two R.F. tubes then oscillate and are interrupted alternately at the frequency of the suppressor-oscillator. This prevents the two oscillators (R.F.) from detuning each other.

The result of this unique arrangement is a reduction of the noise to about one-tenth, while the selectivity is increased fourfold, according to the description in the above-mentioned magazine.

No comparison of sensitivity over the conventional method is given, but it is to be expected that it will compare favorably with ordinary super-regenerative sets on the particular band considered. Details or coils, chokes, etc., must be worked out experimentally by the individual constructor.

\$25.00 FOR GOOD 1-TUBE SET

● THE editors know that our short-wave set-builders and experimenters must have developed some extra fine 1-tube circuits—possibly for receiving sets, short-wave converters, etc.

We are therefore offering \$25.00 for a good 1-tube set, either in the form of a short-wave receiver or a converter. Please note that there is little use in sending in an ordinary hook-up for a 3-element tube as most of the circuits possible with these tubes have been published.

What the editors want is a new circuit, designed around one of the latest type tubes having a multiplicity of grids. Refer to the March issue, page 675, where a very ingenious 1-tube S-W converter circuit is given. This will give you some idea of what we are after.

As a preliminary, you may send in a diagram and a description of the set and a good clear photo or two of it. A list of parts should accompany the description and the editors, who will act as the judges, and whose opinion will be final, reserve the privilege of requiring the set to be sent to them for inspection and test if they so desire. With the dual purpose tubes now available many ideas will suggest themselves. For example—Receivers with R. F. and Detector stages; Detector and A.F. stage; Detector and Plate-Supply Rectifier; 1-tube Super-het; Reflex set, etc.

Short Wave Scouts

FORTY-THIRD TROPHY

Presented to
SHORT WAVE SCOUT

Joseph V. Hellmann

17-07 39th St.

Long Island City, N.Y.

For his contribution toward the
advancement of the art of Radio

by



Magazine

3 Veris Win Trophy!

● WHAT! Only three veris win trophy! Yes—and we were still more surprised that we did not receive other entries for Asia which we could at least list under "Honorable Mention."

We announced the special "Asia" contest months ago, so as to give plenty of time to send for and receive verification cards. Well, Mr. Hellmann is the proud owner of the handsome silver trophy this month. What happened to you S-W listeners?

Read again the closing dates on the following special "continent veri contests"—and don't tell us later that we

didn't announce these far enough ahead! All of these new special *continent* contests have been announced in every issue of *Short Wave & Television* for several months now.

Well—do you want one of these magnificent silver trophies, standing nearly 2 feet high? Then get busy at once and roll up a list of veris for the continent you select.

Our congratulations to Mr. Hellmann—this month's winner. Mr. Hellmann
(Continued on page 392)

● ON this page is illustrated the handsome trophy which was designed by one of New York's leading silversmiths. It is made of metal throughout, except the base, which is made of handsome black Bakelite. The metal itself is quadruple silver-plated, in the usual manner of all trophies today.

It is a most imposing piece of work, and stands from tip to base 22 1/2". The diameter of the base is 7 3/4". The diameter of the globe is 5 1/4". The work throughout is first-class, and no money has been spared in its execution. It will enhance any home, and will be admired by everyone who sees it.

The trophy will be awarded every month, and the winner will be announced in the following issue of *SHORT WAVE & TELEVISION*. The winner's name will be hand engraved on the trophy.

The purpose of this contest is to advance the art of radio by "logging" as many short-wave phone stations, amateurs excluded, as explained in detail elsewhere. The trophy will be awarded to that *SHORT WAVE SCOUT* who has logged the greatest number of short-wave stations in each respective contest as explained herewith.

NEXT CONTEST—European S-W stations, including Iceland.

Closes Oct. 25th, when all veris from these countries must be in the Editor's hands.

Important! Note: the

following special "continent" closing dates!

Contest closing Nov. 24th—North America (including Central Amer-

ica, West Indies, Canada and Mexico).

Contest closing Dec. 24th—South American stations.



Pierre A. Portmann Admires His Trophy.



The accompanying photo shows Pierre A. Portmann, 47-20 48th St., Woodside, N.Y., proud winner of one of the Short Wave Scout Trophies. Mr. Portmann is seated before his National SW-3 receiver and on the table is the S-W Scout Trophy. Mr. Portmann also won the "Short Wave Listener" magazine trophy, which appears on the bookcase to the right.

Trophy Contest Rules

● THE first of the new contests was for the greatest number of verified stations heard in Asia.

A notarized affidavit must be sent with the veri cards and, of course, all of the veris will have to be for the contest assigned for each particular contest. The Australia "listening in" contest closed Sept. 25th. The trophy winner in the next contest will be published in the December issue.

A—By midnight Oct. 25th all entries for the *European* (including *Iceland*) contest must therefore be in the hands of the Editors, together with the veris and the notarized oath that the contestant personally listened to all of the stations listed.

B—In the event of a tie between two or more contestants, each listing the same number of stations, the judges will award a similar trophy to each contestant so tying.

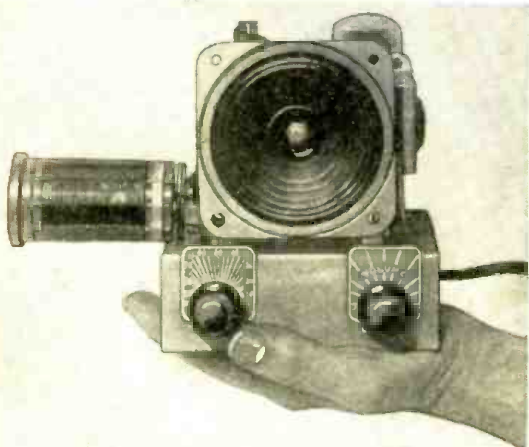
C—Bear in mind that the veri cards

should be absolute verifications, and not simply an acknowledgement that you notified a station that you heard them. Several stations do not verify, but simply send an acknowledgement card. Note that in either contest that only experimental phone or broadcast stations should be entered in your list. No amateur transmitters or commercial code stations can be entered. The contest for the January issue will close in New York City, Oct. 25th, etc.

The judges in each contest will be the Editors of *Short Wave & Television* and the opinion of the judges will be final.

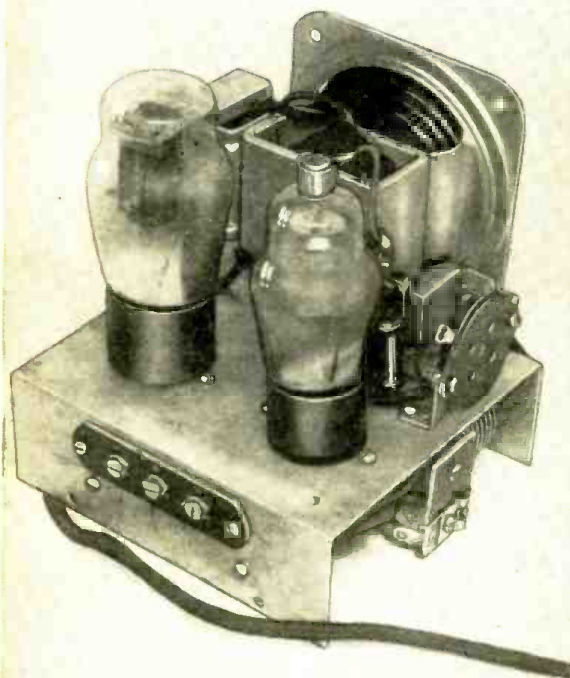
Send veri cards with your letter and oath certificate all in one package. Use a single line for each station and list them in a regular order, such as: frequency, schedule. (All time should be reduced to E.S.T., which is five hours behind the Greenwich Meridian Time.) Name of station, city, country; musical identification signal if any.

The 4-in-2 Midget



● THE Midget Space-Explorer represents the last word in simplicity and compactness. It uses a genuine dynamic speaker capable of ample room volume but nevertheless, requires only two tubes. The entire set can be mounted within a cabinet having inside dimensions of 5" by 4½" by 5¾" high, provided an opening is left at the side of the cabinet for inserting the plug-in coils. The complete set weighs only three pounds. Although only two tubes are used, the set has power equivalent to a standard four tube A.C.-D.C. set. It uses a dual purpose 6F7 tube and the new dual purpose 25A7 tube.

The pentode portion of the 6F7 tube is used as a screen-grid regenerative detector. The triode portion serves as a first audio stage. The new 25A7 tube consists of a pentode having characteristics equivalent to the well-known 43 tube. The other section of the tube consists of a separate plate and cathode suitable for rectification purposes and roughly equivalent to a 12Z3. The pentode portion of this tube, then, is used as a second audio output stage, while the rectifier portion provides direct current for plates and grids as well as speaker field.



This 2-tube receiver is one of the smallest ever built, using standard size tubes and other parts. The set weighs only three pounds. The two dual-purpose tubes perform the functions of four tubes, the tubes used being a 6F7 and a 25A7. The new 3" dynamic speaker and all of the other parts used are standard and available on the market. The receiver may be plugged into any 110 volt A.C. or D.C. lamp socket. It uses a small aerial but no ground.

As will be noted from the illustration, this compact little receiver employs a brand new type of dynamic speaker, which has a cone only three inches in diameter. In spite of its small size, this speaker has excellent volume and can take the output of the 25A7 tube without distortion. The speaker has a depth of less than 2½".

Before discussing the mechanical details of this receiver, it is suggested that the wiring diagram be examined in detail. It will be noted that the set uses plug-in coils, which permit it to be tuned over a range from 17 to 560 meters by means of five overlapping Hammarlund coils. The circuit follows to a great extent the conventional four-tube circuit used in all wave regenerative receivers of this type. In order to show this more clearly, two diagrams are provided. Diagram No. 1 is a simplified diagram which shows the two sections of each tube as separate tubes so that actually, it appears like a four-tube diagram. This is given merely for the purpose of making the theory clear. Diagram No. 2 shows the actual connections as they must be made at the two tube sockets.

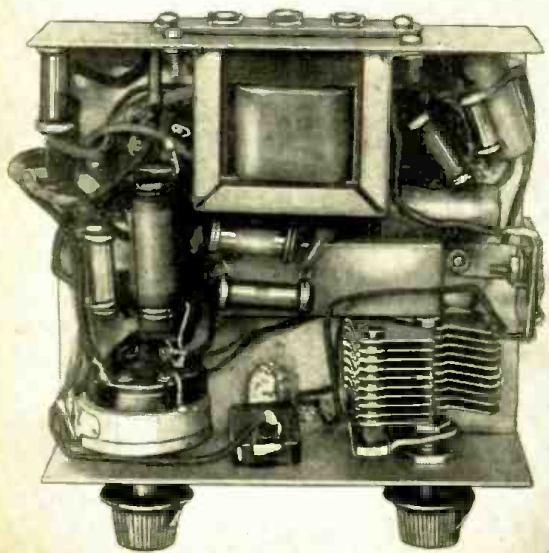
As in other sets of this type, the longer winding of the plug-in coil is tuned by a .00014 mf. variable condenser, while the shorter winding serves as a tickler. An antenna trimmer is provided to give the necessary selectivity on the broadcast band and to aid in short-wave tuning. The regeneration is controlled by varying the plate current within certain fixed limits.

The detector portion of the 6F7 tube is coupled to the first audio stage portion by means of resistors and a condenser. Similarly the first audio stage of the 6F7 tube is also coupled to the output stage of the 25A7 tube. The power-supply is of the built-in A.C.-D.C. type, consisting of the rectifier portion of the tube and an efficient filtering system. A small 20 henry choke by-passed

on either side by midget type 16 mf. electrolytic condensers eliminates hum on all wave bands. The two 16 mf. cartridge type condensers are of extremely small dimensions.

At the rear of the chassis a three-terminal connection strip is mounted. One terminal is for the antenna and the other two are for connecting earphones. Since the remaining parts of the circuit are standard, we will now pass on to the actual construction of the set.

The photos at the left show respectively—appearance of the 4-in-2 Midget receiver held in the hand; center—a rear view of the 2-tube receiver, while lower view shows the appearance "under the chassis."



Space-Explorer

By
H. G. Cisin, M.E.

The Midget Space-Explorer is mounted on a chassis 5" by 4 1/2" by 1 3/4" high. The speaker is mounted at the front of the chassis on two small right-angle brackets. The tube sockets are mounted symmetrically behind the speaker. The 6F7 tube uses a standard seven-prong socket. The 25A7 tube, however, although a glass tube, is equipped with a standard octal base and therefore uses a standard eight-hole socket. After the speaker and the tube sockets have been mounted, the coil socket is fastened at one end on one of the speaker mounting brackets. Right-angle brackets are used in mounting this socket which is placed at the left of the speaker in a vertical plane, so that the coil is inserted horizontally as shown in the illustration.

The next step is to mount the midget variable condenser on the left front chassis wall, and the combination regeneration control and switch on the right front chassis wall. These are fitted with small knobs and dial plates and constitute the only two controls necessary, aside from the adjustment which must be made from time to time on the antenna trimmer. This latter component is fastened ver-

At right—wiring diagram in both schematic and picture form for building the 4-in-2 Midget receiver here described by Mr. Cisin. This set gave surprisingly loud reception when tested by the editors, and the regeneration control was very smooth. Indeed, the diagram at the bottom shows a "Beginner's diagram" from which the action of the 4 sets of elements enclosed in the 2 dual-purpose tubes will be more understandable.

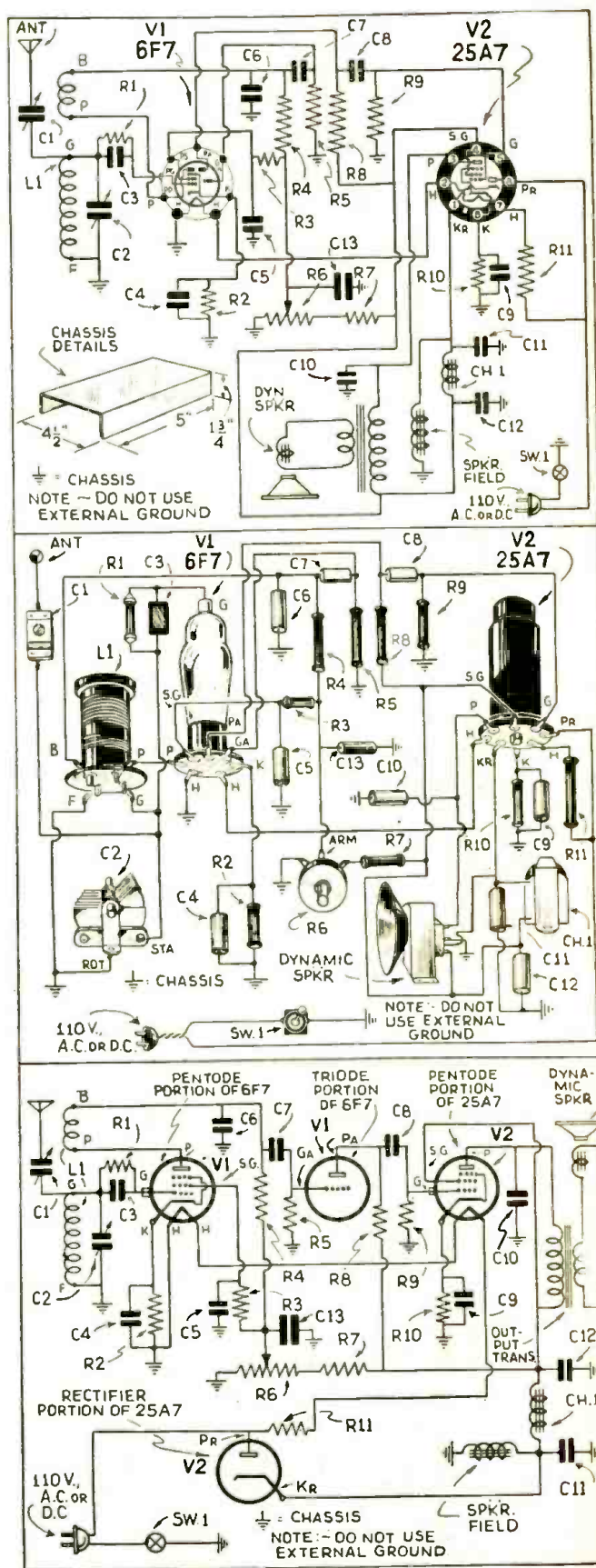
tically beneath the chassis at the left side. The other small parts such as bias resistors, cartridge type electrolytic condensers, coupling condensers, etc., all mount beneath the chassis and are held in place by the wiring, or else soldered directly to the terminals of the sockets or other parts with which they function. The exception to this rule is the mounting of the grid-leak and grid-condenser. These two parts are connected between the "G" terminal of the coil and the cap of the tube and they can be seen plainly in the top view of the receiver.

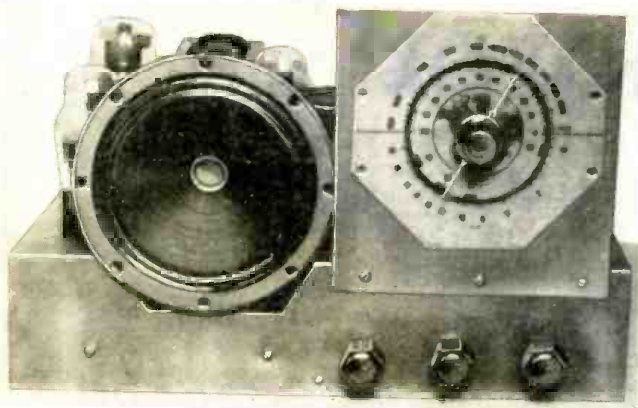
If diagram No. 2 is followed accurately, no trouble will be experienced in wiring this receiver. Of course, the fact that the various parts must be crowded into a rather small space will render the wiring a bit more tricky than if a full size chassis were employed. However, there are no insurmountable difficulties and the job can be neatly done as is evidenced by a glance at the bottom view illustration.

This receiver uses a line cord having a built-in voltage limiting resistor and this is another factor which permits economy of space. No definite procedure will be given for the wiring, except that it is advisable to complete the wiring of the sockets before mounting the filter choke. This is fastened beneath the chassis to the real wall directly below the three-terminal connection strip.

When the wiring is completed and the set is ready for test, insert the broadcast coil and the two tubes. Place the screen-grid clip on the cap of the 6F7 tube and plug into any 110 volt A.C. or D.C. socket. Be very careful not to use an external ground with this set. Connect the aerial and, after the tubes have heated up, adjust the regeneration control for the loudest whistle. Then turn the station selector and the various station whistles will be heard. If the set does not give off whistles, it is a fairly clear indication that the socket connections "B" and "P" need to be reversed. After the strong whistles are heard, these can be cleared up so that the various broadcast stations will come in loud and clear by turning back the regeneration control.

After the set has been tested on the broadcast band, the short-wave coils should be tested next. If the set is not selective enough on the broadcast band, loosen the antenna trimmer or shorten the aerial. For good short-wave reception, a 30 to 50 foot aerial is sufficient. When testing on the short waves, adjust the antenna trimmer, tightening or loosening it until the set brings in the short-wave station whistles. It may be found preferable to test the set out initially on the short waves with a good pair of earphones, although this is not absolutely necessary as the set should have excellent loud-speaker volume on the short waves as well as the broadcast band. (Continued on page 387)





Front view of the 5-T receiver, which may be arranged for tuning in 5 meter phone by the simple addition of two tubes.

• THE present-day craze for multi-tube radio receivers is founded on a logical desire for improved results. An analogous condition exists in the automotive field, where four cylinder engines have been followed by six and eight cylinder ones, and these in turn, by twelve and sixteen cylinder models.

Common sense indicates that there must be a limit beyond which a multiplicity of cylinders or of radio tubes, for that matter, not only fails to produce superior performance but actually often reduces efficiency.

It is entirely feasible, however, to design and build an eight, nine, or ten tube radio set capable of performing certain predetermined functions with high efficiency.

Where each tube serves a legitimate purpose, its use is fully justified. Thus, in this receiver it was found desirable to isolate the five-meter section of the receiver from the 17 to 560 meter portion. This necessitated provision for a separate r.f. and detector stage for the five-meter section. Through the use of a suitable switch, the audio amplifier can be connected either to the five-meter section, or to the portion of the circuit used to bring in the remainder of the short-wave and broadcast bands.

Thus, we find that this receiver uses two separate r.f. tubes and two separate detectors, totalling four tubes; three audio tubes and a rectifier. This eight-tube line-up can be improved still further by the addition of two more tubes. For example, instead of using a single power output tube, improved tone quality and greater power output could be obtained by using two 43's or two beam power tubes in push-pull. This, of course, would necessitate a push-pull output transformer in place of the resistors and condenser making

The 1938 5-T All-Wave Receiver

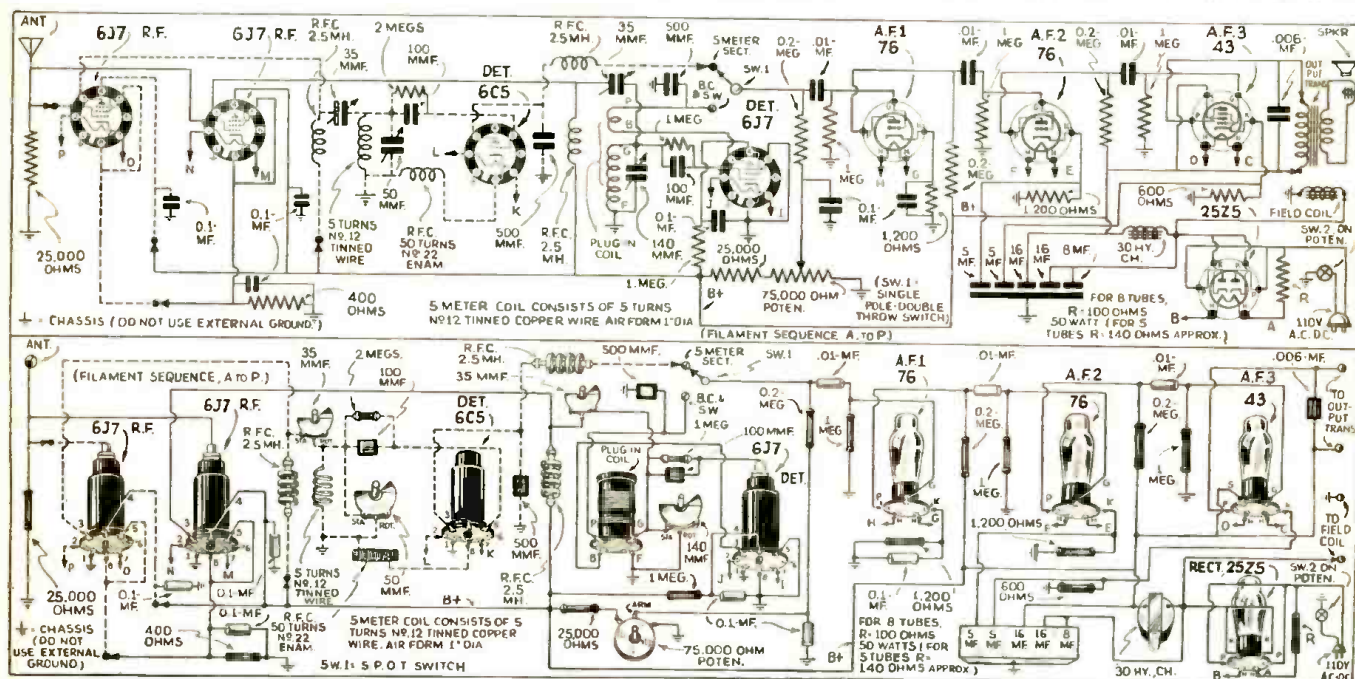
By H. Georges

This receiver will be of interest to every short-wave "fan" because of its flexibility. It may be built as a 5-tube receiver for the broadcast and usual short-wave bands; five-meter waves can also be tuned in by adding two tubes, hook-up for which is given.

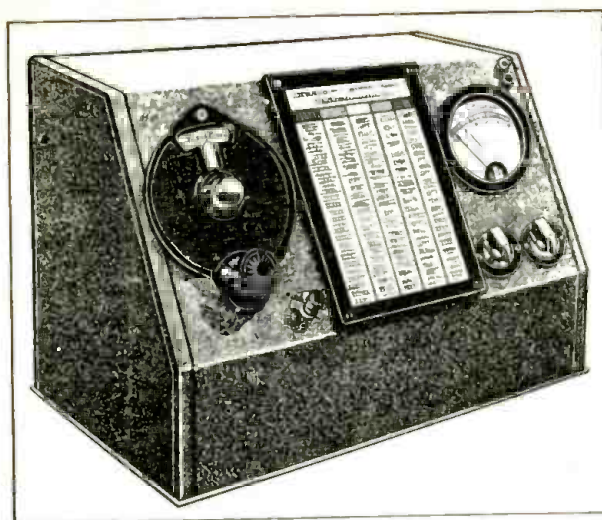
up the last audio stage. A ballast tube could also be substituted for the 100 ohm resistor. (Note: 100 ohm resistor for 8 tube line-up; if only 5 tubes are used, then a 150 ohm, 50 watt adjustable resistor, such as the Electrad should be employed. Adjust it to a resistance of about 140 ohms.) giving the advantage of rapid and convenient replacement and other desirable features which account for the present popularity of ballast tubes.

How Different Bands Are Covered

Getting back to the discussion of the basic five-tube circuit, let us analyze this receiver, section by section. Coverage from 17 to 560 meters is obtained through the use of five plug-in coils. Each coil covers a definite portion of the band and coils are wound to overlap, so that complete coverage is certain. The plug-in coil is used in the detector stage. The longer winding is tuned by a .00014 mfd. variable condenser. The shorter winding is the tickler winding, being connected in the plate circuit of the detector tube, which in this instance is a 6J7 metal tube. The detector stage is preceded by an untuned r.f. stage also employing a 6J7 tube. The five meter section consists of an untuned r.f. stage using a 6J7 tube and a detector employing a 6C5 tube. The single-pole double-throw switch of rotary type, permits either section to be connected to the audio portion of the circuit. The five meter coil is not of the plug-in type. (Continued on page 397)



Hook-up for the model 5-T receiver. Five tubes are used for the reception of "broadcast" and the usual "short-wave" bands; an additional tube serves as a rectifier for the plate supply. An optional addition, as shown in the diagram, provides a separate R.F. and detector tube for 5-meter reception if desired.



HOW TO BUILD AN ALL-WAVE "GRID-DIP" Oscillator

By JIM KIRK, W6DEG

Simple, easily built, A.C. Operated unit uses no plug-in coils and has wide application in the short-wave field

Note the neat appearance of the grid-dip oscillator as constructed by the author
Illustration Courtesy Sprayberry Academy of Radio.

● THE grid-dip oscillator deserves much greater use by short-wave experimenters than it is receiving. Some of the reasons are: the ones I have seen in use cover only the broadcast band, or they employ bothersome plug-in coils to obtain complete coverage and use battery power. Coupling methods are troublesome and little realization of the many uses of the instrument seems to exist.

Simple, easily built, useful: The simple easily built grid-dip oscillator shown in the schematic and drawing overcomes the above-mentioned objections and its versatility will be discussed. It can easily become one of the most useful instruments a short-wave experimenter possesses.

The Schematic: There is nothing novel about the schematic. It is an ordinary Hartley with coil switching, midjet coupling condenser and a simple internal power pack. A single contact switch is provided to use one or both sections of the two gang tuning condenser.

The Cabinet: A sheet-metal worker built the galvanized iron box with the sloping panel. The necessary holes were then drilled and the finish was baked on. It is called variously, Crystalline, Frostine or Crackle.

The Coils: It is a good idea to place the coils at right-angles to each other to minimize interaction. They are wound on small diameter forms to make their fields as compact as possible.

Choice of Meter

The meter may be any one handy, reading from one to ten milliamperes, full scale. The value of the cathode resistor depends upon the meter and the plate voltage used. It is best to select a low plate voltage and use a cathode resistor that gives about three-quarter scale reading on the three lowest frequency bands. On the two high frequency bands, one section of the band switch shorts out a portion of the cathode resistor in order to maintain reading on these bands, also.

Calibration Chart: The tin frame that holds the calibration chart and protecting glass or celluloid can be obtained from any specialty hardware house. The escutcheons were drawn on paper with India ink and covered with celluloid obtained from an auto curtain dealer. Metal washers, 1 1/2 inch outside diameter, hold the escutcheons to the panel. They may also be obtained from the hardware house.

The ground pin-jack is black and is

connected to the chassis when measuring coils in a receiver. The other pin-jack called the *exploring lead* is colored red.

Determining Cathode Resistors

When the oscillator is built, the value of the cathode resistors must first be determined. This value will depend upon what meter you are using, and to some extent upon the condition of the tube and power supply apparatus. Therefore, hook a variable resistor in series with the cathode temporarily. (IRC builds a convenient calibrated variable resistor, or many experimenters have built their own.) Vary this resistance until the meter deflects approximately three-quarters on the three lowest frequency bands. Note this value! That will be the value of the total resistance in the cathode circuit. Then find the values needed for three-quarter deflection on the two high-frequency bands. Connect the *shorting switch* so that there is appropriate resistance in the cathode circuit when turned to the high frequency bands.

Eliminating False Dips

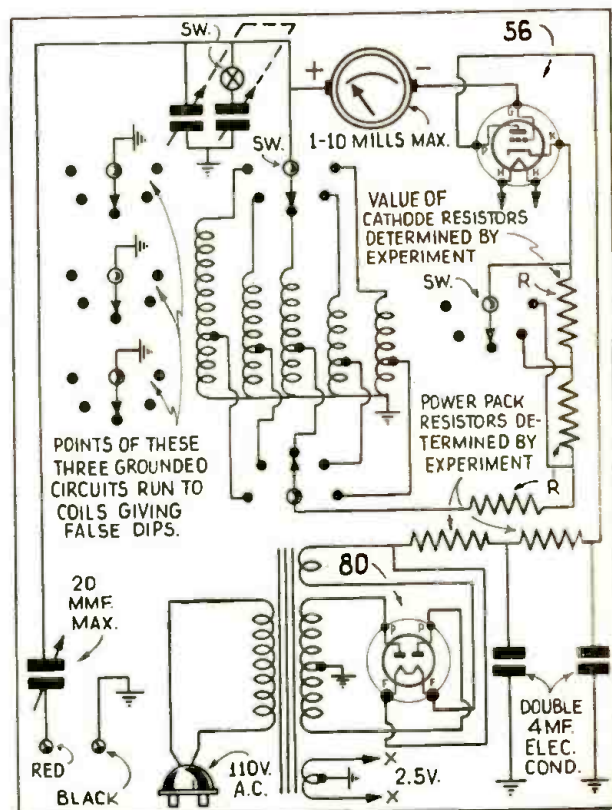
Next, you eliminate the false dips caused by unused coils resonating with the coil in circuit. You will not find any of these dips on the two lowest frequency bands, so begin with the broadcast coil and rotate the tuning condenser until you get a dip. Then temporarily ground with a piece of wire, the grid or cathode of the lower frequency coils until the dip vanishes. Hook this permanently to the switch so that it is grounded out when the switch is turned to the broadcast coil. Treat the other high frequency bands in the same manner. On the highest frequency band it will probably be necessary to ground both the grid and cathode of the lowest frequency coil.

Hooking up for use: Hooking up the grid-dip oscillator is simplicity, itself. Just plug in any 110 volt A.C. 50-60 cycle socket and plug two test

leads into the jacks on the front of the panel. These test leads should be colored for easy identification, as the black lead is always connected to the grounded side of the inductance under test. Always use minimum amount of coupling condenser to obviate trigger effect. However, you might pass over the dip if minimum was always used, especially in cases where the R.F. resistance of the coil to be measured is high and the dial was turned rapidly. Therefore, to find the dip, use say a quarter of the coupling condenser and with the dip once found, reduce the coupling to minimum.

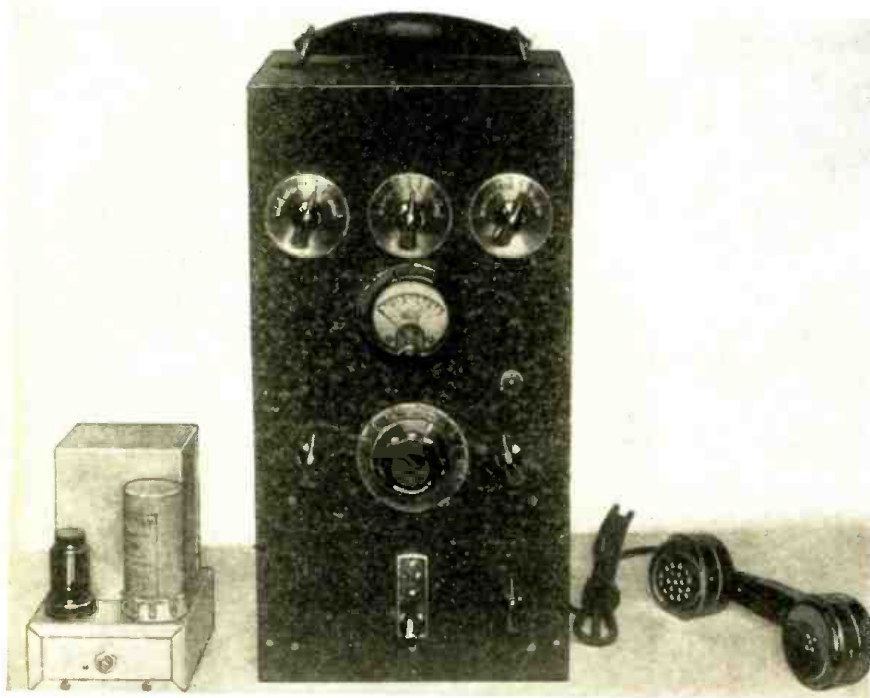
Setting coupling condenser: Setting of the coupling condenser affects calibration, so when doing any comparative work, do not move the coupling condenser.

Disregard Radiation Frequency: With the test leads in, the oscillator will, of course, radiate and the note can be picked up on a broadcast receiver. Do not mistake (Continued on page 395)



Wiring diagram for the all-wave "grid-dip" oscillator here described.

De Luxe Five-Meter



Complete mobile "rig" including the Vibrapack and the Universal handset.

● WITH the increasing DX possibilities and the use of more selective receivers in the 5 meter band, there is no reason why our portable gear should not be improved. Of course, the first thought is crystal control; however, after many sad experiences, we decided that the frequency of the transmitter portion should be variable in order to avoid QRM, when it becomes particularly heavy, by changing the oscillator dial.

The unit shown in the photograph is designed for operation from the six volt storage battery and designed for mobile operation. The R.F. portion consists of a pair of 6F6's. One is employed as an electron-coupled oscillator and multiplier, and the other a straight class C amplifier. The oscillator circuit may be tuned to either 10 or 15 meters; however, we found that best results were obtained with it tuned to 10 meters as more driving power for the 6F6 is obtainable with the latter and consequently better output.

The 6F6 amplifier circuit shows no neutralizing method; while this may be incorporated, extensive experimenting has proved that in this particular set-up neutralizing was entirely unnecessary. However, a small shielded plate should be mounted between the oscillator and amplifier to reduce feed-back. This is not shown in the photograph, it being removed for clarity. Both the plate and screen of the 6F6 amplifier are modulated by the 6N7 class B modulator. The diagram shows another 6N7 as speech amplifier and driver. However, to conserve "A" current it may be replaced with a 6C5. No changes in values or connections are necessary if

the socket is wired for the 6N7 with its two sections in parallel.

The input transformer to the first 6N6, is a combination transformer intended for transceiver operation. It has one winding for a carbon microphone and another which matches the plate of the triode super-regenerative detector. By employing this transformer and using the modulator system as an audio amplifier for the receiver, the number of necessary tubes was reduced. Thus in the *transmit* position the microphone is thrown into the circuit while the detector plate circuit is opened. The diagram shows connections for speaker operation and with this method the plate voltage to the 6N7 modulator is permanently connected.

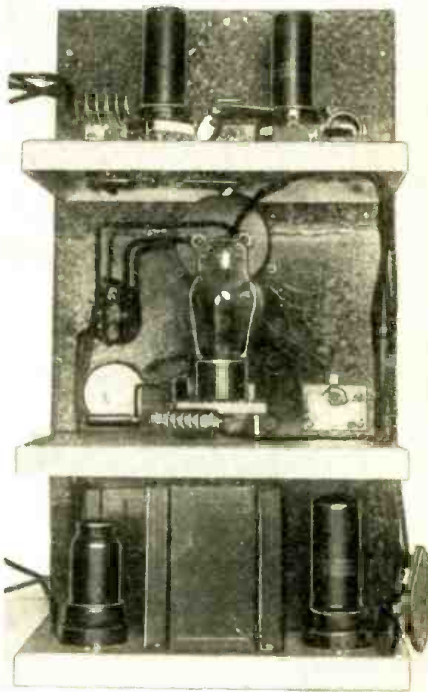
However, for combination earphone and microphone operation that is with the Universal handset shown in the photograph, the earphone section should be connected across the output of the 6N7 as shown by the dotted lines in the diagram. With this method of operation the plate voltage will be removed from the R.F. portion and the 6N7 modulator simultaneously. For metering the various circuits a zero to 50 ma. meter is employed with a double-pole-double-throw toggle switch. In one position the current of the 6N7 modulator is measured, while in the other position the plate current of the final amplifier is metered. This meter could have been shifted from the 6N7 modulator to the oscillator; however, after the set has been put into operation, there is no need for measuring the plate current of the oscillator, inasmuch as its operation can readily be determined by watching the plate current of the final

amplifier with much less complication.

Constantly metering the 6N7 plate current during transmission provides for the proper amount of modulation and there would be no danger of driving the plate current too high in the modulator tube, thus not only overmodulating the transmitter, but overloading the Vibrapack unit.

Under operating conditions the combined plate and screen current of the oscillator will be approximately 18 milliamperes, while the combined screen and plate current of the R.F. amplifier will be 35 milliamperes. For complete modulation it was found necessary to drive the plate current of the 6N7 modulator tube to approximately 35 or 40 milliamperes. Higher values than this would not improve modulation and would overload the power-supply unit. The entire transmitter during operation will use exactly 100 milliamperes. For receiving, a single 6J5 tube is employed as a super-regenerative detector and it works out extremely well.

Separate antennas are recommended for transmitting and receiving as it greatly simplifies matters and does not bring tuned circuits together through



The top deck is the M.O.P.A.; center is the receiver; and bottom is the class "B" modulator.

any coupling which may exist in an antenna change-over switch. The *send-receive* switch is a 4-pole double-throw switch commonly referred to as an *anti-capacity* switch. In most positions a single-pole, single-throw section of the switch is employed to open and close the circuits; however, it will be noticed that the switch which opens the oscillator plate and screen circuit and the other switch which opens the detector

Mobile Station



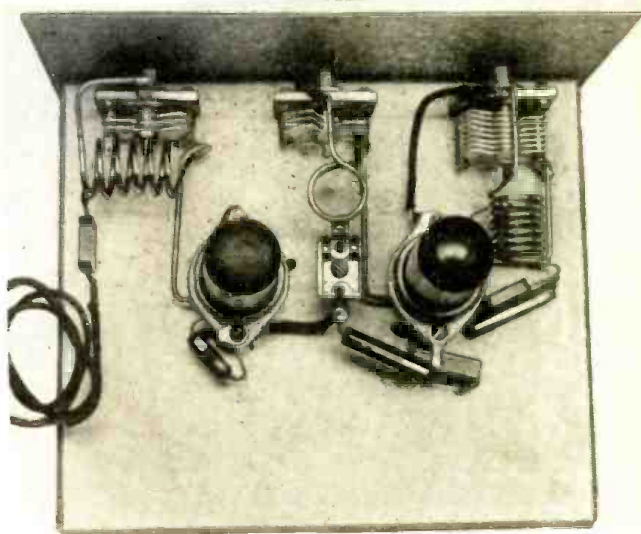
By George W. Shuart, W2AMN.

In the past nearly all portable mobile outfits have been of the modulator-oscillator type. With the ever-increasing DX possibilities and the use of really good receivers in the 5 meter band, this stabilized M.O.P.A. mobile unit provides an excellent opportunity for working real DX when on portable location. Its signal can be received on the most selective of superheterodynes.

plate circuit by breaking the voltage-divider are connected to the common B+ lead. This is really a single-pole double-throw section; the B+ goes to the moving contactor, while the detector connection goes to one stationary contact and the oscillator plate connection to the other stationary contact. This was necessary in order to be able to open and close the various circuits with the particular method of meter switching employed.

The entire transmitter-receiver is enclosed in a 15x7 1/4 x 6 1/2" crackle-finish carrying case which provides a really compact unit. The photographs show the various layouts of the parts and also show how each section is built in a separate compartment, so to speak, formed by the chassis. The top of course is the R.F. amplifier; the center, the detector; and below that is the class "B" modulator.

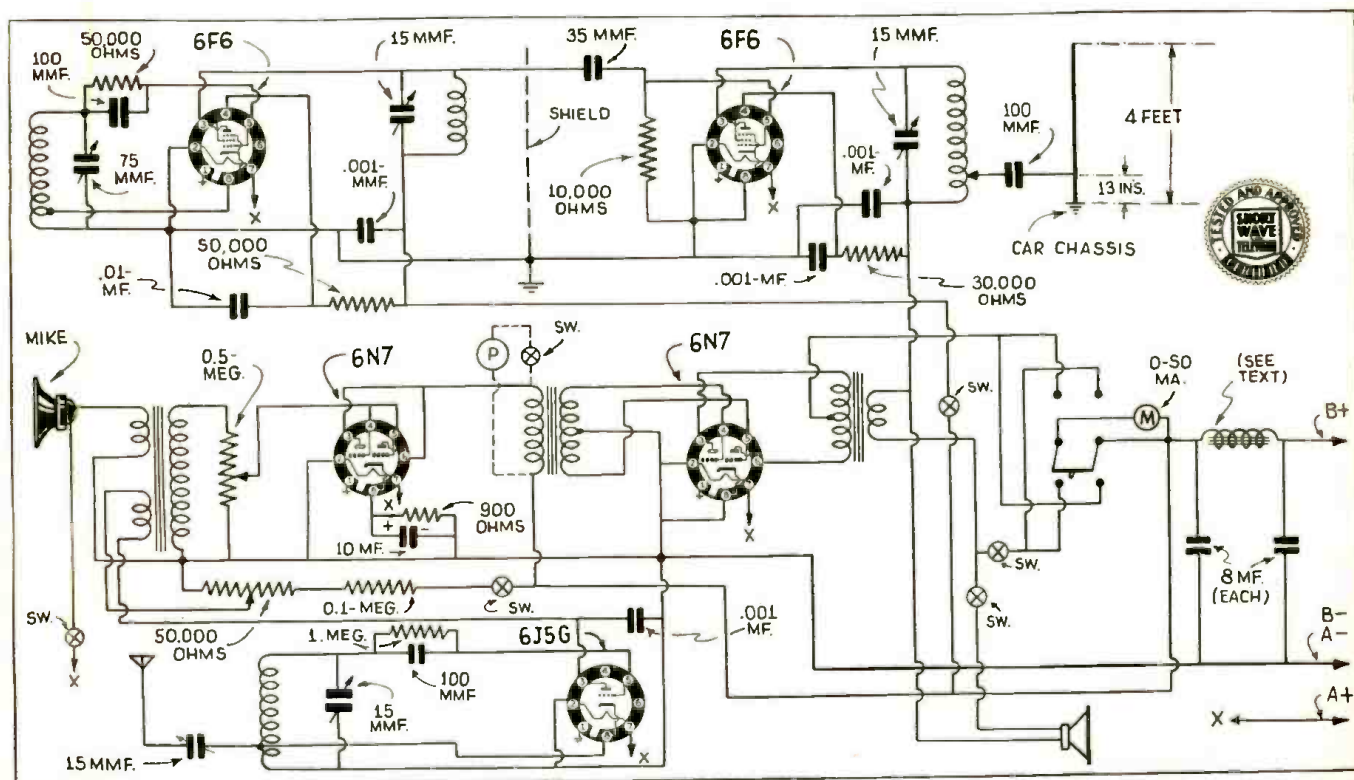
A 300 volt 100 ma. Vibrapack furnishes the necessary "B" voltages for the complete outfit. This is a new unit recently introduced and provides remarkably good regulation and extremely quiet operation. In order to obtain pure D.C. from this unit it is necessary to employ a filter choke and two 8 mf. condensers. The filter choke should be of fairly low resistance, not more than 100 ohms, so as not to provide too much voltage drop. The filter unit is not shown in the photograph. This was mounted permanently in the engine compartment of the car as was also the Vibrapack power sup-



Top view of the R.F. section. This 2-tube M.O.P.A. using 6F6's packs a good wallop and provides a really stable signal.

ply, the latter being removed to be shown in the photograph.

While the 6F6 plate load does not provide a perfect match for the 6N7, with the particular type of transformer now available, the mismatch provides no noticeable distortion and need not cause the builder the slightest anxiety. For receiving, a 4 ft. piece of wire attached to the binding post of the receiver proved sufficient. For transmitting, a single 4 ft. rod is mounted directly on the body of the car. Just 13" from the point where it is fastened to the car body, the single wire feeder is (Continued on page 392)



Wiring diagram of 5-meter mobile set.

"GOING TO TOWN" on the 5-40-400 Transmitter

By Arthur H. Lynch, W2DKJ.

Chairman of the Technical Committee of the Garden City Radio Club.

● HERE it is practically the end of the summer and our five-meter rig continues to give us the same kind of satisfactory service that we have been having for the past few months. We are now running on even less power—200 watts—and we are getting reports from any number of stations, that we are being heard regularly even though we sometimes do not hear the stations which call us.

Last year when we had our portable station, running about 75 watts from the tower at 40 Wall Street, (N.Y. City) some nine-hundred odd feet above the ground, contacts with the New England and Philadelphia stations were rather common occurrences. As soon as we attempted to accomplish the same results, operating from Garden City, we began to realize the very distinct advantage of height for ultra-hi-frequency operation.

More than two years ago we had an opportunity to talk over the beam circuit which was kept in operation between a Boston suburb and American Radio Relay League Headquarters at West Hartford, by James Millen, W1HRX, on one end and Ross Hull, Associate Editor of "QST" on the other.

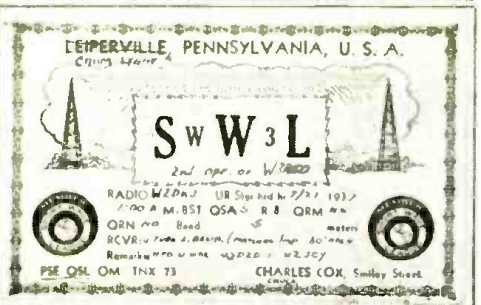
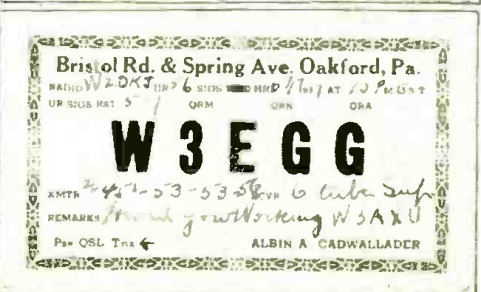
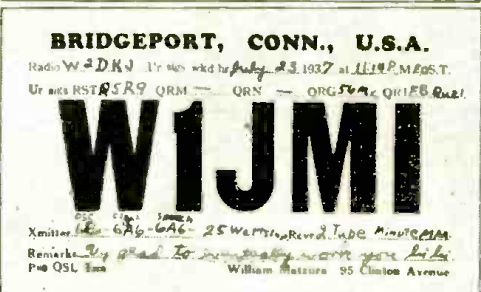
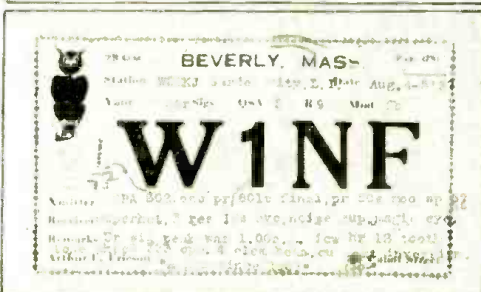
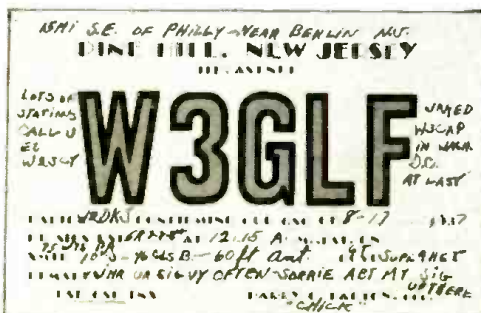
To attempt the use of an eight-element beam of the type used on that circuit was quite out of the question, as far as we were concerned, especially as it was desirable for us to communicate in all directions rather than a single one.

The beam which we have been using for the past few months is simple, light and extremely effective. In fact, its performance has been a revelation to us and to the many ultra-hi-frequency operators who have visited our station.

A couple of weeks ago we made a trip over to Philadelphia and, using the outfit which is permanently installed in our car, chatted with a great many of the fellows who are operating on the five-meter band in the Philadelphia area. Many of them tell us that they hear our Garden City station practically every time we go on the air and have a beam directed toward Philadelphia. The beam, by the way, is bi-directional and it is fortunate that our location is such that we cover the Boston direction and the Philadelphia and Wilmington directions at the same time.

Our location is such that the interference level is more than ordinarily high and it is very likely that we would hear a great many more stations if this were not the case. As an example of just a few of the sources of interference, our shack is

The Last Of The Series Of Four Articles Outlining The Design, Construction And The Results Obtained From What Is Probably New York's Most Outstanding Five-Meter Station.



located less than a block from an electric railroad on which the insulation is not of the best, and from which all kinds of queer noises are created, particularly in damp weather. We are within less than a mile of Roosevelt Field, one of the most active airports in the country. Most of the flying is done on Saturday and Sunday, when the five-meter band is most active. Very few of the ships are shielded and the result is that they lay down a barrage of interference which is much worse than any automobile ignition interference. Another flying field, known as Mitchell Field and one of the largest army bases in the country is not more than a mile away and traffic in and out of this field is very great. Even though some of the ships are shielded the shielding does not seem to have a great deal of effect on the ultra-hi-frequencies and they create a considerable amount of disagreeable interference.

The Globe Wireless Company—a commercial organization which carries on regular radio traffic with steamships, has a station which is located less than a half mile from us and one of the harmonics is smack

Left—Just a few of the QSL cards received by Mr. Lynch, which testify to the "reaching" power of the 5-40-400 transmitter described in recent numbers.

in the middle of the five-meter band. This particular harmonic covers several degrees on our dial.

Within less than an eighth of a mile there is a large printing establishment which operates more than a hundred presses. Most of these presses are equipped with what publishers are pleased to call "static eliminators." The static eliminating system in the publishing plant comprises a high voltage transformer with leads running from the secondary to electrodes on a great many of the presses. As the press operates, a spark discharges between these electrodes, so as to neutralize the static charge which would otherwise develop in the paper as it goes through the press. A better damped wave transmitter is hard to imagine. The publishing house produces its own power and adjacent to the engine room there is a large stack in which there is a smoke precipitator in the upper portion, and if you ever attempted to listen to any kind of a radio receiver in the vicinity of a smoke precipitator (a high voltage discharge is used in this device—Ed.) you will get some idea of the

(Continued on page 386)

WHAT'S NEW In Short-Wave Apparatus

The short-wave apparatus here shown has been carefully selected for description by the editors after a rigid investigation of its merits.



Front view of the 40-watt transmitter.

New 5-Band 40-Watt Transmitter

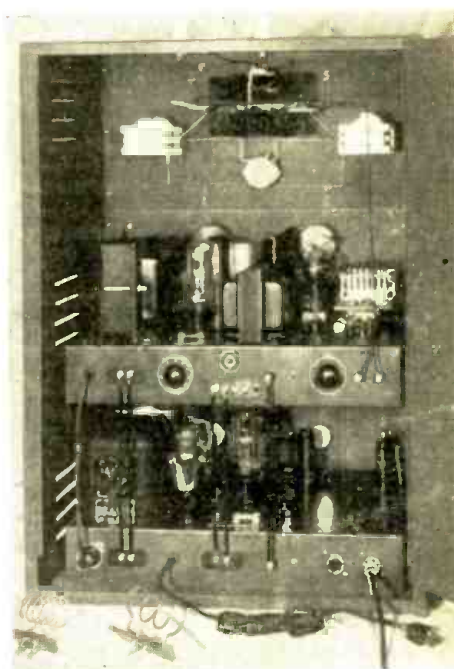
By Frank Lester, W2AMJ

This transmitter will operate on any of the "Amateur" bands, from 10 to 160 meters. The special antenna tuning unit permits matching the transmitter to practically any type antenna.

amplifier. Due to the proper selection of parts and layout, it is possible to operate straight through on the fundamental crystal frequency without resorting to neutralization of any kind. This is mainly due to the good screening of the 6L6 tube, as well as careful circuit design with one or two little tricks. In view of this, it is therefore possible to employ a 40 meter crystal, and actually operate the transmitter on 40 meters for CW, 20 meters, 10 meters and 5 meters. In other words, the one crystal will

act as the frequency control unit for 4 bands if the occasion demands this. Forty watts output will be obtained from the Raytheon type RK-37 hi mu triode which is employed as the final amplifier on all bands with the exception of 5 meters. The power output at 5 meters, due to the fact that frequency doubling is resorted to in the final stage, is approximately 25 watts.

Since this is a complete 3-unit transmitter comprising the antenna panel, the RF unit, and the modulator, the information given in the previous paragraph applies only to the RF unit, which is usually the first item of interest in the operator's mind. The entire unit has exceptionally good appearance, for the 3 unit cabinet it is housed in, as (Continued on page 376)



Rear of the 5-band transmitter, with door of cabinet open.

● WE have attempted to describe this new transmitter by giving it a type number that means something. The name really means 5 band, 40 watt transmitter unit. This transmitter is of ultra-modern design, which enables it to operate on any of the amateur bands from 10 to 160 meters, with the final amplifier operating at the output frequency. By resorting to doubling in the final amplifier, the transmitter is actually capable of 5 meter performance.

Upon referring to the schematic diagram it will be found that the well-known and now more popular than ever Les-tet exciter is employed. This comprises the 6C5 crystal oscillator which is directly coupled to a 6L6 frequency multiplier or straight

Pocket Model Volt-Ohm-Milliammeter



Newest "pocket-model" test meter.

● AT last the serviceman and experimenter is provided with real pocket edition of a universal test meter.

The instrument shown in the photograph has a current range of from 1-250 ma. in 4 ranges. The first is 1 ma., the second 10 ma., third 50 ma., fourth 250 ma. There are 5 voltage ranges in the following

steps: 0-10, 0-50, 0-250, 0-550, 0-1000. It has two resistance ranges, one from 0-300 ohms, and the other up to 250,000 ohms. The entire instrument is built around a sensitive microammeter having a compensated copper-oxide rectifier circuit with re-

sistors for A.C. voltage measurements at 1,000 ohms per volt. The D.C. position maintains the same sensitivity.

A toggle switch is provided for selecting the A.C. or D.C. range of the instrument; a rotary selector switch to select the various meter ranges; a variable resistor to compensate for battery variations when measuring resistances and jacks to make the meter ranges available at the panel.

This article has been prepared from data supplied by courtesy of The Triplett Elec. Instrument Co.

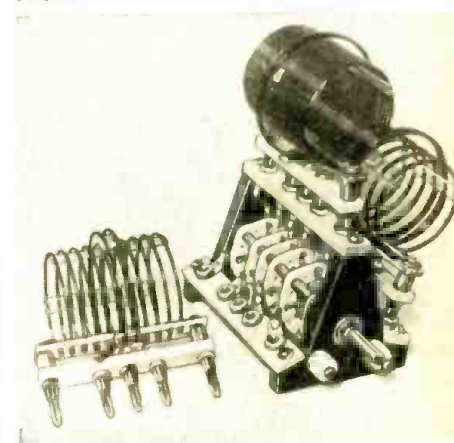
● THE band-switching assembly shown in the photograph is intended for transmitters up to 100 watts. The rating is 100 milliamperes at 1,000 volts to the final amplifier. The entire assembly is constructed with excellent insulating material which provides efficient operation on all amateur bands. The coils are of the plug-in variety, so that the same unit may be employed for any amateur band from 10 to 160 meters.

The coils shown with the switch in the photograph cover the 40-20 and 10 meter bands. For "hams" who like band-switch-

Transmitter Switch-Coil

ing this coil unit would serve excellently in a compact 100-watt transmitter.

Our information bureau will gladly supply manufacturer's names and addresses of any items mentioned in Short Wave & Television.



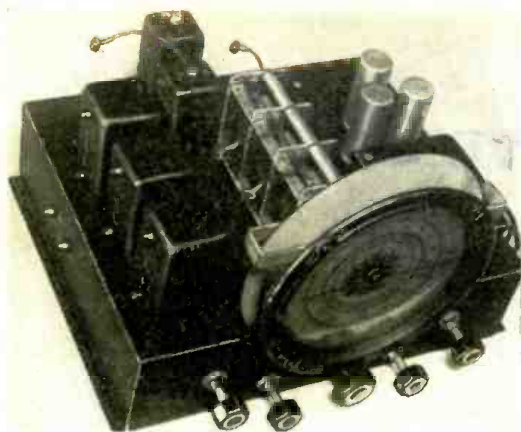
Transmitter Coil-Switch Unit.

Names and addresses of manufacturers of apparatus furnished upon receipt of postcard request; mention No. of article.

A 6-Tube Super-Het for the S-W "LISTENER"

By Clifford E. Denton

One of the principal features of this 6-tube two-band receiver, which operates on 110 volts A.C., is the fact that the parts are available with calibrated dial and tuning coils. The range of this receiver is 16 to 53 meters on the S.W. band, and 187 to 555 meters on the "broadcast" band.



General view of the 6-tube superhet, with its calibrated dial. (No. 657).

● THERE are two great problems for set-builders and experimenters which are very successfully solved in this new superhet design. The first problem involves "a calibrated dial" and the second is the difficulty of obtaining a set of accurately "matched" coils. In fact, these two factors generally limit the constructor to such designs, both mechanical and electrical, that the finished unit is of make-shift appearance and often quite poor in performance.

In this receiver, which is designed for the standard broadcast band and the so-called *International Broadcast Band* incorporates features that assure performance superior or at least equal to the best of the factory-made jobs. This goes for both appearance and performance.

The design is quite conventional, except that little refinements appear which add to the efficiency of the receiver as a whole.

For example, a two-stage filter is used in the power-supply to insure hum-free reception. In the average receiver filtering is done with the loud-speaker field only, with a higher resultant hum level.

A radio frequency stage ahead of the modulator tube is always desirable as it permits a more favorable *signal-to-noise* ratio to be maintained on both bands.

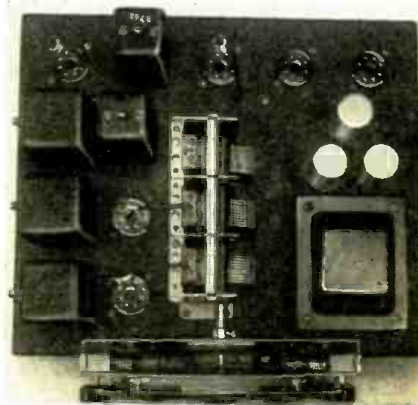
Iron core I.F. transformers having a high "Q" are specified with a resultant gain in sensitivity and selectivity. The intermediate frequency chosen is 456 kc.

The Antenna, R.F. and Oscillator coils have Litz wire (stranded) secondaries on the B.C. band and enameled solid copper wire, which is *space-wound*, on the short-wave band. Each of the coil sets are individually shielded and have their trimming condensers mounted in the cans.

Perfect tracking is thoroughly practical in the hands of the set-builder and the specially calibrated 6" dial not only aids in alignment of the receiver, but adds a finished look to the completed unit.

The two bands are primary and second-

ary switched, which minimizes dead-end losses and improves the sensitivity of the receiver which is most desirable on the high frequency band. (Continued on page 380)



Looking down on the 6-tube superheterodyne receiver, the tube sockets being clearly visible.

New "SUPER-PRO" Console Model Has Simplified Tuning and "bass reflex" System

By Lewis Winner

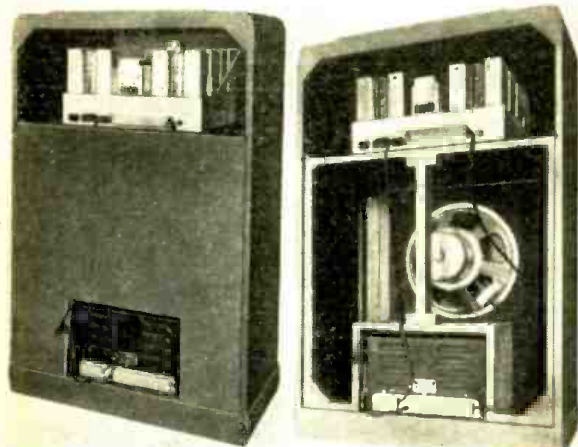
● AFTER almost a year of development and engineering research, the Hammarlund engineers have now devised a new type of console to house the popular "Super-Pro." The professional performance provided by this precision instrument, heretofore available only in the table model or rack and panel style, thus can now be enjoyed by those at home too.

The console in addition to being exceptionally attractive, for it is of the classic-modern style with burl, matched and oriental walnut, artistically blended, also has remarkable *acoustical properties*—a most essential feature required to match the other professional features

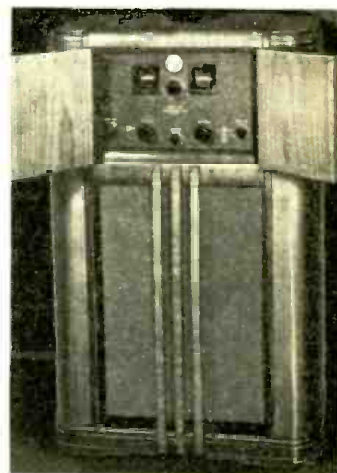
of the receiver. To achieve this exceptional acoustical performance, the new *bass reflex* system has been incorporated in the console, in association with a special 15" speaker.

It is well known that the present run of radio cabinets have many recognized disadvantages. For instance, they certainly permit very little low frequency response. In some console cabinets we do have some bass response which occurs between approximately 120 and 150 cycles and in table type cabinets between 140 and 220 cycles which, of course, results in very loud *boomy* reproduction of both speech and many instruments. This sometimes serves to take the place of real bass response for the listener who is not critical, but it is well known that speech response is poor and that both speech and music are highly toned by this peaked effect. It is, of course, possible to remove this *boom* by many methods, but this is inadequate unless the bass range is extended, because reproduction of certain types of music will certainly suffer from a *deficiency* in bass response. The use of electrical compensation in a receiver is only slightly successful when the acoustic system is inefficient, because naturally excessive compensation limits the apparent output of the system. It is also well known that the low and middle low frequency response depends, to a great extent, upon the acoustical environment of the cabinet, that is, the distance of the cabinet from the wall, the absorption characteristic of the wall material, etc.

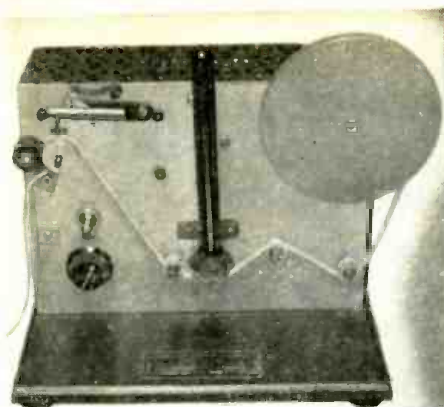
Most of the above difficulties can be charged to what may be termed a *non-controlled* back-side radiation from the speaker. To remedy this, the bass reflex system enclosure is used. This minimizes short-comings of a cabinet by controlling the back-side radiation. By proper design the low frequency efficiency of the speaker is materially increased. The marked resonant peak which makes speech "boomy" can be eliminated. In the bass reflex system a higher degree of (Continued on page 383)



Left—Rear view of the speaker compartment; back in place. Right—With back removed.



Front view of new Super-Pro, with simplified tuning and improved tone quality cabinet. (No. 658)



This new paper tape "recorder" will make many friends among the "Hams" and those interested in Listening-in on "code" signals. No. 656

● THIS new code reader is a simple and inexpensive machine which will automatically record on ticker tape the dots and dashes of any of the radio or wire codes. It will handle such transmissions at a speed of fifty words or more per minute.

This device is of particular interest to

New Device Records Code Signals on Paper Tape . . .

the radio listener, the licensed radio amateur and the beginner because the device is designed to operate directly from the output of any radio receiver. Wide applications of its usefulness are readily visualized.

To the ordinary listener, unacquainted with radio code, a whole new world of exploration is opened up. Now, for the first time, the actual translation of code signals is brought within the reach of all. Even the listener who does not know code can decode the recording on the tape by reference to a standard code table.

In this connection, it is suggested that the code table be arranged not alphabetically but according to the code tests, beginning with letters of dots only, followed by those of dashes only and then with dot-dash and dash-dot combinations in their proper sequence.

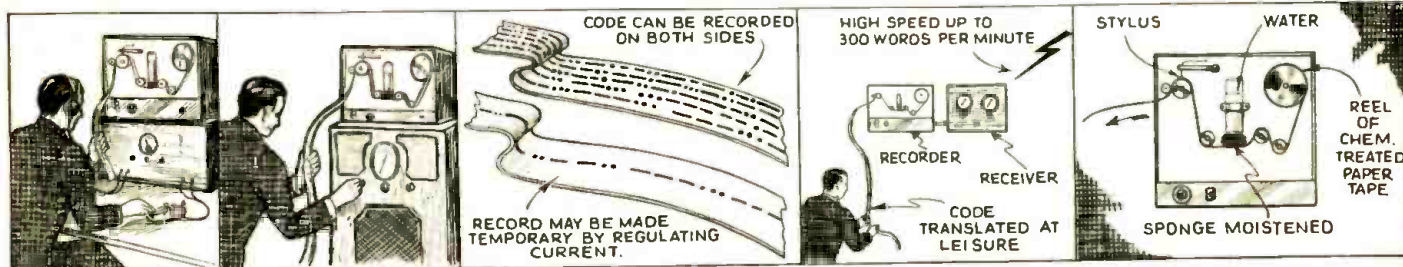
The code recorder is so designed that a standard telegraph key connected in series with a 4½ volt dry battery may be connected to the output for personal tape re-

cordings. This is of interest for those studying for Class B Amateur examinations. The beginner can practise sending on the tape recorder and make note of his progress as to proper letter and word spacing.

By using the recorder with a special audio oscillator, one can see as well as hear his fist at the same time through the headphones. Another use for the code recorder is that the amateur may tie the device into his transmitter, so that he keep a permanent record of everything sent and received.

The apparatus utilizes a special chemically treated tape which is motor-driven. The tape passes under a recording stylus. The interrupted electrical currents from the outputs of the receiver or key are fed to the stylus, and the resultant dots and dashes on the tape are due to an electrolytic action, which takes place at the point of the stylus.

This article has been prepared from data supplied by courtesy of American Communications Corp.



Some of the numerous applications for the tape recorder for code signals are here shown. It is ideal for the beginner as he can now reproduce the signals he taps out on a practice key and in this way actually "see" his mistakes.

Armchair Tuning A Feature Of New All-Wave Sets

● UNTIL recently the convenience of tuning in any one of your favorite broadcast stations from an armchair, has only been available to those who could afford an elaborate receiver costing several hundreds of dollars.

Now, thanks to the ingenuity of RCA-Victor engineers, this excellent idea has been worked out so as to be available on all of their new model sets, at a slight extra cost.

The accompanying pictures show the simple arrangement of the mechanism, whereby push-button tuning may be enjoyed either from the front control panel of the receiver, or from your favorite armchair if desired. The armchair control unit, about the size of an ordinary book, contains 8 buttons which may be pre-set

with regard to the receiver, so that your favorite stations can be tuned in at will, by simply depressing the properly labeled button. A nine-wire flat rubber cable, which may be placed under any rug, connects the armchair push-button selector unit with the set.

A motor, mounted on the chassis of the receiver,

Right — New model RCA all-wave receiver, just one of the models which can be operated by remote control "push-button" tuning mechanism, close-up view of which appears at left.



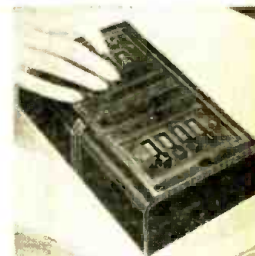
turns the condenser and tunes in the station. The various station settings can be arranged by your local serviceman, or for that matter by the owner himself, and changed at will in a very simple manner. So ingenious is the controlling mechanism for selecting the station by pushing a button, that the action is almost instantaneous and if one station is playing and another button is suddenly depressed, the set immediately tunes to the new station.

The accompanying diagram will provide a



The convenience of armchair tuning cannot be denied; here we see a fair listener selecting a favorite station by simply depressing a button.

Right — A close-up of the push-button selector unit. A flexible, flat rubber cable connects the push-button block with the receiver. No. 655.



good idea of how the selector mechanism on this new line of all-wave receivers works.

The electric tuning mechanism consists essentially of a quick engaging and disengaging reversible electric motor, tuning condenser driving gear train, and eight mechanically interlocked (pushing one button releases

(Continued on page 387)

LET'S LISTEN In With

Joe Miller

Our Short Wave "DX" Editor
Winner of 30th "S-W Scout" Trophy

X CHINA
XU6AZ
E X
VS6AZ
XMTR RCVR
\$3x-616-2-10 Tube super
W2SWL
UR SIGS QSA R T AT GMT. 19
REMARKS *Trx rpt om! Am gld to hear
me sign can go over to W2 New wld W2 fore*
ARRL get C.R.C. BEI
PSE QSL OM! vy 73 es 88 FM OPR *if Kant.*

XU6AZ—Canton, China. A handsome card with deep red letters and edging.

● During the past month DX has been more or less quiet with nothing of note being heard. However, as we have taken our annual "DX Vacation" to freshen us up for the coming DX season, we cannot be the sole judge of conditions. But scarcity of reports from readers, and the class of DX reported shows us that what we did miss in DX wasn't much.

As this is written on Labor Day, we are cognizant of the improving DX conditions within the last few days and can feel the approach of the fall DX season, as signals are coming in so much steadier and clearer. In the 20 meter band, hams all over the world are dusting off their "rigs" for action, and we are confident that this fall should be one of the greatest DX seasons ever.

By the time this copy is on the newsstands 10 meters should be awakening, and by the end of October, in full swing, with more signals than ever to be heard on this increasingly popular band. Last year's FB "DX" results by many hams have proven the great DX possibilities of this newly explored band, and hams all over the world have eagerly altered their rigs to permit 10 meter operation in preparation for this fall's DX. Best times to hear 10 meter DX is from before noon to as late as night-fall, in each DXer's locality, with peak around midday.

Mr. Gernsback has assured us that VAC certificates should be ready by October, so we urge every DXer who has one or more veries on phone from each of the six continents, to write us a postal giving his rating. As soon as certificates are available, we will publish complete details as to how to obtain them. Let's hear from you!

When we mentioned the offer of data on our new doublet here, we expected some sort of response, but boys! you've snowed us under with requests, and we ask your indulgence for a delay in replying to each of you OM's! For all the bouquets you've thrown at us for our column, we thank you all a thousand times! Such a response makes us feel our column is worth while, after all.

Taking up again the ham vs. SWL controversy, we have received a number of letters and cards from hams who read our columns, as far away as Australia, and we quote statements written by W5WN,

Louisiana, who sent us an SWL card he received from Czecho-Slovakia as an example.

Here are a few statements from W5WN's note which we believe every SWL who writes for ham QSLs should carefully read, and re-arrange his methods of reporting to fit requirements mentioned. W5WN states: "I have received many requests from SWLs for QSLs, who give me no information at all about my sign, but simply say that they heard me. Of course these I ignore."

"I am willing to send QSLs to those that send me a report giving all the facts, as to date, time, with whom I was in contact, wavelengths and the tmsn or subject matter of the QSO."

The Czech SWL card mentioned only date, time and what station W5WN QSOd on 20 CW, when W5WN has been on 160 phone for the past 2 years!

W5WN doesn't mention another important point, the sending of return postage, which, in majority of reports means the difference between receiving, or not receiving, a QSL. We have been informed of one foreign ham, no doubt well-to-do, who reports a monthly expenditure of 40 dollars just in QSLing SWL reports alone! As it now stands, many SWLs write for QSLs, enclosing no reply coupons, and hams, seeing so many reports minus return postage, often refuse to bother with any of

the reports, feeling disgusted with the whole situation. Can one blame them? And the DXers who conscientiously send reply coupons with all reports suffer by this situation.

It is only by playing fair with the amateur that we may improve the relations between ham and SWL. Stick to the rules of fair play, OMs!

And now to DX:

SOUTHERN RHODESIA

ZEB, 6.147 mc., Bulawayo, Southern Rhodesia, confirms our reception of last November by letter, much to our delight! This veri we rate second only to Radio Tananarive in our collection of ace veries. Oddly enough, both were heard on same day. ZEB preceding Radio Tananarive! Unusually good DX conditions between here and South Africa were responsible for this ACE catch being heard, and we believe that both the ZEB and Tananarive veries are the first specific veries to be received in the Americas by any DXer!

Best time to hear ZEB is on Sundays from 3:30-5 a.m., E.S.T. A quiet fall or winter morning is the time to hunt for this rare 'un.

ZEA, 5.88 mc., at Salisbury is also on same sked as ZEB, although it is not heard as well. Try for ZEA when tuning for ZEB.

QRA: General Post Office, Station Secretary, P.O. Box 792, Salisbury, Southern Rhodesia. Same QRA for both stations.

BURMA

VVS, 12.87 mc., located at Mingaladon, Burma, confirms our reception through Engineer-in-Charge W. J. Byrne. He states the power is 1.5 kw.

The veri is a form letter intended to confirm reception reports on the Rangoon Gov't. Station on 6.007 mc., with notes on VVS, written in spaces. It seems that VVS, the commercial phone, loans its Xmtr daily to permit SW (Continued on page 364)

Xmitter:
W Metres M.O.P.A.
50 Metres T.N.T.
10 Metres Meisner
10 Metres Stage P.P.
Receiver:
4 S.G.
3 Tube Snell
2 Tube A.C., S.G. and
P.S.
V K 5 W B
QRA, 311 YOUNG STREET, WYLLIE S.A.
To Radio UR Sigs. WSA R
193 QMT QRM
ORN PSE ORK QSL OM
OWNER es OP Horace B. Wilson. Sec. OP. Reg. Davies

VK5WB—South Australia. An unusual QSL, with lavender letters and light orange background.

World Short-Wave Stations

REVISED MONTHLY

Up-to-the-Minute List of

Broadcasters and Phones

Broadcasters Calls in bold type: Phones in light type

Reports on station changes are appreciated.

S.W. BROADCAST BAND ↓			Mc.	Call		Mc.	Call	
31.600	W3XEY	BALTIMORE, MD., 9.494 m., Relays WFBR 4 pm-12m.	19.600	LSF	BUENOS AIRES, ARG., 15.31 m., Addr. (See 20.700 mc.) Tests irregularly.	17.741	HSP	BANGKOK, SIAM, 16.91 m. Works Germany 3-5 am., 8-9 pm. Works JVE 11 pm.-6 am.
31.600	W2XDV	NEW YORK CITY, 9.494 m., Addr. Col. Broad. System, 485 Madison Ave. Daily 6-11 pm.; Sat. and Sun. 1.30-6, 7-10 pm.	19.480	GAD	RUGBY, ENG., 15.4 m. Calls VQG4 7.30-8 am.	17.650	XGM	SHANGHAI, CHINA, 17 m. Works London 7-9 am.
31.600	W4XCA	MEMPHIS, TENN., 9.494 m., Addr. Memphis Commercial Appeal. Relays WMC.	19.355	FTM	ST. ASSISE, FRANCE, 15.5 m. Calls S. America mornings.	17.520	DFB	NAUEN, GERMANY, 17.12 m. Works S. America, near 9.15 am. Works Siam 3-5 am., 8-9 pm.
31.600	W8XAI	ROCHESTER, N. Y., 9.494 m., Addr. Stromberg Carlson Co. Relays WHAM 7.30-12.05 am.	19.345	PMA	BANDOENG, JAVA, 15.51 m. Works Holland 5.30-11 am.	17.480	VWY2	KIRKEE, INDIA, 17.16 m. Works London 7.30-8.15 am.
31.600	W8XWJ	DETROIT, MICH., 9.494 m., Addr. Evening News Ass'n. Relays WWJ 6-12.30 am., Sun. 8 am-12 m.	19.260	PPU	RIO DE JANEIRO, BRAZ., 15.58 m., Addr. Cia. Radiotel. Brasileira. Works France mornings.	17.120	WOO	OCEAN GATE, N. J., 17.52 m., Addr. A. T. & T. Co. Works ships irregularly.
31.600	W9XPD	ST. LOUIS, MO., 9.494 m., Addr. Pulitzer Pub. Co. Relays KSD.	19.220	WKF	LAWRENCEVILLE, N. J., 15.6 m., Addr. A. T. & T. Co. Calls London and Paris daytime.	17.080	GBC	RUGBY, ENG., 17.56 m. Works ships irregularly.
26.400	W9XAZ	MILWAUKEE, WIS., 11.36 m., Addr. The Journal Co. Relays WTMJ from 1 pm.	19.200	ORG	RUYSSELEDE, BELGIUM, 15.62 m. Calls OPI mornings.	16.835	ITK	MOGADISCIO, ITAL. SOMALILAND, 18.32 m. Calls IAC around 9.30 am.
26.100	GSK	DAVENTRY, ENG., 11.49 m., Addr. B. B. C., London. Operates irregularly 5.45-8.55 am., 9.55 am.-12 n.	19.160	GAP	RUGBY, ENG., 15.66 m. Calls Australia 1-8 am.	16.270	WLK	LAWRENCEVILLE, N. J., 18.44 m., Addr. A. T. & T. Co. Works S. Amer. daytime.
25.950	W6XKG	LOS ANGELES, CAL., 11.56 m., Addr. B. S. McGlashan, Wash. Blvd. at Oak St. Relays KGFJ 24 hours daily.	19.020	HS8PJ	BANGKOK, SIAM, 15.77 m. Mondays 8-10 am.	16.270	WOG	OCEAN GATE, N. J., 18.44 m., Addr. A. T. & T. Co. Works England Late afternoon.
21.650	GST	DAVENTRY, ENG., 13.92 m., Addr. (See 26.100 mc.) Irregular at present.	18.970	GAQ	RUGBY, ENG., 15.81 m. Calls S. Africa mornings.	16.240	KTO	MANILA, P. I., 18.47 m., Addr. RCA Comm. Works Japan and U. S. 5-9 pm. irregularly.
21.540	W8XK	PITTSBURGH, PA., 13.93 m., Addr. Grant Bldg. Relays KDKA 7-9 am.	18.890	ZSS	KLIPHEUVEL, S. AFRICA, 15.88 m., Addr. Overseas Comm. of S. Africa, Ltd. Calls GAQ 9-10 am.	16.233	FZR3	SAIGON, INDO-CHINA, 18.48 m. Calls Paris early morning.
21.530	GSJ	DAVENTRY, ENG., 13.93 m., Addr. (See 26.100 mc.) 5.45-8.55 am., 9.15 am.-12n.	18.830	PLE	BANDOENG, JAVA, 15.93 m. Calls Holland early am.	16.030	KKP	KAHUKU, HAWAII, 18.71 m., Addr. RCA Comm. Works Dixon 3-10 pm.
21.620	W2XE	NEW YORK CITY, 13.94 m., Addr. Col. Broad. Syst., 485 Madison Ave. Relays WABC 7.30-10.30 am., Sun. 8-10 am.	18.680	OCI	LIMA, PERU, 16.06 m. Tests with Bogota, Col.	15.880	FTK	ST. ASSISE, FRANCE, 18.9 m. Works Saigon 8-11 am.
21.470	GSM	DAVENTRY, ENG., 13.97 m. (See 26.100 mc.), 5.45-8.55 am., 9.15 am.-12 n.	18.620	GAU	RUGBY, ENG., 16.11 m. Calls N. Y. daytime.	15.865	CEC	SANTIAGO, CHILE, 18.91 m. Calls Peru daytime irregular.
↓ S.W. BROADCAST BAND ↓			18.450	HBF	GENEVA, SWITZERLAND, 16.26 m., Addr. Radio Nations. Tests irregularly.	15.810	LSL	BUENOS AIRES, ARG., 18.98 m., Addr. (See 21.020 mc.) Works London mornings and Paris afternoons.
21.420	WKK	LAWRENCEVILLE, N. J., 14.01 m., Addr. Amer. Tel. & Tel. Co. Calls S. Amer. 7 am.-7 pm.	18.345	FZS	SAIGON, INDO-CHINA, 16.35 m. Works Paris early morning.	15.660	JVE	NAZAKI, JAPAN, 19.16 m. Works Java and Siam 3-5 am.
21.080	PSA	RIO DE JANEIRO, BRAZ., 14.23 m., Calls WKK daytime.	18.340	WLA	LAWRENCEVILLE, N. J., 16.36 m., Addr. A. T. & T. Co. Calls England daytime.	15.620	JVF	NAZAKI, JAPAN, 19.2 m. Works Cal. near 5 am. and 8 pm.
21.060	WKA	LAWRENCEVILLE, N. J., 14.25 m., Addr. (See 21.420 mc.) Calls England morning and afternoon.	18.310	GAS	RUGBY, ENG., 16.38 m. Calls N. Y. daytime.	15.450	IUG	ADDIS ABABA, ETHIOPIA, 19.41 m. Works Rome 9.15-10.30 am.
21.020	LSN6	BUENOS AIRES, ARG., 14.27 m., Addr. Cia. Internacional de Radio. Works N. Y. C. 7 am.-7 pm.	18.299	YVR	MARACAY, VENEZ., 16.39 m. Works Germany mornings.	15.440	XEBM	MAZATLAN, SIN., MEX., 19.43 m., Addr. Flores 103 Alto. "El Pregonero del Pacifico." Irregularly 7 am.-10 pm.
20.860	EIHY-EDM	MADRID, SPAIN, 14.38 m., Addr. Cia. Tel. Nacional de Espana. Works S. Amer. mornings.	18.250	FTO	ST. ASSISE, FRANCE, 16.43 m. Works S. America daytime.	15.415	KWO	DIXON, CAL., 19.46 m., Addr. A. T. & T. Co. Works Hawaii 2-7 pm.
20.700	LSY	BUENOS AIRES, ARG., 14.49 m., Addr. Transradio Internatl. Tests irregularly.	18.200	GAW	RUGBY, ENG., 16.48 m. Works N. Y. C. daytime.	15.370	HAS3	BUDAPEST, HUNGARY, 19.52 m., Addr. Radiolabor. Gyalit 22. Sun 9-10 am.
20.380	GAA	RUGBY, ENG., 14.72 m. Calls Arg., Brazil mornings.	18.135	PMC	BANDOENG, JAVA, 16.54 m. Works Holland mornings.	15.360	DZG	ZEESEN, GERMANY, 19.53 m., Addr. Reichspostzenstrahlamt. Tests irregularly.
20.040	OPI	LEOPOLDVILLE, BELGIAN CONGO, 14.97 m. Works ORG mornings.	18.115	LSY3	BUENOS AIRES, ARG., 16.56 m., Addr. (See 20.700 mc.) Tests irregularly. Broadcasts 4-5 pm. Friday.	15.355	KWU	DIXON, CALIF., 19.53 m., Addr. A. T. & T. Co. Phones Pacific Isles and Japan.
20.020	DHO	NAUEN, GERMANY, 14.99 m., Addr. Reichspostzenstrahlamt. Works S. Am. mornings.	18.040	GAB	RUGBY, ENG., 16.83 m. Works Canada morning and afternoon.	↓ S.W. BROADCAST BAND ↓		
19.900	LSG	BUENOS AIRES, ARG., 15.08 m., Addr. (See 20.700 mc.) Tests irregularly.	17.810	PCV	KOOTWIJK, HOLLAND, 16.84 m. Works Java 6-8 am.	15.340	DJR	BERLIN, GERMANY, 19.56 m., Addr. Br'dcast'g House. 8-9 am., 4.50-10.45 pm.
19.820	WKN	LAWRENCEVILLE, N. J., 15.14 m., Addr. A. T. & T. Co. Calls England daytime.	↓ S.W. BROADCAST BAND ↓			15.330	W2XAD	SCHENECTADY, N. Y., 19.56 m., Addr. General Electric Co. Relays WGY 11 am. to 9 pm.
19.680	CEC	SANTIAGO, CHILE, 15.24 m., Addr. Cia. Internacional de Radio. Calls Col. and Arg. daytime.	17.790	GSG	DAVENTRY, ENG., 16.86 m., Addr. B.B. C., London. 2-4.15 am., 5.45-8.55 am., 9 am.-12 n., 12.20-3.45, 4-6 pm.	15.310	GSP	DAVENTRY, ENG., 19.6 m., Addr. (See 26.100 mc.) 6.20-8.30 pm.
19.650	LSN5	BUENOS AIRES, ARG., 15.27 m., Addr. (See 21.020 mc.) Calls Europe daytime.	17.785	JZL	TOKIO, JAPAN, 16.87 m. Tests irregularly.	15.290	LRU	BUENOS AIRES, ARG., 19.62 m., Addr. El Mundo. 7-9 am.
19.620	VQG4	NAIROBI, KENYA, 15.28 m., Addr. Cable and Wireless, Ltd. Calls London 7.30-8 am.	17.780	W3XAL	BOUND BROOK, N. J., 16.87 m., Addr. Natl. Broad. Co. 9 am.-9 pm.	15.280	H13X	CIUDAD TRUJILLO, D. R., 19.63 m. Relays HIX Sun. 7.40-10.40 am. Week-days 12.10-1.10 pm.
↓ S.W. BROADCAST BAND ↓			17.770	PHI	HUIZEN, HOLLAND, 16.88 m., Addr. (See PHI, 11.730 mc.) Daily except Wednesday. 8.25-10 am., Sat. till 10.40 am., Sun. 7.25-10.35 am.	15.280	DJQ	BERLIN, GERMANY, 19.63 m., Addr. Broadcasting House. 12.05-5.15 am., 5.55-11 am., Sun. 11.10 am.-12.25 pm.
			17.760	DJE	BERLIN, GERMANY, 16.89 m., Addr. Broadcasting House. 12.05-5.15 am., 5.55-11 am., Sun. 11.10 am.-12.25 pm.	15.270	W2XE	NEW YORK CITY, 19.65 m., Addr. (See 21.520 mc.) 3-6 pm. Sun. 1-4 pm., 5-6 pm.
			17.755	ZBW5	NEW YORK, N. Y., 16.89 m., Addr. Col. Broad. System. 485 Madison Ave. HONGKONG, CHINA, 16.9 m., Addr. P. O. Box 200. 4-10 am. irregular.	(Continued on page 365)		

(All Schedules Eastern Standard Time)



EJ43—Tenerife, Canary Islands. Neat new card, with blue portrait of Franco, and red and yellow corner stripes.

broadcasts, after commercial service ends. VVS ordinarily has a beam antenna to VVN, at Fort Madras, India, but in making SW broadcasts, "substitutes a temporary aerial slung to one of our 264 ft. masts," according to Mr. Byrne.

Sked given for the Rangoon station on 6.007 mc. is 4-4:45 a.m., E.S.T., after July 1, 1937.

Mr. Byrne mentions that it is possible a Broadcasting station will be constructed in Rangoon at some future date. He also mentions that reports from listeners are greatly appreciated and thanks us for having written to the station. We thank you for having verified our reception, Mr. Byrne!

QRA for VVS: Mr. Byrne, Engineer-in-Charge, Govt. Radio Station, Mingaladon, Burma.

QRA for Govt. Station on 6.007 mc., Govt. Radio Station, 15th Mile Prom Road, Rangoon, Burma.

VVS heard lately at 7:06 a.m., with a very fine R7-8 signal here.

MANCHUKUO

JDY, 9.925 mc., Dairen, Kwantung, is now broadcasting daily from 7 or 7:15 a.m. until 8 a.m. Programs are Korean, Japanese and English, and seem to be relayed by JQAK, the BCB outlet in Dairen. English news is ready daily from 7:45-8 a.m. at present, though news schedule has been changed 2 or 3 times in the past month. The full QRA of JDY: Manchuria Tele-

phone and Telegraph, 7 Oyamagori, Dairen, Kwantung Peninsula, Manchukuo.

This station has a good signal, should be easy for all to log.

Above data by courtesy of Ashley Walcott, W6.

Moroccan Broadcast

● CN8AJ, operating on 7.045 mc., on Columbus Day, Oct. 12, 1937, at 0700 GMT or 2 a.m., E.S.T., will broadcast a "special" arranged by Joe Miller for the benefit of Short Wave & Television readers, and for the IDA. All DXers should try for this powerful station and send correct reports to Mr. Rene Crettien, 29, Rue des Villas, Casablanca, Morocco, accompanied by a reply coupon; they will be confirmed with a handsome card. Immediately after CN8AJ ends the broadcast, try for CN8AM, who may follow CN8AJ with another "special," also on 7 mc.

JDY often phones Tokio, usually JVO, 10.37 mc., throughout the morning.

INDIA

VWY2, 17.48 mc., Poona, India, was logged at 6:58 a.m., in QSO with GAU, 18.62 mc., Rugby, and GAU, though using inverted speech, came in so well that we clearly heard a woman calling "Hello, Poona." VWY2 had a FB signal. VWY2 has a daily sked with GAU at 7 a.m. whenever there is traffic to be carried, so try for this catch daily; it's a good bet!

QRA of VWY2: W. H. Ashley, Chief Engineer, Indian Radio & Cable Communications Co., Ltd., Beam Wireless Station, Poona 6, India.

VVN, 13.26 mc., at Fort Madras. In-

dia, has verified Mr. Walcott's report, and states that the commercial telephone service between VVS and VVN works from 10 p.m.-7 a.m., E.S.T., and that VVN uses 750 watts.

QRA of VVN is: Asst. Engineer-in-Charge, Madras Fort Radio, Fort St. George, Madras, India.

SIAM

HS8PJ, at Bangkok, Siam, beginning August 5th, will change its Thursday Xmsns to a frequency of 9.51 mc., at the usual time of 8-10 a.m., E.S.T.

This news came to us in a letter from our Siamese radio friend, Sangiem Powtongsook, Asst. Engineer at HS8PJ. Sangiem adds that should HS8PJ be QRM'd on this channel, they will be forced to move to either the 9.35 mc. channel, or to a new frequency.

Sangiem also adds the very welcome news that he has received the HSE2 report we sent to him and "will verify it right away." However, not having cards printed for HSE2, the veri will be in the form of a letter the same as our HSE veri. However, we're not complaining, hi!

Always glad to hear from you, Sangiem. OM, and please write us again often! By the way, is that FB ham station of yours, HS1PJ-BJ-RJ perking on 20 phone yet? We'd surely like to hear it!

CHINA

XGW, 10.41 mc., Shanghai, China, and all other Shanghai calls used by same Xmtr will not be heard for quite some time, as the station, located at Chengfu, a suburb of Shanghai, has been reported bombed by Japanese planes. This station was American owned.

All other radio telephone service in China has been disrupted by the undeclared war, and XGOX, at the capitol, Nanking, has suspended broadcasting indefinitely. Reported before the crash was XTW, 5.91 mc., at Canton, heard phoning Shanghai.

FORMOSA

JFAK, BCB station at Taihoku, Taiwan, has put a new SW relay on 9.625 mc., on the air, daily from 4-10:40 a.m., and Suns. till 10:15 a.m. A woman reads the news in English from 9:50-10:15 a.m. Suns., other days from 10:05 to 10:25-10:30 a.m. Identifies at 4 a.m. and at sign off with Japanese annt, and giving call JFAK twice.

In English the woman announcer identifies at the end of the English news, saying, "This news comes to you from the Taihoku Broadcasting Station, Taiwan."

Near 9:05 a.m., JIB, 10.535 mc., also at Taihoku, joins JFAK in the relays, so try for JIB also, a FB signal in early a.m's., when it phones Tokio.

PORTUGUESE CHINA

CQN, now on 10.135 mc., at Macao, announces in a letter to Murray Buitkant, W2, that they will soon change their frequency to a spot somewhere between 40-50 meters. This data received from J. Estrela, Chief at the Station. Poorly heard here on Labor Day, being badly QRM'd by a strong CW signal.

INDO-CHINA

Philco Radio, at Saigon, verifies 50 meter reception for Ashley Walcott, and also sends a printed schedule along with the veri, giving the following data: Chinese, Annamite (native) and French music is broadcast on the following sked: Dly, 11 p.m.-1 a.m., Sat., beg. at 4:30; Sun. and Wed. at 5:30; other days at 6 a.m., until sign-off daily at 9:30 a.m.

Frequency of the 50 meter relay, using same power as the 25 meter station, is given at 6.01 mc., or 5.985 mc. For a time it was heard near 7.32 mc., but since then has been heard a few times near 5.89 mc. It does not seem to be on often.

Radio Philco was heard on Labor Day with a good R7 signal and should increase in volume this fall, making it an easy catch for all DXers.

(Continued on page 390)



ZT6AL—Johannesburg, South Africa. A neat card with red letters; try for him in November.

Mc.	Call	Mc.	Call	Mc.	Call			
15.250	GSI	DAVENTRY, ENG., 19.66 m., Addr. (See 26.100 mc.) 12.20-3.45, 9-11 pm.	15.500	LSM2	BUENOS AIRES, ARG., 20.69 m., Addr. (See 21.020 mc.) Works RIO and Europe daytime.	12.000	RNE	MOSCOW, U.S.S.R., 25 m. Daily except Sun. 3-6 pm., Sat., Sun., Tues., Fri., 10.15-10.45 pm., also Sun. 6-11 am., Wed. 6-7 am.
15.252	RIM	TACHKENT, U.S.S.R., 19.67 m. Works RKL near 7 am.	14.485	TIR	CARTAGO, COSTA RICA, 20.71 m. Works Central America and U. S. A. daytime.	11.991	FZS2	SAIGON, INDO-CHINA, 25.02 m. Phones Paris mornings.
15.250	W1XAL	BOSTON, MASS., 19.67 m., Addr. University Club. Daily 2-4 pm.	14.485	YSL	SAN SALVADOR, SALVADOR, 20.71 m. Irregular.	11.960	HIZX	CIUDAD TRUJILLO, D. R., 25.08 m., Addr. La Voz de Hispaniola. Relays HIX Tue. and Fri. 8.10-10.10 pm.
15.245	TPA2	PARIS, FRANCE, 19.68 m., Addr. 98 bis. Blvd. Haussmann. "Radio Colonial." 6-11 am.	14.485	HPF	PANAMA CITY, PANAMA, 20.71 m. Works WNC daytime.	11.955	IUC	ADDIS ABABA, ETHIOPIA, 25.09 m. Works IAC around 12 midnight.
15.230	HS8PJ	BANGKOK, SIAM, 19.32 m. Irregularly Mon. 8-10 am.	14.485	TGF	GUATEMALA CITY, GUATEMALA, 20.71 m. Works WNC daytime.	11.950	KKQ	BOLINAS, CALIF., 25.1 m. Tests irregularly evenings.
15.230	OLR5A	PRAGUE, CZECHOSLOVAKIA, 19.32 m., Irregular.	14.485	YNA	NICARAGUA, MANAGUA, 20.71 m. Works WNC daytime.	11.940	FTA	STE. ASSISE, FRANCE, 25.13 m. Works Morocco mornings and Argentina late afternoon.
15.220	PCJ	HUIZEN, HOLLAND, 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.	14.485	HRL5	NACAOE, HONOURAS, 20.71 m. Works WNC daytime.	↓ S.W. BROADCAST BAND ↓		
15.210	WBXK	PITTSBURGH, PA., 19.72 m., Addr. (See 21.540 mc.) 9 am.-7 pm.	14.485	HRF	TEGUCIGALPA, HONOURAS, 20.71 m. Works WNC daytime.	11.900	XEWI	MEXICO CITY, MEXICO, 25.21 m. Monday, Wed. and Fri. 3-4 pm., 9 pm. 12 m. Tues. to Thurs. 7.30 pm.-12 m. Sat. 9 pm. to 12 m. Sunday 12.30-2 pm.
15.200	DJB	BERLIN, GERMANY, 19.74 m., Addr. (See 15.280 mc.) 12.05-5.15 am., 5.55-11 am., 4.50-11 pm. Also Sun. 11.10 am. to 12.25 pm.	14.470	WMF	LAWRENCEVILLE, N. J., 20.73 m., Addr. A. T. & T. Co. Works London and Paris daytime.	11.895	HP5I	AGUADULCE, PANAMA, 25.22 m., Addr. La Voz del Interior. 7.30-9.30 pm.
15.190	ZBW4	HONGKONG, CHINA, 19.75 m., Addr. P. O. Box 200. 11.30 pm. to 1.15 am., 4-10 am. Sat. 9.15 pm.-1 am. Sun. 3-9.30 am.	14.460	DZH	ZEESSEN, GERMANY, 20.75 m., Addr. (See 15.360 mc.) Irregular.	11.880	TPA3	PARIS, FRANCE, 25.23 m., Addr. (See 15.245 mc.) 2-5 am., 12.15-5 pm.
15.180	GSO	DAVENTRY, ENG., 19.76 m., Addr. (See 26.100 mc.) 2-4.15 am., 4-6, 6.20-8.30 pm.	14.440	GBW	RUGBY, ENG., 20.78 m. Works U. S. A. afternoons.	11.870	WBXK	PITTSBURGH, PA., 25.26 m., Addr. (See 21.540 mc.) 7-10.30 pm.
15.185	XEWV	MEXICO CITY, MEXICO, 19.78 m. Irregular 9 am.-6 pm.	14.200	EA9AH	TETUAN, SPANISH MOROCCO, 21.13 m. Daily except Sun. 2.15-5.7 and 9 pm.	11.860	YOB	SOERABAJA, JAVA, 25.29 m., Addr. N. I. R. O. M. Sat. 7.30 pm. to 2.30 am., daily 10.30 pm. to 2 am.
15.160	JZK	TOKIO, JAPAN, 19.79 m., 3-4 pm., 4.30-5.30 pm., 12.30-1.30, 8-9 am.	13.990	GBA	RUGBY, ENG., 21.44 m., Works Buenos Aires late afternoon.	11.860	GSE	DAVENTRY, ENG., 25.29 m., Addr. (See 26.100 mc.) Irregular.
15.150	YDC	BANDOENG, JAVA, 19.8 m., Addr. N. I. R. O. M. 6-7.30 pm. 10.30 pm.-2 am., Sat. 7.30 pm.-2 am., 5.30-10.30 am.	13.820	SUZ	ABOU ZABAL, EGYPT, 21.71 m. Works with Europe 11 am. to 2 pm.	11.855	DJP	BERLIN, GERMANY, 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am. to 4 pm.
15.140	G8F	DAVENTRY, ENG., 19.82 m., Addr. (See 26.100 mc.) 10.30 am.-12 n., 4-6, 6.20-8.30 pm.	13.690	KKZ	BOLINAS, CALIF., 21.91 m., Addr. RCA Communications. Irregular.	11.840	KZRM	MANILA, P. I., 25.35 m. Addr. Erlanger & Gallinger, Box 283. 9 pm.-10 am.
15.120	HVJ	VATICAN CITY, 19.83 m., 10.30-10.45 am., except Sun., Sat. 10-10.45 am.	13.635	SPW	WARSAW, POLAND, 22 m., Mon., Wed. Fri., 12.30-1.30 pm.	11.840	C8W	LISBON, PORT., 25.35 m. Nat'l Broad. Stat. 11.30 am.-1.30 pm.
15.110	DJL	BERLIN, GERMANY, 19.85 m., Addr. (See 15.280 mc.) 12 m.-2, 8-9 am., 11.35 am. to 4.30 pm. Sun. also 6-9 am.	13.585	GBB	RUGBY, ENG., 22.08 m. Works Egypt and Canada afternoon.	11.840	OLR4A	PRAGUE, CZECHOSLOVAKIA, 25.35 m. Addr. Czech Shortwave Sta., Praha X11, Fochova 16. Daily 2-4.30 pm., Mon. and Thurs., 7-9.10 pm.
↓ S.W. BROADCAST BAND ↓			13.415	GCI	RUGBY, ENG., 22.36 m. Works Japan and China early morning.	11.830	W9XAA	CHICAGO, ILL., 25.36 m., Addr. Chicago Federation of Labor. Irregular.
15.085	WNC	HAIALEAH, FLORIDA, 19.92 m., Addr. A. T. & T. Co. Calls Central America daytime.	13.410	YSJ	SAN SALVADOR, SALVADOR, 22.37 m. Works WNC daytime.	11.830	W2XE	NEW YORK CITY, 25.36 m., Addr. Col. Broad. System. 485 Madison Av., N.Y.C., relays WABC 6.30 pm.-12 m. Sun. 7 pm.-12 m.
15.038	RW95-RKI	MOSCOW, U.S.S.R., 19.95 m. Works Tashkent near 7 am. Broadcasts 7-9.15 pm. daily. Relays RAN. Sun. 1-3 pm.	13.390	WMA	LAWRENCEVILLE, N. J., 22.4 m., Addr. A. T. & T. Co. Works England morning and afternoon.	11.820	XEBR	HERMOSILLA, SON., MEX., 25.38 m., Addr. Box 68. Relays XEBH. 2-4 pm., 9 pm.-12 m.
14.980	KAY	MANILA, P. I., 20.03 m., Addr. RCA Comm. Works Pacific Islands.	13.380	IDU	ASMARA, ERITREA, AFRICA, 22.42 m. Works Rome daytime.	11.820	GSN	DAVENTRY, ENG., 25.38 m., Addr. (See 26.100 mc.) Irregular.
14.970	LZA	SOPHIA, BULGARIA, 20.04 m., Addr. Radio Garata. Sun. 12.30-8 am., 10 am. to 4.30 pm. Daily 5-6.30 am., 12 n.-2.45 pm.	13.345	YVQ	MARACAY, VENEZUELA, 22.48 m. Works WNC daytime.	11.810	ZRO	ROME, ITALY, 25.4 m., Addr. E.I.A.R., Via Montello 5. Daily 6.43-10.30 am., 11.30 am.-5.30 pm., 6-7.45 pm. Sun. 6.43-9 am., 11.30 am.-5.30 pm.
14.960	PSF	RIO DE JANEIRO, BRAZIL, 20.43 m., Works with Buenos Aires daytime.	13.285	CGA3	DRUMMONDVILLE, QUE., CAN., 22.58 m. Works London and ships afternoons.	11.805	OZF	SKAMLEBOAEK, DENMARK. 25.41 m. Addr. Statsradiofonien. Irregular.
14.950	HJB	BOGOTA, COL., 20.07 m. Calls WNC daytime.	13.330	IRJ	ROME, ITALY, 22.69 m. Works Tokio 8-9 am. irregularly.	11.803	JZJ	TOKIO, JAPAN, 25.42 m., Addr. Broadcasting Co. of Japan, Overseas Division. 8-9 am, 3-4, 4.30-5.30 pm.
14.940	HII	CIUDAD TRUJILLO, D. R., 20.08 m., Phones WNC daytime.	13.075	VPD	SUVA, FIJI ISLANDS, 22.94 m. Irregularly.	11.800	OER2	VIENNA, AUSTRIA, 25.42 m. Daily 10 am.-5 pm. Sat. until 5.30 pm.
14.940	HJA3	BARRANQUILLA, COL., 20.08 m. Works WNC daytime.	12.840	WOO	OCEAN GATE, N. J., 23.36 m., Addr. A. T. & T. Co. Works with ships irregularly.	11.795	DJO	BERLIN, GERMANY, 25.43 m., Addr. (See 15.280 mc.) Irregular.
14.845	OCJ2	LIMA, PERU, 20.21 m. Works South American stations daytime.	12.825	CNR	RABAT, MOROCCO, 23.39 m., Addr. Director General Tele. & Teleg. Stations. Works with Paris irregularly.	11.795	OAX5B	ICA, PERU, 25.43 m., Addr. Radio Universal. 11 am.-12 n., 4-11.15 pm.
14.790	ROU	OMSK, SIBERIA, U.S.S.R., 20.28 m. Works Moscow irregularly 7-9 am.	12.800	IAC	PISA, ITALY, 23.45 m. Works Italian ships mornings.	11.793	COGF	MATANZAS, CUBA, 25.45 m., Addr. Gen. Betancourt 51. Relays CMGF. 2-3, 4-5, 6-11 pm.
14.730	IQA	ROME, ITALY, 20.37 m. Tests irregularly.	12.780	GBC	RUGBY, ENG., 23.47. Works ships irregularly.	11.790	W1XAL	BOSTON, MASS., 25.45 m., Addr. (See 15.250 mc.) Daily 4-5.30 pm. Sat. 5-5.30 pm.
14.553	GBL	RUGBY, ENG., 20.47 m. Works JHI-7 am.	12.485	HIN	CIUDAD TRUJILLO, D. R., 24 m. "Broadcasting National." 12 n.-2 pm. 6-11 pm. approx.	11.770	DJD	BERLIN, GERMANY, 25.49 m., Addr. (See 15.280 mc.) 11.35 am.-4.30 pm., 4.50-11 pm.
14.540	TYF	PARIS, FRANCE, 20.49 m. Works Saigon and Cairo 3-7 am., 12 m.-2.30 pm.	12.325	DAF	NORDEICH, GERMANY, 24.34 m. Works German ships daytime.	11.760	OLR4B	PRAGUE, CZECHOSLOVAKIA, 25.51 m., Addr. (See 11.875 mc.) Irregular.
14.500	JVH	NAZAKI, JAPAN, 20.55 m. Broadcasts irregularly 5-11.30 pm. Works Europe 4-8 am.	12.300	CB615	SANTIAGO, CHILE, 24.39 m., Addr. Louis Desmaras, Casilla, 761. 11 am.-1 pm., 4-8 pm., Sun. 4-10 pm.	11.750	G8D	DAVENTRY, ENG., 25.53 m., Addr. B. B. C., London. 2-4.15 am., 12.20-3.45 pm., 6.20-8.30, 9-11 pm.
14.580	WMN	LAWRENCEVILLE, N. J., 20.56 m., Addr. A. T. & T. Co. Works England morning and afternoon.	12.290	GBU	RUGBY, ENG., 24.41 m. Works N. Y. C. evenings.	(Continued on page 367)		
14.535	HBJ	GENEVA, SWITZERLAND, 20.64 m., Addr. Radio Nations. Broadcasts Sat. 6.45-8 pm.	12.250	TYB	PARIS, FRANCE, 24.40 m. Irregular.			
14.530	LSN	BUENOS AIRES, ARG., 20.65 m., Addr. (See 20.020 mc.) Works N. Y. C. afternoons.	12.235	TFJ	REYKJAVIK, ICELAND, 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.			
14.503	—	ASMARA, ERITREA, AFRICA, 20.69 m. Works Rome and Addis Ababa 6.30-7.30 am.	12.215	TYA	PARIS, FRANCE, 24.56 m. Works French ships in morning and afternoon.			
			12.150	GBS	RUGBY, ENG., 24.69 m. Works N. Y. C. evenings.			
			12.130	DZE	ZEESSEN, GERMANY, 24.73 m., Addr. (See 15.360 mc.) Tests irregular.			
			12.120	TPZ2	ALGIERS, ALGERIA, 24.75 m. Calls Paris 12 m.-6.30 am.			
			12.060	PDV	KOOTWIJK, HOLLAND, 24.88 m. Tests irregularly.			

(All Schedules Eastern Standard Time)

(Continued on page 367)

How To

IDENTIFY

Short-Wave
Stations

BONG! BONG! BONG!—What Short-Wave Station was that? If you follow the data given in this department you can identify the "foreign" S-W stations easily. Keep these lists of identification interval signals, as they will prove most valuable.

WORLD-WIDE STATION IDENTIFICATION LIST

Part Five

Freq. Station

Mc. Call Type—Location

9.67 TI4NRH B—Heredia, Costa Rica. Slogan: "The Voice of Costa Rica." Various signals used, often bugle. Unstable frequency.

9.66 LRX B—Buenos Aires, Argentina. Slogan: "Radio El Mundo," giving call for both SW and BC stations: "LRU y LRX."

9.66 CR6AA B—Lobito, Angola, Portuguese West Africa. "Short Wave Broadcasting Station CR6AA, Angola, Port. West Africa" heard in occasional English announcement. Interval signal 3 notes played on piano.

9.65 CT1AA B—Lisbon, Portugal. Announces "Radio Coloniale," 3



cuckoo calls is the interval signal.

9.645 HH3W B—Port-Au-Prince, Haiti. Speaks French, announcing in French and English, occasionally in Spanish.

9.64 OAX5C B—Ica, Peru. Slogan: "Radio Universal" (same as OAX5A).

9.635 2RO3 B—Rome, Italy. See 2RO4, 11.81 mc.

9.625 JFAK B—Taihoku, Taiwan



(Formosa). Relays the BCB JFAK. Identifies at beginning of Xmission, 4 a.m., E.S.T., and near 10:40 a.m., end of daily Xmission. (10:15 a.m. Suns.), giving call "JFAK," twice during Japanese announcement. Woman gives news in English (Suns.: 9:50-10:15 a.m., E.S.T.) (Daily 10:05-10:30 a.m., E.S.T.) ending news with "This news comes to you from the Taihoku Broadcasting

Station, Taiwan." About 6 chimes heard occasionally as interval signal.

9.617 HJ1ABP B—Cartagena, Colombia. Slogan: "Radio Cartagena"; uses dual call "HJ1ABP y HJ1ABR." Latter BCB outlet.

9.607 HP5J B—Panama City, Panama. Slogan: "La Voz de Panama." Dual call "HP5J y HP6J." Plays march "Under the Double Eagle."

9.604 XEYU B—Mexico City, Mexico. Slogan: "Universidad de Mejico" (National University of Mexico).

9.60 RAN B—Moscow, U. S. S. R. Announces: "This is Moscow calling." Plays Internationale at opening, close of programs, and between changes of language.

9.60 CB960 B—Santiago, Chile. Slogan: "Radiodifusora Pilot." Plays Victor Herbert's "Babes in Toyland" at beginning and ending of Xmission. S. O. with Gershwin's "Rhapsody in Blue."

9.595 HBL B—Geneva, Switzerland. See HBP, 7.797.

9.59 VK6ME B—Perth, Western Australia. Call given very frequently, "This is VK6ME, the Perth SW Station of Amalgamated Wireless, A/Asia, Ltd." Signs off with "God Save the King."

9.59 VK2ME B—Sydney, Australia.

Slogan: "Voice of Australia" Uses interval signal of Kookaburra bird. Announces as "VK2ME, the SW experimental station of the Amalgamated Wireless, A/Asia, Ltd." Often announces time, clock strikes on the hour with clock chimes each quarter-hour. Closes with "God Save the King."



9.59 PCJ B—Hilversum, Holland. Slogan: "The Happy Station," and when in parallel with PHI, "The Dutch Twins." Announcements in several languages. Uses interval signal of metronome, 80 beats to minute. Signs off with National Anthem.

9.58 VK3LR B—Melbourne, Australia.

Opens with "Song of the Lyre Bird." Call heard rarely during Melbourne relay: "3LR, the Australian National SW Station." Closes with "God Save the King."

9.57 KZRM B—Manila, Philippine Islands. Now used in place of 11.84 mc. frequency. See 11.84 mc.

9.56 OAX4T B—Lima, Peru. Slogan: "Radio Nacionales"; uses dual call "OAX4A y OAX4T." Evidently daytime channel and call for OAX4Z. See OAX4Z, 6.081 mc.

9.55 YDB B—Bandoeng, Java. See YDC, 15.15 mc. Check program heard with PLP, 11.00 mc. Programs emanate from same chain.

9.55 XEFT B—Veracruz, Mexico. Slogan: "La Voz de Veracruz." Uses dual call "XETF y XEFT." Closes with selection "Vals Poetico."

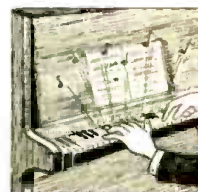
9.54 VPD2 B—Suva, Fiji Islands. Slogan: "Radio Suva." Quarterly or half-hourly identifications as "Station VPD2, Suva." S. O. with "God Save the King."

9.535 JZI B—Nazaki, Japan. English programs open with chimes in melody of National Anthem, "Kimigayo." Then English and Japanese announcements. Call always given at beginning and end of programs. Closes with "Kimigayo" and chimes repeating the Anthem's melody.

9.53 LKJ1 B—Oslo, Norway. Calls

"Halla, halla, Oslo, Calling."

Interval signal six notes played on piano. Closes with piano selection. QRA: Ministère du Commerce, Administration des Télégraphes, Oslo, Norway.



9.525 ZBW3 B—Hong Kong, China. Infrequent announcements. "ZBW, Hong Kong." Usually relays Davenry programs after 8 a.m., E.S.T.

9.523 FIQA B—Tananarive, Madagascar. See FIQA, 11.81 mc. QRA: Le Directeur des Postes et Télégraphes, Administration des P. T. T. Tananarive, Madagascar.

9.523 "Radio Liberta" B—Location unknown. Slogan: "Radio Liberta"; announcer refusing to give location, but asks reports be sent to: 25 Liberte, Paris, France.

9.52 HJ4ABH B—Armenia, Colombia. (Continued on page 379)

Television at London Radio Show

By Mander Barnett

● FOR about \$175.00 Mr. London Radio Listener can now buy a television receiver and view the programs radiated daily by the B.B.C. from the Alexandra Palace.

At the radio exhibition held recently at Olympia, London, many manufacturers were showing new television receivers, all designed to receive the daily transmissions from the ultra short wave television transmitter at the Alexandra Palace. These receivers ranged in price from \$175.00 for a table model receiver

with a small size screen to about \$3000.00 for a large console model. The average screen (image) size on most of the console models was about 8 x 10 inches. The table-model television receiver shown by the English General Electric Company is scarcely any larger than a large size table-model radio receiver; the picture on this receiver is viewed directly on the cathode ray tube screen.

Most of the larger receivers have the tube mounted vertically and the picture is viewed on a glass or polished steel screen mounted in the lid of the console.

It is estimated that some 6,000 television receivers are now in use within the transmission range of the Alexandra Palace transmitter. Public demonstration receivers are located in several of the big London stores and in numerous radio and music shops, where the radio listener can decide whether to invest in a re- (Continued on page 379)

Mc.	Call		Mc.	Call		Mc.	Call	
11.730		SAIGON, INDO CHINA, 25.57 m., Addr. Radio Philco. 11pm.-1am. 5.30-9.30am.	10.350	LSX	BUENOS AIRES, ARG., 28.98 m., Addr. Transradio International. Broadcasts 5-6 pm. Mon. and Fri. Tests irregularly at other times.	9.645	HH3W	PORT-AU-PRINCE, HAITI, 31.1 m., Addr. P. O. Box A117. 1-2, 7-8 pm.
11.730	PHI	HUIZEN, HOLLAND, 25.57 m., Addr. N. Y. Philips' Radio. Irregular.				9.645	YNLF	MANAGUA, NICARAGUA, 31.1 m. 8-9 am., 12.30-2.30, 6.30-10 pm.
11.720	CJRX	WINNIPEG, CANADA, 25.6 m., Addr. James Richardson & Sons, Ltd. 4-10pm.	10.330	ORK	RUYSSELEDE, BELGIUM, 29.04 m. 2.30-4 pm.	9.635	2RO	ROME, ITALY, 31.13 m., Addr. (See 11.810 mc.) Tues., Thurs. and Sat. 6-7.45 pm.
11.718	CR7RH	LAURENCO MARQUES, PORTUGUESE, E. AFRICA, 25.6 m. Daily 11.45 pm.-12.30 am., 9.30-11 am., 12.45-3.45 pm. Sun. 5.30-7 am., 10 am.-12.30 pm., 1.30-3.20 pm.	10.300	LSL2	BUENOS AIRES, ARG., 29.13 m., Addr. Cia. Internacional de Radio. Works Europe evenings.	9.630	HJ2ABD	BUCARAMANGA, COL., 31.14 m. 11.30 am.-12.30 pm., 5.30-6.30, 7.30-10.30 pm.
11.715	TPA4	PARIS, FRANCE, 25.61 m., (See 15.245 mc.) 6.15-8.15 pm., 10 pm.-1 am.	10.290	DZC	ZEESSEN, GERMANY, 29.16 m., Addr. (See 15.360 mc.) Irregular.	9.620	HJ1ABP	CARTAGANA, COL., 31.19 m., Addr. P. O. Box 37. 11 am.-1 pm., 5-11 pm. Sun. 10 am.-1 pm., 3-6 pm.
11.710	SBG	MOTALA, SWEDEN, 25.63 m., 7-9, 11 am.-1.30 pm. Sunday 3 am.-1.30 pm.	10.260	PMN	BANDOENG, JAVA, 29.24 m., Relays YDB 5.30-10.30 or 11 am. Sat. to 11.30 am.	9.615	HP5J	PANAMA CITY, PANAMA, 31.22 m. Addr. Apartado 867. 12 n. to 1.30 pm., 6-10.30 pm.
11.700	HP5A	PANAMA CITY, Pan., 25.65 m. Addr. Radio Teatro, Apartado 954. 10 am.-10 pm.	10.250	LSK3	BUENOS AIRES, ARG., 29.27 m., Addr. (See 10.310 mc.) Works Europe and U.S.A. afternoons and evenings.	↓ S.W. BROADCAST BAND ↓		
↓ S.W. BROADCAST BAND ↓			10.230	CED	ANTOFAGASTAN, CHILE, 29.33 m. Tests 7-9.30 pm.			
11.680	KIO	KAHUKU, HAWAII, 25.68 m., Addr. RCA Communications. Irregularly.	10.220	PSH	RIO DE JANEIRO, BRAZIL, 29.35 m. Irregular.	9.600	RAN	MOSCOW, U.S.S.R., 31.25 m. Daily 7-9.15 pm.
11.595	VRR4	STONY HILL, JAMAICA, B. W. I., 25.87 m. Works WNC daytime.	10.170	RIO	BAKOU, U.S.S.R., 29.15 m. Works Moscow 10 pm.-5 am.	9.600	CB960	SANTIAGO, CHILE, 31.25 m. Heard after 9.30 pm.
11.560	VIZ3	FISKVILLE, AUSTRALIA, 25.95 m., Addr. Amalgamated Wireless of Australasia Ltd. Tests irregularly.	10.140	OPM	LEOPOLDVILLE, BELGIAN CONGO, 29.59 m. Works Belgium around 3 am. and from 1-4 pm.	9.595	HBL	GENEVA, SWITZERLAND, 31.27 m., Addr. Radio Nations. Sat. 5.30-6.30 pm.
11.500	XAM	MERIDA, YUCATAN, 26.09 m. Irregular 1-7.30 pm.	10.080	RIO	TIFLIS, U.S.S.R., 29.76 m. Works Moscow early morning.	9.590	PCJ	HUIZEN, HOLLAND, 31.28 m., Addr. (See 15.220 mc.) Sun. 2-3, 7-8 pm. Tues. 1.30-3 pm. Wed. 7-10 pm.
11.500	PMK	BANDOENG, JAVA, 26.09 m. Tests irregularly.	10.070	EDM-EHY	MADRID, SPAIN, 29.79 m. Works S. A. evenings.	9.590	VK6ME	PERTH, W. AUSTRALIA, 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd. 6-8 am. exc. Sun.
11.435	COCX	HAVANA, CUBA, 26.19 m. P. O. Box 32. 6.55 am.-1 am. Sun. till 12 m. Relays CMX.	10.065	JZB-TDB	SHINKYO, MANCHUKUO, 29.81 m. Works Tokio 6.30-7 am.	9.590	VK2ME	SYDNEY, AUSTRALIA, 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd., 47 York St. Sun. 12.30-2.30 am. 4.30-8.30, 9.30-11.30 am.
11.413	CJA4	ORUMMONDVILLE, QUE., CAN., 26.28 m. Tests irregularly.	10.055	ZFR	HAMILTON, BERMUDA, 29.84 m. Works N. Y. C. irregular.	9.590	W3XAU	PHILADELPHIA, PA., 31.28 m. Relays WCAU 12 n. to 8 pm. Sun. and Wed. to 7 pm.
11.402	HBO	GENEVA, SWITZERLAND, 26.31 m., Addr. Radio Nations. Sat. 6.45-8 pm.	10.055	SCV	ABOU ZABAL, EGYPT, 29.84 m. Works Europe 1-6 pm.	9.580	GSC	DAVENTRY, ENGLAND, 31.32 m., Addr. B. B. C., Portland Pl., London, W. 1. Irregular. 9-11 pm.
11.280	HIN	CIUDAD TRUJILLO, D. R., 26 m., Addr. La Voz del Partido Dominicano. Irregular.	10.042	DZB	ZEESSEN, GERMANY, 29.87 m., Addr. Reichspostzentralamt. Irregular.	9.580	VK3LR	MELBOURNE, AUSTRALIA, 31.32 m., Addr. 61 Little Collins St. Daily 3.30-8.30 am. Sun. 3.30-7.30 am. Sun., Fri. 9.30 pm.-2.30 am.
11.050	ZLT4	WELLINGTON, NEW ZEALAND, 27.15 m. Works Australia and England early morning.	9.990	KAZ	MANILA, P. I., 30.03 m., Addr. RCA Communications. Works Java early morning.	9.575	HJ2ABC	CUCUTA, COL., 31.34 m. 8 pm. to 12 m.
11.040	CSW	LISBON, PORTUGAL, 27.17 m., Addr. Nat. Broadcasting Sta. 1.30-5 pm.	9.950	GCU	RUGBY, ENGLAND, 30.15 m. Works N. Y. C. night time.	9.570	KZRM	MANILA, P. I., 31.35 m., Addr. Erlanger & Galingier, Box 283. 9 pm.-10 am.
11.000	PLP	BANDOENG, JAVA, 27.27 m. Relays YDB 5.30-10.30 or 11 am. Sat. until 11.30 am.	9.930	CSW	LISBON, PORTUGAL, 30.31 m., Addr. Nat. Broad. Station. 5-7 pm.	9.570	W1XK	SPRINGFIELD, MASS., 31.35 m., Addr. Westinghouse Electric & Mfg. Co. Relays WBZ 7 am. to 1 am. Sun. 8 am. to 1 am.
10.970	OCI	LIMA, PERU, 27.35 m. Works Bogota, Col. evenings.	9.890	LSN	BUENOS AIRES, ARG., 30.33 m., Addr. (See 10.300 mc.) Works N. Y. C. evenings.	9.560	DJA	BERLIN, GERMANY, 31.38 m., Addr. Broadcasting House. 12.05-5.15 am., 4.50-10.45 pm.
10.840	KWV	DIXON, CALIF., 27.68 m., Addr. A. T. & T. Co. Works with Hawaii evenings.	9.870	WON	LAWRENCEVILLE, N. J., 30.4 m., Addr. A. T. & T. Co. Works England nights.	9.555	HJ1ABB	BARRANQUILLA, COL., 31.39 m., Addr. P. O. Box 715. 11.30 am. to 1 pm., 4.30-6 pm.
10.770	GRP	RUGBY, ENGLAND, 27.85 m. Works Australia early morning.	9.860	EAQ	MADRID, SPAIN, 30.43 m., Addr. Post Office Box 951. Daily 5.15-7.30 pm., Sat. also 12 n.-2 pm.	9.550	OLR3A	PRAGUE, CZECHOSLOVAKIA, 31.41 m. See 11.840 mc.
10.740	JVM	NAZAKI, JAPAN, 27.93 m. Works U.S.A. 2-7 am.	9.830	IRM	ROME, ITALY, 30.52 m. Works Egypt afternoons.	9.550	XEFT	VERA CRUZ, MEX., 31.41 m., 11.30 am.-4 pm., 7 pm.-12 m.
10.675	WNB	LAWRENCEVILLE, N. J., 28.1 m., Addr. A. T. & T. Co. Works with Bermuda irregularly.	9.810	COCM	HAVANA, CUBA, 30.59 m. Addr. Transradio Columbia, P. O. Box 33. 7 am.-12 m. Relays CMCM.	9.550	YDB	SOERABAJA, JAVA, 31.41 m., Addr. N.I. R.O.M. Daily exc. Sat. 6-7.30 pm., 5.30 to 10.30 or 11 pm. Sat. 5.30-11.30 am.
10.670	CEC	SANTIAGO, CHILE, 28.12 m. Daily 7-7.15 pm.	9.800	LSI	BUENOS AIRES, ARG., 30.61 m., Addr. (See 10.350 mc.) Tests irregularly.	9.540	DJN	BERLIN, GERMANY, 31.45 m., Addr. (See 9.560 mc.) 12.05-5.15 am., 4.50-10.45 pm.
10.660	JVN	NAZAKI, JAPAN, 28.14 m. Broadcasts daily 2-8 am. Works Europe irregularly at other times.	9.790	GCW	RUGBY, ENGLAND, 30.64 m. Works N. Y. C. evenings.	9.540	VPD2	SUVA, FIJI ISLANDS, 31.45 m., Addr. Amalgamated Wireless of Australasia, Ltd. 5.30-7 am.
10.650	WOK	LAWRENCEVILLE, N. J., 28.44 m., Addr. A. T. & T. Co. Works S. A. nights.	9.760	VLJ-VLZ2	SYDNEY, AUSTRALIA, 30.74 m., Addr. Amalgamated Wireless of Australasia Ltd. Works Java and New Zealand early morning.	9.535	JZ1	TOKIO, JAPAN, 31.46 m., Addr. (See 11.800 JZJ)
10.535	JJB	TAIWAN, FORMOSA, 28.48 m. Works Japan around 6.25 am.	9.750	WOF	LAWRENCEVILLE, N. J., 30.77 m., Addr. A. T. & T. Co. Works London and Paris night time.	9.530	W2XAF	SCHENECTADY, N. Y., 31.48 m., Addr. General Electric Co. 4 pm.-1 am.
10.520	VLK	SYDNEY, AUSTRALIA, 28.51 m., Addr. Amalgamated Wireless of Australasia Ltd. Works England 1-6 am.	9.740	COCQ	HAVANA, CUBA, 30.78 m. Addr. 25 No. 445, Vedado, Havana. 6.55 am.-1 am. Sun. till 12 m.	9.525	ZBW3	HONGKONG, CHINA, 31.49 m., Addr. P. O. Box 200. Irregular 11.30 pm. to 1.15 am., 4-10 am.
10.430	YBG	MEDAN, SUMATRA, 28.76 m. 5.30-6.30 am., 7.30-8.30 pm.	9.710	GCA	RUGBY, ENGLAND, 30.89 m. Works S. A. evenings.	9.525	LKJ1	JELOY, NORWAY, 31.49 m. 5-8 am.
10.420	XGW	SHANGHAI, CHINA, 28.79 m. Works Japan 12 m.-3 am.	9.675	DZA	ZEESSEN, GERMANY, 31.01 m., Addr. (See 10.042 mc.) Irregular.	9.520	HJ4ABH	ARMENIA, COLOMBIA, 31.51 m. 8-11 am., 6-10 pm.
10.410	PKD	KOOTWIJK, HOLLAND, 28.8 m. Works Java 7.30-9.40 am.	9.670	TI4NRH	HEREDIA, COSTA RICA, 31.02 m., Addr. Amando C. Marin, Apartado 40. 8.30-10 pm., 11.30 pm.-12 m.	9.520	OZF	SKAMLEBOAEK, DENMARK, 31.51 m., Addr. Statensradiofonien, Copenhagen. 2-6.40 P.M.
10.410	KES	BOLINAS, CALIF., 28.8 m., Addr. RCA Communications. Irregular.	9.660	LRX	BUENOS AIRES, ARG., 31.06 m., Addr. El Mundo. 9.30 am.-11.30 pm.	9.520	XEDQ	GUADALAJARA, GAL., MEXICO, 31.5 m. Irregular 7.30 pm. to 12.30 am.
10.370	JVO	NAZAKI, JAPAN, 28.93 m. Broadcasts around 5 am.	9.650	CT1AA	LISBON, PORTUGAL, 31.09 m., Addr. Radio Colonial. Tues., Thurs. and Sat. 4.30-7 pm.	9.510	VK3ME	MELBOURNE, AUSTRALIA, 31.55 m., Addr. Amalgamated Wireless of Australasia, 167 Queen St. Daily except Sun. 4-7 am.
10.370	EHZ	TENERIFFE, CANARY ISLANDS, 28.93 m. Relays EAJ43 2.15-3.15, 6.15-9.	9.650	DGU	NAUEN, GERMANY, 31.09 m., Addr. (See 20.020 mc.) Works Egypt afternoons.	(Continued on page 369)		

(All Schedules Eastern Standard Time)

SHORT WAVE LEAGUE



HONORARY MEMBERS

Dr. Lee de Forest
John L. Reinartz
D. E. Replogle
Hollis Baird
E. T. Somerset
Baron Manfred von Ardenne
Hugo Gernsback
Executive Secretary

WHEN TO LISTEN IN

M. Harvey Gernsback

All Schedules in Eastern Standard Time

● **SHANGHAI** . . . As a result of damage from bombardment the Chinese phones XGM 17.65 mc., XOJ 15.8 mc., XGW 10.42 mc., and XTC 9.3 mc., are off the air temporarily.

● **COCM MOVES** . . . COCM, Havana has been trying out 9.8 mc. for several weeks in place of its old frequency. Signals on the new frequency are excellent.

● **THE FRENCHMAN ON 9.7 MC.** . . . Is FZF6 at Fort De France, Martinique also trying out a new frequency. There must be something in the fall air, which makes West Indian stations go roaming.

● **BECHUANALAND** . . . ZNB at Mafeking, Brit. Bechuana-land, Union of S. Africa, operates on 5.9 mc. with a power of 300 watts. This station is used for telephone service but broadcasts daily from 1-2:30 p.m. and irregularly from 1-2 a.m. On account of its low frequency and unfavorable operating hours it is improbable that it will be heard on the N. American continent except on rare occasions.

● BELGRADE'S SCHEDULE

. . . The Yugoslav station YUA on 6.11 mc. operates daily from 12:45-2:30, 4-8 a.m. and 1-6 p.m. The first period is heard frequently in this country. In the winter the period from 5-6 p.m. should be heard occasionally, too. YUA is a low-power transmitter rated at about 500 watts.

● **COMMUNIST STATION** . . . The mystery Communist station mentioned several months ago apparently is located in France. We have received the following information about the station: It is operated by F. Carville at Becon Courbevoie, Seine, France. Broadcasts for Germans are sent out on 9.53 and 10.07 mc. from 4-4:55 p.m. For Italians on 9.53, 10.37 and 7.32 mc. from 6-6:55 p.m. For Frenchmen broadcasts go out on 9.45 mc. from 3-3:55 a.m., 5-5:55 a.m., and 3-3:55 p.m.



Short Wave League

At a Directors Meeting held in New York City, New York, in the United States of America, the Short Wave League has elected

John F. Müller

a member of this League.

In Witness whereof, this certificate has been officially signed and presented to the above.

H. W. Gernsback
Club Secretary

This is the handsome certificate that is presented FREE to all members of the SHORT WAVE LEAGUE. The full size is 7 1/4"x9 1/2".

See page 396 how to obtain certificate.

● **PARIS-NEW YORK** . . . Telephone service is now in operation by direct radio circuits to France, instead of to England as formerly. The French transmitters are located at Pontoise. Three are used, TYE2 on 18.09 and 13.76 mc. and TYE3 on 10.42 mc. The American end is handled through the Lawrenceville, N.J., station of the A.T. & T. Co. WKF 19.22 mc., WMF 14.47 mc. and WOF 9.75 mc. are used, depending on the time of day.

● **SCHENECTADY** . . . W2XAD 15.33 mc., now broadcasts with a European beam antenna from 11 a.m.-6 p.m. and with a South American beam from 6-9 p.m. W2XAF, 9.53 mc., operates with a non-directional aerial from 4-6 p.m. and with a South American beam directed at Buenos Aires from 6 p.m.-

12 m. With the opening of the football season W2XAF will operate on Saturday afternoons from about 12 n. in addition to its regular schedule.

● **LISTENING AROUND** . . . The arrival of fall has been heralded by a gradual change in listening conditions, particularly in the daytime. Daytime reception is now becoming good again after a summer lull. Any morning the 15 mc. band is quite active. This same band is due for a falling off in nighttime activity as far as Europeans are concerned. Longer nights will make the 11.7 mc. broadcast band the "happy hunting ground" for evening listeners.

● **DENMARK** . . . OZF at Skamleboæk now operates on 9.52 mc. The station began a regular short-wave program service on September 6. The station is on daily from 2-4 p.m. with aerial directed at Asia and South America. From 4-6:40 p.m. a program is directed to Greenland and North America. The old OXY has been taken off the air. OZF also operates on 11.802 mc. irregularly.

● **MANILA** . . . KZRM at Manila is now operating regularly on 9.57 mc. from approximately 10 p.m. to 10 a.m. It is also heard from 4:30-5:30 p.m. broadcasting setting-up exercises. The 11.84 mc. frequency is not being used regularly.

● **TUNING HINTS** . . . Listeners in the eastern parts of North America should note that the following suggestions are in order for October and November.

Europeans are best heard in the range between 21 and 15 mc. from 6 a.m. to 12 noon. Listen between 18 and 11 mc. from noon to 4 p.m. The 15 to 9 mc. range should be most productive of Europeans from 4 to 6 p.m. After 6 p.m. listen in between 12 and 6 mc.

Asiatic stations come in best during the hours from 4 to 10 a.m. Listen between 12 and 7 mc. before 7 a.m. After this hour the higher frequencies improve and the 19 to 9 mc. band should be most productive. In the late afternoon (4-7 p.m.) Asiatics are heard from 9 to 15

(Continued on page 378)

Here's Your Button

The illustration herewith shows the beautiful design of the "Official" Short Wave League button, which is available to everyone who becomes a member of the Short Wave League.

The requirements for joining the League are explained in a booklet, copies of which will be mailed upon request. The button measures 3/4 inch in diameter and is inlaid in enamel—3 colors—red, white, and blue.

Please note that you can order your button AT ONCE—SHORT WAVE LEAGUE supplies it at cost, the price, including the mailing, being 35 cents. A solid gold button is furnished for \$2.00 prepaid. Address all communications to SHORT WAVE LEAGUE, 99-101 Hudson St., New York.



Mc.	Call		Mc.	Call		Mc.	Call	
9.51Q	G8B	DAVENTRY, ENGLAND, 31.55 m., Addr. (See 9.580 mc.—GSC) 2-4.15 am., 12.20-6 pm., 9-11 pm.	8.580	YNLG	MANAGUA, NICARAGUA, 34.92 m. 7.30-9.30 pm.	6.730	H18C	LA ROMANA, DOM. REP., 44.58 m., Addr. "La Voz de la Feria." 12.30- 2 pm., 5-6 pm.
9.505	HJ1ABE	CARTAGENA, COLOMBIA, 31.57 m. Addr. P. O. Box 31. 5-10.30 pm.	8.560	WOO	OCEAN GATE, N. J., 35.05 m. Works ships irregularly.	6.720	PMH	BANODENG, JAVA, 44.64 m. Relays NIROM programs. 5.30-9 am.
9.500	XEWV	MEXICO CITY, MEX., 31.58 m. Addr. Apart. 2516. Relays XEW.	8.400	HC2CW	QUAYAQUIL, ECUADOR, 35.71 m. 11.30 am.-12.30 pm., 8-11 pm.	6.710	TIEP	SAN JOSE, COSTA RICA, 44.71 m., Addr. Apartado 257, La Voz del Tropico. Daily 7-10 pm.
9.500	HJU	BUENAVENTURA, COLOMBIA, 31.58 m., Addr. National Railways. Mon., Wed. and Fri. 8-11 pm.	8.380	IAC	PISA, ITALY, 35.8 m. Works Italian ships irregularly.	6.672	YVQ	MARACAY, VENEZUELA, 44.95 m. Sat. 8-9 pm.
9.500	PRF5	RIO DE JANEIRO, BRAZ., 31.58 m. Irregularly 4.45 to 5.45 pm.	8.190	XEME	MERIDA, YUCATAN, 36.63 m., Addr. Calle 59, No. 517, "La Voz de Yucatan desde Merida." 10 am.-12 n., 6 pm.-12 m.	6.670	HC2RL	QUAYAQUIL, ECUADOR, S. A., 44.95 m., Addr. P. O. Box 759. Sun. 5.45- 7.45 pm., Tues. 9.15-11.15 pm.
9.478	EAR	MADRID, SPAIN, 31.65 m., Addr. (See 9.860 mc.) Exc. Mon. 6.30-7 7.30-9.30 pm., Mon. 7.30-9.30 pm.	8.185	PSK	RIO DE JANEIRO, BRAZIL, 36.65 m. Irregularly.	6.650	IAC	PISA, ITALY, 45.11 m. Works ships irregularly.
▲ S.W. BROADCAST BAND ▲								
9.460	ICK	TRIPOLI, N. AFRICA, 31.71 m. Works Rome, 5.30-7 am.	7.975	HC2TC	QUITO, ECUADOR, 37.62 m. Thurs. and Sun. at 8 pm.	6.630	HIT	CIUDAD TRUJILLO, D. R., 45.25 m., Addr. "La Voz de la RCA Victor," Apartado 1105. Daily exc. Sun. 12.10- 1.40 pm., 5.40-8.40 pm.; also Sat. 10.40 pm.-12.40 am.
9.450	TGWA	GUATEMALA CITY, GUATEMALA, 31.75 m., Addr. Ministre de Fomento. Daily 12 n. to 2 pm., 8 pm. to 12 m. Sat. 9 pm. to 5 am. (Sun.)	7.901	LSL	HURLINGHAM, ARGENTINA, 37.97 m. Works Brazil at night.	6.625	PRADO	RIOBAMBA, ECUADOR, 45.28 m. Thurs. 9-11.45 pm.
9.440	FZF8	FORT DE FRANCE, MARTINIQUE, 31.78 m. 11.30 am., 12.30 pm., 6.15- 7.15 pm., 8-9 pm.	7.860	SUX	ABOU ZABAL, EGYPT, 38.17 m. Works with Europe, 4-6 pm.	6.558	HI4D	CIUDAD TRUJILLO, D. R., 45.74 m. Except Sun. 11.55 am.-1.40 pm.
9.440	HC2RA	QUAYAQUIL, ECUADOR, 31.78 m. Irregularly till 10.40 pm.	7.854	HC2JSB	QUAYAQUIL, ECUADOR, 38.2 m. Evenings.	6.550	XBC	VERA CRUZ, MEX., 45.8 m. 8.15-9 am.
9.428	COCH	HAVANA, CUBA, 31.8 m., Addr. 2 B St., Velado. 7 am.-1 am.	7.797	HBP	GENEVA, SWITZERLAND, 38.48 m., Addr. Radio-Nations. Sat. 5.30-6.30 pm.	6.550	TIRCC	SAN JOSE, COSTA RICA, 45.8 m., Addr. Radioemisora Catolica Costarricense. Sun. 11 am.-2 pm., 6-7, 8-9 pm. Daily 12 n.-2 pm., 6-7 pm., Thurs. 6-11 pm.
9.415	PLV	BANDONG, JAVA, 31.87 m. Works Holland around 9.45 am.	7.716	KEE	BOLINAS, CAL., 38.89 m. Relays NBC and CBS programs in evening irregu- larly.	6.545	YV6RB	BOLIVAR, VENEZUELA, 45.84 m., Addr. "Ecos de Orinoco." 6-10.30 pm.
9.350	COBC	HAVANA, CUBA, 32.09 m. Addr. P.O. Box 132. Relays CMBC. 6.55 am.-12.30 am.	7.626	RIM	TACHKENT, U.S.S.R., 39.34 m. Works with Moscow in early morning.	6.530	YN1GG	MANAGUA, NICARAGUA, 45.94 m., Addr. "La Voz de los Lagos." 8-9 pm.
9.350	HS8PJ	BANGKOK, SIAM, 32.09 m. Thursday, 1-2.30, 7.30-10 am.	7.610	KWX	DIXON, CAL., 39.42 m. Works with Hawaii, Philippines. Java and Japan. nights.	6.520	YV4RB	VALENCIA, VENEZUELA, 46.01 m. 11 am.-2 pm., 5-10 pm.
9.330	CGA4	DRUMMONDVILLE, CANADA, 32.15 m. Works England irregularly.	7.550	T18WS	PUNTA ARENAS, COSTA RICA, 39.74 m., Addr. "Ecos Del Pacifico," P. O. Box 75. 6 pm.-12 m.	6.500	HIL	CIUDAD TRUJILLO, D. R., 46.15 m., Addr. Apartado 623. 12.10-1.40 pm., 5.40-7.40 pm.
9.330	OAX4J	LIMA, PERU, 32.15 m., Addr. Box 1166, "Radio Universal." 7 pm.-12 m.	7.520	KKII	KAHUKU, HAWAII, 39.89 m. Works with Dixon and broadcasts irregularly nights.	6.500	TIOW	PUERTO LIMON, COSTA RICA, 46.15 m., Addr. Ondas del Caribe. Daily 12 n.-1.30 pm.
9.300	YNGU	MANAGUA, NICARAGUA, 32.26 m. 12 n.-2 pm., 6-7 pm.	7.510	JVP	NAZAKI, JAPAN, 39.95 m. Irregular.	6.477	HI4V	SAN FRANCISCO DE MACORIS, D. R., 46.32 m. 11.40 am.-1.40 pm., 5.10- 9.40 pm.
9.280	GCB	RUGBY, ENGLAND, 32.33 m. Works Canada and Egypt evenings and after- noons.	7.500	RK1	MOSCOW, U.S.S.R., 40 m. Works with RIM early am.	6.470	YNLAT	GRANADA, NICARAGUA, 46.36 m., Addr. Leonidas Tenorio. "La Voz del Mombacho." Irregular.
9.170	WNA	LAWRENCEVILLE, N. J., 32.72 m. Works England evenings.	7.390	ZLT2	WELLINGTON, N. Z., 40.6 m. Works with Sydney, 3-7 am.	6.450	H18A	CIUDAD TRUJILLO, D. R., 46.51 m. 8.40-10.40 am., 2.40-4.10 pm. Sat. 9.40-10.40 pm. Sun. 2.40-4.40 pm.
9.150	YVR	MARACAY, VENEZUELA, 32.79 m. Works with Europe afternoons.	7.220	HKE	BOGOTA, COL., S. A., 41.55 m. Tues. and Sat. 8-9 pm. Mon. and Thurs. 6.30-7 pm.	6.420	HI1S	SANTIAGO, D. R., 46.73 m. 11.40 am. -1.40 pm., 5.40-7.40, 9.40-11.40 pm.
9.125	HAT4	BUDAPEST, HUNGARY, 32.88 m., Addr. "Radiolabor," Gyali-ut, 22. Sun. and Wed. 7-8 pm., Sat. 6-7 pm.	7.200	YNAM	MANAGUA, NICARAGUA, 41.67 m. Daily at 9 pm.	6.410	TIPG	SAN JOSE, COSTA RICA, 46.8 m., Addr. Apartado 225, "La Voz de la Victor." 12 n.-2 pm., 6-11.30 pm.
9.060	TFK	REYKJAVIK, ICELAND, 33.11 m. Works London afternoons.	7.100	FO8AA	PAPEETE, TAHITI, 42.25 m., Addr. Radio Club Papeete. Tues. and Fri. 11 pm.-12 m.	6.400	YV5RH	CARACAS, VENEZUELA, 46.88 m. 7-11 pm.
9.030	COBZ	HAVANA, CUBA, 33.2 m., Radio Salas, Addr. P. O. Box 866, 7.45 am.-12.3 am. Irreg. 12.30-2 am. Relays CMBC	6.995	PZH	PARAMIRABO, DUTCH GUIANA, 42.88 m., Addr. P. O. Box 18. Daily 6.06-8.36 am., Sun. 9.36-11.36 am., Daily 5.36-8.36 pm.	6.380	YV5RF	CARACAS, VENEZUELA, 47.02 m., Addr. Box 983. 6-10.30 pm.
9.020	GCS	RUGBY, ENGLAND, 33.26 m. Works N. Y. C. evenings.	6.977	XBA	TACUBAYA, D. F., MEX., 43 m. 9.30 am.-1 pm., 7-8.30 pm.	6.360	HRP1	SAN PEDRO SULA, HONDURAS, 47.19 m. 7.30-9.30 pm.
9.010	KEI	BOLINAS, CAL., 33.3 m. Relays NBC and CBS programs in evening irregu- larly.	6.976	HCETC	QUITO, ECUADOR, 43 m., Addr. Teatro Bolivar. Thurs. till 9.30 pm.	6.360	YV1RH	MARACAIBO, VENEZUELA, 47.19 m., Addr. "Ondas Del Lago," Apartado de Correos 261. 6-7.30 am., 11 am.-2 pm., 5-11 pm.
8.957	VWY	KIRKEE, INDIA, 33.43 m. Works with England in morning.	6.905	GDS	RUGBY, ENG., 43.45 m. Works N.Y.C. evenings irregularly.	6.350	HRY	TEGUCIGALPA, HONDURAS, 47.24 m. 6.30-8.30 pm.
8.960	TPZ	ALGIERS, ALGERIA, 33.48 m. Works Paris afternoons.	6.880	COCW	HAVANA, CUBA, 43.62 m. Addr. La Voz de las Antillas, P. O. Box 130. 6.55 am.-1 am. Sun. 10 am.-10 pm.	6.340	HI1X	CIUDAD TRUJILLO, D. R., 49.32 m. Sun. 7.40-10.40 am., daily 12.10-1.10 pm., Tues. and Fri. 8.10-10.10 pm.
8.950	HCJB	QUITO, ECUADOR, 33.5 m. 7-10 pm. except Monday.	6.860	KEL	BOLINAS, CALIF., 43.70 m. Tests irregularly. 11 am.-12 n., 6-9 pm.	6.316	HIZ	CIUDAD TRUJILLO, D. R., 47.5 m. Daily except Sat. and Sun. 11.10 am.- 2.25 pm., 5.10-8.40 pm. Sat. 5.10- 11.10 pm. Sun. 11.40 am.-1.40 pm.
8.795	HKV	BOGOTA, COLOMBIA, 34.09 m. Mon. and Thurs. 7-7.30 pm.	6.850	XGOX	NANKING, CHINA, 43.8 m. Daily 6.40-8.40 am., Sun. 4.40-6.05 am.	6.310	TG2	GUATEMALA CITY, GUAT., 47.55 m., Addr. Secretaria de Fomento. Relays TGI 11 pm.-2 am.
8.775	PN1	MAKASSER, CELEBES, N. I., 34.19 m. Works Java around 4 am.	6.800	HI7P	CIUDAD TRUJILLO, DOM. REP., 44.12 m., Addr. Emisora Diaria de Commercio. Daily exc. Sat. and Sun. 12.40-1.40, 6.40-8.40 pm. Sat. 12.40- 1.40 pm. Sun. 10.40 am.-11.40 am.	6.300	YV4RG	MARACAY, VENEZUELA, 47.62 m. 8- 10.30 pm.
8.765	DAF	NORDDEICH, GERMANY, 34.23 m. Works German ships irregularly.	6.775	WOA	LAWRENCEVILLE, N. J., 44.41 m., Addr. A. T. & T. Co. Works England evenings.	6.280	COHB	SANCTI SPIRITUS, CUBA, 47.77 m., Addr. P. O. Box 85. 9-11.30 am., 12.30- 1.30, 4-7, 8-11 pm.
8.760	GCQ	RUGBY, ENGLAND, 34.25 m. Works Africa afternoons.	6.750	JVT	NAZAKI, JAPAN, 44.44 m., Addr. Kokusai-Denwa Kaisha, Ltd., Tokio. Irregular.	6.270	YV5RP	CARACAS, VENEZUELA, 47.79 m., Addr. "La Voz de la Philco." Irregular.
8.750	FZE8	DJIBOUTI, FR. SOMALILAND, AFRICA, 34.29 m. Works Paris around 2.30 am.						
8.730	GCI	RUGBY, ENGLAND, 34.36 m. Works India 8 am.						
8.720	VPD3	SUVA, FIJI ISLES, 34 m., Addr. (See 9.540 mc., VPD2). 5.30-7 am.						
8.580	GBC	RUGBY, ENGLAND, 34.56 m. Works ships irregularly.						
8.665	COJK	CAMAGUEY, CUBA, 34.62 m., Addr. 4 General Gomez. 5.30-6.30, 8-11 pm., daily except Sat. and Sun.						

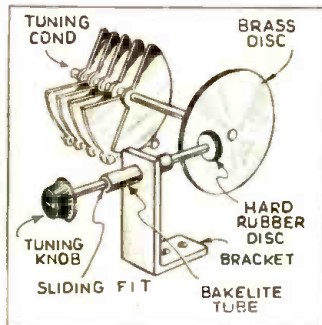
(Continued on page 371)

(All Schedules Eastern Standard Time)

\$5.00 FOR BEST SHORT-WAVE KINK

The Editor will award a five dollar prize each month for the best short-wave kink submitted by our readers. All other kinks accepted and published will be awarded eight months' subscription to **SHORT WAVE & TELEVISION**. Look over these "kinks"; they will give you some idea of what the editors are looking for. Send a typewritten or ink description, with sketch, of your favorite short-wave kink to the "Kink" Editor, **SHORT WAVE & TELEVISION**.

First Prize \$5.00



BANDSPREAD

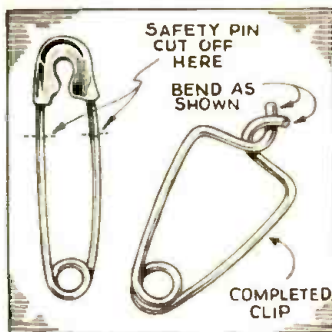
A 6" dia. brass disc is soldered to the end of the condenser shaft. The tuning knob is fastened to an $\frac{1}{8}$ " shaft, which passes with a sliding fit through a piece of bakelite tubing mounted on the panel. To the end of this shaft a $\frac{1}{2}$ " dia. hard rubber disc is cemented, which presses against the side of the brass disc, and by friction turns the condenser when the tuning knob is turned. By pulling out the tuning knob the amount of bandspread may be increased from 2-1 to 16-1. —J. Esterhuizen.

MAKE YOUR OWN QSL'S



LINDTYPE SET-UP USED FOR PRINTING CARD.

This Kink ought to be welcomed by financially embarrassed "Hams" and SW's. Very inexpensive QSL's can be made as follows: First a simple printed card must be designed. Second, have your job printer or local newspaper set up the printing on the Linotype (this shouldn't cost over 50c). The type will consist of bars of metal, one bar to a line. Third, place these "slugs" in a hand clamp. Fourth re-ink your stamp pad (a bottle of stamp pad ink costs 15c). Fifth, after practicing on some old paper you are ready to start printing your cards (1c postal cards are fine). —Jack Sheets.



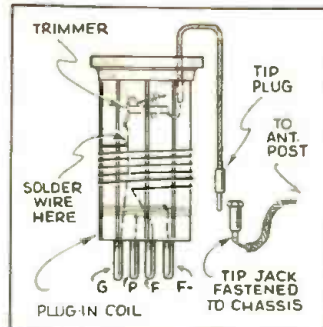
CLIP MADE FROM SAFETY PIN

While experimenters often run out of small clips it is almost certain that safety pins can be found around the home. The accompanying drawing clearly shows how a clip may be made from a safety pin. The snathread is removed and the ends bent and twisted as per diagram. At a first glance one might not appreciate the effectiveness of such a clip, however, it is surprising how well it works. It can be fastened to almost any size article from the smallest wire to a large screw. —Edward McQuade, W1EOM.

FIXED TRIMMERS

Here is a scheme that will enable you to connect a trimmer condenser in a 4-prong coil form. Merely insert your condenser, then solder a wire from the trimmer to the grid wire in the coil. Also, solder a wire about 1" to 2" long to the trimmer and

bring it out of the coil form. Next solder the wire to the tip plug, connect up the tin jacks to the antenna and you will have a very useful scheme completed. —Edward Wagner.

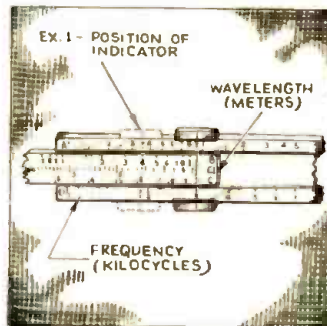


"SLIPSTICK" TRICK

Any slide rule may be used for this purpose. If the rule has no CI scale, reverse the slide and use the C scale in the reverse position. Opposite a D scale index, place 3 on the CI scale. See figure. The choice of the D scale index depends upon which half of the scale the known frequency or wavelength lies. These next two examples clearly show how the desired conversion is made. (Q.) What is the wavelength of 1800 kc? Opposite 186 on D scale is 16 on CI. (A.) 160 meters. (Q.) What is the frequency of a five meter transmitter? Opposite 5 on CI find 6 on D. (A.) 60,000 kc. The following equivalents will be helpful in determining the location of the decimal point in your answer.

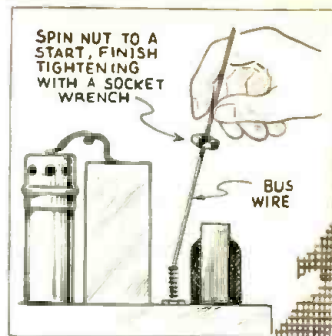
Kilocycles	Meters
600	500
1,000	300
25,000	12
60,000	5

—Frederick A. Mason.



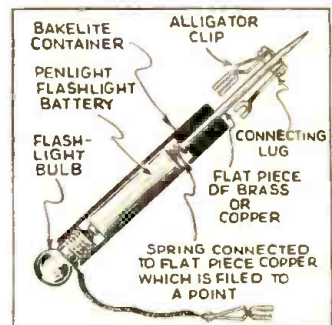
"NUT-STARTER"

This kink is for starting nuts in the most difficult places; we have used this method for some time and find it highly satisfactory. First procure a length of No. 14 bus wire and slide nut on same. Hold the nut with the index finger, while placing end of bus wire on end of bolt on which nut is to be started. Retain this position with wire while you spin nut around, using another piece of bus wire or a small shank screw-driver. The diagram illustrates operation. —Roscoe Walther.



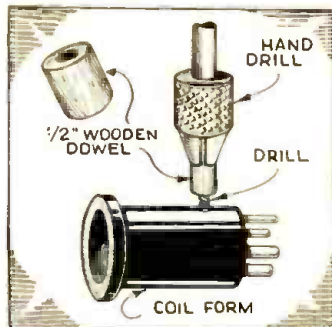
UNIVERSAL PROD

I found this kink very valuable to me when I wanted to make different tests quickly. The picture of the test prod will explain the construction of it. This prod can be used in any test with the alligator clip, the connecting lug or the pin which may be opened, used, then folded away so that something else can be used. —Edward Poligorski.



COIL WINDING KINK

To prevent the drill from going through the coil form too forcefully and damaging the form, make a hole in a $\frac{1}{2}$ " dowel just large enough for the drill to go through. The drill should protrude about $\frac{1}{2}$ ". I hope these hints will prove of some use to your readers. —Art Craig.



HELP! WE NEED MORE AND BETTER "KINKS"! SO SEND YOUR IDEAS ALONG!

"CQ"

"CQ"

"2450 mile call for doctor 30 miles distant!" This reserve is in the "bush." Nearest doctor 30 miles. Needed doctor—got QSO with W8NQL Pittsburgh who wired for doctor. Message traveled 2,450 miles approx! —A. G. Laggart, Md.

"CQ"

Rover, the dog mascot at W5EVX, gets interested in Amateur Radio only when a "Ham" is mentioned. —Hays Pool, W5EVX.

"CQ"

A certain "Ham" in Ridgetown, Ont., expects to go on 10 meters with a bang. Not being able to find anything the correct size to wind his coils on, he noticed a shot-gun standing near by and promptly began winding his coils on the barrel. —G. L. Perritt.

A Chat With Our Readers

Send us your "CQ"—all those accepted and published will be awarded a year's subscription to *Short Wave & Television*.

* * *

Did YOU vote? If not see ballot on page 336 of the October issue. Here's your chance to see the kind of articles you want published in your magazine.

* * *

Don't forget to send the editors a diagram of that slick-working set. They will advise you quickly whether or not they would like an article on it. But tell 'em about it anyway—it may mean dollars in your pocket.

"CQ"

Who says "Hams" don't advertise? On U.S. highway No. 50 in California's high Sierras there is a small sign near a natural spring drinking fountain which originally was a warning, but is now so plastered with the calls of "Hams" that it is almost illegible. —C. Royse.

"CQ"

Overheard on a street corner as several cars passed with the "new fangled" aerials attached:—"Mary, where are all the people going with fishing poles on their cars?" —J. S. Jackson, Jr.

"CQ"

A farmer said to me: "What won't those inventors think of next! Look, Johnny, even the cars have lightning rods!" —J. S. Jackson, Jr.

Mc.	Call		Mc.	Call		Mc.	Call	
6.243	HIN	CIUDAD TRUJILLO, D. R., 48 m., Addr. "La Voz del Partido Dominicano." 12 m.-2 pm., 7.30-9.30 pm., irregularly.	6.110	XEPW	MEXICO CITY, MEX., 49.1 m., Addr. La Voz de Aguila Azteca desde Mex., Apartado 8403. Relays XEJW 11 pm.-1 am.	6.040	YDA	TANDJONGPRIOK, JAVA, 49.65 m., Addr. N.I.R.O.M., Batavia. 10.30 pm.-2 am.; Sat. 7.30 pm.-2 am.
6.235	HRD	LA CEIBA, HONDURAS, 48.12 m., Addr. "La Voz de Atlantida." 8-11 pm.; Sat. 8 pm.-1 am.; Sun. 4-6 pm.	6.110	VUC	CALCUTTA, INDIA, 49.1 m. Daily 3-5.30 am., 9.30 am.-12 m.; Sun 7.30 am.-12 m.	6.030	HJ4ABP	MEDELLIN, COL., 49.75 m. 8-11 pm.
6.230	YV1RG	VALERA, VENEZUELA, 48.15 m. 6-9.30 pm.	6.110	YUA	BELGRADE, JUGOSLAVIA, 49.18 m., 12.45-2.30, 4-8 am., 1-6 pm.	6.030	HP5B	PANAMA CITY, PAN., 49.75 m., Addr. P.O. Box 910. 12m.-1 pm., 7-10.30 pm.
6.230	OAX4G	LIMA, PERU, 48.15 m., Addr. Apartado 1242. Daily 7-10.30 pm.	6.105	HJ4ABB	MANIZALES, COL., 49.14 m., Addr. P. O. Box 175. Mon.-Fri 12.15-1 pm.; Tue. and Fri. 7.30-10 pm.; Sun 2.30-5 pm.	6.030	VE9CA	CALGARY, ALTA., CAN., 49.75 m. Thru. 9 am.-2 am.; Sun 12 m.-12 m.
6.210	YV6RI	CORO, VENEZUELA, 48.31 m., Addr. Roger Leyba, care A. Urbina y Cia. Irregular.	6.100	W3XAL	BOUND BROOK, N. J., 49.18 m., Addr. Natl. Broad. Co. 9.15 pm.-1 am.	6.030	OLR2B	PRAGUE, CZECHOSLOVAKIA, 49.75 m. (See 11.875 mc.)
↓ S.W. BROADCAST BAND ↓			6.100	W9XF	CHICAGO, ILL., 49.18 m., Addr. N.B.C.	6.025	HJ1ABJ	SANTA MARTA, COL., 49.79 m. 5.30-10.30 pm. except Wed.
6.190	H18Q	CIUDAD TRUJILLO, D. R., 48.47 m. 11.45 am.-1 pm., 4.45-6.45 pm.	6.100	HJ4ABE	MEDELLIN, COL., 49.18 m. 11 am.-12 m., 6-10.30 pm.	6.020	DJC	BERLIN, GERMANY, 49.83 m., Addr. (See 6.079 mc.) 11.35 am.-4.30 pm.
6.185	H11A	SANTIAGO, D. R., 48.5 m., Addr. P. O. Box 423. 11.40 am.-1.40 pm.; 7.40-9.40 pm.; Wed. 6-10.30 pm.	6.097	ZTJ	JOHANNESBURG, S. AFRICA, 49.2 m., Addr. African Broad. Co. Sun.-Fri. 11.45 pm.-12.30 am.; Mon.-Sat. 3.30-7 am., 9 am.-4 pm.; Sun. 8-10.15 am., 12.30-3 pm.	6.020	XEUW	VERA CRUZ, MEX., 49.83 m., Addr. Av. Independencia 98. 8 pm.-12.30 am.
6.171	XEXA	MEXICO CITY, MEX., 48.61 m., Addr. Dept. of Education. 7-11 pm.	6.095	JZH	TOKIO, JAPAN, 49.22 m., Addr. (See 11.800 mc., JZJ.) Irregular.	6.018	ZHI	SINGAPORE, MALAYA, 49.18 m., Addr. Radio Service Co., 2 Orchard Rd. Mon., Wed. and Thurs 5.40-8.0 am., Sat. 10.40 pm.-1.10 am.
6.160	YV5RD	CARACAS, VENEZUELA, 48.7 m. 11 am.-2 pm., 4-10.40 pm.	6.092	OAX4Z	LIMA, PERU 49.25 m. Radio Nacional 7-11 pm.	6.015	H13U	SANTIAGO DE LOS CABALLEROS, D. R., 49.88 m. 7.30-9 am., 12m.-2 pm., 5-7 pm., 8-9.30pm; Sun. 12.30-2.5-6 pm.
6.160	VPB	COLOMBO, CEYLON, 48.7 m. Daily exc. Thurs. and Fri., 6.30 am.-12.30 pm.; Sun. 7-11.30 am.	6.090	HJ4ABC	IBAGUE, COL., 49.26 m. 7 pm.-12 m.	6.012	HJ3ABH	BOGOTA, COL., 49.91 m., Addr. Apartado 565. 12 m.-2 pm., 6-11 pm.; Sun. 12m.-2 pm., 4-11 pm.
6.160	CSL	LISBON, PORTUGAL, 48.78 m. Irregular. 7-8.30 am., 2-7 pm.	6.090	CRGX	TORONTO, CAN., 49.26 m., Addr. Can. Broadcasting Corp. Daily 5.30-11.30 pm.; Sun. 5-11.30 pm.	6.010	COCO	HAVANA, CUBA, 49.92 m., Addr. P. O. Box 98. Daily 7.55 am.-12m., Sun. till 11 pm.
6.150	CJRO	WINNIPEG, MAN., CANADA, 48.78 m., Addr. (See 11.720 mc.) 4-10 pm.	6.090	ZBW2	HONGKONG, CHINA, 49.26 m., Addr. P. O. Box 200. Irregular.	6.005	HP5K	COLON, PAN., 49.96 m., Addr. Box 33. 7-9 am., 11.30 am.-1 pm., 6-11 pm.
6.147	ZEB	BULAWAYO, RHODESIA, S. AFRICA, 48.8 m. Sun. 3.30-5 am.; Tues. Fri., 1.15-3.15 pm.; Mon. and Thurs. 11 am.-12 m.	6.085	HJ5ABD	CALI, COLOMBIA, 49.3 m., Addr. La Voz de Valle. 12m.-1.30 pm., 5.10-9.40 pm.	6.005	CFCX	MONTREAL, CAN., 49.96 m., Can. Marconi Co. Relays CFCF 7.45 am.-1 am.; Sun. 10 am.-12.15 am.
6.147	COKG	SANTIAGO, CUBA, 48.8 m., Addr. Box 137. 9-10 am., 11.30 am.-1.30 pm., 3-4.30 pm., 10-11 pm., 12 m.-2 am.	6.083	VQ7LO	NAIROBI, KENYA, AFRICA, 49.31 m., Addr. Cable and Wireless, Ltd. Mon.-Fri. 5.45-6.15 am., 11.30 am.-2.30 pm., also Tues. and Thurs. 8.30-9.30 am.; Sat. 11.30 am.-3.30 pm.; Sun. 11 am.-2 pm.	6.005	VE9DN	DRUMMONDVILLE, QUE., CAN., 49.96 m., Addr. Canadian Marconi Co. Sat. 11.30 pm.-2 am.
6.145	HJ4ABU	PEREIRA, COL., 48.8 m. 9.30 am.-12 m., 6.30-10 pm.	6.080	ZHJ	PENANG, FED. MALAY STATES, 49.34 m. 6.40-8.40 am., except Sun., also Sat. 11 pm.-1 am.	6.000	ZEK	SALISBURY, RHODESIA, S. AFRICA, 50 m. (See 6.147 mc., ZEB.)
6.140	W8XK	PITTSBURGH, PA., 48.86 m., Addr. Westinghouse Electric & Mfg. Co. Relays KDKA 9 pm.-1 am.	6.080	CP5	LAPAZ, BOLIVA, 49.34 m. 7-10.30 pm.	6.000	RV59	MOSCOW, U.S.S.R., 50 m. Irregular.
6.137	CR7AA	LAURENCO MARQUES, PORT. E. 48.87 m. 4-9, 10.30-11 am., 12 m.-3.30 pm., 11.15 pm.-1 am.	6.080	HP5F	COLON, PAN., 49.34 m., Addr. Carlton Hotel. 11.45 am.-1.15 pm., 7.45-10 pm.	5.990	XEBT	MEXICO CITY, MEX., 50.08 m., Addr. P. O. Box 79-44. 8 am.-1 am.
6.135	HJ1ABB	BARRANQUILLA, COL., 48.9 m., Addr. P. O. Box 715. 11.30 am.-1 pm., 4.30-10 pm.	6.080	W9XAA	CHICAGO, ILL., 49.34 m., Addr. Chicago Fed. of Labor. Relays WCFL Irregular.	↓ S.W. BROADCAST BAND ↓		
6.135	H15N	SANTIAGO, D. R., 48.9 m. 6.40-9.10 pm	6.079	DJM	BERLIN, GERMANY, 49.34 m., Addr. Broadcasting House. Irregular.	5.970	HJ4ABD	MEDELLIN, COL., 50.26 m., Addr. La Voz Citia. 8-11.30 pm.
6.130	TQXA	GUATEMALA CITY, GUAT., 48.94 m., Addr. Giornal Liberal Progressista. Irregularly.	6.070	VP3MR	GEORGETOWN, BRI. GUIANA, 49.42 m. Sun. 7.45-10.15 am.; Daily 4.45-8.45 pm.	5.968	HVJ	VATICAN CITY, 50.27 m. 2-2.15 pm. daily; Sun. 5-5.30 am.
6.130	VP3BQ	GEORGETOWN, BRIT. GUIANA, 48.94 m. From 5 pm. on.	6.070	HJ3ABF	BOGOTA, COL., 49.42 m. 7-11.15 pm.	5.950	HJN	BOGOTA, COL., Radiodifusora Nacional, 50.42 m. 6-11 pm.
6.130	COCD	HAVANA, CUBA, 48.94 m., Addr. Calle G y 25, Vedado. Relays CMCD 10 am.-10 pm.	6.070	CFRX	TORONTO, CAN., 49.42 m. Relays CFB 6.30 am.-11 pm. Sun. 9.30 am.-11 p. m.	5.940	TG2X	GUATEMALA CITY, GUAT., 50.5 m. 4-6, 9-11 pm.; Sun. 2-5 am.
6.130	VE9HX	HALIFAX, N. S., CAN., 48.94 m., Addr. P. O. Box 998. Mon.-Fri. 9 am.-1 pm., 5-11 pm. Fri.; 1-3 pm., Sat.; Sun. 9 am.-1 pm., 2-11 pm. Relays CHNS.	6.070	YV1RE	MARACAIBO, VEN., 49.42 m. 6-11 pm.	5.930	YV1RL	MARACAIBO, VEN., 50.59 m., Addr. Radio Popular, Jose A. Higuera M., P. O. Box 247. Daily 11.43 am.-1.43 pm., 5.13-10.13 pm.; Sun. 9.13 am.-3.13 pm.
6.130	ZGE	KUALA LUMPUR, FED. MALAY ST., 48.94 m. Sun., Tue. and Fri. 6.40-8.40 am.	6.070	VE9CS	VANCOUVER, B. C., CAN., 49.42 m. Sun. 1.45-9 pm., 10.30 pm.-1 am.; Tues. 6-7.30 pm., 11.30 pm.-1.30 am. Daily 6-7.30 pm.	5.925	HH2S	PORT-AU-PRINCE, HAITI, 50.63 m., Addr. P. O. Box A103. 7-9.45 pm.
6.130	LKL	JELOY, NORWAY, 48.94 m. 11 am.-6 pm.	6.065	HJ4ABL	MANIZALES, COL., 49.46 m. Daily 11 am.-12 m., 5.30-7.30 pm.; Sat. 5.30-10.30 pm.	5.917	YV4RP	VALENCIA, VEN., 50.71 m. Irregular.
6.125	CXA4	MONTEVIDEO, URUGUAY, 48.98 m., Addr. Radio Electrico de Montevideo, Mercaderes 823. 10 am.-12 m., 2-8 pm.	6.065	SBG	MOTALA, SWEDEN, 49.46 m. Relays Stockholm 1.30-5 pm.	5.900	ZNB	MAFeking, BRI. BECHUANALAND S. AFRICA, 50.84 m., Addr. The Govt. Engineer. P. O. Box 106., 1-2.30 pm. Irregularly from 1-2 am.
6.125	OAX1A	CHICLAYO, PERU, 48.98 m., Addr. La Voz de Chivlayo, Casilla No. 9. 8-11 pm.	6.060	W8XAL	CINCINNATI, OHIO, 49.6 m., Addr. Crosley Radio Corp. Relays WLW 6.30 am.-8 pm., 11 pm.-2 am.	5.900	TIMS	PUNTARENAS, COSTA RICA, 50.85 m., 6-10 pm.
6.122	OAX4P	HUANCAYO, PERU, 49 m. La Voz del Centro del Peru. 8 pm. on.	6.060	W3XAU	PHILADELPHIA, PA., 49.5 m. Relays WCAU 8-11 pm.	5.898	YV3RA	BARQUISIMETO, VEN., 50.86 m., Addr. La Voz de Lara, 12 m.-1 pm., 6-10 pm.
6.122	HP5A	PANAMA CITY, PAN., 49 m. Addr. Box 58. 12 m.-1 pm., 8-10 pm.	6.060	OXY	SKAMLEBOAEK, DENMARK, 49.5 m. Irregular.	5.890	JIC	TAIHOKU, FORMOSA, 50.93 m. Works Tokio 6-9 am.
6.122	HJ3ABX	BOGOTA, COL., 49 m., Addr. La Voz de Col., Apartado 2665. 12 m.-2 pm., 5.30-11 pm.; Sun. 6-11 pm.	6.050	HJ3ABD	BOGOTA, COL., 49.59 m., Addr. La Nueva Granada, Box 509. 12m.-2 pm., 7-11 pm.; Sun. 5-9 pm.	5.885	HCK	QUITO, ECUADOR, 50.98 m. 8-11 pm.
6.120	W2XE	NEW YORK CITY, 49.02 m., Addr. Col. B'cast. System, 485 Madison Ave. Irregular.	6.045	H19B	SANTIAGO, O. R., 49.63 m. Irregular 6-11 pm.	5.875	HRN	TEGUCIGALPA, HONDURAS, 51.06 m. 1.15-2.16, 8.30-10 pm.; Sun. 3.30-5.30, 8.30-9.30 pm.
6.120	XEUZ	MEXICO CITY, MEX., 49.02 m., Addr. 5 de Mayo 21. Relays XEFO 1-3 am.	6.042	HJ1ABG	BARRANQUILLA, COL., 49.65 m., Addr. Emisoras Atlanticas. 11 am.-11 pm.; Sun. 11 am.-8 pm.	5.855	H11J	SAN PEDRO DE MACORIS, D. R., 51.25 m., Addr. Box 204. 12 m.-2 pm., 6.30-9 pm.
6.115	OLR2C	PRAGUE, CZECHOSLOVAKIA, 49.05 m. (See 11.875 mc.)	6.040	W4XB	MIAMI BEACH, FLA., 49.65 m. Relays WIOD 12m.-2 pm., 5.30-6 pm., 10 pm.-12 m.	5.853	WOB	LAWRENCEVILLE, N. J., 51.26 m., Addr. A. T. & T. Co. Works Bermuda nights.
			6.040	W1XAL	BOSTON, MASS., 49.65 m., Addr. University Club. Generally from 6-10 pm.	5.850	YV1RB	MARACAIBO, VEN., 51.28 m., Addr. Apartado 214. 8.45-9.45 am., 11.15 am.-12.15 pm., 4.45-9.45 pm.; Sun. 11.45 am.-12.45 pm.

(Continued on page 380)

(All Schedules Eastern Standard Time)

SHORT WAVE

EDITED BY
G. W. SHUART, W2AMN

QUESTION BOX

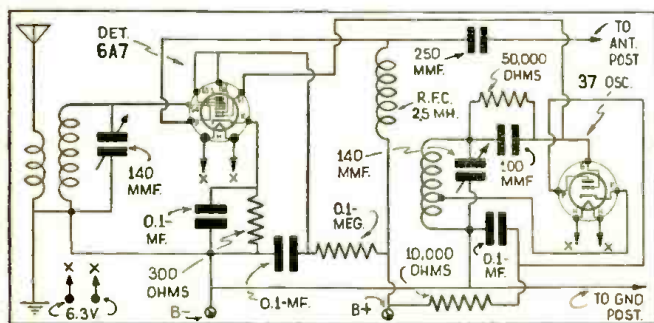
● Because the amount of work involved in the drawing of diagrams and the compilation of data, we are forced to charge 25c each for letters that are answered directly through the mail. This fee includes only hand-drawn schematic drawings. We cannot furnish "picture-layouts"

or "full-sized" working drawings. Letters not accompanied by 25c will be answered in turn on this page. The 25c remittance may be made in the form of stamps, coin or money order.

Special problems involving considerable research will be quoted upon request. We cannot

offer opinions as to the relative merits of commercial instruments.

Correspondents are requested to write or print their names and addresses clearly. Hundreds of letters remain unanswered because of incomplete or illegible addresses.



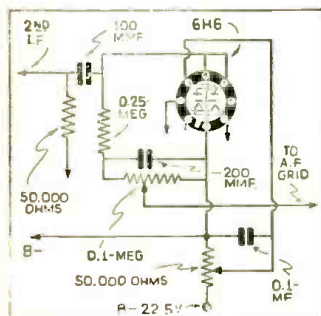
2-Tube Converter With Plug-in Coils—1093

SHORT WAVE CON- VERTER

Edward Russell. Chicago, Ill.

(Q.) I have a few 6 volt tubes such as the 6A7 and 37, and would like to build a converter which would work with my present broadcast receiver. Kindly specify all the values and give the diagram in the *Question Box*.

(A.) We have shown a diagram of a simple but very efficient short-wave converter. The 6A7 is employed in the detector section and the 87 as the oscillator. But due



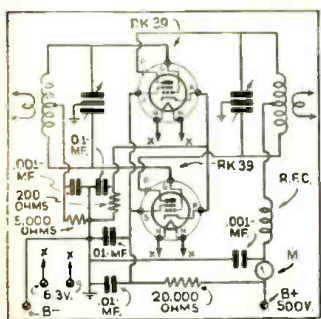
Noise Silencer for Resistance-Coupled Superhet—1094

to the method of injecting the oscillator voltage, this system works out very well. It is stable in operation and the conversion gain is exceptionally good. We would advise the use of 2 separate controls for tuning, unless you wish to go to the trouble of arranging the coils and padding the oscillator circuit for tracking.

RK-39's IN PUSH-PULL

David Kreismann, New York City.

(Q.) I am interested in a push-pull R.F. amplifier for an all-band



Push-Pull RK-39-1095

transmitter. This amplifier should have approximately 50 watts output and be of very simple construction. Will you kindly provide the necessary advice through your *Question Box*.

(A.) The new beam-type screen-grid tube offers the simplest type of R.F. amplifier. Inasmuch as neutralization is not needed and very little excitation or driving power is required. Two of the RK-39's or 807's will provide an output of at least 50 watts, and the excitation requirement will be low enough so that any type of oscillator, even though using receiving type tubes, will be sufficient. Link coupling is shown in both the input and output circuits; however, any conventional method may be employed.

NOISE-SUPPRESSOR FOR RESISTANCE-COUPLED SUPER

Joseph Wittier, Dallas, Tex.

(Q.) I have been using a resistance-coupled type superheterodyne for 5 and 10 meter operation, and would like to know why no one has ever attempted to incorporate a noise-silencer in such a receiver. Is it possible, and if so, will you kindly provide the diagram in the *Question Box*?

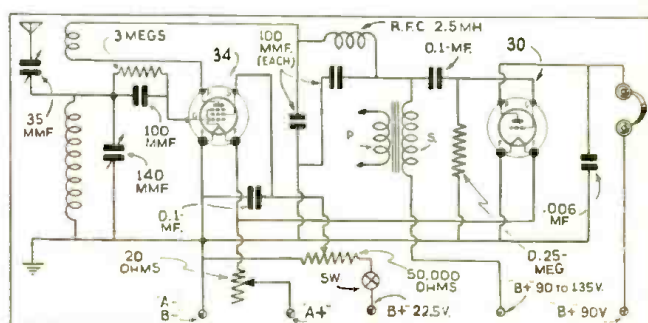
(A.) It is most certainly possible for one to have been using a noise-silencer in a resistance-coupled superhet at station WZAM for almost a year. The diagram is shown. It may be necessary to add another stage of audio amplification, if you desire the same output-level as with the signal diode second-order detector. The signal-level drops considerably with the diode second detector. However, the sensitivity of the receiver remains the same. The noise-silencer does not work quite as effectively in the resistance-coupled superhet as in other types, but it does reduce the auto ignition interference at least 95%, which is a most remarkable improvement. We must admit,

TUNABLE HUM

Norman Keller, Knoxville, Tenn.

(Norm.) I am using a well filtered power supply in my short-wave receiver and still I experience hum, although this hum is not present in all parts of the short-wave band, but it seems that the hum is heard on just the bands in which I wish to receive. Adding filter condensers and chokes to the power-supply does not help matters. Can this hum be eliminated.

(A.) We suggest connecting .002 mf. condensers between the filament and the 2 plates of the 80 rectifier tube. Also, connect a similar condenser from each leg of the heater in the regenerative detector tube to the "B" minus.



2-Tube Battery Set for Beginner—1096

SCREEN-GRID BATTERY SET

Francis Medon, Yonkers, N.Y.

(Q.) Please print a diagram in your *Question Box* showing how to change a 30 detector to a 32 or 34. (A.) We have shown in the latter type the screen-grid type lattice-type tubes connected as a regenerative detector. This will be a simple matter to change your present receiver. We have also shown the secondary of the audio transformer used as a plate impedance for the detector. Of course this may be replaced with a $\frac{1}{4}$ megohm resistor to conserve space.

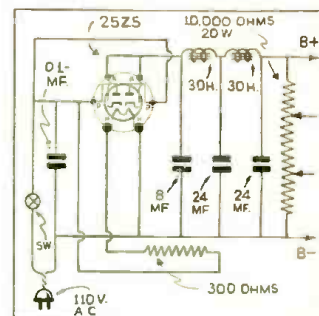
A.C.-D.C. POWER-SUPPLY

Richard Watson, New York City.

(Q.) I would like to build an A.C.-D.C. power-supply delivering somewhere around 135 volts, also with various low voltage taps. Would you be kind enough to print a diagram of such a unit: the main idea is to reduce hum as much as possible.

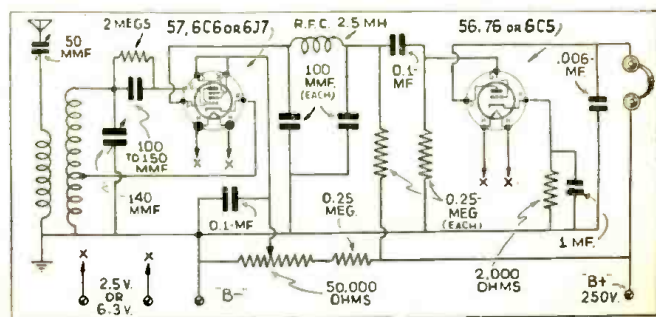
(A.) The diagram of the A.C.-D.C. circuit employing a 25Z5 rectifier tube is shown. The filter system consists of two 30 henry filter chokes, the current carrying capacity of which will depend upon the number of tubes you intend to operate from the power supply. The voltage divider and bleeder can be any type of tapped resistor: one having 10,000 ohms and a 20 watt rating, with 2 sliders should work satisfactorily. The taps should be adjusted with the aid of a voltmeter for desired voltage. Of course, these taps should be adjusted under load.

In receivers where adequate bypass condensers are not connected between the various input voltage terminals and the common "B" negative, it is advisable to by-pass each one of the taps on the voltage divider with an 8 mf. electrolytic condenser.



A.C.-D.C. Power-Supply—1097

sistor. The coils for this receiver can be constructed identical to the usual short-wave coils of the 4-prong, 2-winding variety, except that the grid coil should be tapped for the cathode connection. For the coils from 100 to 200 meters, this tap should include about 2 turns; for 50 to 100 meters, 1 turn; 25 to 50 meters, $\frac{1}{2}$ turn and from $\frac{1}{4}$ to $\frac{1}{2}$ turn for coils from 10 to 25 meters. For *hand-spread* connect a 35 mmf. condenser in parallel with the main tuning condenser.



Regenerative E.C. Detector and 1 Stage of Audio—1098

OCT. 31st

Your last chance

TO WIN in the \$1,000 PRIZE CONTEST

HERE'S WHAT YOU CAN WIN ...

PUBLIC ADDRESS EQUIPMENT

Famous LAFAYETTE P.A. Systems in all sizes for every conceivable requirement or demand. A complete NEW line of modern sound systems, portable and permanent, at prices low enough to furnish you with a handsome profit. New colors, stream-lined designs, lightweight, non-corrosive steel cabinets, special illuminated control dials. *Win in the contest and take your pick.*

LAFAYETTE RADIOS

More than 50 LAFAYETTE models to choose from and every one from 5-tube superhet to 13-tube custom-built model a beauty! Electric Tuning, Acoustic Tone Chambers, unequalled performance feature the new 1938 line of Lafayettes. Described on 35 rotogravure pages in the catalog. *Win in the contest and take your pick.*

"HAM" RECEIVERS

The new 1938 catalog is a "field-day" for hams. Pictured is the greatest line of receivers, transmitters and parts ever assembled. Pages of top-notch equipment by such leading manufacturers as Hallicrafter, Hammarlund, RCA, W. E., etc.; everything a "ham" wants. *Win in the contest and take your pick.*

TEST INSTRUMENTS

The greatest collection of up-to-the-minute test equipment in Radio today—at Wholesale prices—rock-bottom prices that cannot be beaten. See extensive line in the new 1938 catalog. *Win in the contest and take your pick.*

Open to Everyone!

Servicemen, engineers, sound men, amateurs . . . EVERYONE, less than 30 days are left to get in on the greatest, easiest contest in years! You have a splendid chance to win one of these big prizes: **First Prize, \$250.00; Second Prize, \$150.00; Third Prize, \$100.00; and fifty other prizes of \$10.00 each!** You don't have to be "talented" to win in this contest. There is nothing to buy—no strings attached.

But you *will* have to hurry! Contest closes at midnight, October 31st. So better get busy—here is the opportunity of a lifetime right in your lap.

HERE'S HOW TO WIN ...

All you have to do to bag one of the big prizes is simply grab your pen and tell us in 100 words or less "Why I Have Found The Wholesale Radio Service Company Catalog Valuable". Easy? It's a natural! Prizes will be announced in the January issues of all radio magazines. To get your official application form, clip the coupon in the corner of this page and mail to Wholesale Radio Service Company, Inc. 100 Sixth Avenue, New York, N. Y.—immediately. We're not only waiting to shoot your Application Form along, but a copy of the BIG New 1938 Wholesale Catalog with it — **FREE!**

FREE MAIL COUPON FOR 180 PAGE CATALOG AND ENTRY BLANK

Has more radio bargains packed between its covers than ever before. This new Wholesale Catalog will prove a gold-mine. Over 50,000 real radio "Buys". Because of our key position in the radio industry, because of our tremendous purchasing power, we can offer you these rock-bottom prices on quality merchandise. So don't wait a single day to mail the coupon for your **FREE** Catalog and contest Entry Blank.

CUT THIS COUPON

AND CUT YOURSELF IN ON \$1000

WHOLESALE RADIO SERVICE CO., INC.

100 Sixth Avenue, New York, N. Y.

Rush **FREE** 1938 Catalog No. 69-4L7 ☐

Rush contest entry blank ☐

Name.....

Address.....

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

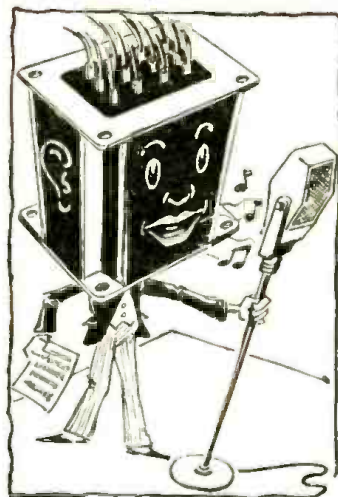
WHOLESALE RADIO SERVICE CO., INC.

NEW YORK, N.Y. CHICAGO, ILL. ATLANTA, GA.

100 SIXTH AVENUE 901 W. JACKSON BLVD. 430 W. PEACHTREE ST., N. W.

BOSTON, MASS. BRONX, N. Y. NEWARK, N. J. JAMAICA, L. I.

KENYON TRANSFORMERS



ARE
AMATEUR HOUR WINNERS
THEY
NEVER GET THE GONG!



Ask your local Jobber to show you the new Ham line.

180 Different Items: From pre-amplifier to I K. W. audio components.

Kenyon Transformer Co., Inc.

840 Barry Street

Export Dept., 25 Warren St., N.Y.C.

New York, N. Y.

HYVOL HIGH-VOLTAGE CAPACITORS



Handy, inexpensive oil-filled capacitors for high-voltage heavy-duty filter circuits.

★
Compactness due to new exclusive HYVOL—the super-dielectric oil.

★
Inverted screw mounting. Same size as usual electrolytics. 1 1/2" dia. by either 2 7/8" or 4 1/2" tall.

★
2, 3 and 4 mfd. 600 v.; 1 and 2 mfd. 1000 v.; 1/2 and 1 mfd. 1500 v. D.C. working.

DATA

Typical of many new items in big 32-page catalog just issued. Ask for copy.

AEROVOX

CORPORATION

70 Washington St.

Brooklyn, N. Y.

ASTATIC

CRYSTAL MICROPHONES



New! "ACORN" MODEL T-3

For High Class
P.A., Broadcast,
Recording and
Amateur Use

A general purpose instrument of single diaphragm type. New tilting mount permits uni- or non-directional pickup and controls acoustic feedback. Complete with Astatic interchangeable plug and socket connector, cable and spring protector. Polished chrome finish. Fully guaranteed.

LIST PRICE \$25.00

Astatic Microphone Laboratory, Inc.

DEPT. J-2, YOUNGSTOWN, OHIO
Licensed Under Brush Development Co. Patents

BLILEY CRYSTALS

10-20-40-80-160 Meter Bands

Now \$3.35 up.

Bliley Electric Co., Erie, Pa.

Shades of Heinrich Hertz!

(Continued from page 345)

"powerful spark gap," vowed on their way home that they would build a bigger and better station and have a spark that made twice as much noise.

Above the head of the operator, seated at right center of the photo, may be seen one of the 1910 vintage glass-plate condensers. A few sheets of glass, garnered from the nearest greenhouse or, perchance, Pop's cold frame, coated with tin-foil (shellacked) on either side of the glass, served to build up the spark into a good healthy crackle. We remember one "extra loud spark" station in Philadelphia, and every time we had visitors we used to haul them over to see this A-1 station, so that they could be suitably awed by the terrific crashing spark, backed by 2 kw.

Another 1910 crack Ham station we remember in New York City was owned and operated by the electrician of a well-known theater on Broadway. We visited him one night, having heard of the tremendous crashing spark-gap he operated, and we were, as we now recollect, distinctly impressed by the sparks as he operated his key and endeavored to call a station in Pittsburgh. It is interesting to note that this theater had D. C. instead of A.C. supply, and remember this was before the days of a radio law or "act" which came into effect a few years later. This particular bird was operating with 9 kilowatts and to make A.C. he had rigged up a commutator (such as used on D.C. motors and dynamos) with a pair of brushes, so that when it was rotated rapidly with a small motor, positive and negative impulses were shot into the mid-tap primary of the high-voltage transformer.

One can well imagine what a stiff spark this outfit put out, and for the final laugh imagine this scene:

A very delightful musical comedy performance was in full swing on the stage about 9 p.m. while the writer was visiting the stage electrician in his "den," two stories below the stage. He was so anxious to demonstrate that he could "raise" Pittsburgh or Chicago, at any time, that he threw in the switch and "opened up" the transmitter. Half a minute later, a stage attache came tearing down the circular iron stairway and gasped out:

"For heaven's sake, shut down that wireless; it can be heard all over the theater!"

Broadcast via S-W's from Kentucky Hills

(Continued from page 345)

he explained, when several years ago the university faculty decided to take advantage of radio's cultural and recreational possibilities by establishing its own studios. In order to make its programs available for all to hear, it penetrated into the hills where the country folk still depend on the old time spinning wheel.

The listening centers were inaugurated by Elmer Seltzer of the University, according to Dr. Frank McVey, president of the institution. Dr. McVey's talk, prepared for the CBS broadcast, was read when he was unable to make the trip.

Dr. McVey's address outlined the beginnings of the centers, when discarded battery sets were used to set up receivers. But they did not prove adequate for long, and with the aid of Kentucky's business and civic leaders and organizations more modern equipment was supplied. Today, he said, most of the centers are equipped with up-to-date receivers.

"Daily a score or more of the people gather at these listening centers," said Dr. McVey, "to listen to news broadcasts which are made in a direct educational nature, farm programs, musical programs, children's hours, and entertainment."

"The enthusiasm of audiences for this comparatively new instance of enlightenment is high."

Please mention SHORT WAVE & TELEVISION when writing advertisers

8 TUBES

QUALITY

6L6 BEAM
Power OutputNo Parallel or
Dummy Tubes

Full Size Dynamic Speaker

Condensers Mounted on
Rubber Eliminating Feed-
backSeparate Con-
trols for
5 Meter Tuning

R.F. GAIN

AUDIO GAIN

Regeneration

5 Meter Regen-
eration

Standby Switch

Tone and Noise
SuppressorOFFICIAL
DOERLE
WORLD-WIDE
Receiver

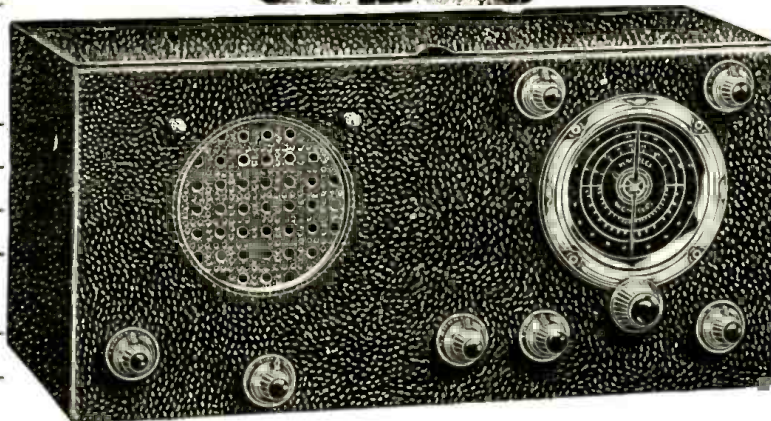
\$22.50

Kit Factory
Assembled
Less Tubes
Unwired

\$32.50

Complete
Wired-Tested
With Tubes
Ready to Use

17 1/2 x 8 1/2 x 8 1/2

110 VOLT AC
50 to 60 Cycles5 to 3000
METERSSPECIAL
AMATEURBand Spread Coils
For Ham ModelConnections
for
Crystal Pickup
Allowing
Victrola
Records to be
PlayedEXTERNAL
SPEAKEREARPHONE
OPERATION

Eilen having combined with the Guy Stokely Radio Corporation is now the sole manufacturer and distributor of the Doerle Receiver. We offer you the 1938 official Doerle constructed of the finest materials and workmanship and of great flexibility which lends itself either as an excellent receiver for the short wave listener or amateur communication work. Equipped with the new octal socket in which either glass or metal type tubes may be used. The tuned RF stage, tuned screen grid electron coupled detector and audio sections individually shielded. Extra heavy duty power supply, an elaborate filter system insures hum-free operation. No trace of back lash due to the fact that band-spread is not accomplished mechanically. All in all the 1938 Doerle is the ultimate in a DX receiver for the amateur, short wave fan, experimenter, or listener of foreign radio programs, leaving little to be desired. Space does not permit the full description of this receiver. Enclose 3c stamp for special circular fully describing this model. Special circular D-38.

3 TUBE
SHORT WAVE AND
BROADCAST RADIO

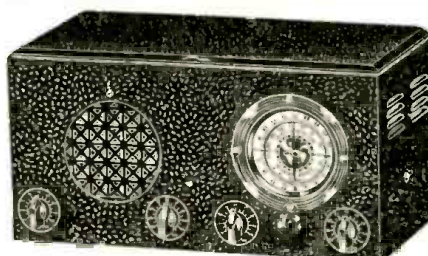
\$3.25

LESS TUBES
PHONES
UNWIREDCOMPLETE
all Tubes,
Coils, Wired
Ready to use

2 to 600 Meters

\$5.75

Phones \$1.35

**RX-17-7-TUBE**
Bandsread T.R.F. ReceiverS. W. FAN MODEL
Complete all coils 10-3000
meters

\$21.75

KIT—Less tubes, cabinet,
unwired

\$14.95

AMATEUR MODEL

Complete special Ham
coils for 10-20, 40-80-160
and 200 to 3000 meter
coils

\$22.75

**BS 6-6 TUBE BAND
SWITCH RECEIVER**10 to 600 meters in 5 steps. No
plug in coils—complete, ready to
use, includes tubes

\$16.95

KIT—Less tubes—unwired \$12.95

Dept. SC 11, 136 Liberty Street,
NEW YORK, N. Y.**EILEN RADIO LABORATORIES**

Please mention SHORT WAVE & TELEVISION when writing advertisers

THESE 2 NEW 1938 CROSLEY FIVERS

BRING YOU
THE BEST IN AMERICAN
AND FOREIGN
RECEPTION

FOR ONLY
\$24.95

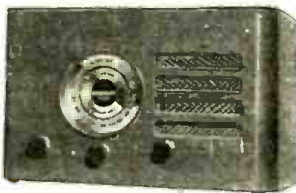
★ UPRIGHT TABLE MODEL



The famous Crosley Fiver with beautiful new cabinet styling and featuring sensational Foreign reception in addition to the new Crosley Mirro-Dial and all other features that have made and kept the Fiver "The World's Greatest Radio Value." Dimensions: 12 1/2" high, 10 3/4" wide, 6 1/4" deep.

★ COMPACT TABLE MODEL

The same Crosley Fiver housed in an unusually attractive compact type cabinet. Offers the same outstanding features and brilliant American and Foreign reception found in the regular Fiver. Dimensions: 8 1/4" high, 13 1/4" wide, 6 1/4" deep. 5 tube superheterodyne; 2 bands, 540-1720 Kc. and 5800-15,400 Kc.; 5" full floating, moving coil electrodynamic speaker; full-vision, illuminated 3-dimensional Mirro-Dial; automatic volume control; power supply noise filter.



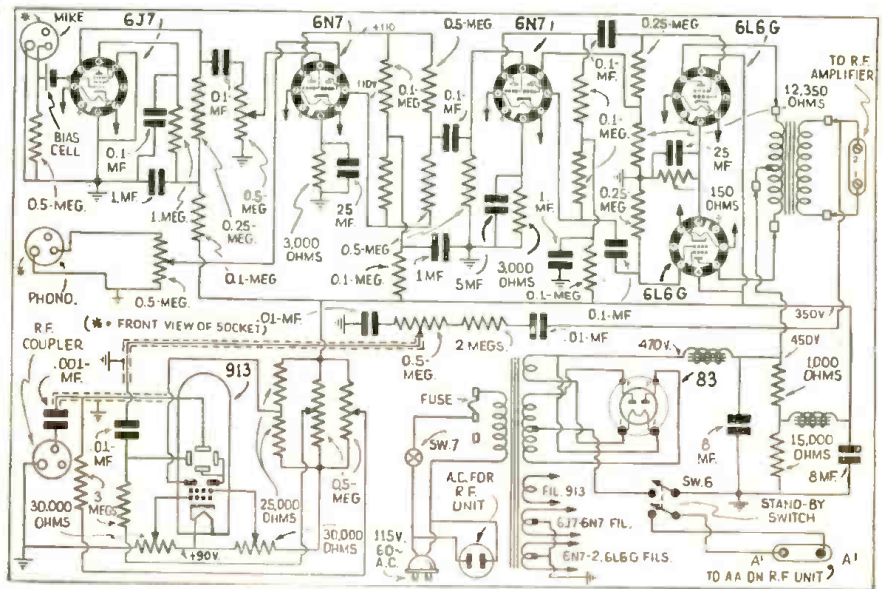
(Prices slightly higher in South and West)

THE CROSLEY RADIO CORPORATION
POWELL CROSLEY, Jr., President CINCINNATI
Home of "the Nation's Station"—WLW—
500,000 watts—70 on your dial.

YOU'RE **THERE**
WITH A
CROSLEY

5-Band 40-Watt Transmitter

(Continued from page 359)



This diagram shows hook-up of microphone and speech amplifier circuit, with plate supply and oscillograph hook-up.

well as the panels, is finished in the new gray wrinkled finish. Unlike the former black crackle or wrinkled finish, the gray finish will not show fingerprints or absorb dust. Therefore, in addition to improving the appearance, the new finish also has other advantages. The new contrast presented by the nicked silver dials and black knobs on the gray finished panels really must be seen to be appreciated.

ANTENNA PANEL

In designing the antenna panel, every effort was made to make this unit match about every antenna tuning combination it is possible to obtain. This panel comprises two Hammarlund 100 mf. double-spaced tuning condensers, and a tapped air-wound and spaced inductance unit. By means of the special rotary-type switch, it is possible to obtain four different circuits. Position 1 of the switch connects the two variable condensers parallel across the inductance for tuning at the lower frequen-

cies. Position 2 connects only one of the 100 mf. condensers across the inductance. Position 3 connects the two 100 mf. variable condensers in series across the inductance, while position 4 connects the two 100 mf. condensers in series with the feeders. A Triplet thermo-coupled R.F. ammeter is also incorporated to aid in tuning and output indication. The antenna unit is link-coupled to the R.F. unit.

R.F. UNIT

As the first paragraph and schematic diagram describes the R.F. unit rather thoroughly insofar as the circuit, tubes employed and output are concerned, we will not repeat this information.

Two Triplet milliammeters are employed with four jacks, making it possible to tune and operate the transmitter with a minimum of difficulty and expense. All of the jacks are at ground potential, completely eliminating possible contact with high voltage. A 0 to 50 milliammeter is

(Continued on page 378)

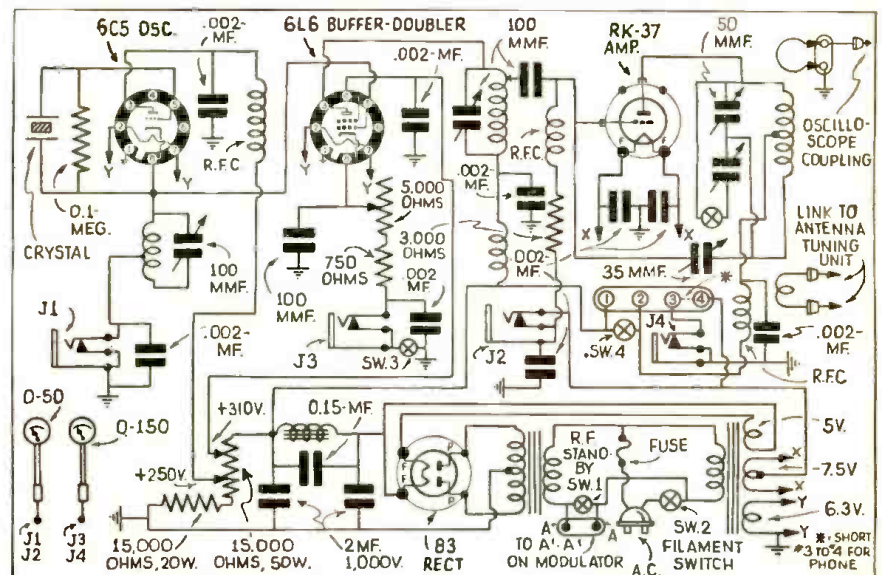
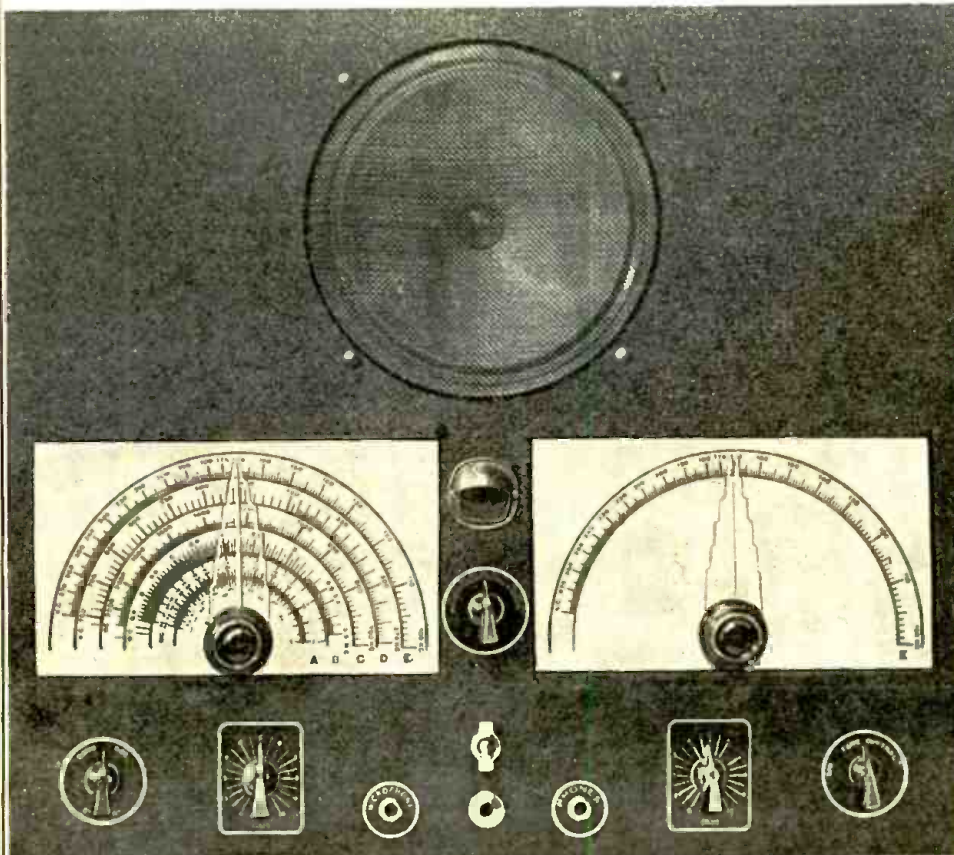


Diagram of crystal oscillator, buffer-doubler and amplifier, together with plate supply.

Please mention SHORT WAVE & TELEVISION when writing advertisers

The New 1938 Ultra Stratosphere "10"



SENSATIONAL ULTRA A.C.+D.C. 2-TUBE TRANS-RECEIVERS 2 1/2 to 4000 Meters



FEATURES

- ★ Transmits from 2 1/2 to 5 meters
- ★ Receives from 2 1/2 to 4000 meters (12 bands)
- ★ Separate electrical and mechanical bandsread
- ★ Loud speaker volume
- ★ Automatic super-regeneration from 2 1/2 to 15 meters
- ★ House to house communication
- ★ Plate modulation
- ★ Built-in A.C.&D.C. power supply (any cycle)

A SENSATION Numerous letters of appreciation received from the many purchasers of the Ultra Sky Rover since its release a few months ago pronounces it as the sensation of the year. Never before was a unit of this type available at any price. This compact and self-contained unit will receive from 2 1/2 to 4000 meters with a high degree of excellence. Will receive foreign stations, amateurs, police calls, broadcast, press, airplane and weather reports, time signals, and all ultra high frequency stations. As a 2 1/2 and 5 meter transmitter surprising results will be obtained when calling friends from afar.

Complete kit unwired less tubes, coils,	\$7.15
cabinet microphone	.95
Cabinet	1.65
Matched set of tubes (12A7-6J5G)	2.00
Wired and tested	.30
Set of 4 coils (2 1/2 to 15 meters)	.95
Set of 4 coils (15-200 meters)	1.75
Set of 5 coils (200 to 4000 meters)	2.95
American SB Hand mike	1.25
5" Magnetic Speaker	



2 1/2 to 4000 Meters Trans-Receiver.

*Ten tubes.

1—6K7 Regenerative Tuned R.F. Amplifier.

1—6J7 Regenerative Detector.

1—6J5G Super Regenerative Detector & Transmitting Osc.

2—6C5 P.P. 1st Audio stage.

2—25L6 P.P. Beam power output stage & modulators.

2—25Z6 Parallel Rectifiers.

1—6G5 Electronic tuning indicator & R meter.

*Receives from 2 1/2 to 4000 meters.

*Transmits on 2 1/2 & 5 meters.

*8" Dynamic Speaker.

*Calibrated R.F. Gain Control.

*A.F. Gain Control.

*Size—17 1/2" x 19 1/2"—16 gauge metal.

*Tone control.

*R.F. Resonator control.

*Separate electrical bandsread.

*Vernier planetary drives on tuning Cond.

*Large illuminated 8" tuning dials.

*May be used for I.C.W. and phone transmission and as a code practice oscillator. Only a key required.

*Standby switch.

*Automatic Phone jack.

*Built-in A.C. & D.C. Power supply.

Complete kit of parts, including 8" Dynamic Speaker, unwired, less tubes and accessories.	\$18.95
1 Kit of 10 matched Sylvania tubes.	\$6.95
Set of 4 coils—2 1/2 to 15 meters.	.30
Set of 8 coils—15 to 550 meters.	2.20
Set of 4 coils—550 to 4000 meters.	2.00
American S. B. Handmike.	2.95
Wired and tested extra.	4.50

ULTRA DUPLEX 6 TUBE MOBILE OR A. C. 2 1/2 to 5 Meters (56 to 120 M.C.)

This unit uses six of the latest 6 volt tubes in a circuit which may be operated from a 6 volt automobile battery or by substituting power supplies from 110 volts A.C. Receiver uses 1-6J5G as a supersensitive detector, 1-6J7 1st A.F. stage, 1-6F6 output stage. Transmitter consists of 1-6E6 oscillator, 1-6J7 speech amplifier, 1-6L6 class A modulator. Power output of transmitter is 10 watts 100% plate modulated. Separate antennas are used for peak efficiency of both units regardless of frequency settings. Changeover from 6 volt to A.C. operation is extremely simple. All that is necessary is to remove the built in genemotor and insert the A.C. power supply.

Supplied complete with all coils including coil for 10 meter reception.

- 6J5G—6J7—6F6—6E6—6J7—6L6
- Built in 350 volt 150 mil filtered genemotor
- Built in dynamic speaker
- 10 watts power output
- 100% plate modulation
- Absolutely independent receiver and transmitter
- Negligible receiver radiation
- Automatic phone jack

Ultra 6 tube Duplex complete with built in dynamic speaker, and A.C. power supply, wired & tested, with cabinet, less tubes, mike and antenna. **\$28.90**

Ultra Duplex complete with built in dynamic speaker, and 150 mil genemotor, wired & tested, with cabinet, less tubes, mike and antenna. **\$38.45**

Set of 6 Sylvania tubes **5.35**

American SB hand mike **2.95**

Adjustable 8 ft. antenna **1.60**

Ultra High Frequency Products Co., 123 Liberty St., New York, N. Y.

A real break for Hams and Fans!

Beginning with the

JANUARY ISSUE

we will inaugurate a department that will be of great interest to our readers **ALL OVER THE WORLD.**

The heading for this department

Free Barter and Exchange Ads

fully explains its purpose.

Space in this department will not be sold. It is intended solely for the benefit of our readers, who wish to buy, sell or exchange radios, parts, phonographs, cameras, bicycles, sporting goods, books, magazines, etc., without profit.

As we receive no money for these announcements, we cannot accept responsibility for any statements made by the readers.

We venture to make the prediction that after this department has been running for several months, it will have a reader interest not surpassed by any article in the magazine.

Readers from all over the world will start corresponding with each other and many lifelong friendships will be started.

Use these columns freely. Only one advertisement can be accepted from any reader in any issue. All transactions MUST be above board. Remember you are using the U. S. mail in all these transactions and therefore you are bound by the U. S. Postal Laws. Describe anything you offer accurately and without exaggeration. Treat your fellow men the way you wish to be treated.

We welcome suggestions that will help to make this department interesting and profitable to both buyer and seller.

Address your letters to the Advertising Department.

SHORT WAVE & TELEVISION

99 Hudson Street,

New York, N.Y.

5-Band 40-Watt Transmitter

(Continued from page 376)

employed to measure the oscillator plate current, and amplifier grid current, while a 0 to 150 milliammeter is employed for measuring buffer plate current and final amplifier plate current. All tuning controls and jacks are clearly marked.

As the final amplifier is the only one requiring neutralization, this control is brought out at the rear and is equipped with a calibrated dial and knob. Terminals for keying the final amplifier in the filament center tap and for insertion of the modulation transformer secondary are also brought out at the rear of the chassis. A fuse is employed in series with the primaries of the two transformers employed, one of which incorporates all filament windings, and the other high voltage. The filament and plate switches are located on the front panel along with a third switch which opens the cathode circuit of the 6L6 buffer multiplier.

If you will refer to the schematic diagram it will be noticed that a split stator condenser is employed to tune the final amplifier plate circuit. This however is not connected in usual split stator fashion. In order to cover all amateur bands from 160 to 5 meters efficiently, it is necessary that the proper L-C ratio be maintained in the tank circuit. This is very effectively accomplished by the use of a split stator condenser which is really used as a straight condenser, enabling 50 microfarads to be employed for tuning the high frequency band, from 14 megacycles up, and 100 microfarads for tuning from 7 megacycles down. Switch SW5 is mounted right on the variable condenser frame, keeping all leads exceptionally small. As a matter of fact the entire R.F. unit has been so designed that all leads are less than 3 inches long in the grid and plate circuits.

COILS

All of the coils, with the exception of the 10 meter buffer coil, and 5 and 10 meter final amplifier plate coil, are wound on bakelite 5 prong forms, the higher frequency coils being space-wound on the threaded form.

The 10 meter buffer plate coil, and the 5 and 10 meter final amplifier plate coil are of the air-wound and air-spaced type, mounted on a small piece of micalex, in order to keep losses at a minimum.

An excitation control is provided in the buffer stage of the R.F. unit, which adequately takes care of the variable excitation requirements that must be contended with.

MODULATOR UNITS

The combined speech-amplifier-modulator employs the following tube line-up: a 6J7 high-gain high impedance input; a 6N7 low-gain high impedance input and mixer stage; a 6N7 phase inverter; and a pair of 6L6G tubes in pushpull. A 913 Cathode ray tube may be employed for modulation monitoring purposes, for the modulator is also equipped to supply the various plate and filament voltages for this tube.

Five controls are also provided for the 913 tube. The focus and intensity controls are brought out to the panels, and are therefore equipped with knobs. The vertical and horizontal centering controls are of the screw-driver adjustment type, as one set may very seldom require readjustment. These screw-driver adjustment controls are brought out on the chassis. The fifth control is for the audio frequency sweep and enables a trapezoidal pattern to be obtained.

The undistorted output of the modulator is conservatively rated at 30 watts, which is more than enough to modulate the R.F. unit at 100%. A Thordarson multi-match modulation transformer is employed, which means that this modulator is capable of matching practically any R.F. load that will ever have to be contended with. It is also possible to obtain a 500 ohm output impedance, which means that the unit may also serve for P.A. use if the occasion demands. Two switches are employed for plate and filament control. The plate control switch

is of the double-pole, double-throw variety, and is so wired that when the three units are properly interconnected, the plate switch of the modulation unit controls both the modulator and the plate supply of the R.F. unit. This means that this switch is the only one that has to be thrown for transmit and standby periods. The frequency response of the modulator is within 3 db from 50 to 10,000 cycles. The high-level input circuit has a gain of 125 db, while the low-level channel has a gain of 85 db.

As previously explained, this transmitter is capable of operating on all of the amateur bands from 10 to 160 meters. On all of these bands the final amplifier is operating as a straight neutralized class "C."

The writer does not like to advocate modulating a frequency doubler; however, for 5 meter operation this is perfectly O.K., for a far superior signal will be emitted from this transmitter on the 5 meter band, than it is possible to obtain from any of the self-excited rigs which are still in the majority on 5 meters. All reports received when this transmitter was being tested were more than gratifying, regardless of what band was being employed. Five meter reports usually met with the query "Say, O.M., what are you using anyway?" This is due to the exceptionally stable signal and lack of frequency modulation that is immediately noticed when a signal of this type is tuned in on the 5 meter band.

For the high-power man who may desire to operate a transmitter capable of 250 watts input or thereabouts, the R.F. unit only, makes an exceptionally swell exciter unit. As it is possible to merely open the modulation link and use the built-in power supply for only the oscillator buffer doubler stages and use an external supply delivering 1000 or 1250 volts to the RK-37 plate circuit, much higher output can be obtained from the RK-37. As the final amplifier in this case will require a separate power supply, there is no reason why this cannot also be employed for the RK-37 in the 5 BRF unit, which naturally would greatly increase the output of the RK-37. Only approximately 600 volts is applied to the RK-37 in the 5 BRF unit, however, this tube is capable of taking up to 1250 volts on the plate, without showing any signs of discomfort whatsoever.

The 5 BM modulator likewise may be employed to modulate any other R.F. amplifier or oscillator running at no more than 75 or 80 watts input. Due to the built-in Thordarson multi-match modulation transformer, any class "C" or oscillator plate load may be matched.

This article has been prepared from data supplied by courtesy of Wholesale Radio Service Co., Inc.

When to Listen In

(Continued from page 368)

mc. These are not rigid rules because changes in the ionization of the wave-reflecting layers in the upper atmosphere frequently modify conditions. For example, Europeans sometimes will be heard at good strength near 18 mc. as late as 11 p.m. At the same time reception on 12 mc. may be very poor. Such conditions are classed as abnormal, however.

The general trend during the fall is for the lower frequencies to improve and for the higher ones to deteriorate. Most foreign stations shift to lower frequencies during the fall and winter to take advantage of this well-known phenomenon. That is why the Europeans which operate near 18 and 15 mc. during our summer evenings, shift to the bands near 12 and 9 mc. in the fall, and in some cases to 6 mc. in the winter. But the 6 mc. band is not likely to be much used by Europeans for transmission to North America this winter. Next month we'll endeavor to explain why this is the case and also to clarify some other points on short-wave peculiarities.

How to Identify Short-Wave Stations

(Continued from page 366)

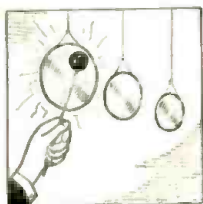
Slogan: "La Voz de Armenia," uses single musical note before announcements, giving call as "HJ4ABH y HJ4ABN." Signs off with "Spanish Soldiers" March.

9:51 HS8PJ B—Bangkok, Siam. Announces: "Here is SW experimental broadcasting station HS8PJ, at Bangkok, testing on a wavelength of 31.55 meters, or a frequency of 9.51 mc/sec." Identifications first in Siamese, then English, then French. Ordinary non-ident. announcements in English. Before announcements are made, 3 chimes in ascending order are frequently heard.

9:51 HJU B—Buenaventura, Colombia. Announces: "La Voz del Pacifico, Buenaventura."

9:502 XEWW B—Mexico City, Mexico. Slogan: "La Voz de Latina America." Only occasionally announces SW call, usually announcing XEW, which BCB station they relay.

9:50 VK3ME B—Melbourne, Australia. Call given very frequently. Opens and closes with chimes of clock. Signs off with "God Save the King."



9:50 PRF5 B—Rio de Janeiro, Brazil. When on "Brazilian Hour" announces phrase very clearly rolling his "r's." Standby signal a 3-note gong. S. O. with Brazilian National Anthem.

Television at London Radio Show

(Continued from page 366)

ceiver now or wait until bigger and better pictures (as the movie producers say) are available.

Most of the radio receivers seen at this year's show were of the all-wave type, the majority of receivers having at least one short-wave tuning band, which would cover most of the short-wave broadcasting stations. A number of receivers had two and three short-wave bands, a feature of many of the new sets being the use of large, clear tuning dials marked with wavelengths and station names. Owing to the fact that European stations on the 200-550 meter band are not separated by definite ten kilocycle channels, dials are rarely marked in kilocycles.

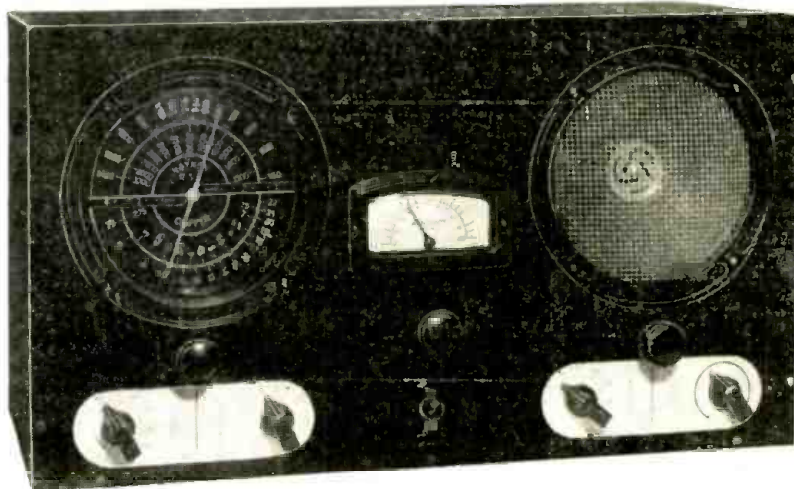
Very few short-wave receivers were to be seen at this show, the majority of receivers used by hams and short-wave listeners in the British Isles either being home-made or imported from America, although there are now one or two signs that British firms are beginning to pay attention to this type of receiver. However, the all-wave receiver, using one or more short-wave bands, a medium wave band (200-550 m.) and a long wave band (1,000-2,000 m.) has now definitely come to stay, and many British firms are producing these receivers in large quantities.

In the NEXT issue!
100-watt, 5-meter
Transmitter.

8 BANDS on the New HAYNES

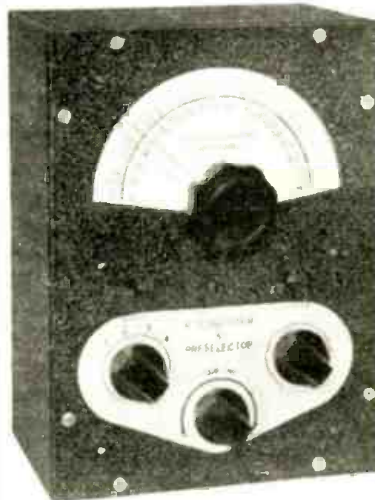
5 Tube R-S-R CLIPPER 3 to 1600 Meters

With VERNIER BANDSPREAD Over This Whole Tremendous Range



ASK THE MAN WHO OWNS ONE

A beautiful communication receiver in both appearance and operation. Five tubes always in full use with R.F. amplification on all frequencies. Uses the genuine Haynes electron coupled regenerative-super-regenerative circuit which means that it really "goes to town" on the high-frequency bands. Tube line-up is: 6K7 RF amplifier, 6J5G regenerative and super-regenerative detector, 6J5G first audio amplifier, 6L6G power output, 80 rectifier.



- ★ Beam power output with 6" dynamic speaker.
- ★ Separate tone, sensitivity and volume controls.
- ★ Bandswitching (no plug-in coils) down to 14 meters.
- ★ Removable air-wound coils for the ultra-high frequencies.
- ★ Regeneration control that is absolutely smooth and free from tuning interaction.
- ★ 5-inch main tuning dial, calibrated in kilocycles.
- ★ Perfect super-regenerative control on the ultra-frequencies.

Complete with five Sylvania tubes. **\$28⁸⁵**
ready to operate from any 110 volt
A.C. line

Shipping weight 30 lbs.

R-9 SIGNAL BOOSTER

WILL GIVE YOUR WEAK DX SIGNALS A TREMENDOUS BOOST. Try this new unit ahead of your CLIPPER if you want a thrill! Can be used with any receiver that operates from A.C. Selectivity increased tremendously!

Weak stations brought up to loudspeaker volume!

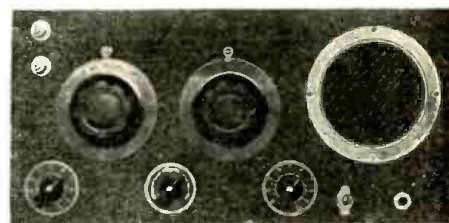
A bandswitch preamplifier (4 bands—no plug-in coils). Tunes from 11 to 560 meters with overlaps on each band. If you are interested in long distance reception you need a signal booster regardless of what receiver you are using. The R-9 not only gives you extreme selectivity, preventing interference from other stations, but it gives you, at the same time, maximum regenerative amplification of the station you want before it even reaches your receiver.

In ordering, specify what output tube is used in your receiver. R-9 SIGNAL BOOSTER with 6K7 tube complete in cabinet ready to operate. List price \$18.75. **\$11.25**
INTRODUCTORY PRICE.

THE AC-4

4-Tube Communication Receiver

An outstanding achievement. A truly fine regenerative receiver covering the tremendous tuning range of 2½ to 555 meters. A.C. operation with built-in power supply. Isolantite insulated bandspread and high-frequency tuning condenser. Super-regeneration on the 5 and 10 meter band. Separate volume and regeneration control. Antenna coupling control on front of panel. Straight-line-frequency tank condenser. Jack for earphones, cuts out speaker. Standby switch, etc. Uses three of the new 6J5G super-triodes with 80 rectifier. The AC-4 stands in a class by itself among long distance low price receivers. It is the greatest "miles per dollar" value in radio; a real communication receiver with perfect bandspread—the 20 meter amateur band, for instance, one of the most fascinating DX bands which is only 100 kilocycles wide, covers 100 degrees on the big 3½" German silver band-spread dial with NO band overlap effect. Do foreign reception you will be amazed at the way the AC-4 separates the crowded foreign stations on the short-wave bands. Price, AC-4; complete kit of parts, drilled chassis, speaker, etc. Less only cabinet and tubes, unperfected. **\$10.75**



Crystaline finished metal cabinet.....\$1.25
Kit of four picked Sylvania tubes.....2.05
Wiring and testing.....2.50
SPECIAL PRICE ON COMPLETE AC-4:
wired, tested and ready to operate from
any 110-volt line.....**\$15.85**

Radio Constructors Labs.

136 Liberty St., N.Y.C., N.Y. Dept. S-11

Please mention SHORT WAVE & TELEVISION when writing advertisers



FOR THIS 25 WATT
C. W. JUNIOR TRANSMITTER KIT

by



THE BIGGEST BARGAIN IN THE HISTORY OF RADIO!

● Just think of it! For the amazingly low price of \$15.95, you can assemble your own PROFESSIONALLY STYLED transmitter that beats any home-made outfit you ever saw. It's full 25 watts output enables you to keep your schedules CONSISTENTLY. Any amateur can assemble this kit, with just a screwdriver, soldering iron and pliers. Complete instructions furnished.

● Covers all bands with only two crystals. Only one coil change per band. Self-contained power supply. Antenna condenser included. Makes an excellent portable unit. Can always be added to without junking parts. Complete except for tubes, meters, crystal.

● In appearance, performance, and VALUE, the UTAH Junior Transmitter Kit is the most amazing opportunity ever offered aspiring DX'ers. Write Dept. SW-11 for details, or see your jobber TODAY!

UTAH RADIO PRODUCTS CO.

CHICAGO, U. S. A.

TORONTO

BUENOS AIRES

ONTARIO, CANADA

UTAH RADIO PRODUCTS CO.

"16 YEARS OF LEADERSHIP"

CHASSIS—CABINETS PANELS & CANS

STANDARD SIZES ON HAND
SPECIAL SIZES MADE TO ORDER
KORROL RADIO PRODUCTS CO.

Dept. S-11
232 Greenwich St. New York City

QUALITY recommends

Condensers
by

WET... DRY
PAPER
MICA... TRIMMER



Please Write for Details

SOLAR MFG. CORP. 599-601 Broadway New York City

A 6-Tube Super-Het for the S-W "Listener"

(Continued from page 360)

Tuning Range, A.V.C. and Other Features

The tuning condenser must have a low minimum capacity to cover the two ranges of 16-53 meters and 187-555 meters. (5.7-18 mc. and 1600-540 kc.) For this reason the coils, tuning condenser and calibrated dial have been coordinated in design for proper tracking and dial calibration. Needless to say, substitution of parts in the tuning section of the receiver will make it difficult to track and practically impossible to calibrate.

Full A.V.C. action is obtained on the R.F., modulator and I.F. stage, plus a variable sensitivity control, placed in the cathode circuit of the 6K7 R.F. tube, which combine to give the listener in ample R.F. circuit adjustment for sensitivity and minimization of R.F. overload on strong local signals.

The 6Q7 is used as the diode rectifier for A.V.C. voltage and audio signal source. The triode section of the 6Q7 has the manual volume control placed in the grid circuit and has its output resistance-capacity coupled to the 6F6 output tube.

The tone control is located in the plate circuit of the 6F6 tube in the manner that is conventional with most pentode output circuits.

A 5Z4 is used as the rectifier tube and while on the subject of the plate-supply, it should be noted that the speaker field, which is part of the filter circuit, can have a field resistance between 1000 and 1800 ohms, without seriously affecting the performance of the receiver. However, it is best to use a speaker having the lower value of field resistance, as this will keep the plate voltage on the output tube high. The higher the effective voltage on the tube plates (within reason) the greater will be the power output, and the higher the receiver sensitivity.

While this is only a two-band receiver it is ideal for the short-wave listener as it provides excellent broadcast performance and ample sensitivity on the most popular short-wave broadcast bands at low cost.

Its finished appearance and calibrated dial, added to the flexibility of the controls located on the front of the receiver chassis, make this new set very attractive to construct and operate.

Construction and Wiring

The first step in the construction of this receiver is to prepare the chassis and mount the parts. The chassis layout is shown in Fig. 3 and it is interesting to note that this generally laborious job can be avoided by purchasing a chassis already drilled and enamelled.

All the parts should then be mounted on the chassis except the tuning condenser and dial. The top view shown with the circuit diagram and the under-chassis picture will enable the constructor to place the parts in the proper locations. Special attention should be given to location of ground lugs, which are fastened under one of the mounting screws on each tube socket. This should be a long lug with shake-proof type hole and if a lacquered chassis is used, it should be placed directly against the under side of the chassis between it and the socket. The end of the lug may then be bent up and soldered to the socket terminal as indicated.

The wiring of the receiver should follow as closely as possible the arrangement shown in the diagram. This arrangement has been worked out to give minimum interaction of high frequency circuits and to eliminate regeneration and howls caused by stray coupling.

It is advisable to wire the heater circuits first, using a pair of wires twisted together. These should not be smaller than No. 20 gauge which is a good size to use for all wiring in this set. The power transformer and connections to the filter-

H. G. CISIN'S All-Wave Air Scout Jr. Radios THREE-TUBE \$3.20 ALL ELECTRIC ALL WAVE SET

MODEL 3A-E
A powerful sensitive all-wave set. Holds wonderful records for foreign reception. Also brings in police calls, amateur, code, Transatlantic phone and broadcast entertainment. Excellent volume. Works from any A.C. or D.C. house current. Easiest set to build. Employs newest metal ballast tube as one of the tubes. Speaker mounts on attractive panel. Range 912 to 610 meters or to 1500 meters with special long wave coil. Complete kit includes: Earphone, broadcast coil, 70 to 200 meter coil. Panel, Chassis, High Grade Variable Condenser, Potentiometer, Antennas, Condensers, and all other required parts including instructions and diagram. \$3.20 With Phone (Less ONLY)

Model 3A-E
Pat. No. 2,086,258
tenna Trimmer, Dial, Sockets, Knobs, Wire, Resistors, Condensers, and all other required parts including instructions and diagram. \$3.20 With Phone (Less ONLY)

ONE-TUBE BATTERY SET—Model 1B. Suitable for owners report MARVELOUS FOREIGN RECEPTION. Also Miller S.W. and broadcast reception same as model 3A-E. Earphone reception. Complete kit includes: Earphone, above plus 30 tube and filament rheostat. Uses inexpensive

\$2.45 With Tube and batteries
TWO-TUBE BATTERY SETS—Model 2B. Complete kit including all parts in the 1-tube model plus parts for extra audio stage in— \$2.95 With Two Tubes & Phone (unwired)

THREE-TUBE DE LUXE BATTERY SET—Model 3B. Complete kit including all parts in the 1-tube model plus parts for two extra audio stages including two 30-type tubes and 30. \$3.45 & Phone (unwired)

Following Auxiliary Parts are available: 0 1/2 to 20 meter coil 25c; 15 to 45 meter coil (foreign) 25c; 40 to 80 meter coil (foreign) 25c; 22 1/2 volt "B" battery 75c; Two flashlight "A" batteries 10c each; 5" Find-All Loud Speaker \$1; Complete Antenna Kit 50c; Wood screw kit 10c; 10c tubes for Model 3A-E, each 45c; Long Wave Unit and coil for any model \$1; Double Earphones \$1.30; Bandspread Attachment 75c. Any model will accept extra 75c.

NOTE: If you already have earphones, two extra foreign coils may be substituted in any model.

H. G. CISIN, Chief Eng., ALLIED ENG. INSTITUTE
98 Park Place Dept. S-41, New York, N.Y.

ELECTRIC PENCIL

AN electric tool that embosses on leather, wood, silk, paper or other material. Writes like a pencil.

The writing can be embossed in any of the five following colors: Gold, Silver, Red, Green, Blue.

A roll of colored foil of each of these colors is furnished with the outfit. Cord and plug is included in the box. Also 4-page instruction booklet. Plugs into any electric outlet, A.C. or D.C. 110 volts. Amount of current used is negligible. Very useful to anyone wanting to emboss books, wooden objects, leatherware, fabrics, Radio phones, hat bands, stationery goods, gifts, tools, instruments, etc.

Size of writing tool 6". Size of box containing outfit 10"x3 1/4".
STOCK NUMBER: S204 ELEC-
TRIC EMBOSSEMENT SET. YOUR \$2.27
PRICE

Sent postpaid anywhere in U. S. A.
Money back guarantee

WELLWORTH TRADING CO.

Dept. SWT-1137
560 W. WASHINGTON BLVD., Chicago, Ill.

CRYSTAL HEAD PHONES

"TRANSFILTER"

Information on request

THE BRUSH DEVELOPMENT CO.

3326 PERKINS AVE., CLEVELAND, OHIO

RADIOS..SAVE UP TO 50%

DEAL DIRECT...FACTORY PRICES! Many models to select from: AC-DC; All-Wave; armchair models; automatic tuning; car radios; Farm sets that operate like city radios! Send postcard for NEW Bargain Catalog FREE. 30-DAY TRIAL plan. And agent-user proportion! GOLDENTONE RADIO CO. DEPT. C11, DEARBORN, MICHIGAN

Please mention SHORT WAVE & TELEVISION when writing advertisers

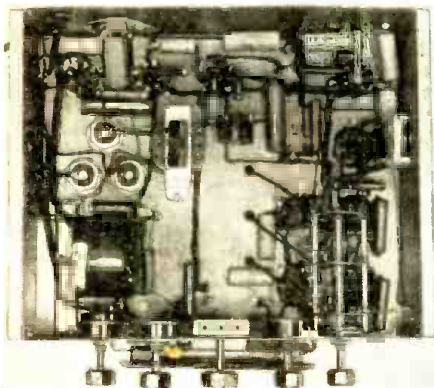
choke, electrolytic condensers and speaker socket should then be wired. It may be desirable to make all connections to the three coils and the two tubes near the band-switch before mounting the band-switch. It is a good idea to connect about a 6-inch length of wire to the terminals on these coils which connect to the band-switch, and after making all other connections in this vicinity, to mount the switch and connect these wires to the proper terminals thereon.

The remainder of the wiring should now be completed and the proper tubular condensers and fixed resistors connected in place as the wiring progresses. A .05 mf. 200 volt tubular condenser, which is not shown on the pictorial diagram, should be connected to the left-hand terminal of the tie-lug which is mounted with the I.F. transformer and the other end grounded on the ground lug of the 6K7 I.F. socket.

The tuning condenser and dial may then be mounted and a small right-angle bracket should be bolted to the chassis immediately back of the dial and the dial bolted to this bracket. This prevents any rocking motion of the dial. The adjustable trimmers mounted on top of the tuning condenser should be removed. Tubes may now be inserted in the proper sockets and grid-cap connections made as indicated. The grid caps of the 6A8 tubes near the tuning condenser are connected to the first and second stator terminals, respectively, of the tuning condenser.

Alignment and Testing

After making all connections and carefully checking to make certain that everything is correct, the speaker should be plugged in and the receiver turned on. Never turn on the receiver unless the speaker is plugged in, as this may damage



Bottom view of complete receiver.

the rectifier tube or filter condensers. A high-resistance volt-meter should now be used to measure the voltages from the chassis to each of the plates and screens of the tubes. Plate voltages should show between 220 and 250 volts as well as the screen on the 6F6. Screen volts on the other tubes should be slightly over 100 volts. Before proceeding with the alignment, the AVC should be temporarily shorted-out, by connecting a jumper between the left-hand and center terminals of the tie-lug mounted on the I.F. Transformer. This jumper should be removed after completing the alignment.

To align the I.F. transformers connect the output of a signal-generator directly to the grid cap of the 6A8 tube, removing the regular connection to the tuning condenser. An output meter should be connected on the speaker to get proper adjustment. Set the generator to exactly 45 kc. and turn the volume control of the receiver full on. The generator signal should be strengthened until a reading is obtained on the output meter and the two trimmers located in the top of each I.F. transformer should be adjusted for maximum output reading. The generator may now be removed from the 6A8 and the regular grid connection replaced.

For the broadcast band the generator should be connected to the antenna termi-

GET THOSE WEAK C. W. SIGNALS—



SARGENT MODEL II

Experienced Operators Prefer This One.

A rapidly increasing number of experienced radio operators are beginning to realize that the tuned R.F. with regeneration is still the best receiver. Low static and noise level, tube hiss almost non-existent with the set wide open, and yet sensitive to the weak C.W. signals that are lost in noise on larger sets. A pleasant receiver to operate, good tone on long and short wave broadcast, easy to tune, flexible—the operator's pal.

HOW ABOUT SELECTIVITY?

Don't judge a modern T.R.F. receiver by standards of 2 years ago. Model 11 has been built in accordance with latest engineering discoveries, tempered by 25 years of radio design experience. Nothing short of a super-het with crystal filter will exceed the selectivity of Model 11. A glance at the chassis and bottom view, showing construction and shielding used, will show how selectivity is obtained.

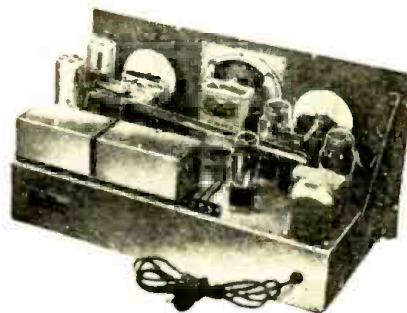


MODEL 11—BOTTOM VIEW

Could You Ask for Anything That Is Not Listed Here:

- Coil Switching
- All-Wave Band Spread
- Built-in Power Supply
- Jensen Dynamic Speaker
- R.C.A. Tubes
- Antenna Trimmer
- Fully Calibrated Dial
- Phone Jack
- Break-in Switch
- R.F. Gain Control
- Regeneration
- Large Knobs

Made in 3 tuning ranges, as follows: 9.5-550 meters, 9.5-3750 meters, 9.5-20,000 meters. Continuous tuning, no skips, no dead spots.



MODEL 11 CHASSIS—REAR VIEW

Model 11 Net Prices, 110 v. 60 cy. A.C.

Model 11-UA, UNIVERSAL tuning range, 9.5 to 20,000 meters.	\$77.00
Model 11-MA, MARINE tuning range, 9.5 to 3750 meters.	\$57.00
Model 11-AA, AMATEUR tuning range, 9.5 to 550 meters.	\$52.00

Prices include power supply, speaker and R.C.A. tubes.

Immediate Delivery

Model 11 is available in all A.C., D.C. and battery voltages.

Write for full description.

E. M. SARGENT CO., 212 9th Street Oakland, Calif.



E. H. RIETZKE

PRES. OF CREI

Is Radio . . . Just A Job to You?

If you can equip yourself with the necessary training . . . Radio can offer you an excellent future. Continuous new developments have created a need for technically trained men, who have kept their knowledge up with Radio's fast pace.

YOU CAN'T BLUFF YOUR WAY

CREI courses are planned only for serious-minded men who know that it takes training to qualify for and to hold the big jobs and salaries that go with them. Let us suggest the course best suited for you and the easy ways of paying for it.

ILLUSTRATED CATALOG FREE

Write today for your copy. Answers your every question and shows actual equipment, as well as outline of course.

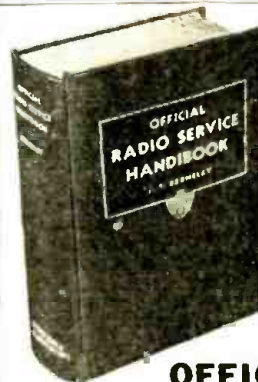
CAPITOL RADIO ENGINEERING INSTITUTE

Dept. SW-11
Washington, D. C. — 14th & Park Road
New York City — 29 Broadway

RACKS, PANELS, CABINETS

Our complete line is listed in Catalog No. 37. Write for your copy today.

PAR-METAL PRODUCTS CORP.
35-27 41st St., Long Island City, N. Y.



THE YEAR'S OUTSTANDING SERVICE BOOK!

Over 1,000 Pages
Over 1,000 Illustrations

OFFICIAL RADIO SERVICE HANDBOOK

PUBLISHED only a few months ago, the OFFICIAL RADIO SERVICE HANDBOOK by Bensley, is the most modern, up-to-the-minute volume on radio servicing. Contains over 1,000 PAGES filled with vitally important service data—over 1,000 ILLUSTRATIONS.

OVER 250 PAGES OF OPERATING NOTES
The section on Operating Notes contains valuable information supplied from personal notes of hundreds of Service Men for over a thousand manufactured receivers.

Other highlights of the OFFICIAL RADIO SERVICE HANDBOOK: CIRCUIT THEORY AND ANALYSIS—Circuit Fundamentals, Tuning Circuits and Aligning Data, Volume Control, Tone Control, A.V.C., Resonance Indicator Circuits, A. F. Amplifier Systems and Power Supplies, Speakers, Pickups, Phono Equipment, Commercial Receivers, SERVICING EQUIPMENT—Fundamentals of Test Instruments, Commercial Equipment, Cathode-ray Oscilloscope, Building Test Instruments, Localizing Trouble, Short Cuts, Unusual Servicing Experiences, STANDARD AND SPECIALIZED RECEIVER AND INSTALLATION DATA—All-Wave Receivers, Auto-Radios, Noise Interference, MODERNIZATION AND CONVERSION DATA—Receiver Conversion Work, SOCIAL AND ECONOMIC PROBLEMS OF THE SERVICE MAN—Improving Knowledge and Technique, Uplifting the Profession, OPERATING NOTES FOR STAND-ALONE RECEIVERS.

Order your HANDBOOK today—use the coupon below
RADCRRAFT PUBLICATIONS, Inc. 99 Hudson St., New York, N. Y.

RADCRRAFT PUBLICATIONS, Inc. SWT-1137
99 Hudson Street, New York, N. Y.
Gentlemen: Enclosed please find my remittance of \$4.00 for which send me immediately, POSTPAID. One copy of the OFFICIAL RADIO SERVICE HANDBOOK by Bensley—just published.
Please send HANDBOOK to me C. O. D.

Name _____
Address _____
City _____ State _____
Please send complete literature on HANDBOOK (Send remittance by check or money order. Register letter if you send cash or currency.)

RADIO INSTRUCTION

**a \$50.00
Radio Course**

**for only
\$4-**

**RADIO PHYSICS
COURSE**

A. GHIRARDI

**Ghirardi's Great 972 page
RADIO PHYSICS
COURSE**

What a bargain! What a chance for you to really learn radio the easy way. Here's the whole famous Ghirardi RADIO PHYSICS COURSE condensed into one great big 972-page volume—easy to read, easy to understand. This complete instruction course will teach you RADIO, ELECTRICITY, SOUND—and even TELEVISION—while sitting right at home in your own easy chair. Yes, it's all here, all you need to learn is thoroughly explained painstakingly and simply, so you can really understand it at once. Nothing is left out. Ghirardi's marvelous style, freedom from unnecessary mathematics, and more than 500 clear illustrations make everything so clear and simple that you need no previous training to understand it. That's why more radio schools and students use it than any other radio book in the world. All radio instructors recommend it. They say it's the best there is—at any price! You get it at the amazingly low price of only \$4. Where could you do better than this? YOU CAN'T! So order your copy right now—mail the Coupon below—AT ONCE! Remember—every penny of your money back if not fully satisfied!

What You Will Learn From This Book!

Sound, Speech and Music . . . Electrons . . . Electric Current . . . Batteries . . . Magnetism . . . Electromagnetism . . . Transformers . . . Inductance . . . Condensers . . . Alternating Current Circuits . . . Filters . . . Electrical Measuring Instruments . . . Radio Waves and Radiations . . . Broadcast Stations . . . Receiving Equipment . . . Vacuum Tubes . . . Radio and Audio Frequency Amplification . . . Superheterodynes . . . Loud Speakers . . . Battery Operated Receivers . . . Power Supply Units . . . Electric Receivers . . . Automobile and Aircraft Receivers . . . Phonograph Pickups . . . P. A. Systems . . . Short-wave Receivers . . . Photoelectric Cells . . . Television . . . Antennas and Grounds . . . Testing and Servicing Receivers . . . Sound Motion Pictures . . . Appendices . . . 856 Review Questions for Self-Study . . . AND LOTS MORE!

TEAR OFF—FILL OUT—AND MAIL!

RADIO & TECHNICAL PUBLISHING CO.
45 Astor Place, New York, Dept. SW-117.

☐ Enclose final \$4. Send my RADIO PHYSICS COURSE at once, (cost \$4.00, foreign \$4.50.)

☐ Send me a free circular describing this book.

Name

Address

MONEY-BACK GUARANTEE

FASTEST WAY TO LEARN CODE

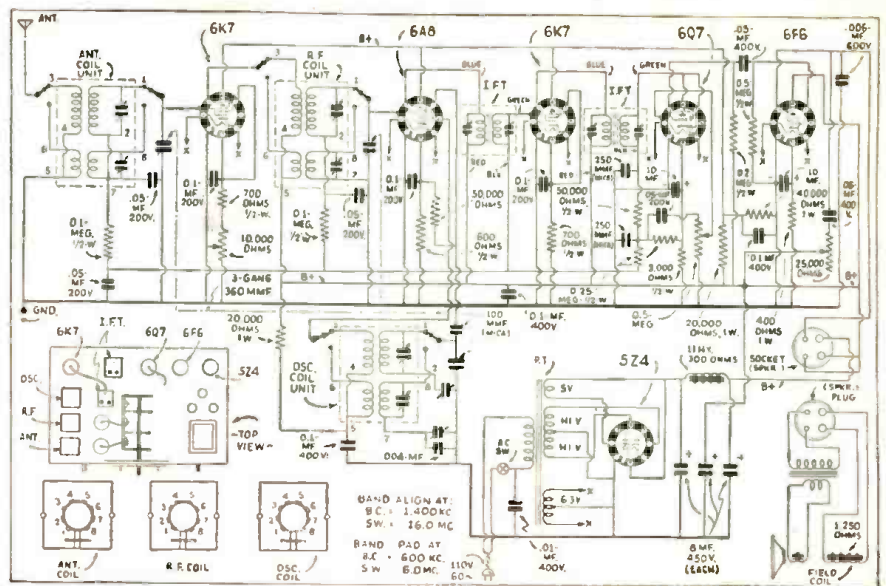
Easy, Fascinating, LEARN by EAR
To Be a GOOD OP.

The New All Electric Master Telex Code Teaching Machine is exactly what thousands are looking for. No experience needed. Ideal for beginners—steps up WPM for ALL ops.

There is no guess sending in visible dots and dashes. You SEE and HEAR exactly how you are making your signals. You learn code the way you'll be using it—by SOUND. Complete course included at no extra charge. Used by many schools and several governments for teaching code. Low cost; easy terms. MONEY BACK GUARANTEE. Send now for booklet \$11. no obligation. Post card will do.

TELEPLEX CO.

72-76 Cortlandt St. New York, N.Y.



Wiring diagram of receiver.

nal of the set through a 200 mmf. condenser and for the short-wave band this should be replaced with a 400 ohm resistor. The broadcast-band trimmers are adjusted through the holes in the coil shields which are nearest the chassis, while the short-wave trimmers occupy the upper opening on each coil. Set the generator at the alignment frequency shown on the circuit diagram for the band being adjusted. Set the receiver dial to this frequency and adjust the proper trimmer on the oscillator coil to bring in this signal with maximum output. The corresponding trimmers on the R.F. and antenna coils should then be adjusted to give maximum output. The generator should now be set to the padding frequency indicated and the receiver tuned to this point. The padding condenser for the band being aligned should be adjusted through the end of the chassis to give maximum output, while rocking the tuning condenser slightly, in order to locate the most favorable position. It is advisable to return to the alignment point and repeat the adjustments given above for best results.

If construction and alignment of this receiver has been properly carried out, perfect operation should be obtained on both bands with a sensitivity of from 1 to 3 microvolts on the broadcast band, and from 10 to 20 microvolts on the short-wave band for 50 milliwatts output.

This article has been prepared from data supplied by courtesy of Meissner Mfg. Co.

Parts List

MEISSNER MFG. CO.

- 1—Meissner Coil and Tuning Kit containing:
 - 1 2-band ant. coil
 - 1 2-band R.F. coil
 - 1 2-band osc. coil
 - 1 adjustable dual band condenser
 - 1 .004-mf. fixed pad condenser
 - 1 Ferrocart 456-ke. input I.F. transformer
 - 1 Ferrocart 456-ke. output I.F. transformer
 - 1 3-gang "band" switch
 - 1 3-gang .00036-mf. variable condenser
 - 1 6" vernier airplane type dial

SOCKETS
6—Octal metal tube sockets

Chassis dimension layout.

TUBES

- 1—6A8 metal tube
- 2—6K7 metal tubes
- 1—6Q7 metal tube
- 1—6F6 metal tube
- 1—5Z4 metal tube

RESISTORS

- 1—10,000-ohm sensitivity control
- 1—500,000-ohm volume control
- 1—25,000 tone-control, volume-control with A.C. switch
- 2—700-ohm, 1/2-watt resistors
- 1—400-ohm, 1-watt resistor
- 1—3,000-ohm, 1/2-watt resistor
- 1—200,000-ohm, 1/2-watt resistor
- 1—600-ohm, 1/2-watt resistor
- 2—20,000-ohm, 1-watt resistors
- 1—40,000-ohm, 1-watt resistor
- 2—50,000-ohm, 1/2-watt resistors
- 2—100,000-ohm, 1/2-watt resistors
- 2—250,000-ohm, 1/2-watt resistors
- 1—500,000-ohm, 1/2-watt resistors

CONDENSERS

- 4—.05-mf. 200-volt paper condensers
- 3—.1-mf. 200-volt paper condensers
- 1—.01-mf. 400-volt paper condenser
- 2—.05-mf. 400-volt paper condensers
- 3—.1-mf. 400-volt paper condensers
- 2—10-mf. 35-volt electrolytic condensers
- 1—.006-mf. 600-volt condenser
- 2—.00025-mf. mica condensers
- 1—.001-mf. mica condenser
- 1—10" x 12" x 3" metal chassis
- 1—power trans.: 110-volt primary 650-volt secondary c.t.

A: 1" DIA. HOLE, B: 1/2" DIA. HOLE, C: 1/8" DIA. HOLE, D: 3/4" DIA. HOLE, E: 1/2" DIA. HOLE, F: 3/8" DIA. HOLE, G: 1/4" DIA. HOLE, H: 3/16" DIA. HOLE, K: 1/4" DIA. HOLE, L: 2 1/2" x 3 1/2" x 3/4" DIA. HOLE, M: 1/2" DIA. HOLE, N: 1/4" DIA. HOLE, O: 1/8" DIA. HOLE, P: 1/16" DIA. HOLE, Q: 1/32" DIA. HOLE, R: 1/64" DIA. HOLE, S: 1/128" DIA. HOLE, T: 1/256" DIA. HOLE, U: 1/512" DIA. HOLE, V: 1/1024" DIA. HOLE, W: 1/2048" DIA. HOLE, X: 1/4096" DIA. HOLE, Y: 1/8192" DIA. HOLE, Z: 1/16384" DIA. HOLE, AA: 1/32768" DIA. HOLE, AB: 1/65536" DIA. HOLE, AC: 1/131072" DIA. HOLE, AD: 1/262144" DIA. HOLE, AE: 1/524288" DIA. HOLE, AF: 1/1048576" DIA. HOLE, AG: 1/2097152" DIA. HOLE, AH: 1/4194304" DIA. HOLE, AI: 1/8388608" DIA. HOLE, AJ: 1/16777216" DIA. HOLE, AK: 1/33554432" DIA. HOLE, AL: 1/67108864" DIA. HOLE, AM: 1/134217728" DIA. HOLE, AN: 1/268435456" DIA. HOLE, AO: 1/536870912" DIA. HOLE, AP: 1/1073741824" DIA. HOLE, AQ: 1/2147483648" DIA. HOLE, AR: 1/4294967296" DIA. HOLE, AS: 1/8589934592" DIA. HOLE, AT: 1/17179869184" DIA. HOLE, AU: 1/34359738368" DIA. HOLE, AV: 1/68719476736" DIA. HOLE, AW: 1/137438953472" DIA. HOLE, AX: 1/274877906944" DIA. HOLE, AY: 1/549755813888" DIA. HOLE, AZ: 1/1099511627776" DIA. HOLE, BA: 1/2199023255552" DIA. HOLE, BB: 1/4398046511104" DIA. HOLE, BC: 1/8796093022208" DIA. HOLE, BD: 1/17592186044416" DIA. HOLE, BE: 1/35184372088832" DIA. HOLE, BF: 1/70368744177664" DIA. HOLE, BG: 1/140737488355328" DIA. HOLE, BH: 1/281474976710656" DIA. HOLE, BI: 1/562949953421312" DIA. HOLE, BJ: 1/1125899906842624" DIA. HOLE, BK: 1/2251799813685248" DIA. HOLE, BL: 1/4503599627370496" DIA. HOLE, BM: 1/9007199254740992" DIA. HOLE, BN: 1/18014398509481984" DIA. HOLE, BO: 1/36028797018963968" DIA. HOLE, BP: 1/72057594037927936" DIA. HOLE, BQ: 1/144115188075855872" DIA. HOLE, BR: 1/288230376151711744" DIA. HOLE, BS: 1/576460752303423488" DIA. HOLE, BT: 1/1152921504606846976" DIA. HOLE, BU: 1/2305843009213693952" DIA. HOLE, BV: 1/4611686018427387904" DIA. HOLE, BW: 1/9223372036854775808" DIA. HOLE, BX: 1/18446744073709551616" DIA. HOLE, BY: 1/36893488147419103232" DIA. HOLE, BZ: 1/73786976294838206464" DIA. HOLE, CA: 1/147573952589676412928" DIA. HOLE, CB: 1/295147905179352825856" DIA. HOLE, CC: 1/590295810358705651712" DIA. HOLE, CD: 1/1180591620717411303424" DIA. HOLE, CE: 1/2361183241434822606848" DIA. HOLE, CF: 1/4722366482869645213696" DIA. HOLE, CG: 1/9444732965739290427392" DIA. HOLE, CH: 1/18889465931478580854784" DIA. HOLE, CI: 1/37778931862957161709568" DIA. HOLE, CJ: 1/75557863725914323419136" DIA. HOLE, CK: 1/151115727451828646838272" DIA. HOLE, CL: 1/302231454903657293676544" DIA. HOLE, CM: 1/604462909807314587353088" DIA. HOLE, CN: 1/1208925819614629174706176" DIA. HOLE, CO: 1/2417851639229258349412352" DIA. HOLE, CP: 1/4835703278458516698824704" DIA. HOLE, CQ: 1/9671406556917033397649408" DIA. HOLE, CR: 1/19342813113834066795298816" DIA. HOLE, CS: 1/38685626227668133590597632" DIA. HOLE, CT: 1/77371252455336267181195264" DIA. HOLE, CU: 1/154742504910672534362390528" DIA. HOLE, CV: 1/309485009821345068724781056" DIA. HOLE, CW: 1/618970019642690137449562112" DIA. HOLE, CX: 1/1237940039285380274899124224" DIA. HOLE, CY: 1/2475880078570760549798248448" DIA. HOLE, CZ: 1/4951760157141521099596496896" DIA. HOLE, DA: 1/9903520314283042199192993792" DIA. HOLE, DB: 1/19807040628566084398385987584" DIA. HOLE, DC: 1/39614081257132168796771975168" DIA. HOLE, DD: 1/79228162514264337593543950336" DIA. HOLE, DE: 1/158456325028528675187087900672" DIA. HOLE, DF: 1/316912650057057350374175801344" DIA. HOLE, DG: 1/633825300114114700748351602688" DIA. HOLE, DH: 1/1267650600228229401496703205376" DIA. HOLE, DI: 1/2535301200456458802993406410752" DIA. HOLE, DJ: 1/5070602400912917605986812821504" DIA. HOLE, DK: 1/10141204801825835211973625643008" DIA. HOLE, DL: 1/20282409603651670423947251286016" DIA. HOLE, DM: 1/40564819207303340847894502572032" DIA. HOLE, DN: 1/81129638414606681695789005144064" DIA. HOLE, DO: 1/162259276829213363391578010288128" DIA. HOLE, DP: 1/324518553658426726783156020576256" DIA. HOLE, DQ: 1/649037107316853453566312041152512" DIA. HOLE, DR: 1/1298074214633706907132624082305024" DIA. HOLE, DS: 1/2596148429267413814265248164610048" DIA. HOLE, DT: 1/5192296858534827628530496329220096" DIA. HOLE, DU: 1/10384593717069655257060992658440192" DIA. HOLE, DV: 1/20769187434139310514121985316880384" DIA. HOLE, DW: 1/41538374868278621028243970633760768" DIA. HOLE, DX: 1/83076749736557242056487941267521536" DIA. HOLE, DY: 1/166153499473114484112975882535043072" DIA. HOLE, DZ: 1/332306998946228968225951765070086144" DIA. HOLE, EA: 1/664613997892457936451903530140172288" DIA. HOLE, EB: 1/1329227995784915872903807060280344576" DIA. HOLE, EC: 1/2658455991569831745807614120560689152" DIA. HOLE, ED: 1/5316911983139663491615228241121378304" DIA. HOLE, EE: 1/10633823966279326983230456482242756608" DIA. HOLE, EF: 1/21267647932558653966460912964485513216" DIA. HOLE, EG: 1/42535295865117307932921825928971026432" DIA. HOLE, EH: 1/85070591730234615865843651857942052864" DIA. HOLE, EI: 1/170141183460469231731687303715884105728" DIA. HOLE, EJ: 1/340282366920938463463374607431768211456" DIA. HOLE, EK: 1/680564733841876926926749214863536422912" DIA. HOLE, EL: 1/1361129467683753853853498429727072845824" DIA. HOLE, EM: 1/2722258935367507707706996859454145691648" DIA. HOLE, EN: 1/5444517870735015415413993718908291383296" DIA. HOLE, EO: 1/10889035741470030830827987437816582766592" DIA. HOLE, EP: 1/21778071482940061661655974875633165533184" DIA. HOLE, EQ: 1/43556142965880123323311949751266331066368" DIA. HOLE, ER: 1/87112285931760246646623899502532662132736" DIA. HOLE, ES: 1/174224571863520493293247799005065324265472" DIA. HOLE, ET: 1/348449143727040986586495598010130648530944" DIA. HOLE, EU: 1/696898287454081973172991196020261297061888" DIA. HOLE, EV: 1/1393796574908163946345982392040522594123776" DIA. HOLE, EW: 1/2787593149816327892691964784081045188247552" DIA. HOLE, EX: 1/5575186299632655785383929568162090376495104" DIA. HOLE, EY: 1/11150372599265311570767859136324180752990208" DIA. HOLE, EZ: 1/22300745198530623141535718272648361505980416" DIA. HOLE, FA: 1/44601490397061246283071436545296723011960832" DIA. HOLE, FB: 1/89202980794122492566142873090593446023921664" DIA. HOLE, FC: 1/178405961588244985132285746181186892047843328" DIA. HOLE, FD: 1/356811923176489970264571492362373784095686656" DIA. HOLE, FE: 1/713623846352979940529142984724747568191373312" DIA. HOLE, FF: 1/1427247692705959881058285969449495136382746624" DIA. HOLE, FG: 1/2854495385411919762116571938898990272765493248" DIA. HOLE, FH: 1/5708990770823839524233143877797980545530986496" DIA. HOLE, FI: 1/11417981541647679048466287755595961091061972992" DIA. HOLE, FJ: 1/22835963083295358096932575511191922182123945984" DIA. HOLE, FK: 1/45671926166590716193865151022383844364247891968" DIA. HOLE, FL: 1/91343852333181432387730302044767688728495783936" DIA. HOLE, FM: 1/182687704666362864775460604089535377456991567872" DIA. HOLE, FN: 1/365375409332725729550921208179070754913983135744" DIA. HOLE, FO: 1/730750818665451459101842416358141509827966271488" DIA. HOLE, FP: 1/1461501637330902918203684832716283019655932542976" DIA. HOLE, FQ: 1/2923003274661805836407369665432566039311865085952" DIA. HOLE, FR: 1/5846006549323611672814739330865132078623730171904" DIA. HOLE, FS: 1/11692013098647223345629478661730264157247460343808" DIA. HOLE, FT: 1/23384026197294446691258957323460528314494920687616" DIA. HOLE, FU: 1/46768052394588893382517914646921056628989841375232" DIA. HOLE, FV: 1/93536104789177786765035829293842113257979682750464" DIA. HOLE, FW: 1/187072209578355573530071658587684226515959365500928" DIA. HOLE, FX: 1/374144419156711147060143317175368453031918731001856" DIA. HOLE, FY: 1/748288838313422294120286634350736906063837462003712" DIA. HOLE, FZ: 1/1496577676626844588240573268701473812127674924007424" DIA. HOLE, GA: 1/2993155353253689176481146537402947624255349848014848" DIA. HOLE, GB: 1/5986310706507378352962293074805895248510699696029696" DIA. HOLE, GC: 1/11972621413014756705924586149611790497021399392059392" DIA. HOLE, GD: 1/23945242826029513411849172299223580994042798784118784" DIA. HOLE, GE: 1/47890485652059026823698344598447161988085597568237568" DIA. HOLE, GF: 1/95780971304118053647396689196894323976171195136475136" DIA. HOLE, GH: 1/191561942608236107294793378393788647952342390272950272" DIA. HOLE, GI: 1/383123885216472214589586756787577295904684780545900544" DIA. HOLE, GJ: 1/766247770432944429179173513575154591809369561091801088" DIA. HOLE, GK: 1/1532495540865888858358347027150309183618739122183602176" DIA. HOLE, GL: 1/3064991081731777716716694054300618367237478244367204352" DIA. HOLE, GM: 1/6129982163463555433433388108601236734474956488734408704" DIA. HOLE, GN: 1/12259964326927110866866776217202473468949912977468817408" DIA. HOLE, GO: 1/24519928653854221733733552434404946937899825954937634816" DIA. HOLE, GP: 1/49039857307708443467467104868809893875799651909875269632" DIA. HOLE, GQ: 1/98079714615416886934934209737619787751599303819750539264" DIA. HOLE, GR: 1/19615942923083377386986841947523957550319860763950107872" DIA. HOLE, GS: 1/39231885846166754773973683895047915100639721527900215744" DIA. HOLE, GT: 1/78463771692333509547947367790095830201279443055800431488" DIA. HOLE, GU: 1/15692754338466701909589473558019166040255888611160086336" DIA. HOLE, GV: 1/31385508676933403819178947116038332080511777222320172672" DIA. HOLE, GW: 1/62771017353866807638357894232076664161023554444640345344" DIA. HOLE, GX: 1/125542034707733615276715788464153328322047108889280690688" DIA. HOLE, GY: 1/251084069415467230553431576928306656644094217778561381376" DIA. HOLE, GZ: 1/502168138830934461106863153856613313288188435557122762752" DIA. HOLE, HA: 1/1004336277661868922213726307713226265776376871114245525504" DIA. HOLE, HB: 1/2008672555323737844427452615426452531552753742228491051008" DIA. HOLE, HC: 1/4017345110647475688854905230852905063105507484456982102016" DIA. HOLE, HD: 1/8034690221294951377709810461705810126211014968913964204032" DIA. HOLE, HE: 1/16069380442589902755419620923411620252422029937827928408064" DIA. HOLE, HF: 1/32138760885179805510839241846823240504844059875655856816128" DIA. HOLE, HG: 1/64277521770359611021678483693646481009688119751311713632256" DIA. HOLE, HH: 1/128555043540719222043356967387292962019376239502623427264512" DIA. HOLE, HI: 1/257110087081438444086713934774585924038752479005246854529024" DIA. HOLE, HJ: 1/514220174162876888173427869549171848077504958010493709058048" DIA. HOLE, HK: 1/102844034832575377634685573909834369615500991602098741811609

6.3-volt sec. @ 2-amp.
 5-volt @ 2-amp. 2½" x 3½" mntg. centers
 1—filter choke, 11-henry, 300-ohm, 60-ma.
 2½" mntg. center
 3—8-mf. 450-volt electrolytic filter condensers
 1—8" dynamic speaker, 1250-ohm field
 1—4-prong speaker socket
 1—4-prong speaker plug
 1—A.C. line cord and plug
 1—ant.-gnd. terminal strip
 1—½" rubber grommet
 4—¼" rubber grommets
 3—6.3-volt, 0.15-amp. dial lights
 4—3-terminal tie-lugs
 3—2-terminal tie-lugs
 Miscellaneous assortment of machine screws,
 nuts, lock-washers and soldering lugs

New Console Model "Super-pro"

(Continued from page 360)

efficiency in the output range has been obtained than in any other system heretofore designed to accomplish the same result.

The tremendous improvement provided by this system is very evident from a special test which was made, affording the results shown below:

Frequency (C.P.S.)	Open Back	Closed Back	Improvement
40	-18	-5	+13 d.b.
50	-6.5	+1	+7.5 d.b.
60	+1.2	+4	+2.8 d.b.
70	+1.0	+6	+5.0 d.b.
80	-3.5	+7.5	+11.0 d.b.
90	0	+8.5	+8.5 d.b.
100	+5.5	+8.5	+3.0 d.b.
110	+8	+8	0
120	+10	+7	-3.0 d.b.
130	+10.5	+6.5	-4.0 d.b.
140	+10	+6	-4.0 d.b.
150	+9	+5.5	-3.5 d.b.
175	+7	+5	-2.0 d.b.
200	+5	+5	0

The effect from 40 to 100 is very advantageous because it definitely brings up the real bass response. Between 120 and 200 the effect is also very advantageous because this removes the boominess or so-called cabinet resonance. The bass reflex system is effective in extending the range of the loud speaker approximately an octave. The port or rectangular opening located beneath the loud speaker opening, which is a feature of the bass reflex system, behaves as an auxiliary diaphragm.

The large size speaker used provides the effective diaphragm area to afford high fidelity reproduction.

The receiver used in this console is identical to the standard model made for table model or rack and panel except for two slight modifications to simplify the tuning. One of these is the removal of the variable beat oscillator control, but the C.W.-Modulation switch has still been retained. The other is the removal of the stand-by switch. Both of these features, while important to the amateur or professional operator, are not necessary for home use. All of the other important advanced features such as variable band-width (3 to 16 kc.); electrical band-spread; fractional microvolt sensitivity; A.V.C.-manual switch; calibrated audio and sensitivity controls; direct tuning, accurate to within ½%; self-contained tuning unit with the fool-proof cam-operated knife switch; tropic-proofed chassis; 8 metal and 8 glass tubes; two tuned R.F. stages on all bands; tuning meter, and so on, have all been retained.

Models for three tuning ranges are available for 7½ to 240, 15 to 560, and 15 to 2000 meters. The console is 29¾" x 18" x 49½".

This article has been prepared from data supplied by courtesy of Hammarlund Mfg. Co.

S-W FANS

will find plenty of valuable articles in the next issue! Don't miss it!

RADIO INSTRUCTION

JOBS are offering Good Pay in Radio & Aviation-Radio



"I am now a special radio operator with one of the country's leading air lines, which is the best job I ever had. I owe all of this to your training."
 George Osborne,
 Kansas City, Mo.

"I already had a good job in radio, but since completing your training my salary has doubled."
 Stanley McKnight,
 Camden, N. J.

"Thanks to your training and help, I am setting alone fine on my first job in radio."
 Rollie Terrill, Dallas, Texas.

Men with foresight are turning attention to the thrilling careers now offered in Radio and Aviation-Radio, and are fitting themselves for the glamorous future opportunities in Television. Trained radio men are in demand—at good pay. And now you can get the practical training needed, with real apparatus for conducting experiments in your own home, followed by four weeks' intensive training in our big modern laboratories. (Ours is the only independent school with modern 441-line electronic television equipment.)

Anyone 17 years of age or older with average ability and real ambition can qualify—for Midland makes progress simple by step-by-step experiments and "Color-Coded" lessons. Graduates are fitted to take exams for two Government Licenses and qualified to step into splendid-paying jobs in 50 to 60 different lines of work. Lifetime employment service. This may be your future. Investigate. Send for our big illustrated FREE BOOK.

MIDLAND'S GREAT "Color - Coded" EXTENSION TRAINING in RADIO-TELEVISION

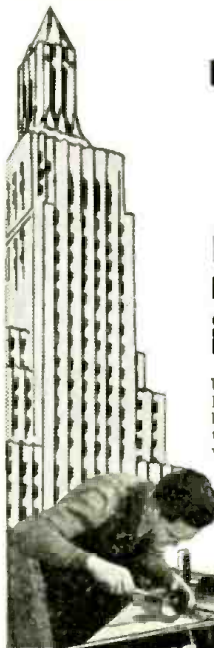
Under this new, improved method, devised by practical engineers in the Radio, Aviation-Radio and Television fields, you first learn the fundamentals by conducting experiments in your own home. Then we send you a bus ticket to come to Kansas City for your postgraduate training in our fine new school with its thousands of dollars worth of modern equipment.

We Furnish Equipment and Tools

You get 90 modern, Color-Coded lessons, 10 big shipments of equipment (to own and keep) including 3-inch Cathode Ray tube, all tools necessary, and 10 attractive "Home Laboratory" manuals.

MIDLAND TELEVISION, INC.

Firs. 29, 30, 31, Kansas City Power & Light Bldg., Kansas City, Mo.
 Sponsored by 5000-watt Columbia basic network Station KMBC



FREE—Send at once for this big illustrated book that will give you all the facts.

MAIL COUPON FOR FREE BOOK

MIDLAND TELEVISION, INC., Kansas City Power & Light Bldg.
 112-L W. 14th St., Kansas City, Mo.

Without obligating me, send your FREE BOOK on Radio-Television opportunities—"FORTUNES IN FORESIGHT."

Name _____ Age _____
 Address _____
 City _____ State _____

RADIO COURSES

RADIO OPERATING: Prepare for Gov't License Exam. • RADIO SERVICING: Including Short Wave • AMATEUR CODE • ELECTRONICS • TELEVISION: Day and Evening Classes. Booklet Upon Request.

New York YMCA Schools
 6 W. 64th Street, New York City

RADIO ENGINEERING

broadcasting, aviation and police radio, servicing, marine radio telegraphy and telephony, Morse telegraphy and railway accounting taught thoroughly. Engineering course of nine months' duration equivalent to three years of college radio work. All expenses low. Catalog free. School established 1874.
 Dodge's Institute, Turner St., Valparaiso, Ind.

RADIO ENGINEERING TRI-STATE COLLEGE DEGREE IN 2 YEARS

Complete Radio Engineering Course in 96 weeks. Bachelor of Science Degree. Radio (television, talking pictures and the vast electronic field) offers unusual opportunities for trained radio engineers. Courses also in Civil, Electrical, Mechanical, Chemical, Aeronautical Engineering; Business Administration and Accounting. Low tuition, low living costs. World famous for technical two-year courses. Those who lack high school may make up work. Students from all parts of the world. Enter September, January, March, June. Write for catalog. 25117 College Ave., Angola, Ind.

Please mention SHORT WAVE & TELEVISION when writing advertisers

RADIO INSTRUCTION

... NO HALF-WAY MEASURES

**CANDLER
TRAINED
OPERATORS**

Know their Stuff!

YOU ACQUIRE CODE SKILL *plus* A RADIO EDUCATION WHEN YOU'RE CANDLER TRAINED

Practice alone, on any kind of practice set, won't make you an operator. Why stumble along by yourself, trying to learn code the hard way? Walter Candler will develop your sending and receiving senses to work automatically—without strain or conscious effort on your part. It's *so easy* when you practice right. You will be amazed at your immediate progress. You will read entire words—even sentences of code, just as easily as you read print! And that's not all! Candler Training includes, without extra cost, a Short Course in the Theory and Practice of Radio. You get code training **PLUS** a radio education—all at one *surprisingly* low price! Walter Candler is personally interested in making every one of his students an all 'round good operator. Write Candler Today! He'll soon have you pounding brass with the best of them!

Candler System Co.

Department S-11

Asheville,

North Carolina, U. S. A.



CANDLER TRAINED T. R. McElroy, World's Champion Radio Operator, who teaches Candler System at Harvard College.

"To be a skilled operator you need a thorough knowledge of the Fundamentals and Mind Training taught exclusively by the Candler System. The surprising fact is, this **BEST** way to learn is also the **EASIEST**."

THREE FAMOUS CANDLER COURSES

SCIENTIFIC CODE COURSE for beginners. Teaches all the necessary code fundamentals. Develops automatic sound consciousness.

HIGH SPEED PROFESSIONAL TRAINING for operators who want speed, accuracy and better technique for good jobs in commercial radio.

TELEGRAPHIC TOUCH-TYPE WRITING for those who want to become expert in the use of the "mill"—in recording speedy code by touch-type writing.

How Short Waves Could Have Saved Miss Earhart

(Continued from page 342)

radio operator who just happened to be listening idly over a frequency range far removed from any of the amateur bands.

To be sure, 3.105 megacycles, where the call was unofficially reported heard first by Ernest Johnson (K6KMB) of Honolulu, is an assigned American aviation frequency, but even at night, when it is at its best, it is operable over only relatively short distances, especially in the summer.

Dick Merrill, on his transatlantic flight to the coronation, was in contact with the United States for some 1,700 miles across the ocean, using identical equipment, but that was early in May, and two months can and do make a tremendous difference in distant reception conditions in the lower short-wave frequencies. Even so, Merrill's radio achievements on that flight were regarded by radio engineers as being little short of phenomenal.

That Miss Earhart's distress call was heard at all, even so comparatively short a distance away as Honolulu, proves that it was getting out, though very weak, and emphasizes the urgent need for *more careful monitoring* on any frequency *known to be used by any operator* who might be running any risk.

Miss Earhart's other frequency, 6.21 megacycles, could not possibly have been of any use to her *under any conditions*, even though it is presumable that one or more stations must have been specifically detailed to monitor her. Except for such assigned listeners it is a frequency far removed from any regularly monitored channel. Even if it were right in the nearest lane, the 49-meter band, it would have no audience in the summer.

And like the 3.105 channel, it would be nothing but sheer luck if any signal, especially phone, on 6.21 megacycles, could be strong enough to be picked up over the distance believed to separate Miss Earhart from the nearest possible monitoring station, with only 50 watts output, and in daylight in the tropics in summer.

S-W Band Which Might Have Saved Her

Since both Miss Earhart's short-wave frequencies failed her in the crisis, the question arises as to what alternative is available. And the answer is that there is at least one *wide frequency band* which knows no distance limitations, by day or by night, winter or summer, regardless of power used, and which is constantly and carefully monitored twenty-four hours of every day, 365 days out of each year.

If Miss Earhart's plane had been equipped to operate anywhere between 13.8 megacycles and 14.5 megacycles, a range which juts out just a little on each side of the *20-meter amateur band*, it would have been impossible for her to have broadcast any call for help, even with much less than fifty watts power, without being heard by someone, somewhere.

Perhaps she might have been heard by the nearest amateur on the nearest shore, or it might have been some "ham" up in Siberia or down in South Africa, but in any event she would have been heard, and the receiving operator would have relayed her message to the nearest available rescue agency with no loss of time!

To begin with, the 20-meter band is the most efficient band thus far developed for operation around the clock, in *all seasons and climates*. Like all other bands it is subject to the vagaries of the "skip distance," depending upon the angle at which signals bounce off the Kennelly-Heaviside layer as the layer varies in its proximity to the earth's surface. But regardless of fluctuations in skip distance, there never has been a time recorded yet when distance could not be achieved with low power on 20 meters.

Amateurs with flea-powered home-brew equipment regularly carry on two-way ra-

LEARN CODE RIGHT

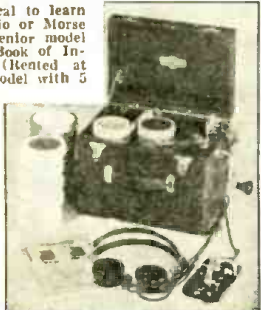
Tapes for Every Need—Even Airways—Send you Typical Messages by INSTRUCTOGRAPH

It's easy and practical to learn or improve your radio or Morse Code, any speed. Senior model with 10 tapes and Book of Instructions—\$20.00 (Not rented). Complete oscillator equipment, less battery, \$8.50. Send for details today to—

INSTRUCTOGRAPH CO., Dept. SW-11
912 Lakeside Place
Chicago.

Canadian Representative: Radio College of Canada, 863 Bay St., Toronto

BUY ON CASH OR TERMS: HALLICRAFTER and R.M.E. SHORT-WAVE RECEIVERS, SPEED-X and VIBROPLEXES, TELEGRAPH INSTRUMENTS AND HAND BOOKS.



\$100 for a RADIO KEY!!?

WORTH IT, but I only charge \$9.50

This semi-automatic key makes it easy to send! Dot stabilizer equipped. Selected main-spring. Marbleite finish base plays put. Chromium metal parts. Proper height for tireless, rhythmic sending. New 1938 Mac key only \$9.50. Order Today! Also New Mac Straight Key—best ever—only \$1.50. Mac Oscillator \$4.50. Immediate delivery! Write for complete dope on other Mac items of tremendous help to radio ops.

T. R. McELROY—175 Congress St., Boston, Mass.
WORLD'S CHAMPION TELEGRAPHER

LEARN RADIO CODE

FREE INSTRUCTION BOOK

High pitched Radio Buzz—Light Blinker or Telegraph Sound all from one set. Batteries self contained. Metal case, nickled parts. Pocket Size. Two sets can be connected and messages sent and received. Many jobs want men with knowledge of code. Single set with batteries, \$1.50. Double set, 100 ft. wire \$3.50. postpaid or from your Dealer. Instruction Book Free.

M. M. Fierlon & Son, Inc., Dept. R, Trenton, N.J., U.S.A.

STUDY RADIO

Pay After Graduation

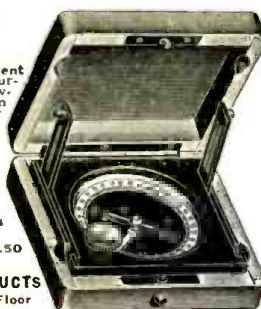
Entirely new, different Radio Servicing Course prepared with the help of 40 leading radio manufacturers. Planned to fit you immediately into a good pay radio job. We are so sure you will make real money after graduation that we will let you pay later, out of your radio earnings. Write today for this "Earn Your Way" plan. It's Free.

RADIO TECHNICAL INSTITUTE, 3729 W. Thirteenth St. CHICAGO, ILL.

STOPPANI COMPASS

A Precision Instrument made in Belgium. Purchased by the U. S. Government at more than \$30.00 each. Ideal for Radio Experimenters. Laboratory, also, may be used as a Galvanometer for detecting electric currents in radio circuits. Ruby, jeweled, solid bronze, 4 inches square, fitted in a hardwood case. Also used by hunters and surveyors. Our price prepaid \$4.50 each.

GOLD SHIELD PRODUCTS
99 Hudson St., 11th Floor
New York City



Learn SOUND RECORDING TALKING PICTURE PROJECTION TELEVISION-RADIO

Master training courses qualify you for good jobs. Practical, easy to learn. Newest equipment. Established 1905. Earn room and board while learning. Coach H. R. (fare allowed) to L. A. Write for FREE BOOK. Address Dept. 11, S.W.C., 4000 S. Figueroa St.

NATIONAL SCHOOLS—Los Angeles

RADIO ENGINEERING

RCA Institutes offer an intensive course of high standard embracing all phases of Radio. Practical training with modern equipment at New York and Chicago schools. Also specialized courses and Home Study Courses under "No obligation" plan. Catalog Dept. SW-37.

RCA INSTITUTES, Inc.

A Radio Corporation of America Service
75 Varick St., New York. 1154 Merchandise Mart, Chicago

BE A RADIO SERVICE EXPERT

Modern receivers require men with modern training for service work. **LEARN AT HOME** Our home instruction method and service equipment offer starts you earning money almost at once. Up to \$3 an hour easy in a short time. Write for free book.

Radio Training Ass'n of America
Dept. SW-711
4525 Ravenswood Ave., Chicago



Please mention SHORT WAVE & TELEVISION when writing advertisers

diophone conversations over distances as great as 12,000 miles, at all hours of the day and night, on 20 meters. Sometimes greater distance is possible than at other times, but with short-wave radio in its present stage of development, greater distance always is possible on the 20-meter "ham" band than in any other frequency range.

Plenty of Listeners to Hear SOS Call on 20 Meters

But even more important is the fact that the 20-meter band is by far the most consistently monitored band on the air. In the United States alone there are more than 50,000 amateurs, all licensed by the Federal Communications Commission and all with a thorough technical knowledge and the proven ability to receive at least thirteen words a minute in code.

There is no hour of the day or night when there is not a representative number of these amateurs listening on 20 meters. No matter how dead you may find the other bands, as for instance in the pre-dawn hours, you always will find amateurs working on 20 meters! Thus, with America's 50,000 and more amateurs, augmented by at least as many more scattered around the globe, it is practically impossible to see how a distress call on that frequency could ever be missed.

But while it is one thing to say that something *should* be done, it is quite a different matter to say that it *shall* be done, and then to see that it is done!

Radio authorities today, aroused by the Earhart tragedy, are quite unanimous in asserting that all future hazardous air expeditions involving personal risk must be equipped with radio capable of operating on several well-monitored frequencies.

They also insist that whenever any such expedition crosses water the planes must be equipped with pontoons, which will keep them high enough out of the water to prevent the radio equipment from becoming wet and consequently inoperable.

But how to bring that about is quite another question. Present laws make no such stipulations, and authorities point out that even if there were such laws it would be impossible to enforce them beyond the nation's borders.

What Is "Adequate" Radio Equipment for Plane?

Present regulations of the Federal Communications Commission contain absolutely no provisions for specifying or controlling the radio equipment of any airplane, while a rather vague clause in the rules of the Bureau of Air Commerce provides that passenger planes must be equipped with "adequate" radio provisions, and in cases such as the Earhart flight, the Commerce department checks over the plane "as a whole" from the point of view of whether plane and equipment are adequate.

But who shall say what is or is not adequate? The Commerce Department makes no pretense of prescribing any specifications for such radio equipment. And Miss Earhart's radio facilities proved themselves to be far from adequate.

Can any radio be called *adequate* which must automatically and inevitably go out of commission instantly upon being taxed with any such emergency as appears to have confronted Miss Earhart? Her equipment being what it was, and lacking pontoons, there was nothing else that could have happened than that her radio should go dead when she hit the water.

Her empty gasoline tanks might have been expected to keep the plane from sinking altogether, but being located above the radio equipment, it was hardly within the realm of reason to expect them to maintain the radio set high enough to keep it dry and operable.

Marine Vessels' Radio More Strictly Watched

All marine vessels carrying twelve or more passengers, or with a registry of 1,600 tons or more, are required to carry radio equipment operating on certain as-

SWAPPERS

Names of Swappers—those who would like to exchange correspondence with other Short Wave Fans, will be published here free of charge. A postcard will do.

Robert Alexander
1101 E. 6th St.
Alton, Ill.

R. W. Allsop
51 Drakefield Rd.
Teetings, S. W. 17
LONDON

Chas. E. Auelair
45 Temple St.
Spencer, Mass.

Robert Bach
3957 Gouverneur Ave.
Bronx, N. Y. C.

B. B. Barker
632 W. 67th St.
Chicago, Ill.

Carrol Beasley
Linden, Iowa

Jerry E. Behagen
2827A North 4th St.
Milwaukee, Wis.

John W. Benedict
9 Colonial Rd.
Worcester, Mass.

Carl Bernier
Box 38
Tracadie, N. B. Can.

Ronald H. Bettinson
345 Aylestone Rd.
Leicester, ENGLAND

Arthur G. Blair
315 Eighth St.
Lorain, Ohio

Van O. Blair
Rt. 11, Box 845
Portland, Oregon

Paul Boer
R. F. D. No. 3, Box 90
Santa Ana, Calif.

Louis Bodian
2900 Briggs Ave.
Bronx, N. Y.

John M. Bond
116 Hawthorn Rd.
Roland Park, Md.

Victor Buhs
825 Cedar Ave.
Secaucus, N. J.

Stanley Burns
3067 Mercer St.
Phila. Pa.

Donald Caldwell
Cartersville, Ill.

Glenn Chapman
Russell, Iowa

Wesley Clark
35 W. Main St.
St. Anthony, Idaho

Ross Cockell
141 N. Jefferson St.
Peoria, Ill.

Austin Cope
Arcadia, Utah

Felix O. Cox, Jr.
R. F. D. No. 12
Knoxville, Tenn.

Bob Critton
233 W. Central St.
Redkey, Ind.

Robert B. Davidson
110 E. Front St.
Lansford, Pa.

Paul R. Deitrick
516 Hance Ave., N. W.
New Phila., Pa.

Eugene C. Denton, Jr.
1025 So. Anderson St.
Morganton, N. C.

J. J. Dezna
3024 House Ave.
Cleveland, Ohio

Eugene H. Dadds
% Dadds Ready-to-Wear
Knoxville, Iowa

Earl O. Dodge
17 Northwood St.
Chicopee, Mass.

A. B. Ekensteen
34 Naseby St.
Merivale, Christchurch, N. Z.

Richard P. Ellis
Edgar Springs, Mo.

Russell Erdman
Girard College
Phila., Pa.

George H. Sutton
306 Keefer St.
Willard, Ohio

Aubrey C. Fergus
8 Hooper St.
W. Australia, Aus.

Hubert F. Fey
4544-42nd St.
Long Island City, N. Y.

Emory F. Fretz
80 Meade Ave.
Passaic, N. J.

Theo. R. Furman
1453 Dorchester Rd.
Upper Darby, Pa.

Robert Gaiser
Box 182
Butler, N. J.

John A. Galbraith
Gen. Dely.
W. Palm Beach, Fla.

John D. Gall
3766 Grey Ave.
Montreal, Que., Canada

Peter Gardiner, Jr.
334 E. White St.
Summit Hill, Pa.

Joseph Geraci, Jr.
14010 Kinsman Rd.
Cleveland, Ohio

W. G. Gooch
32 Mill St.
Bideford, Devon,
ENGLAND

John Gray
Hyde Park, Vt.

Henry J. Green, Jr.
3424 W. 67th St.
Chicago, Ill.

James Groll
N. Chicago St.
Dwight, Ill.

Herbert R. Gross
1 Miller St.
Caldwell, N. J.

H. Hare
9197 Falcon Ave.
Detroit, Mich.

R. M. Henderson
Honea Path, S. C.

Richard T. Henley
2237 Court Pl.
Denver, Colo.

Joseph Hermes
1055 Flint St.
Cincinnati, Ohio

Alfred Hillman
802 Linwood Ave.
Collingswood, N. J.

Gordon W. Hitch
11 King St.
Timaru, N. Z.

Everett E. Hoard
765 Mississippi St.
St. Paul, Minn.

Jack E. Holloway
106 de Korte St.
Wanderers View
Johannesburg, S. Afr.

Jack Horne
11 Queen St., North
Bundaberg, Australia

Warren Jackson, Jr.
515 Lathrop Ave.
River Forest, Ill.

Dave G. Jimenez
R3, Box 84
Tucson, Arizona

Arthur B. Johnson
472-83 St.
Fort Hamilton
Brooklyn, N. Y.

Bob Johnson
609 N. Main St.
Paudling, Ohio

C. H. Johnson
1539 W. 12th St.
Casper, Wyo.

Harold Johnson
27 Third St.
Norwood, Mass.

Frederick Joslin
147 Everett St.
Southbridge, Mass.

RAYTHEON

Alone

IS RESPONSIBLE FOR THE SALE OF OVER...

3,000,000 FARM RADIOS!

Over ten years ago RAYTHEON developed and pioneered the 2-volt battery tube. Since that time there has been no major improvement in that field until the recent introduction of the new RAYTHEON low-drain cathode-type tubes. RAYTHEON likewise led in the introduction of AMATEUR tubes. Two sensational new "BEAM" power tubes—the RK-47 and RK-48—are RAYTHEON's latest contribution to short-wave radio.

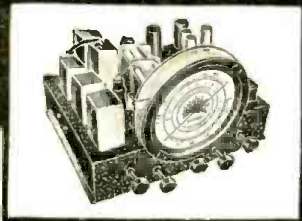
RAYTHEON

445 Lake Shore Drive, Chicago, Ill.
420 Lexington Ave., New York, N. Y.
385 Howard St., San Francisco, Cal.
415 Peachtree St., N. E., Atlanta, Ga.
55 Chapel Street, Newton, Mass.



FOR BETTER RECEPTION

Please mention SHORT WAVE & TELEVISION when writing advertisers.



Complete Tuning Kits by Meissner

DE LUXE

Broadcast and Short Wave 6 TUBE RECEIVER KIT

16-53 and 187-555 Meters

TWO BANDS

Complete detailed diagrams and instructions furnished with each Kit.
Easy to build.

COMPLETE COIL AND TUNING KIT CONSISTING OF

1 Shielded 2-Band Antenna Coil, 1 Shielded 2-Band R.F. Coil, 1 Shielded 2-Band Oscillator Coil, 2 Ferrocarril I.F. Transformers, 1 3-Gang Condenser, .000365 Mfd., 1 Wave-Change Switch, 1 6" Calibrated Dial, 2 Padders, Complete wiring instructions.

Kit Number 7509.

List **\$17.50**

112 PAGE INSTRUCTION BOOK

Containing complete detailed wiring instructions, diagrams, schematics, pictorial diagrams, chassis lay-outs, alignment data and operating instructions for 16 MODERN CIRCUITS and 4 ADAPTER UNITS. Ranging from the latest 4 tube AC-DC circuit to the ultra-modern 14 tube Communications receiver using R.F.O., Crystal Filter, Noise Silencer, Band Expansion, Band Spread, etc., etc. Net Price **50c**

SOLD BY ALL LEADING JOBBERS

MEISSNER MFG. CO. MT. CARMEL, ILL.

signed frequencies and manned by thoroughly competent licensed commercial operators.

This provision is made by international agreement, but no such regulations exist for air vessels of such international importance as the Earhart "Flying Laboratory."

Not only is there the apparent loss of two such valuable lives as those of Miss Earhart and Captain Noonan to be taken into consideration, but perhaps of equal if not greater importance is the prolonged mental shock suffered by the entire world occasioned by the mystery and uncertainty surrounding the fate of the plane.

It certainly was bad enough that two such lives should be lost, but it was even worse that so many millions should have been forced to endure so many weeks of acute mental anguish and worry just because the "Flying Laboratory" was deficient in its most important piece of laboratory equipment, its radio!

Next February the nations of the world will foregather at Cairo, Egypt, to make any necessary revisions in the present international pact governing the operation of radio. Since it is admitted that no nation appears able to enforce its own laws outside its own boundaries without the cooperation of other nations, and since the United States, at least, now has no radio rules, regulations or laws covering situations such as occurred to terminate the Earhart flight, one of the primary considerations at the Cairo conference should be the drafting of laws and radio specifications uniformly for all nations, with full provisions for enforcing them.

Unless and until that is done, transoceanic flying never will be safe, either for the fliers themselves or for the anxious millions on the ground.

(Battery-operated transceivers or transmitter-receivers of portable type should be carried on all such plane trips.—Hugo Gernsback, Editor.)

The Only COMPLETE Radio Library Published Today— RADIO-CRAFT 50c LIBRARY SERIES



THE RADIO-CRAFT LIBRARY SERIES—a most complete and authentic set of Volumes—treats individually, important divisions of radio. Each book has been designed to give you the opportunity to learn one or more branches of radio. The authors of the books are well-known to everyone. Each is an expert radio man; an authority on the subject—each is thoroughly familiar with the field which he represents.

Here are the Titles:

No. 2. MODERN VACUUM TUBES
No. 3. THE SUPER-HETERODYNE BOOK
No. 5. HOW TO BECOME A SERVICE MAN
No. 6. BRINGING ELECTRIC SETS UP TO DATE

No. 8. RADIO QUESTIONS AND ANSWERS
No. 9. AUTOMOBILE RADIO AND SERVICING
No. 10. HOME RECORDING AND ALL ABOUT IT
No. 12. PUBLIC ADDRESS INSTALLA-

TION AND SERVICE
No. 13. ABC OF AIR CONDITIONING
No. 14. POCKET RADIO GUIDE
No. 15. ABC OF REFRIGERATION
No. 17. SERVICING WITH SET ANALYZERS

RADIO PUBLICATIONS.

99T Hudson Street, New York, N. Y.

SWT-1137

I have circled below the numbers of books in the RADIO-CRAFT LIBRARY SERIES which you are to send me. I have included my remittance in full, at the price of 50c each. (Stamps, checks or money orders accepted).

2 3 5 6 8 9 10 12 13 14 15 17

Name _____

Address _____

City _____

State _____

All books are sent postage prepaid

All Books Uniform
The volumes in the RADIO-CRAFT LIBRARY SERIES are uniform, 6 x 9 inches. Each book contains on an average of 50 to 120 illustrations. The books are printed on an excellent grade of paper which makes the type easy to read.

Ask your **JOBBER**
for the NEW

STANCOR

"HAMANUAL"

New Tubes . . . New Circuits

16 NEW TRANSMITTERS
5 WATTS TO 1000 WATTS

STANDARD TRANSFORMER CORPORATION
850 BLACKHAWK STREET, CHICAGO

See Page 398 for the 6 Best Short Wave Books.

NEW NATIONAL RECEIVERS

NC-80X Receiver—Ten tubes, crystal filter, controllable selectivity from 200 to 10,000 cycles, automatic coil shifting, complete frequency coverage from 545 to 660 meters, self-contained power pack, PM speaker, calibrated mechanical bandspread.

NC-81X Receiver—Same as above, but a strictly amateur-hand model, providing extreme calibrated bandspread on the amateur bands, with no frequency coverage between bands. Either above receiver complete with tubes, crystal and speaker chassis.

AMATEUR PRICE \$88.00 NET COMPLETE

Write for our 1937 catalog

GAMERADIO

963 LIBERTY AVE.
PITTSBURGH, PA.

30 TWELFTH ST.
WHEELING, W.VA.

Established 1919

"Going to Town" on the 5-40-400 Transmitter

(Continued from page 358)

interference which such a device can kick up. The railroad station, which is at our corner, is used a great deal and the cars running to and from the station contribute their mite to the already heavy din.

So, if, perchance, you call us and we fail to reply, it may be that your signal is prevented from reaching us by the terrific noise-level through which we have to operate most of the time.

In spite of these rather severe handicaps we have been able to effect a number of very fine contacts, as the reproductions of some of the QSL cards we have received and which accompany this article, will indicate.

(Those interested in the construction of the 5-40-400 transmitter will find diagrams and full details in the August, September and October issues.—Ed.)

The Editors Want

articles describing in detail television receivers on which short-wave experimenters may pick up the television images being broadcast by the RCA Station, in New York City, on about 5 meters, and also those being broadcast in Los Angeles and Philadelphia. All articles accepted and published will be paid for at regular space rates. Send outline of article and what diagrams available to: The Editor, Short Wave and Television, 99 Hudson St., New York, N.Y.

Please mention SHORT WAVE & TELEVISION when writing advertisers

The 4-in-2 Midget

(Continued from page 353)

HAMMARLUND

C1-Hammarlund Equalizer Antenna Trimmer,
type EC-35 (8 to 35 mmf.)
C.2-Hammarlund "Star" Midget Condenser,
type SM-140 (140 mmf.)
L1-Set of Four Hammarlund 4-Prong Short
Wave Coils, 17 to 270 meters, type SWK-4
L1-One Hammarlund 4-Prong Broadcast Coil,
250 to 560 meters, type BCC-4

CORNELL-DUBILIER

C3—Cornell-Dubilier .0001 mf. Mica Condenser,
type 3L
C4—Cornell-Dubilier .1 mf. 400 volt "Cub"
Tubular Condenser, type BA-4P1
C5—Same as C4
C6—Cornell-Dubilier .0005 mf. Mica Condenser,
type 1W
C7—Cornell-Dubilier .01 mf. 400 volt "Cub"
Tubular Condenser, type BA-4S1
C8—Same as C7
C9—Cornell-Dubilier 5 mf. 50 volt Cartridge
condenser (electrolytic)
C10—Same as C7
C11—Cornell-Dubilier 16 mf. 200 volt Cartridge
type electrolytic condenser
C12—Same as C11
C13—.01 mf. 400 V.

IRC

R1—1 meg., $\frac{1}{2}$ watt Metallized Resistor
R2—1500 ohm, $\frac{1}{2}$ watt Metallized Resistor
R3—Same as R1
R4—200,000 ohm, $\frac{1}{2}$ watt Metallized Resistor
R5—Same as R1
R7—25,000 ohm, $\frac{1}{4}$ watt Metallized Resistor
R8—Same as R4
R9—Same as R1
R11—250 ohm, 500 watt resistor in line cord

SOCKETS

1—4-Prong wafer type socket for L1
1—7-prong wafer type socket for V1
1—Octal (8-prong) Metal Tube Socket for V2

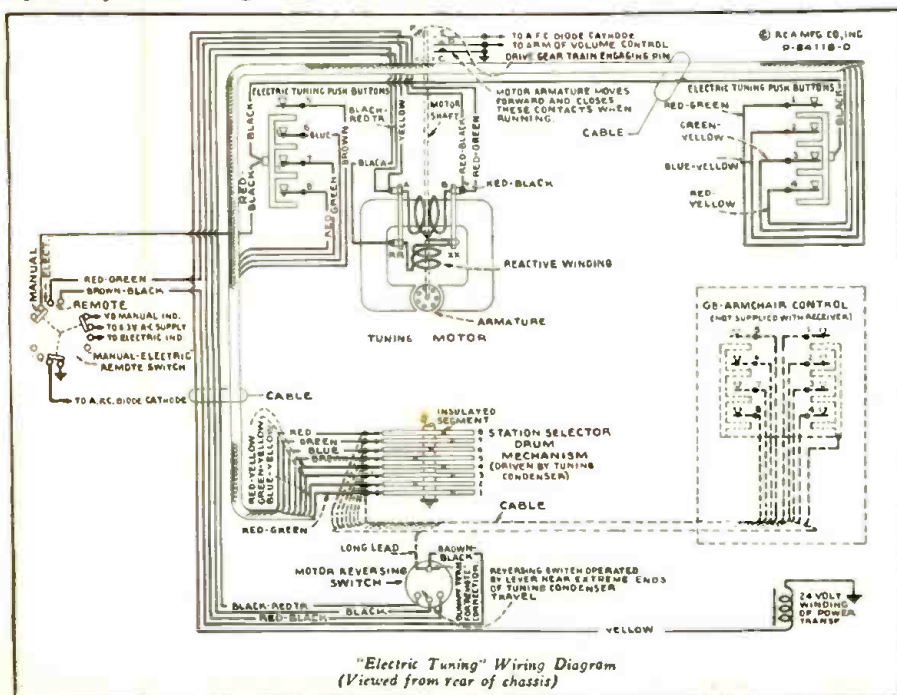
MISCELLANEOUS

1—3" Find-All Dynamic Speaker, 2500 ohm field.
43 output
1—Chassis (see sketch for dimensions)
1—Screen-Grid clip for cap of V1
1—R11 Hook-up Wire
Ch1—20 henry, 300 ohm choke
Sw1—Switch on R6
V1—6F7 Tube
V2—25A7 Tube (Name of Manufacturer on request)
2—Knobs
1—Station Selector Dial Plate
1—Volume Control Dial Plate
1—3-Terminal connection strip

Armchair Tuning in New All-Wave Sets

(Continued from page 361)

all others) station-selector push-buttons respectively wired to eight adjustable sta-



*"Electric Tuning" Wiring Diagram
(Viewed from rear of chassis)*

Please mention **SHORT WAVE & TELEVISION** when writing advertisers

20 Instruments in One

Price is **\$10⁴⁰**
Only



The Allmeter is the Season's Biggest Sensation!

Incomparable Signal Generator

Our new generator has the following features:

1. Direct reading in frequencies, 100 kc—22 mc, in five bands, all fundamentals by front-panel switching. Ultra band by harmonics to 105 mc, also direct-reading.
2. Direct reading in frequencies, 25—10,000 cycles, in three bands, all fundamentals, by front-panel switching.
3. R.F. and A.F. outputs independently obtainable alone, or with A.F. (any frequency) modulating R.F.
4. Output meter.
5. R.F. attenuation.
6. Condenser and other leakages to 100 megohms.
7. Main dial protracted on $7\frac{1}{2}$ " diameter, precision pointer 4-to-1 vernier planetary drive.
8. All services on 90-130 volts a.c. or d.c.

\$14⁴⁰
PRICE



Send for our **Free Catalogue PV** in colors!

SUPERIOR INSTRUMENTS COMPANY 136 LIBERTY STREET
Dept. SW-11, New York, N. Y.

ELECTRAD

R6—Electrad 75,000 ohm Potentiometer with Switch, type 202-S
R10—600 ohm, 10 watt Electrad Vitreous Enamelled resistor

tion-selector contactor discs (each with a motor-stopping insulated segment), mounted on a drum which is direct-coupled to the gang tuning condenser shaft. The arrangement permits any one of eight pre-determined stations to be electrically tuned in by merely touching the correct push-button.

FOR HI-FREQ. HEAVY-DUTY

TYPE 86



MICA TRANSMITTING CAPACITORS

HIGH voltage, heavy current-carrying mica capacitors, hermetically sealed in glazed porcelain containers. Extensively utilized by "old-timers" who insist on professional results. Check a few of the salient features of these outstanding capacitors, fully three years ahead of the industry.

- Mica dielectric fully 200% more effective than ordinary flint glass.
- Porcelain case insulates capacitor from interfering ground capacity.
- Porcelain case prevents field absorption.
- Capacity remains constant at high frequencies and temperatures.
- Capacitors can operate at full load without heating up.

For the complete details see your local C-D authorized distributor or write for catalog No. 151-A.

*Cornell-Dubilier Electric Corporation
1027 Hamilton Blvd.,
South Plainfield, New Jersey*

CORNELL - DUBILIER

ELECTRIC CORPORATION

South Plainfield, New Jersey

few isolated dots of light, a great many of them have to appear to the audience as being reproduced instantaneously on the screen. This impression is created by an interesting trick. The single light dots are reproduced so often and with such a speed as to make it impossible for the eye to recognize that it is the object of an optical deception.

In order to create this illusion with high perfection 40,000 of these tiny dots of light are reproduced in every second on the screen. This number of light dots is equivalent to approximately 175 lines, to express it in the language of the television engineer. Considering the fact that ordinary home television operates at present with 441 lines, the number of lines applied is not very large. But we must consider that the audience sees this image from quite a distance, and for this type of image projection a greater number of picture elements is not required, as experience has shown.

The size of the large screen is about 8x10 feet. The image reproduced on the screen is created on a little screen in a specially designed cathode ray tube with enormous illumination power. This extremely bright picture on the end of the small tube is projected, by means of a lens system with large opening, onto the screen. Since a translucent screen is employed the projector is installed behind the screen, away from the audience.

Finally some additional information about the gun-like device installed in front of the speaker's platform. It is interesting to note that here also a cathode ray tube is used as the fundamental unit. The cathode ray tube used here operates with a plate potential of approximately 20,000 volts. This high plate voltage has been applied by the Telefunken engineers, in order to obtain a very powerful cathode ray beam. This beam strikes an extremely thin layer of a chemical, which glows brightly the moment it is contacted by the cathode rays. This bright point is reflected, by means of a specially designed mirror (by a very powerful lens), in the form of a tiny ray of light towards the speaker, and the process of magnifying the speaker's facial image starts. The photo-electric cells as described above gather or collect the reflected light, and at the same instant a correspondingly illuminated dot of light appears on the large size screen.

All this appears to be developed to great perfection, but nevertheless if one would like to use this outfit in the way it is described annoying trouble would be met. The speaker would move out of focus very frequently, and temperamental speakers do quite a big of jumping around. To counter-balance all this jumping around by adjust-

ment of the optical system would be quite bothersome, and it seems at first that this marvel of scientific progress is in actuality not so perfect. However, this trouble has been solved in a surprisingly simple way. A system of mirrors installed at both sides of the platform (but not shown in our cover illustration, for the sake of clarity), permit the speaker to control the large size image which appears on the screen behind him. These mirrors are generally concealed from the eyes of the audience.

As the demonstrations at the Berlin Radio Show of 1937 have proven, this method of maintaining proper focus is a very efficient means to obtain a steadily sharp picture. Although the entire outfit is already quite compact, considering that it is a stationary unit, one does not need to stretch his imagination excessively in order to visualize that the image magnifier of the future will shrink to even smaller dimensions. In a few years to come lecturers will have at their disposal portable "image magnifiers" of the same size as the portable public-address systems which are in such widespread use at present.

VALUABLE DATA IN BACK NUMBERS

● MANY short-wave set-builders frequently need constructional data on certain transmitters or receivers as well as converters and other allied apparatus.

Recently many inquiries have been received asking for data on "1-meter" sets, for example. The January, 1936, issue contains a very good article describing how to build and operate a transmitter and a receiver of modern type, tuning over a range of from 1/2 to 1 meter.

This shows how important it is to retain all back numbers of this magazine, as they may prove extremely valuable at any moment. Back numbers are available from the Subscription Dept.

Substantial binders are available for preserving these back numbers.

World S-W Station List

(Continued from page 371)

6.830	TDD	SHINKYO, MANCHUKUO, 51.46 m. Works Tokio 6-9 am.	5.077	WCN	LAWRENCEVILLE, N. J., 59.7 m. Addr. A. T. & T. Co. Works England late at night irregularly.
5.830	TIGPH	SAN JOSE, COSTA RICA, 51.5 m., Addr. Alma Rica, Apartado 800. 11 am.-1 pm., 6-10 pm. Relays TIX 9-10 pm.	5.025	ZFA	HAMILTON, BERMUDA, 59.7 m. Works N. Y. C. irregularly at night.
6.800	YV6RC	CARACAS, VEN., 51.72 m., Addr. Radio Caracas. Sun. 8.30 am.-10.30 pm. Daily 7-8 am., 10.45 am.-1.30 pm., 4-9.30 pm.	6.000	TFL	REYKJAVIK, ICELAND, 60 m. Works Europe nighttime irregularly.
5.790	JYU	NAZAKI, JAPAN, 51.81 m. Irregular.	4.975	GBC	RUGBY, ENG., 60.3 m. Works ships irregularly.
5.780	OAX4D	LIMA, PERU, 51.9 m., Addr. P. O. Box 853. Mon., Wed. and Sat. 9-11.30 pm.	4.820	GDW	RUGBY, ENG., 62.24 m. Works N.Y.C. nighttime irregularly.
5.758	YNOP	MANAGUA, NICARAGUA, 52.11 m. 8-9.30 pm.	4.790	VE9BK	VANCOUVER, B. C., CAN., 62.63 m. Addr. Radio Sales Service, Ltd. 780 Beatty St. Except Sun. 11.30-11.45 am., 3-3.15, 8-8.15 pm.
5.740	TGS	GUATEMALA CITY, GUAT., 52.26 m. Wed., Thur. and Sun. 6-9 pm.	4.752	WOO	OCEAN GATE, N. J., 63.1 m. A. T. & T. Co. Works ships irregularly
5.730	HC1PM	QUITO, ECUADOR, 52.36 m. Irregular 10 pm.-12 m.	4.500	HC2ET	GUAYAQUIL, ECUADOR, 65.22 m. Addr. Apartado 249. Wed. and Sat. 9.15-11 pm.
5.720	YV2RB	SAN CRISTOBAL, VEN., 52.45 m., Addr. La Voz de Tacihira. 6-11.30 pm.	4.272	WOO	OCEAN GATE, N. J., 70.22 m. Addr. A. T. & T. Co. Works ships irregularly.
5.500	T15HH	SAN RAMON, COSTA RICA, 54.55 m. Irregular 3.30-4, 8-11.30 pm.	4.250	RV15	KHABAROVSK SIBERIA, U. S. S. R., 70.42 m. 1-10 am.
5.145	PMY	BANDOENG, JAVA, 58.31 m. 5.30-11 am.			

Please mention SHORT WAVE & TELEVISION when writing advertisers

The RADIO LEADER
FOR 1938

● ELECTRIC TUNING
● SELECT-O-MATIC DIAL
● ALL-WAVE RANGE
● 12" DYNAMIC SPEAKER
● AUT. FREQ. CONTROL
● 7 WATTS OUTPUT

Only \$58.95

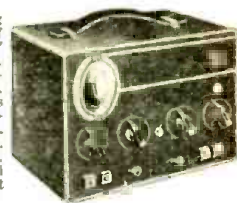
The Amazing KNIGHT II TUBE SUPERHET

1938's Radio Sensation—with every desirable new feature at an amazingly low price. Electric Push-Button Tuning—press a button and there's your station instantly! Select-O-Matic 9" horizontal dial with all ranges in full view! Giant 12" Electro-dynamic Speaker for perfect tone! Tubes everything on the air! Three full wave-bands from 16 to 550 meters. Powerful new R.C.A. and Hazeltine Licensed Superhet circuit incorporates: full 7 Watts Output; Double-tuned I.F.'s; R.F. Pre-selector; 3-gang Condenser; A.V.C.; Tone Control; etc. No other radio has all these features at so low a price. Here's the set that will bring you tremendous sales volume and big profits.

See this new radio and 64 other new KNIGHT models in the 1938 ALLIED Catalog. Models from 5 to 16 tubes for AC, AC-DC, 6 Volt, 32 Volt, Battery, and Auto operation. These new KNIGHTS are Radio's Outstanding Values! Send coupon for Catalog today.

Latest IN TEST EQUIPMENT

ALLIED's 1938 Catalog shows you every type of test instrument. New 2" Cathode Ray Oscilloscope. New analyzers, tube-checkers, set-testers, meters, signal generators—in every nationally-known brand: Supreme, Tough-Bronze, Triplet, R.C.A., Readrite, Weston, Millon, and others. All standard equipment at radio's lowest prices!



New BUILD-YOUR-OWN KITS

More than 30 new Build-Your-Own kits from a Beginner's 1-Tube set to a 14-Tube All-Wave Superhet. More than 12,000 exact duplicate and replacement parts for building or repairing any circuit. ALLIED offers you matched kits of parts for building any set described in any radio publication. Write for Free Parts Lists.



P.A. SYSTEMS—AMATEUR GEAR

New KNIGHT "Integrated" Sound Systems for every need. New KNIGHT receivers, transmitters, transceivers. ALLIED's new 164-page Catalog shows you Everything in Radio for Dealer, Serviceman, P. A. Specialist, and Amateur-Experimenter. ALLIED's complete stocks and fast service save you time. ALLIED's low prices save you money. Write today for ALLIED's Complete Supply Guide—Radio's Greatest Catalog. Send coupon now.



ALLIED RADIO

ALLIED RADIO CORPORATION
DEPT. 3-LB
833 W. JACKSON BLVD.
CHICAGO

☐ Send your Free 1938 Catalog.
☐ Send Free Parts Lists for.....

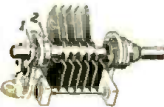
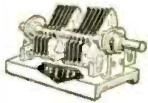
Name
Address

City State

EVERYTHING IN RADIO AT LOWEST PRICES



ALL BUD RADIO Products are put through gruelling laboratory "torture" tests, before being approved by our engineers. R. F. choke pigtails were discarded because the shearing strength of No. 18 copper wire wasn't sufficient to withstand our laboratory-simulated life conditions. Instead—solid, firmly anchored solder lugs are utilized—a typical example of the thoroughness of Bud laboratories. Whether it be a standard production line midget or a special hi-freq. job for the navy—Bud Products must pass rigid performance tests. Only then, when we know they can "take it", do Bud parts receive the stamp of approval—"O. K. for shipping."



BUD PRODUCTS
stand up best and
sell for less, too!

SEND FOR
THIS CATALOG
FREE!



Today! Send for catalog
No. SW-1138 describing the
complete BUD line. **FREE!**

BUD RADIO, INC.
CLEVELAND, OHIO., U. S. A.

BUD RADIO, INC.
5205 CEDAR AVENUE CLEVELAND, OHIO

Please rush big FREE catalog SW-1138

Name

Address

City State

Are you a member of the Short Wave
League? See Page 396.

**WORLDWIDE RADIO IN A
QUIET HOME Cannon-Ball
HEADSETS**



Cannon-Ball Adaptor
permits using headsets on
all radios. Get complete
details.

C. F. CANNON COMPANY
SPRINGWATER, N. Y.

Let's Listen In With Joe Miller

(Continued from page 364)

SUMATRA

YBG, 10.43 mc., at Medan, has been heard several mornings near 5:45-6 a.m. phoning PLV, the 80 KW station on 9.42 mc., at Bandoeng, Java. PLV was heard calling "Hello, Medan," repeatedly, and it was an easy matter to tune down to YBG and hear them acknowledge the call. Both are good reliable signals, PLV the better.

EGYPT

SUZ, 13.83 mc., Cairo, Egypt, heard here FB again at their usual time of phoning, 11 a.m., in contact with GBB, 13.58 mc., Rugby, which station SUZ always contacts. SUZ can be easily logged by any DXer, as they have an average R7-8 signal, and are on nearly daily, on schedule.

QRA of SUZ: Marconi Radiotelegraph Co., Ltd. P. O. Box 795, Cairo, Egypt.

SUV, 10.05 mc., also at Cairo, is often heard around 3:30-5:30 p.m., phoning. All Cairo phones use inv. speech.

AFRICAN REVIEW

ITK, 16.385 mc., at Mogadiscio, Italian Somaliland, heard lately at 9:15 a.m., with a FB signal.

ZSS, 18.89 mc., Klipheuevel, South Africa, lately heard at 6:35 a.m., inside their daily sked of 6:30-7 a.m., whenever there is traffic to be carried. ZSS puts in a fair signal, usually phoning GAU at Rugby, on 18.62 mc. ZSS usually precedes VVY2 in phoning GAU. VQG, 19.62 mc., Nairobi, Kenya Colony, phones GAU after VVY2 or between 7:30-8:30 a.m. So, by watching GAU daily and checking ZSS, VVY2 and VQG's frequencies, in turn, whenever GAU is on, at the proper time for each station's operation, DXers should clean these three off of their "GET" list this fall. Incidentally, they all verify correct reports.

IUD, 18.27 mc., Addis Ababa, Ethiopia, was recently logged here at 6:45 a.m., with a woman at the mike. It seems there are two IUD stations in existence, as our report of an Italian station on 14.48 mc. was recently confirmed as IUD! Many other DXers have reported the same situation. We wonder what station will be confirmed for us when our IUD, 18.27 mc., report is confirmed.

IUG, 15.45 mc., also at Addis Ababa, heard at 8:45 a.m., in contact with an unknown Italian on 16.235 mc., believed to be IBS, Rome. ITK was also on at this time; must have been a round-table.

ASIATIC REVIEW

KTR, 10.91 mc., Manila, Philippines, was heard at 6:15 a.m., calling KEJ, 9.01 mc., Bolinas, Calif., and piling in here with a FB signal. Between calls KTR sent a slowly interrupted tone whistle.

XTR, 9.36 mc., Swatow, and XTV, 9.50 mc., Canton, China, were heard at 6 a.m. once.

TDE, 10.065 mc., Shinkyo, Manchukuo, heard phoning JVO, 10.37 mc., Nazaki, Japan, in side band frequency xmsn at 6:35 a.m. TDE heard throughout the morning, usually standing by.

JVD, 15.86 mc., Nazaki, Japan, heard phoning at 5:55 a.m.

ZMBJ, 8.84 mc., "T. S. S. Awatea" was once heard phoning, inv. speech, at 4 a.m. Good signal.

*****HAM STARDUST*****

VS1AI, 14244, Singapore, Straits Settlements, our catch for last month was heard again in August at 6:40 a.m., in QSO with VK5AW, a good R6 signal here.

Ashley Walcott reports VS1AI, but on 14050 and we must remark on VS1AI's frequent change in frequency, having been heard all the way from 14050 to 14390!

VS1AD, 14240, also heard near 6 a.m. by Ashley.

Other Asiatic DX reported for the West Coast by Ashley Walcott:

(Continued on page 400)

DATAPRINT SERVICE

New low price—
Any 3 Prints..... \$1.00

TESLA COIL DATA:

Dataprint—drawings and data for building 36 inch spark Tesla.....50c
Exciter—1 K.W. 20,000 Vt. Transf.....50c
3" Sp'k. Tesla Coil. Works on Ford.....50c
3" Sp'k. Tesla Coil. Works on 110.....50c
20 "Tricks" with Teslas & Oudins.....50c
8" Sp'k. Tesla Coil.....50c
Exciter—1/4 K.W. 15,000 W. Transf.....50c
Violeta—1/4 Sp'k. Oudin, Vibrator type.....50c
How to Operate Oudins from V. T. Osc.....50c



S-W DIATHERMY (Artificial Fever)

Dataprint Constructional data for Small, Medium and Large size App.....50c

RECORD PROGRAMS on Steel Wire!

Telegraphone Data, for Voice or Code.....50c



Induction PIPE & ORE LOCATOR

Construction Data.....50c

20 ELECTRIC LODGE & PARTY TRICKS. Fun Galore!

"How to Do 'Em" Data 50c



RADIO CONTROL FOR MODEL BOATS, etc.

Circuit data.....50c

More DATAPRINTS You Need!

50c each..... 3 for \$1.00

Water Turbines
Motor Circuits (20)
Telephone Hookups (20)
100 Mechanical Movements
Polarized Relay, Ultra-sensitive
Ring 4 bells on 2 wires
20 Simple Bell Hook-ups
Electric Chime Ringer fits any clock
Welding Trf. 2 K.W. 110 V. Prim. 18 V. Sec.....50c
4" metal SLIDE RULE \$2.00; 8".....\$5.00

The DATAPRINT Co.
Lock Box 322
RAMSEY, N. J.

NEWER THAN NEW!



At last a new magazine that really is N-E-W! Not only new but revolutionarily NEW! NEW IDEAS is a revelation in magazines—A GOLD MINE OF INFORMATION. Adjectives are no longer sufficient to describe its revolutionary ideas. Just to name a few:

The magazine that can't get dog-eared because it has rounded corners.

The magazine is

presented. A brand new idea in magazine publishing. It gives off a most pleasant odor, pleasing to man and woman alike. As for its contents, it is literally worth its weight in gold. NEW IDEAS supplies a want that has not been satisfactorily filled by any other magazine before.

A veritable mine of information, where a single copy may be the one that will start YOU on the road to success. All ideas are eminently practical and all are NEW.

Over 300 new ideas are put into a single issue every month. Ideas by which everyone may benefit and profit.

It is ideas that make the world go round and, particularly, new ideas that shape our destinies.

NEW IDEAS has many departments among which are the following NEW IDEAS:

New Ideas How to Make Money
New Ideas for the Working Man
New Ideas for the Working Girl
New Ideas How to Succeed
New Ideas in Careers
New Ideas in Spare-Time
New Ideas in Money Making
New Ideas for Your Home
New Ideas for Your Business
New Ideas for Boys
New Ideas for Girls
New Ideas for Your Health

The magazine will be on sale the 25th of the month, and as the magazine is widely advertised, we suggest that you place your order with your newsdealer now. If the newsdealer cannot supply you, send 25c to

NEW IDEAS, 99-A Hudson Street, New York City

Reflecting Layer Heights Automatically Recorded

(Continued from page 348)

not keylocked but is keyed with short pulses or dots, approximately 0.0001 second duration, at the rate of about .10 per second. On account of this low pulse rate and continuous frequency change, this system makes negligible interference with other radio services. All of the operations described are automatic so that records are made during the 24 hours per day every day. The equipment requires servicing only about once each week, and has been in operation at the National Bureau of Standards for over four years.

The recorder gives a record of the relation between the radio frequency of the pulse signals and the virtual height reached by them in the ionosphere. Records of this type give a measure of the maximum density of ionization. The useful frequencies for practical radio-communication over various distances under any conditions may be derived.

The recent adoption of the idea of multi-frequency automatic recording and the principle of this recording system by the

Carnegie Institution of Washington, British Radio Research Board, Australian Radio Research Board, and Harvard University, will increase enormously the continuity and value of ionosphere data, which will in turn greatly increase our understanding of world-wide ionosphere and radio transmission conditions.

Example of Practical Importance

To show the practical importance to modern radio engineering of the new automatic recording system, one of the large American air transport companies recently experienced difficulty in communicating between ground stations and aircraft along one of its routes in the northeastern United States, using a frequency of 3,257.5 kc. They reported transmission signals to be especially poor during September 1934. Since the frequency used fell within the band covered by a group of measurements made on reflections at different frequencies in the ionosphere on the Bureau of Standards apparatus, the data on hand was examined to see just what behavior could be expected at this frequency. (The graphs accompanying the solution of this problem by the U. S. Bureau of Standards experts appears in the B.S. research paper, No. RP769) and to sum up the matter briefly the following deduction was made:

It is likely that the satisfactory ground-wave range at this frequency is only 30 or 35 miles, so that transmission is mainly by sky wave. The results of this study show that at times, night transmissions over short distances at a frequency of 3,257.5 kc. pass through the ionosphere and are lost from the earth. The results also indicate that a lower frequency, such as 2,750 kc. passes through the ionosphere at a given angle a much smaller percentage of the time. It would be necessary to go below 2,500 kc. to obtain practically complete freedom from *skipping*. The other F-layer critical frequency graphs indicate that transmissions at a frequency of 3,257.5 kc. will often pass through the ionosphere during any season.

In allocating frequencies for a given type of service a consideration of data of the type shown here should prove most useful. World-wide information will be necessary for an intelligent allocation of frequencies to be used in different geographical locations and for different types of service.

Record Showing How the Height Reached by the Waves Depends on the Frequency

Frequency is changed uniformly from 2500 kc. to 4400 kc. at the rate of 200 kc. per minute. E layer reflections are noted at the left coming from a height of about 135 km. for 2500 kc. The height increases gradually as the frequency is increased to about 2850 kc. This is the critical frequency f_c for the E layer. At this point, where the wave passes through the layer, its velocity is decreased so that it appears to come from a much greater height. As the frequency is increased to about 3200 kc. the virtual height drops to a minimum of 210 km. which is near the actual height of the F_1 layer. As the frequency is increased still further, reflections for this component come from the F_2 layer. The trace at the right (F_X) is the extraordinary component returned from the F_1 layer. Its critical frequency should appear off scale at the right about 800 kc. above that for the ordinary component. This separation of 800 kc. in frequency is directly dependent upon the strength of the earth's magnetic field at the layer.

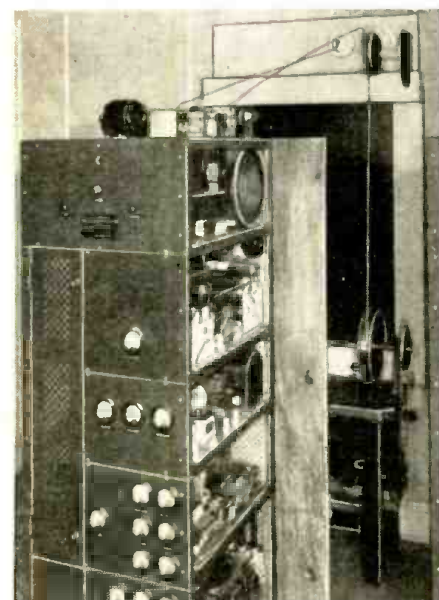


Fig. 5—"Door open" view of receiver cabinet.

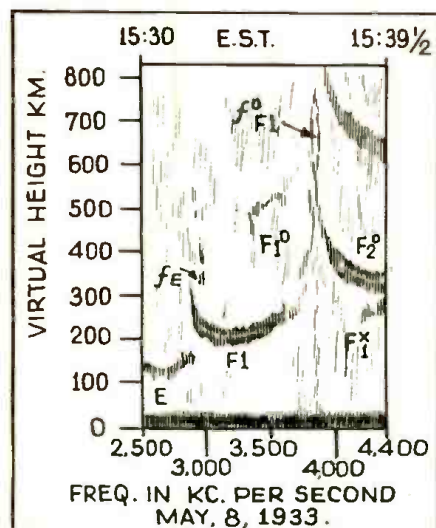


Fig. 2—Record made with original recorder in 1933.



Now THE NEW Console "SUPER-PRO"

HAMMARLUND now presents the internationally famous "Super-Pro" 16 tube professional receiver in a new, distinctively designed, high fidelity console. The professional performance provided by this precision instrument, heretofore available only in a table model or rack and panel style, thus now can be enjoyed by those at home.

The console, in addition to being exceptionally attractive for it is of the classic-modern style, with hurl, matched and oriental walnut artistically blended, also has remarkable acoustical properties painstakingly engineered to match the other advanced features of the "Super-Pro" receiver. This striking acoustical performance is achieved with a new type of sound chamber and a special 15" high fidelity speaker.

The receiver itself is identical to the table model "Super-Pro" with such outstanding features as two stages of R.F. on all bands, affording a sensitivity of 0.85 microvolt, and image rejection ratios from 150 to 1 on 10 meters to 175,000 to 1 on 300 meters! Other "Super-Pro" features are calibrated 3 to 16 kc. band width control, as well as calibrated audio and sensitivity controls; noiseless and trouble free cam-switch; direct tuning accurate to within 1/2%; three audio stages; separate electrical band spread control; self-contained tuning unit; A. V. C. Manual switch; phone jack; models for 7 1/2 to 240, 15 to 560, and 15 to 2000 meters, etc.

You will be proud to own this new "Super-Pro" console model! Write Department SWT-11 for further details. Mail the coupon below today!

HAMMARLUND MFG. CO., Inc. SWT-11
424-438 W. 33 St., N. Y. City

☐ Please mail me "Super-Pro" console bulletin.

Name

Address

City State



HAMMARLUND

Please mention SHORT WAVE & TELEVISION when writing advertisers



BRINGS YOU ANY ONE OF THESE 4 FAMOUS RADIO BOOKS

RADIO FANS! Help yourselves to a radio education for the price of 10c per book. These books give you a good foundation towards the study of radio. You'll be amazed at the wealth of information contained in them. They are especially written for beginners but are useful review and reference books for all.

Each book contains 32 pages, profusely illustrated with clear, self-explanatory diagrams. They contain over 15,000 words of clear legible type. They are an education in themselves and lay the groundwork for a complete study of radio and electricity.

HOW TO BUILD FOUR DOERLE SHORT WAVE SETS

Due to a special arrangement with the publishers of SHORT WAVE CRAFT, we present in this book complete details for building the Doerle sets, also an excellent power pack. If you plan to electrify any of the sets, Contains EVERYTHING that has ever been printed on these famous receivers. These are the famous sets that appeared in SHORT WAVE CRAFT: "A 2-Tube Receiver that Reaches the 12,500 Mile Mark," by Walter C. Doerle, "The Doerle

HOW TO MAKE THE MOST POPULAR ALL-WAVE 1-AND 2-TUBE RECEIVERS

This book contains a number of excellent 1- and 2-tube sets, some of which have appeared in past issues of RADIO CRAFT. These sets are not toys, but have been carefully engineered. They are not experiments. To mention only a few of the sets the following will give you an idea. The Megadyne 1-Tube Pentode Loudspeaker Set, by H. Gensack—Energizing The Megadyne—How to Make a 1-Tube Loudspeaker set, by W. P. Chesney—How to Make a Simple 1-Tube All-Wave Electric Set, by F. W. Harris—How To Build A Four-In-Two

ALTERNATING CURRENT FOR BEGINNERS

This book gives the beginner a foothold in electricity and radio. Electric circuits are explained. This includes Ohm's Law, alternating current, sine waves, volts, amperes, watts, condensers, transformers, motors and generators, A.C. instruments, house-wiring systems, electrical appliances and electric lamps. Here are some of the practical experiments which you can perform. Simple tests for differentiating between A.C. and D.C., how to light a lamp by induction; making a simple electric horn; demagnetizing a watch; testing motor armatures; charging storage batteries from A.C. outlet; testing condensers with A.C.; making A.C. electromagnets; frying eggs on a cake of ice; making simple A.C. motors and many others. Has 42 illustrations.

ALL ABOUT AERIALS

In simple, understandable language this book explains the theory underlying the various types of aerials; the inverted "L," the Doublet, the Doublet, etc. It explains how noise-free reception can be obtained, how low impedance transmission lines work; why transposed lead-ins are used. It gives in detail the construction of aerials suitable for long-wave broadcast receivers, for

De Luxe Five-Meter Mobile Station

(Continued from page 357)

connected. However, various types of antennas may be employed, possibly with equal results. Many will go so far as to use directive antennas, so we leave the choice to the builder.

As for results, we find that the increased stability of the transmitter—even though the power output is less than the average portable transmitter—makes it much easier to work distant stations from good locations, especially DX stations using superheterodyne receivers. This transmitter will put a signal with very respectable quality through a superheterodyne receiver with 465 kc. intermediate amplifier.

Parts List for 5-Meter Portable

CARDWELL
1-75 mmf. trim-air condenser (ZU-75-AS).
4-15 mmf. trim-air condensers (ZR-15-AS).

I.R.C.
2-50,000 ohm 1 watt resistors.
1-30,000 ohm 1 watt resistor.
1-1 meg. ohm 1 watt resistor.
1-900 ohm 1 watt resistor.
1-1 meg. 1/2 watt resistor.
1-10,000 ohm 1 watt resistor.
1-50,000 ohm potentiometer.
1-5 meg. potentiometer.

CORNELL-DUBILIER

3-100 mmf. mica condensers.
4-001 mmf. mica condensers.
1-.01 mf. mica condenser.
1-10 mf. electrolytic condenser.
2-8 mf. electrolytic condensers (500 V.).

KENYON

1-3 winding transceiver transformer.
1-class B input transformer for 6N7.
1-class B output transformer for 6N7 to 5,000 ohm load.
1-100 ma. filter choke—15-30 Henrys.

UNIVERSAL

1-Combination handset (200 ohm microphone and 2,000 ohm earphone).

TRIPLETT

1-0-50 ma. meter, small bakelite case.

POWER SUPPLY

1-300 V. 100 ma. Vibrapack.

PAR-METAL

1-crackle finish case, 15" x 7 3/4" x 6 1/2"

RAYTHEON

2-6F6 tubes.
2-6N7 tubes.
1-6J5G tube.

Coil Data for 5-Meter Portable

	Turns	Size Wire	Length Winding
*Osc. grid	8	No. 12	3/4"
Osc. plate	5	No. 12	3/4"
Amp. plate	5 1/2	No. 12	1"
†Receiver	6	No. 12	by experiment

*Tapped at 2nd turn for cathode.
†Tapped at 1st turn for anode.

Short Wave Scouts

(Continued from page 351)

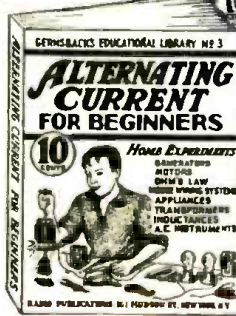
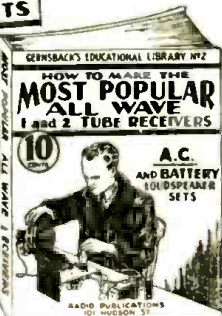
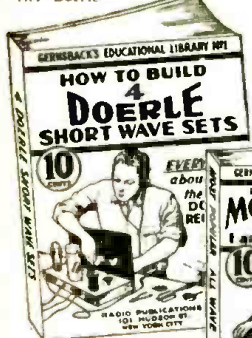
used a National "S-W 3" receiver. The aerial used for listening to China was a 24 foot "T" type antenna. Another essential part of the set-up was an antenna tuner, which helped a great deal to remove interference and also in sharpening the incoming signals.

The Chinese stations heard by Mr. Hellmann were:

Call—Frequency Time
XOJ—15,800 kc. (18.99 m.) heard at 8:05 p.m. E.S.T.
XTV—9,500 kc. (31.58 m.) heard at 5:22 a.m. E.S.T.
XTC—9,280 kc. (32.32 m.) heard at 5:19 a.m. E.S.T.

XOJ and XTC are both located at Shanghai, China.
XTV is located at Canton, China.

Have you an idea for a "new" circuit? Send it to the Editors: New 1 to 6 tube Receiver Circuits especially desired.



RADIO PUBLICATIONS SWT-1137
101 Hudson Street, New York, N. Y.
Please send immediately POSTPAID the books checked:

☐ No. 1—How to Build 4 Doerle Short Wave Sets.....10c
☐ No. 2—How to Make the Most Popular All-Wave 1- and 2-Tube Receivers.....10c
☐ No. 3—Alternating Current for Beginners.....10c
☐ No. 4—All About Aerials.....10c

I am enclosing.....c; the price of each book is 10c

☐ Send me FREE circular listing 48 new 10c publications

Name.....
Address.....
City..... State.....
(U. S. Coin or U. S. Stamps acceptable.) Books are sent postpaid

Remember that each book has 32 pages and contains over 15,000 words. Each book has from 30 to 66 fine illustrations. POSITIVELY THE GREATEST 10c VALUE IN RADIO BOOKS EVER OFFERED TO THE PUBLIC.

If you do not think that these books are worth the money asked for them, return them within 24 hours and your money will be instantly refunded.

Send for our FREE circular listing 48 new 10c Publications

RADIO PUBLICATIONS
101 Hudson St., New York, N. Y.

The Biggest 50c "Ham" Book ever published!
See Page 340.

Taking the Country by Storm
RADIO-CRAFT

RADIO-CRAFT is devoted to all things radio and television. It brings you the very latest in news, information, and advice. It is the only magazine that gives you the complete story of the radio and television industry. It is the only magazine that gives you the complete story of the radio and television industry. It is the only magazine that gives you the complete story of the radio and television industry.

Edited by HUGO GENSBACK
Over 175 Illustrations in Each Issue
98 C Hudson Street New York, N. Y.

8 MONTHS \$1.00

GADGETS
ILLUSTRATED

The world's only magazine on this subject. Contains 150 illustrations of the latest and best gadgets, novelties, and specialties. A veritable gold mine of information which you can get in any other way.

Every month, GADGETS' rankers not only America but the entire world for the newest, most useful articles of this type, including the latest gadget and novelty patents.

Don't fail to read the monthly articles how inventors of well known gadgets have made fortunes from their ideas.

If your newsdealer cannot supply GADGETS MAGAZINE, send 25c to Gadgets Magazine, 99-S Hudson Street, New York City

Please mention SHORT WAVE & TELEVISION when writing advertisers

How to Choose a Short Wave Receiver

(Continued from page 347)

ter quality can be obtained in this way, the lower or bass notes being reproduced by the larger speaker, and the higher notes that range from 6,000 to 9,000 cycles by the tweeters.

16 to 37 Tube Receivers—the DeLuxe Class

A certain percentage of radio set buyers fall into the class of those who can spend a liberal amount of money on a receiver and we find De Luxe all-wave sets available in this class. For instance, at the Radio Show during the last year or two, sets having from 25 to 37 tubes have been exhibited and, of course, the price runs as high as \$1,500.00 for such a set. One of the accompanying pictures shows such a set and the average man may say—"So what; why should I want a 37-tube receiver?" In the first place, the average man with a small home and living room will find such a size set a "white elephant," but for those who are fortunate enough to have a real spacious home, with a large living room having a length of possibly 50 to 60 ft. or more, with a high ceiling, and in which considerable entertaining is done, dancing, etc., then one of these big De Luxe sets will be found very suitable. With a set using from 20 to 37 tubes, the engineers have been enabled to provide much finer quality of reproduction than in sets using a lesser number of tubes. In some receivers such as the 37 tube model illustrated here, dual amplifier circuits are provided for the high and low frequency audio notes. As many as six loudspeakers are used in one of these sets—the bass, middle register and high notes being reproduced by loudspeakers especially designed to suit these respective jobs.



A Typical "Communications" Type Receiver—the 1938 Super-Skyrider

These large De Luxe models usually have electric phonographs "built in," and frequently they are fitted also with microphones and switching systems, whereby the amplifier may be used for public-address work. In this way a man with a large home and outlying grounds may install loudspeakers in the trees or on suitable masts and thus entertain his guests at outdoor garden parties, etc. The outdoor loudspeakers may be supplied by music from phonograph records placed on the set, or radio programs may be fed to the loudspeakers.

These elaborate multi-tube sets are supplied with sufficient *bandspread* to make tuning a pleasure and extra large dials are also fitted on them so that tuning is comparatively a simple matter. Plenty of controls are also mounted on the front panel, so that any degree of tone quality can be readily obtained. The engineers have also provided extra fine quality of reproduction in receivers in this class—thanks to a special study of the acoustic problems involved and the selection and arrangement of loudspeakers employed, together with especially devised circuits. Take the large De Luxe model here shown—it is capable of reproducing audio sounds having a frequency of from 20 to 20,000 cycles, which surpasses the ordinary requirements of the human ear, for ordinarily

one does not hear sounds of much higher frequency than 16,000 cycles.

It might be well to mention at this point that where a radio receiver is purchased from a local dealer, that in many cases it will be possible to try out a certain receiver in your own home and if it doesn't give satisfaction, another type of receiver may then be tried. If a 6 tube receiver, for example, does not give strong enough reception in a certain locality, probably the next best thing to do is to try a receiver having more tubes. Also the direction in which the aerial points may be changed or a different type of aerial may be erected and tried out.

Where the receiving location is surrounded by hills or mountains, it is frequently the case that poor reception may be experienced during the daytime, and for such locations a receiver having 8 to 10 tubes at least should be employed, so that sufficient amplifications of the weak signals will be afforded. Where poor reception has been noted on previous receivers and a new one is about to be selected, it is well to keep in mind that 1 or 2 stages or pre-selection will help to amplify these weak signals before they are passed through the detector stage.

Merits of "Communication" Type Receivers.

For the real enthusiastic short-wave DXer, who goes after distant stations with a vengeance, a good *communications* type receiver will probably prove the best answer.

The *communications* type receiver invariably has an extraordinary amount of bandspread, so that the stations in a certain band are spread out over half a foot or more of scale length. (At least two of the general "fan" type broadcast and S-W receivers have, within the past year, made a special feature of extra wide bandspread).

A *crystal-filter* is built into most of the communications receivers, or can be had in special models, and these help to provide greatly improved selectivity. A *beat-oscillator* is also found on this type of receiver, the use of which greatly facilitates the locating or "spotting" of weak DX short-wave stations.

Another feature is a calibrated tuning strength meter, by means of which the strength of the received signal can be read off directly. Some of these sets also have a switch to disconnect the A.V.C. which is valuable in case of flutter-fading. The ordinary B.C. and S-W receiver does not permit the reception of C.W. code signals, but this is, of course, one of the main reasons for using a *communications* receiver. A great many of the communications type receivers also cover the broadcast band from 200-550 meters, changing from one band to another by means of a switch in some cases and by means of plug-in coils in others.

READER'S TECHNICAL SERVICE DEPARTMENT

New Transmitting Tube Manual

● THIS new tube manual is most complete. Not only does it provide the reader with complete data on dozens of different types of transmitting tubes, but also there is considerable technical data covering such interesting subjects as general tube information, that is, the technical aspects of tube characteristics; all about different types of transmitters, including buffers, doublers, antenna couplers, L.C. ratios and modulators. There are also a number of pages devoted to constructional articles wherein many different types of transmitters both phone and C.W. are completely described.

This booklet is provided free of charge. Write to the Reader's Technical Service, Short Wave & Television Department, 99 Hudson Street, New York City. Mention No. 104.

Please mention SHORT WAVE & TELEVISION when writing advertisers

Here It Is!

Model
666



THE
*Instrument
of 1000 Uses*

Engineers and experimenters are very enthusiastic about this pocket size instrument, sturdy and precision built. Handy for laboratory, shop or field use.

HANDY SIZE
COMPLETE A.C.
AND D.C.
MOLDED CASE
AND PANEL

DEALER NET

\$15⁰⁰

POCKET VOLT-OHM MILLIAMMETER

Model 666—Has 3" Sq. Triplett Improved Rectifier Type Instrument.
A.C.-D.C. Voltage Scales Read: 10-50-250-500-1000 at 1000 Ohms per Volt.
D.C. Milliampere Scale Reads: 1-10-50-250.
Ohms Scales Read: Low 1/2-300; High 250,000.
Size 3 1/16" x 5 7/8" x 2 1/8".
Black Molded Case and Panel.
Low Loss Selector Switch.
Complete with Alligator Clips, Battery and Test Leads. DEALER PRICE \$15.00
A complete instrument for all servicing and other needs. Can be used for all A.C.-D.C. voltage, current and resistance analyses. Resistance range can be increased by adding external batteries.
Attractive Heavy Black Leather Carrying Case with Finished Edges and Strap. Model 669, supplied extra. DEALER PRICE \$3.67

WRITE FOR CATALOG



The Triplett Electrical Instrument Co.
2911 Harmon Ave., Bluffton, Ohio

.....Please send me more information on Model 666:

.....I am also interested in.....

Name

Address

City State

Remember Booth No. 205—Radio Parts Show—New York City . . . Many New Triplett Items Will Be Displayed.

YOU CAN HAVE EITHER OR BOTH OF THESE TWO OUTSTANDING BOOKS FREE

The publishers of *Short Wave & Television* give you the opportunity to add one or two new books to your library. They make the offer even more attractive by giving the books to you absolutely FREE. A subscription to *Short Wave & Television* for seven months at the sensationally small cost of One Dollar brings to you your choice of the books illustrated and described below. For Two dollars you will receive *Short Wave & Television* for fourteen months and BOTH books sent to you absolutely FREE. ANOTHER SAVING FOR YOU—THE PUBLISHERS PAY POSTAGE ON THE BOOK OR BOOKS YOU CHOOSE.



ABC OF TELEVISION

This book contains only the latest material available on television. It is written by a well-known radio authority, and the book is available with a subscription to *SHORT WAVE & TELEVISION*.

Partial Contents of ABC of Television

- CHAPTER 1**—The simplest television receiver; how the eye sees; its likeness to television equipment.
- CHAPTER 2**—Theory of scanning; the Nipkow disc and its relation to television; the photo-electric cell; neon lamps; brief description of several modern mechanical systems.
- CHAPTER 3**—Need for a large number of picture elements; need for broad channel width in transmission of high-fidelity television signals.
- CHAPTER 4**—The use of the cathode ray tube in television receivers; necessary associated equipment used in cathode-ray systems.
- CHAPTER 5**—How a television station looks and how the various parts are operated.
- CHAPTER 6**—The Iconoscope as used for television transmission in the RCA system.
- CHAPTER 7**—The Farnsworth system of television transmission.
- CHAPTER 8**—The future of television; probable cost of receivers; some expressions of opinion by prominent men; list of present television transmitters.
- 64 PAGES—100 ILLUSTRATIONS**
Stiff, Flexible Covers, 5 1/4 x 8 1/4 INCHES

SHORT WAVE GUIDE

A few thousand copies of *SHORT WAVE GUIDE* still remain from our subscription campaign earlier in the season. It is an excellent book—recommended by short-wave enthusiasts everywhere. Send for your copy if you have not already received it.

Partial Contents of SHORT WAVE GUIDE

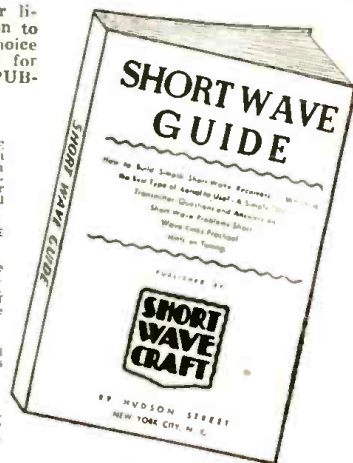
SHORT-WAVE QUESTIONS AND ANSWERS
So many questions and answers were sent to *SHORT WAVE & TELEVISION* more did not permit them to be included. In this book we have printed hundreds of questions and answers, with complete illustrations.

SHORT-WAVE KINKS, illustrated in *SHORT WAVE GUIDE*. You'll find dozens of short-wave kinks and wrinkles described and illustrated.

HOW TO BUILD SIMPLE SHORT-WAVE RECEIVERS
Complete constructional plans, including schematic diagrams, lists of parts, are included for building a number of one-, two-, and three-tube receivers.

WHICH IS THE BEST TYPE OF AERIAL TO USE?
The many antenna systems suitable for short-wave receivers are carefully described and illustrated in *SHORT WAVE GUIDE*.

A SIMPLE "HAM" TRANSMITTER
All the details, including list of parts, wiring diagrams and constructional details in building a simple "ham" transmitter will be found in this book.



PRACTICAL HINTS ON SHORT-WAVE TUNING

Hundreds of short-wave stations are heard daily by "fans," but if you knew how to tune them in, you could hear more stations and get greater enjoyment and thrills from your receiver. Expert advice on proper short-wave tuning is included in *SHORT WAVE GUIDE*.

64 PAGES—100 ILLUSTRATIONS
Stiff, Flexible Covers, 5 1/4 x 8 1/4 INCHES

SHORT WAVE & TELEVISION, 99G HUDSON STREET, NEW YORK, N. Y.

Gentlemen: Enclosed you will find my remittance of One Dollar (Canada and Foreign \$1.30) for which enter my subscription to *SHORT WAVE & TELEVISION* for Seven Months. You are also to send me ABSOLUTELY FREE and POSTPAID the book indicated by (X) at the right.
() Two Dollars are enclosed. Send *SHORT WAVE & TELEVISION* for fourteen months and send me BOTH BOOKS ABSOLUTELY FREE. (Canadian and Foreign \$2.60)

Name _____ Address _____

City _____ State _____

Send remittance in form of check, money order or unused U.S. Postage Stamp. (Foreign: Register letter if you send cash.)

- 11-37
- ☐ ABC OF TELEVISION
- ☐ SHORT WAVE GUIDE
- ☐ New Subscriber
- ☐ Old Subscriber

ADD THESE BOOKS TO YOUR LIBRARY!

When you subscribe to *SHORT WAVE & TELEVISION*, you get these books FREE. If you already are a subscriber, and you send for these books, your present subscription will be extended for another seven or fourteen months. It's easy to add these books to your technical library.

SHORT WAVE & TELEVISION

99 HUDSON STREET, NEW YORK, N. Y.

AMERICA'S MOST POPULAR RADIO BOOKS

We herewith present a selected collection of recent important radio books. We have selected these volumes because they represent the foremost radio books of their kind in print today. We publish no catalog. Order direct from this page. Prompt shipments will be made to you. Remit by money order or certified check. Register all letters containing cash.

RADIO ENGINEERING HAND BOOK, 850 pages, latest. **\$4.90**

PRACTICAL TELEVISION, 223 pages, 127 illus. **\$3.69**

ELEMENTS OF RADIO COMMUNICATION 286 pages, 241 illus. **\$2.98**

RADIO PHYSICS COURSE, 992 pages, 510 illus. **\$4.00**

THE RADIO AMATEUR'S HANDBOOK, 448 pages, 126 illus. **\$1.97**

MODERN RADIO ESSENTIALS, over 200 pages, and over 100 illus. **\$1.95**

FOUNDATIONS OF RADIO, 246 pages, 145 illus. **\$2.47**

PHOTOCELLS AND THEIR APPLICATION, 332 pages, 180 illus. **\$2.88**

ELECTRONICS, 134 pages, 45 illus. **\$1.95**

SHORT WAVE RADIO HAND BOOK, 128 pages, 150 illus. **\$1.00**

PRINCIPLES OF RADIO, 478 pages, 306 illus. **\$3.46**

EXPERIMENTAL RADIO, 256 pages, 168 illus. Prepaid. **\$2.69**

MODERN RADIO SERVICING, 1300 pages, over 700 illus. **\$4.00**

FIELD SERVICE DATA AND ANSWER BOOK, 436 pages. **\$2.50**

Both Books **\$6.00**

DRAKE'S CYCLOPEDIA OF RADIO AND ELECTRONICS, 1050 pages, 1178 illus. **\$4.88**

FUNDAMENTALS OF RADIO, 426 pages, illustrated. Prepaid. **\$3.46**

ELECTRICITY AT HIGH PRESSURES AND FREQUENCIES, 248 pages, 141 illus. Prepaid. **\$1.89**

RADIO CONSTRUCTION AND REPAIRING, 444 pages, illustrated. **\$2.50**

THEORY OF VACUUM TUBE CIRCUITS, 226 pages, 226 illus. **\$3.00**

PRINCIPLES OF RADIO COMMUNICATION, 988 pages, profusely illus. **\$7.35**

RADIO ENGINEERING, 813 pages, 475 illus. **\$5.50**

EXPERIMENTAL RADIO ENGINEERING, 346 pages, 250 illus. **\$3.46**

RADIO OPERATING QUESTIONS AND ANSWERS, 427 pages, 106 illus. **\$2.50**

OFFICIAL RADIO SERVICE HANDBOOK, over 1,000 pages, over 1,000 illus. Prepaid. **\$3.92**

OFFICIAL SHORT-WAVE RADIO MANUAL, 240 pages, many illustrations. Vol. 1 (1934) Prepaid. **\$2.00**

Vol. 2 (1935) Prepaid. \$2.50

OFFICIAL RADIO SERVICE MANUAL, Volume 4, 2,000 illus., over 400 pages. Prepaid. **\$3.43**

OFFICIAL RADIO SERVICE MANUAL, Volume 5, over 3,000 illus., over 1,000 pages. Prepaid. **\$6.86**

OFFICIAL RADIO SERVICE MANUAL, Volume 6, over 1,200 pages, over 2,500 illus. Prepaid. **\$6.86**

15 HANDY—POCKET-SIZE RADIO BOOKS

Here are 15 up-to-date books on radio and air conditioning. Modern in every sense. ALL BOOKS UNIFORM—they contain 64 pages; 50 to 120 illustrations. All books written by well-known authors. Order by Number.

2. MODERN VACUUM TUBES
3. THE SUPERHETERODYNE BOOK
5. HOW TO BECOME A SERVICE MAN
6. BRINGING ELECTRIC SETS UP TO DATE
8. RADIO QUESTIONS AND ANSWERS
9. AUTOMOBILE RADIO AND SERVICING
10. HOME RECORDING AND ALL ABOUT IT
12. PUBLIC ADDRESS INSTALLATION AND SERVICE
13. ABC OF AIR CONDITIONING
14. POCKET RADIO GUIDE
15. ABC OF REFRIGERATION
16. PRACTICAL RADIO CIRCUITS
17. SERVICING WITH SET ANALYZERS
18. POINT-TO-POINT RESISTANCE ANALYSIS
19. PRACTICAL RADIO KINKS AND SHORT CUTS

PRICE PREPAID EACH BOOK **50c**

HOW TO ORDER

No. C.O.D. orders. Our prices are net, as shown. Some of the books sent prepaid (in U.S. only). Those that are not thus listed are shipped collect if sufficient postage is not sent. Add 7% of price for postage.

Television and the Motion Picture

By James L. Baird

(Continued from page 341)

of diminish his business.

The question of programs has already become one of paramount interest. The British Broadcasting Company, which controls all broadcasting in Great Britain, has had an unrivalled experience in sound broadcasting and in a selection of programs suitable for the British public. But television is still a comparative novelty, although in this field also the British Broadcasting Co. is not lacking in experience as they commenced supplying television programs many years ago on the original 30-line system, and have been experimenting with programs continuously. Even so, however, the television programs sent out are already meeting with considerable criticism. The provision of programs must always depend upon the cash available, and unlike the American broadcasting stations, the British Broadcasting Company is dependent on government grants. As the importance of television increases, we may, however, hope for a more lavish expenditure on this essential feature.

At present, with only one television broadcasting station covering London, and the nearest neighbors in Germany and France—well out of reception range—interference problems do not arise. As television broadcasting develops, and more transmitters come into use, it may be that this problem will have to be faced. The effect of two images being superimposed on one screen would be even more distressing than receiving two sound programs simultaneously. Fortunately this contingency seems unlikely to arise—at any rate, for some time to come.

RADIO PUBLICATIONS, 97 HUDSON ST., NEW YORK, N. Y.

Please mention *SHORT WAVE & TELEVISION* when writing advertisers

How to Build an All-Wave "Grid-Dip" Oscillator

(Continued from page 355)

this note for the calibrating frequency and do not attempt to re-calibrate the instrument by drawing a curve obtained in this way. The instrument is always used with the leads hooked around an inductance and all power turned off in the apparatus under test. You will find the frequency reading is considerably different in picking up the radiations than it is when measuring a coil.

Calibration

Accuracy of calibration is not necessary, as the oscillator is never used to align a receiver (except roughly) as a signal generator is necessary for precision alignment. A signal generator gives dynamic tests and the grid-dip oscillator gives static tests. But just as an ohm-meter (which is a static testing device) is invaluable for testing resistors, so a grid-dip oscillator is invaluable whenever a coil is involved.

Building and Testing Transmitters

The problem of "how many turns" is solved in a hurry by the use of the grid-dip oscillator. Always wind on a few more turns than you estimate will be needed, as it is easy to remove turns but difficult to do an artistic job of adding turns. All inductances and R.F. chokes used in transmitting should have their tests before and after mounting and wiring. Grid-Dip Oscillator tests will explain many a strange, stubborn case of refusal to oscillate. Take the case of a partially shorted inductance. The R.F. resistance will be high and so you will only obtain a small dip and the short will make the amount of the inductance as read by the meter much smaller than one would expect. From the shorted place to ground there will be no dip at all.

Building and Testing Receivers

You may have a short-wave super-heterodyne that lacks sensitivity. It may need balancing and then again some other cause may be responsible. Instead of using the Signal-Generator and taking the time to set up and actually align the receiver in order to find out whether it needs it or not, simply ground the black lead of the Grid-Dip Oscillator to the chassis and rapidly, one by one, touch the control grids with the other lead. If the dial of the Grid-Dip Oscillator must be adjusted quite a few degrees each time—you are safe in assuming the set needs re-balancing. (The oscillator in the super will dip at a higher frequency than the R.F. and the I.F. and second detector grid will dip I.F. frequency.) R.F. trouble, such as shorted trimmers, "open" or "shorted" R.F. chokes: A shorted trimmer or coil will cause the receiver to be completely dead. Few experimenters have ohm-meters that will detect the difference between the resistance of the coil with or without shorted trimmers.

Scraping condenser blades: The Grid-Dip Oscillator is useful for finding out and repairing scraping condensers in a gang. You need not unsolder any wires and you can quickly tell which gang is responsible and just where. The Grid-Dip Oscillator will tell you when you have repaired the trouble.

Measuring small capacities, both fixed and variable: Small fixed condensers are rarely of the value marked on the case. It is important that their capacity be exact if they are used as padding condensers or for tuning. In these cases or where it is desired to measure condensers up to 500 mmf., their capacity may be accurately obtained by use of the Grid-Dip Oscillator. Hook the condenser to be measured in parallel with a honeycomb coil or any standard inductance at hand. Hook the Grid-Dip Oscillator to this combination and turn the dial until you get a dip. Leave everything set; remove the unknown condenser and in its place substitute a cali-

brated variable condenser. Rotate the dial of the calibrated condenser until you get a dip and read the capacity of the unknown directly from the dial of the calibrated condenser.

Super-oscillator at "sum" or "difference" frequency: A super-heterodyne oscillator that is designed to work at sum frequency (and all commercial supers are) may sometimes be incorrectly adjusted to difference frequency. As such, it will work but imperfectly. There is a complicated method of finding out if the oscillator is adjusted to sum or difference frequency, but the Grid-Dip Oscillator method is simplest and easiest. Just touch the control grid and find out!

Measuring R.F. resistance and comparing coils for efficiency: To compare coils for their R.F. resistance, measure them both without touching the Grid-Dip Oscillator controls. Everything else being the same, the coil which causes the greatest dip has the lowest R.F. resistance and is the most efficient. The more variable or fixed capacity connected across a coil, the higher the R.F. resistance. The Grid-Dip Oscillator will demonstrate this strikingly.

Test inductances, R.F. chokes and I.F. transformers before installing: As with transmitter construction, it is a good idea to test every coil before mounting it in a set, and after it is wired up and before you turn the power on. Often I.F. transformers are not marked. Much time can be saved by knowing their I.F. frequency.

Use in building and testing aeri-als: Aerials with transmission lines may be home-constructed and experimented with. The coils of the coupling units may be matched with the Grid-Dip Oscillator. An ordinary aerial and ground can be connected to the output jacks of the Grid-Dip Oscillator in order to test efficiency. You should get a dip over the entire range of the Grid-Dip Oscillator. There will be less dip at the natural frequency of the aerial system. (The receiver should be disconnected when making this test.) Poor aerial contacts will show up in an unsteady needle of the meter. Grounded aerials will be shown by this method. A very poor method of installing an aerial lead-in is to run the lead-in along with the ground lead. This causes a high capacity between the two and the Grid-Dip Oscillator needle will not dip when hooked to such an installation.

PARTS LIST

- 1 Metal cabinet, crystalline-black finish
- 1 Vernier Dial
- 1 switch (six-gang, 5-points)
- 1 Milliammeter, from one to ten mills (M.A.) full-scale
- 2 small bar knobs
- 1 S.P.S.T. Jack switch
- 1 2-gang variable midget condenser, 350 mmf. per section
- 1 20 mmf. maximum midget variable condenser (for coupling)
- 1 .25 mf. fixed condenser
- 2 insulated tip-jacks—one black, one red
- 1 5-prong tube socket
- 1 4-prong tube socket
- 5 inductances (They may be built following instructions given in the table; name of manufacturer on request.)
- 1 A.C. cord and plug
- 1 chart and glass
- 3 cathode resistors (Value determined experimentally; see text.)
- 2 power-pack resistors, 10 watts apiece, if 10 milliamper meter is used
- 1 double 4 mf. electrolytic condenser
- 1 inexpensive midget power transformer

RAYTHEON

- 1 type 56 tube
- 1 Type 80 tube

COIL TABLE

Lowest frequency I.F. coil—bank wound, 12 banks, 36 turns per bank, making 432 turns No. 26 D.S.C. wire, 1 1/4 inch diameter winding form.

Other I.F. coil—same as above, only with 6 banks.

Broadcast coil—70 turns No. 30 enamelled, close-wound on 1-inch diameter form.

First short-wave coil—30 turns No. 26 D.S.C. wound on 1-inch form spaced diameter of wire.

Second short-wave coil—15 turns No. 18 bare wire, wound on air-spaced diameter of wire and braced with celluloid ribs. Form 1 inch in diameter.

All coils center-tapped for the cathode connection.

I'VE NEVER WORKED HARDER-NOR EARNED LESS! THINGS'RE TOUGH

OH, BOB, IF YOU COULD ONLY GET IN SOME NEW UNCROWDED FIELD

BOB! LOOK! HERE'S YOUR "POT OF GOLD" YOU CAN QUICKLY TRAIN FOR RADIO-TELEVISION RIGHT HERE AT HOME

S-A-Y! THAT'S SWEET WORK, TOO!

YOU, TOO, CAN NOW GET STARTED RIGHT! TRAIN IN SPARE TIME FOR RADIO-TELEVISION. LEARN OF THE MANY OPPORTUNITIES IN THIS FASCINATING CAREER

SEND FOR "VISION" A FREE BOOK TELLING THE WHOLE STORY

BOB AND MARY FIND A WAY

RADIO! TELEVISION!

THAT'S WHAT JANE'S HUSBAND DOES! THEY'RE GETTING ALONG SWEET! SURELY BOB CAN DO AS WELL—OR BETTER

LATER

WELL, HONEY, I'LL SOON BE A RADIO EXPERT. THIS FIRST NATIONAL TRAINING IS AS THOROUGH AND PRACTICAL AS GOING AWAY TO SCHOOL

YES, AND LOOK HOW MUCH YOU EARNED WHILE TRAINING

RADIO-TELEVISION PAY YOU BIG

Get in on the ground floor now!

Men with vision who train now for fascinating careers in Radio-Television are destined to become leaders quickly in this fabulous money-making industry.

TRAIN AT HOME! MAKE SPARE TIME PAY YOU RICH REWARDS

Now you can get the same expert training as at resident schools—the advanced knowledge and practical experience available through First National's operation of Radio Station KXBY and Television Station W9XAL—all without leaving your home or costing more from your present safeguards.

COMPLETE TRAINING LABORATORY SENT YOU—YOURS TO KEEP

All equipment for actual experiments is now furnished you—your final assurance of expert training. Many other progressive new advantages have been instituted for you by First National to make it easily possible for you to quickly train for the big paying jobs in Radio-Television. Write me personally today, using coupon below for full facts—FREE

S. Q. Noel, President

First National Television, Inc.
Training Division Kansas City, Mo.

SEND COUPON TODAY! ACT NOW

S. Q. Noel, Pres., First National Television, Inc.
Dept. BB-II, Fidelity Bldg., Kansas City, Mo.

I want to be an outstanding success. Send me your free book "Vision" I am _____ years old.

Name _____

Address _____

Town _____ State _____

Please mention SHORT WAVE & TELEVISION when writing advertisers

All about the SHORT WAVE LEAGUE

Application for Membership SHORT WAVE LEAGUE

SHORT WAVE LEAGUE 11-37
99-101 Hudson Street, New York, N. Y.
I, the undersigned, herewith desire to apply for membership in the SHORT WAVE LEAGUE. In joining the LEAGUE I understand that I am not asked for membership and that there are no dues and no fees of any kind. I pledge myself to abide by all the rules and regulations of the SHORT WAVE LEAGUE, which rules you are to send to me on receipt of this application. I consider myself belonging to the following class (put an X in correct space): Short Wave Experimenter ☐ Short Wave Fan ☐ Radio Engineer ☐ Student ☐ I own the following radio equipment:

Transmitting _____
Call Letters _____
Receiving _____
Name _____
Address _____
City and State _____
Country _____

I enclose 10c for postage and handling for my Membership Certificate.

A FEW WORDS AS TO THE PURPOSE OF THE LEAGUE

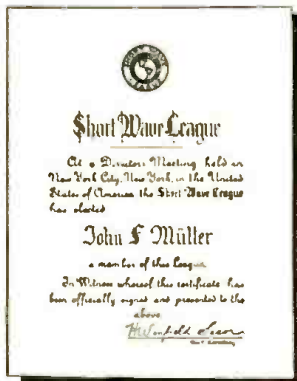
The SHORT WAVE LEAGUE was founded in 1930. Honorary Directors are as follows: Dr. Lee de Forest, John L. Reinartz, D. E. Replogle, Hollis Baird, E. T. Somerset, Baron Manfred von Ardenne, Hugo Gernsback, Executive Secretary.

The SHORT WAVE LEAGUE is a scientific membership organization for the promotion of the short wave art. There are no dues, no fees, no initiations, in connection with the LEAGUE. No one makes any money from it; no one derives any salary. The only income which the LEAGUE has is from its short wave essentials. A pamphlet setting forth the LEAGUE'S numerous aspirations and purposes will be sent to anyone on receipt of a 3c stamp to cover postage.

FREE MEMBERSHIP CERTIFICATE

As soon as you are enrolled as a member, a beautiful certificate with the LEAGUE'S seal will be sent to you, providing 10c in stamps or coin is sent for mailing charges.

Members are entitled to preferential discounts when buying radio merchandise from numerous firms who have agreed to allow lower prices to all SHORT WAVE LEAGUE members.



If you wish your name engraved on the Free membership certificate, as illustrated above, please send 25c to cover cost.

SHORT WAVE ESSENTIALS LISTED IN OPPOSITE COLUMN SOLD ONLY TO SHORT WAVE LEAGUE MEMBERS

They cannot be bought by anyone unless he has already enrolled as one of the members of the SHORT WAVE LEAGUE or signs the blank below (which automatically enrolls him as a member, always provided that he is a short wave experimenter, a short wave fan, radio engineer, radio student, etc.).

Inasmuch as the LEAGUE is international, it makes no difference whether you are a citizen of the United States or any other country. The LEAGUE is open to all.

Short Waves and Long Raves

(Continued from page 349)
SEA". "HAM AND YEGGS" etc.

I have been reading S. W. & T. since 1933 and it seems that each time I look at a copy, I learn something new.

I would like to correspond with anyone in the U.S.A. or Foreign country.

Well I guess that's about the "works", so I will stop. Thanks again for a FB magazine!

CHARLES MOURMOURIS
2121 So. Washington St.,
Denver, Colorado.

(Thanks for your letter, Charles, and while we have published quite a number of "metal" tube sets, we'll endeavor to dig up some more. About the S-W fiction—we'll wait till some more letters asking for it come in. So if you fellows want more S-W fiction, just give us a shout!—Editor.)

A Plan to Help Spanish S-W Fans.

Editor, SHORT WAVE & TELEVISION:

This is to let you know that I have received a reply to a letter I wrote to Mr. F. Oliveras Sarri of Barcelona, Spain. Mr. Sarri's letter appeared in the November issue of *Short Wave Craft*, telling of the conditions under which the "Hams" over there are permitted to operate.

I here quote from Mr. Sarri's letter to me:

"With regards to radio, we cannot at present operate any transmitter here because the Government only allows several official owners to work. So we cannot make any call or reply to the many W's in the U.S.A. who are so well heard here. I do not own any transmitter, but I have a friend in my neighborhood who had one before all this trouble arrived, and we enjoyed it a lot because it worked so well that we were in contact with many DX stations on the 20 meter band. As soon as this war is over, we shall arrange another equipment, but we are afraid we shall not be in a position to get the best materials, because it is obtained from the U.S.A. There will be great difficulties, since we must pay in dollars and these will not be available for us, because we will become so poor in every respect due to this "upside down" of things, that we shall have to restrain ourselves to our national possibilities."

In view of the existing conditions in Spain, I think that after this civil war is over we "Fans" and amateurs should come to the aid of our fellow "Fans" and amateurs in Spain. As we can see by Mr. Sarri's letter, the fellows in Spain will be left impoverished and in no position to buy equipment. So we "Fans" and amateurs in the interest of "good will" and to promote a better understanding among the peoples of the world, should come to the aid of these "Fans" and amateurs. The amateurs are a great "front" against war, due to their common interest in radio and their great friendship, even though they probably never have met.

In my last letter to Mr. Sarri, I asked for his opinion about making an appeal through *Short Wave & Television* for equipment or cash. When I receive his reply, I will forward it to *Short Wave & Television* so that the "Fans" and "Hams" will be able to give any assistance they possibly can.

I have been a newsstand reader of your magazine for over three years. I have the last two years' issues on file at home. I have been confined in this Tuberculosis Sanitarium for the last fifteen months and I always look forward to the day when the next issue comes out. It affords me much pleasure and I have plenty of time to study—not just read it over.

I am glad to see the television end of the magazine broaden out. I used to read your *Television News* magazine about 1928.

In 1929 I built a television "rig." To those who care to write me I shall be only too glad to answer all letters as it helps to pass the time away while lying in bed all the time.

John J. Marnich, Weimar Sanitarium, Weimar, Calif.

(Continued on page 399)

Accessories for Members of the SHORT WAVE LEAGUE

Every member of the SHORT WAVE LEAGUE wants to identify himself in some way. For your convenience the League directors have prepared suitable letterheads, label buttons, stickers, etc. In addition there are many short-wave accessories, such as maps, globes, etc., which the League offers only to members at special prices. Take your choice from this advertisement. THESE ESSENTIALS ARE SOLD ONLY TO LEAGUE MEMBERS.



LEAGUE LETTERHEADS

A beautiful, official letterhead has been designed for members' correspondence. The letterhead is invaluable when it becomes necessary to deal with the radio industry, mail order houses and radio manufacturers, as many houses offer members of the LEAGUE preferential discount. The letterhead is also absolutely essential when writing for verification to radio stations either here or abroad. It automatically gives you a professional standing.

A—SHORT WAVE LEAGUE letterheads, 50c per 100.

A—50c per 100

WORLD GLOBE

This important essential is an ornament for every den or study. It is a globe, 6 in. in diameter, printed in fifteen colors, glazed in such a way that it can be washed. This globe helps you to intelligently log foreign stations. The base is of solid walnut, and the semi-meridian of a nickel-like metal. Entire device substantially made, and will give an attractive appearance to every station, emphasizing the long-distance work of the operator.

D—Globe of the World, 89c

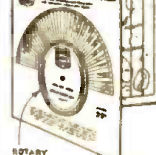
D—89c each



SHORT WAVE MAP OF THE WORLD

This beautiful map, measuring 18x26 in. and printed in 18 colors is indispensable when hung in sight or placed "under the glass" on the table or wall of the short wave enthusiast. It contains a wealth of information such as distances to all parts of the world, political nature of the country in which a broadcast station is located, etc., and from the manner in which the map is blocked off gives the time in different parts of the world at a glance.

F—SHORT WAVE Map of the World, 25c



WORLD RADIO MAP AND STATION FINDER

The finest device of its kind published. The world's map on heavy board is divided into 23 sections, while the rotary dial shows you immediately the exact time in any foreign country. Invaluable in logging foreign stations. Also gives call letters assigned to all nations. Size 11"x22".

C—Radio Map of the World and Station Finder, 25c



C—25c each

LEAGUE SEALS



G—15c for 25

These seals or stickers are executed in three colors and measure 1 1/4 in. in diameter, and are gummed on one side. They are used by members to stick to stationery, letterheads, envelopes, postal cards and the like. The seal signifies that you are a member of the SHORT WAVE LEAGUE. Sold in 25 lots or multiples only.

G—SHORT WAVE LEAGUE seals, per 25, 15c



E—35c each

This beautiful button is made in hard enamel in four colors, red, white, blue and gold. It measures three quarters of an inch in diameter. By wearing this button, other members will recognize you and it will give you a professional air. Made in bronze, gold filled, not plated. Must be seen to be appreciated.

E—SHORT WAVE LEAGUE label button, 35c

EE—SHORT WAVE LEAGUE label button, like the one described above but in solid gold, \$2.00

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

SHORT WAVE LEAGUE, 11-37
99-101 Hudson Street, New York, N. Y.

Gentlemen:

☐ I am a member in the SHORT WAVE LEAGUE

☐ Please send me application for membership in the SHORT WAVE LEAGUE

Please send me the following short wave essentials as listed in this advertisement:

for which I enclose \$_____ here-with.

Name _____

Address _____

City and State _____

Country _____

(The LEAGUE accepts money order, cash or new U. S. Stamps in any denomination. Register cash and stamps.)

Please mention SHORT WAVE & TELEVISION when writing advertisers

The 1938 5-T All-Wave Receiver

(Continued from page 354)

but consists of five turns of No. 12 tinned copper wire, wound on an air core of 1" diameter. This is permanently connected in the circuit.

Volume and Regeneration Control

Volume and regeneration control are obtained by varying the detector plate voltage with the 75,000 ohm potentiometer. This potentiometer is also combined with the on-off switch. The three audio stages all employ resistance coupling. In the first two audio stages 76 tubes are used, while the output stage employs a 43 tube. A conventional 5" dynamic speaker is used. This may have a speaker field of from 2500 to 3000 ohms but the output transformer should have the correct impedance to match the output of the 43 tube. Due to the use of the three audio stages the Model 5-T possesses excellent speaker volume—in fact the output is ample enough to permit the use of a six or an eight inch speaker, if desired.

This set is aptly referred to as an "Economy" receiver. In spite of the fact that it employs eight tubes, (if five-meter reception is desired) it is inexpensive to build and economical to operate. For it uses the a.c.-d.c. circuit requiring no power supply or filament transformers. All eight

mounts on the inside front chassis wall at the left. The five-meter coil is soldered directly between the grid terminal connection of its tuning condenser and the chassis.

The various other parts are mounted beneath the chassis at the most convenient points. Naturally, every effort should be made to keep all leads, especially grid leads, as short as possible. The wiring of this receiver follows more or less routine procedure of all a.c.-d.c. sets. It will probably be found more convenient to complete all filament wiring first. The rest of the wiring should then be done in an orderly fashion, to eliminate the possibility of missing up any place. By using a little more care while the set is being wired, a great deal of time can be saved later on as it will then be unnecessary to look for unwired terminals, etc.

The completed receiver will give very satisfactory results, and will bring in the distant stations, with surprisingly good volume.

(If trouble from "motor-boating" is experienced, reduce the grid resistors to 1/4 meg. and the plate resistors to from 20,000 to 50,000 ohms, in the three A.F. stages.—Ed.)

Complete List of Parts

HAMMARLUND

- 1—Midget condenser 140 mmf.
- 1—Midget condenser 50 mmf.
- 2—Equalizer trimmer condensers.
- 3—2.1 millihenry r.f. chokes.



Top view of the 5-T receiver as built complete for broadcast, ordinary short-wave bands and 5-meter band reception—8 tubes in all.

- 1—Set of four Hammarlund four-prong short-wave coils, 17 to 270 meters.
- 1—Four-prong broadcast coil, 250 to 560 meters.

CORNELL-DUBILIER

- 1—.006 mf. mica condenser.
- 2—.0001 mf. mica condensers.
- 2—.0005 mf. mica condensers.
- 4—.1 mf. tubular condensers.
- 4—.01 mf. tubular condensers.
- 1—Five-section dry electrolytic condenser (card-board container, 16 mf., 16 mf., 8 mf., 5 mf., 5 mf.).

ELECTRAD

- 1—Electrad 75,000 ohm potentiometer with switch.
- 1—Truvalt adjustable resistor, 100 ohms, 50 watts.
- 2—1,200 ohm vitreous enameled resistors.
- 1—600 ohm vitreous enameled resistor.
- 1—400 ohm vitreous enameled resistor.

RESISTORS

- 2—25,000 ohm carbon resistors.
- 5—1 meg. carbon resistors.
- 1—2 meg. carbon resistor.
- 3—200,000 ohm carbon resistors.

TUBES

- 3—6J7 tubes.
- 1—6C5 tube.
- 2—76 tube.
- 1—43 tube.
- 1—25Z5 tube.

MISCELLANEOUS

- 1—30 henry, 300 ohm filter choke.
- 3—Metal tube type screen-grid clips.
- 1—Dial.
- 4—Knobs.
- 1—Five-inch dynamic speaker.
- 1—Metal chassis 12 1/4" by 5" by 2 3/8".
- 1—Aluminum plate, 5 1/2" square.
- 1—Line cord and plug.
- 1—Roll hook-up wire.
- 1—Special five-meter coil.
- 4—Octal wafer sockets.
- 2—Five-prong wafer sockets.
- 2—Six-prong wafer sockets.
- 1—Four-prong coil socket.
- 1—Single-pole, double-throw rotary switch.

tube filaments are connected in series. Hence, the same current flows in all the tube filaments and the actual power consumption is about 34.5 watts. Since 86 volts out of the total line voltage of 115 is required for the eight tubes, the energy dissipated in the 100 ohm limiting resistor (for 5-tube line-up, 140 ohms approximately in limiting resistor is used) is only about one-fourth of the total power consumption, so that the efficiency of this set is nearly 75 percent.

Rectification is accomplished by a 25Z5 tube, which supplies rectified current to the speaker field and rectified filtered current to the plates and screen grids of the other seven tubes. The required filtering is readily attained with the usual 300 ohm, 30 henry choke, bypassed by electrolytic condensers.

Constructional Details

The receiver is built on a metal chassis 12 1/4" by 5" by 2 3/8" high. An aluminum plate 5 1/2" square is mounted on the front of the chassis at the right and serves to support the .00014 mf. variable condenser and the tuning dial. The dynamic speaker is mounted above the chassis at the left of this plate. The only other parts above the chassis are the tubes, the filter choke and the grid leak and grid condenser which function with the regenerative detector. The potentiometer, the .00005 mf. variable condenser for the five-meter section and the rotary change-over switch are mounted on the front chassis wall below the dial. The multi-section electrolytic condenser

JUST TOUCH BUTTON

LATEST 18-TUBE MIDWEST TUNES ITSELF BY ELECTRIC MOTOR!



FACTORY TO-YOU

only \$39.95 LESS TUBES

NEW LOW BASE PRICE CHASSIS

30 DAYS FREE TRIAL

ONLY

Midwest offers

MOTORIZED Tuning!

Just touch buttons (on top of radio) . . . and their corresponding stations flash in! Zip . . . Zip . . . Zip . . . 9 stations in 3 seconds. World-wide reception up to 12,000 miles. Super-power and 101 advanced features bring in weak, distant foreign stations like locals.

Famous Midwest factory-to-you plan enables you to buy at wholesale price . . . to save up to 50% . . . to enjoy 30 days FREE trial in your own home.

Send for FREE 1938 Catalog

MIDWEST RADIO CORPORATION

Dept. FF-14 Cincinnati, Ohio

PASTE COUPON ON 1¢ POSTCARD . . . OR WRITE TODAY!

MIDWEST RADIO CORPORATION
Dept. FF-14 Cincinnati, Ohio
Name _____
Address _____
Town _____ State _____
Send me your new FREE catalog and complete details of your liberal 30-day FREE trial offer.
(Special offer and prices prevail only when dealing direct with factory by mail.)
User Agents Make Easy Extra Money. Check Here ☐ for details.
☐ Check Here for 1938 BATTERY catalog

6 BACK NUMBERS SHORTWAVE CRAFT MAILED PREPAID 70c

For a limited time only, and as long as they last, we will send you six back numbers of SHORT WAVE CRAFT assorted, your choice, for 70 cents.

The usual price for six copies would be \$1.50 and most publishers charge a higher price for back numbers over one year old. We can supply only the following back numbers: Dec. 1930; Feb., April, June, Oct. 1931; Oct., Nov., Dec. 1933; Jan., Feb., Mar., April, May, June, July, Aug., Sept., Oct., 1934; 1935—All issues except January; 1936—All issues; 1937—All issues to date.

If you do not specify copies we will use our own judgment in sending assorted numbers to fill your order. Note we cannot exchange the copies for ones that have been sent to you.

Practically every copy of SHORT WAVE AND TELEVISION contains important information that you should have. Here is a chance to get those copies. As we have only a small supply of back numbers on hand, this offer will be withdrawn as soon as they have been sold.

We accept U.S. stamps, U.S. coin, or money order. Rush your order today.

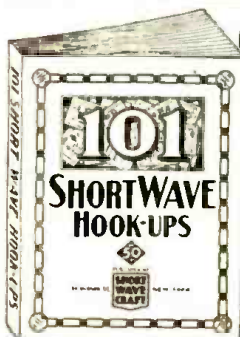
SHORT WAVE & TELEVISION

99-101 Hudson Street, Dept. 11-37, New York, N. Y.

Please mention SHORT WAVE & TELEVISION when writing advertisers

SHORT-WAVE BOOKS WITH WORLD-WIDE REPUTATION

You must go a long way to buy better books on short waves than you find on this page. Each book has been written by a well-known authority on short waves... each book carefully illustrated with photographs and diagrams to make this field of radio simpler. The volumes are the *finest books on short-waves today*. Order one or more copies... find out for yourself how instructive they are. Prices are postpaid.



101 SHORT-WAVE HOOKUPS

Each diagram illustrated is accompanied by a thorough text explanation. What parts are required, coil-winding information, values of resistors, etc., in fact, everything needed to build the set or to look up the data required.

All the important sets which have appeared in print during the past few years are in this book. Sets such as the Doerle, Dinsmore, the "19" Twinplex, Oscilodyne, Denton, "Stand-by," Megadyne Triple X 2, "Globe-Trotter," 2-Tube Superhet, Minidyne, "Loop"

100 Illustrations, 72 Pages,
Stiff, flexible covers

Receiver, "Doerle" 2-tube Battery, "Doerle" 3-tube Battery, "Doerle" 2-tube A.C., "Doerle" 3-tube A.C., Doerle "Signal Gripper," Duo R.F. 4-tube Receiver, The Sargent 9-33 Tapped Coil Receiver, Globe-Girdler 7, The 2-Tube "Champ"—2 Tubes Equal 3, Ham-Band "2-Tube Pee-Wee" Wyeth All-Way 6, Denton Economy 3, 2-Tube "Regenerative-Oscilodyne" will be found here, with full descriptions. In many cases, we have included a picture hook-up in addition to the regular symbolic hook-up.

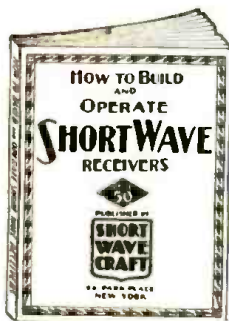
50c

HOW TO BUILD AND OPERATE SHORT-WAVE RECEIVERS

This is the most up-to-date hook on the subject. It has been 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.

150 Illustrations,
72 Pages, Stiff,
flexible covers

50c



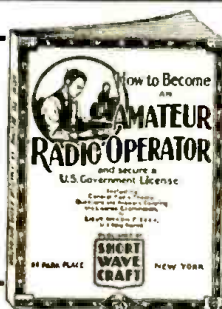
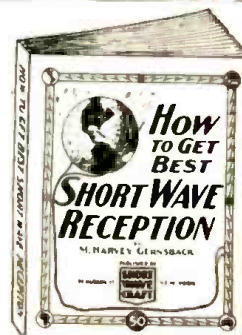
How to Get Best Short-Wave Reception

The author, a professional radio listener for many years, gives you his long experience in radio reception and all that goes with it. Why is one radio listener enabled to pull in stations from all over the globe, even small 100 watters, 10,000 miles away, and why is it that the next fellow with much better and more expensive equipment, can only pull in powerful stations? The reason is intimate knowledge of short waves and how they behave. Here are the chapters of this new book:

1. What are Short Waves and what can the listener hear on a short-wave receiver or converter?
2. How to tune and when to listen in on the short waves.
3. How to identify short-wave stations.
4. Seasonal changes in short-wave reception.
5. Types of short-wave reception.
6. Aerial systems for short-wave receivers.
7. Verifications from short-wave stations.

40 Illustrations,
72 Pages, Stiff,
flexible covers

50c



HOW TO BECOME AN AMATEUR RADIO OPERATOR

We chose Lieut. Myron F. Eddy to write this book because his experience in the amateur field has made him pre-eminent in this line. 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—this is the book you must get.

Ways of learning the code. A system of sending and receiving with necessary drill words. Concise authoritative definitions of radio terms, units and laws, brief descriptions of commonly used pieces of radio equipment. Graphic symbols used to indicate the various parts of radio circuits. General radio theory as it applies to the beginner. The electron theory is briefly given, then waves—their creation, propagation and reception. Fundamental laws of electric circuits, particularly those used in radios. Descriptions of modern receivers that are being used with success by amateurs. You are told how to build and operate these sets. Amateur transmitters. Diagrams with specifications are furnished so construction is made easy. Power equipment that may be used with transmitters and receivers, rectifiers, filters, batteries, etc. Regulations that apply to amateur operators. Appendix which contains the International "Q" signals, conversion tables for reference purposes, etc.

150 Illustrations, 72 Pages.
Stiff, flexible covers

50c

The Short-Wave Beginner's Book

Here is a book that solves your short wave problems. It is the only low-priced reference book on short waves for the beginner. The book is profusely illustrated—it is not "technical." It has no mathematics and no technical jargon.

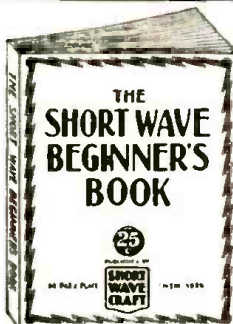
It also gives you a tremendous amount of important information, such as time conversion tables, all about aerials, noise elimination, all about radio tubes, data on coil winding and other subjects.

PARTIAL LIST OF CONTENTS

Getting Started in Short Waves—Symbols, the Short Hand of Radio—Short Wave Coils—Short Wave Aerials.
The Transposed Lead-In for reducing Static.
The Beginner's Short-wave Receiver.
How to Tune the Short-Wave Set.
Audio Amplifiers for S-W Receivers.
Learning the Code.
Wave length to Kilocycle Chart.
Wire Chart—to assist in the construction of coils.

75 Illustrations, 40 Pages.
Stiff, flexible covers

25c



Ten Most Popular Short-Wave Receivers

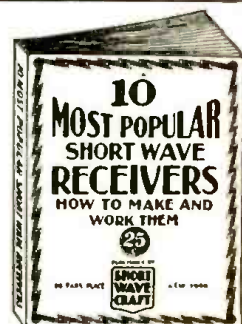
HOW TO MAKE AND WORK THEM

SHORT WAVE CRAFT Editors selected ten outstanding short-wave receivers. Each receiver is fully described and illustrated with photographs, hook-up and all workable specifications. Everything from the simplest one-tube set to a 5-tube T. R. F. receiver. Complete lists of parts.

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 T. R. F., by Clifford E. Denton and H. W. Seer.
My De Luxe S-W Receiver, by Edward G. Ingram.
The Kinnear 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.
Denton 2-Tube All-Wave Receiver, by C. E. Denton.
The Denton "Stand-by," by Clifford E. Denton.
The "Stand-by" Electrified.
A GOAT-POCKET Short-Wave Receiver, by Hugo Gernsback and Clifford E. Denton.
The S.W. PENTODE-4, by H. G. Cisin, M. E.
Louis Martin's Idea of A GOOD S-W RECEIVER, by Louis Martin.

75 Illustrations, 40 Pages.
Stiff, flexible covers

25c



All the books shown on this page are published exclusively by

SHORT WAVE & TELEVISION

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

CLIP-MAIL

SHORT WAVE AND TELEVISION, 99-101 Hudson Street, New York, N. Y. SWT-11-37

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

- | | |
|---|--|
| () How to Get Best Short-Wave Reception..... 50c each | () How to Become an Amateur Radio Operator..... 50c each |
| () 101 Short-Wave Hook-Ups..... 50c each | () Ten Most Popular Short-Wave Receivers, How to Make and Work Them..... 25c each |
| () How to Build and Operate Short-Wave Receivers..... 50c each | () The Short Wave Beginner's Book..... 25c 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.)

OVERSEAS READERS!

These books can be obtained from the following houses:

GREAT BRITAIN
Gorrings
9a, Green Street, Leicester Square
London, England
FRANCE
Editions Radio
42 Rue Jacob
Paris
AUSTRALIA
McGill's
183-195, 218 Elizabeth St.
Melbourne, C. I.

Please mention SHORT WAVE & TELEVISION when writing advertisers

Short Waves and Long Raves

(Continued from page 396)

Were of 100% Assistance!

Editor, SHORT WAVE & TELEVISION:

I appreciate your fine magazine. I have been DXing and experimenting since way back in 1922, and have been reading *Short Wave & Television* regularly for over two years, and can say it has been of one-hundred per cent assistance to myself and club mates.

I would like to record my vote for the continuation of that very fine article, "Let's Listen In" with Joe Miller, King of DXers. It will be of help to us DXers down by the old South Pole!

W. C. BARRON,
RA 724,
7 St. George's Gate,
Wanganui, New Zealand.

A Bouquet from Australia

Editor, SHORT WAVE & TELEVISION:

This is the first time I have written you, and wish to say that I have read your "F.B." magazine for the past two years, and find it the best short-wave magazine in print.

I would like to have some *Short Wave & Television* readers write me, and I will answer their letters promptly.

MAURICE TIERNEY,
62 Connemarra Street,
Bexley, N.S.W.,
Australia.

He's Glad to See "Television" Included

Editor, SHORT WAVE & TELEVISION:

Allow me to express in a few words my appreciation of your magazine.

I wish to congratulate you on the past success and feel sure that you will do for *Television* in the future, what you did for *Wireless* in the past. As an interested reader I have long felt the need of a publication that would keep one well informed with the up-to-date developments in this field, and therefore appreciate this change.

Three cheers for *Short Wave & Television*.

Yours,
J. Esterhagen,
221 7th Avenue,
Bez. Valley,
Johannesburg, South Africa.

Book Review

RADIO STARS OF TODAY, by Robert Eichberg. Cloth covers; size 8x11 inches; 218 pages + xiii; profusely illustrated with 275 unusual pictures of radio stars and stations. Published by L. C. Page Co., Boston, Mass.

Every radio listener will thoroughly enjoy this volume by Mr. Eichberg, who has given us a very interesting and personal story of the famous radio stars. Most of the material has been obtained from personal interviews with the stars and some of the chapters scintillate with personal charm. For instance, the chapter giving Mr. Eichberg's interview with Lily Pons.

If you want to know all of the inside information about the radio stars—how much some of them earn, what their hobbies are, whether they are married or single, and dozens of other personal questions which practically everybody is curious about—then this book by Robert Eichberg is the one you want.

One of the most attractive features of this large sized, finely printed book is the collection of unusual photos of radio stars, which were personally selected by the author and many of which have never appeared in public print. This book will provide many an interesting half-hour's reading and we can highly recommend it to any radio "fan."

In addition to complete coverage of the principal stars, programs and broadcasting stations, this book devotes a considerable portion of its space to activities on the short waves. There is a section which outlines the history of the "hams" and tells something of their current activities. Another section describes in detail some of the more sensational police radio cases,



ELGIN

"Air Roamer III"

3-TUBE RECEIVER

Completely outclasses any receiver of similar design. Reaches out and pulls in signals from all parts of the world. Plug-in coils, the most efficient system for shortwave tuning, are employed. The coils furnished with the receiver tune from 15 to 550 meters. Additional coils may be purchased to tune from 975 to 15 and 550 to 2000 meters. Four tube performance is obtained from the three used. 1-6F7 combination detector and 1st audio feeds into a 43. A 25Z-1 is used for rectification. A 5" dynamic speaker capably handles the full output.

Complete Kit of Parts, less tubes, cabinet, extra coils, unwired.....

Set of matched tubes.....

Wiring, extra.....

Metal Cabinet.....

\$1.50 9 1/2-15 meter coil.....

\$1.25 350-2000 meter coils.....

\$2.08

\$.29

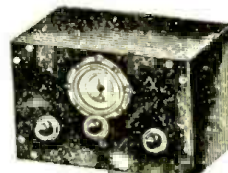
\$.89

\$8.12

"Buddy" II S.W. 2-Tube Receiver

Operates on either A.C. or D.C. Makes use of 1-6J7 metal tube and 1-12A7 as a combined rectifier and pentode output tube. Furnished with four plug-in coils which tune from 15 to 200 meters. Additional coils to extend the ranges down to 9 1/2 and up to 2000 meters are available.

Complete kit of parts including pictorial and schematic wiring diagrams, unwired, less tubes, cabinet and additional coils.....\$4.95
Wiring and testing, extra.....1.25
2 Matched Sylvania tubes.....1.75
Crystallized metal cabinet......95
9 1/2-15, and 200 to 2000 meter coils.....1.47



Send for New
1938 Catalog

TRY-MO RADIO CO., INC.
85 CORTLANDT ST., N. Y. C.

CLASSIFIED

Advertisements are inserted at 5c per word to strictly amateurs, or 10c a word to manufacturers or dealers. Each word in a name and address is counted. Cash should accompany all orders. Copy for the December issue should reach us not later than October 5.

AGENTS WANTED

SIGN LETTERS FOR STORE AND
Office Windows; 500% profit. Free Samples. Metallic Co., 446 N. Clark, Chicago.

"HAM" OFFERS AND WANTS

MANY BARGAINS SUPER-SEVEN
Skyrider \$29.50; Chief \$34.50; Me-Murdo Silver Prof. 5e 8 tube with Xtal \$34.50; Duerte Sr. \$12; W. E. and RCA Condenser Mikes \$15; \$10 Mike-stand with ring \$3.50. Canoid Camera Bargains, sell or trade. Wells-Smith Radio Corp., 71 E. Adams Street, Chicago, Ill.

SKY-BUDDY: VERY SLIGHTLY
used. All cond. \$23.50. Oliver Douglass, 6693 Bantry, Cincinnati, O.

MASTERPIECE IV, LIKE NEW;
cabinet \$85. Owner, 1711 Riverside Ave., Muncie, Ind.

WANTED: USED CANDLE
Teleplex code course. Munson, 151 Quincey, Brooklyn.

INSTRUCTION

LEARN MORSE CODE. NEW
method brings voice of teacher and live messages into your own home. Complete practical course with album of records, text and electric key set—\$15. Send for circular SW. Linguaphone Institute, Rockefeller Center, New York.

COMPLETE TRAINING FOR ALL
Amateur and Professional Radio Licenses. New York Wireless School, 1123 Broadway, New York.

MISCELLANEOUS

WE ORIGINALLY HAD FIVE
thousand Stoppant Compasses for which the U.S. Government paid over \$30.00 each. We sold all but a very few. We cannot obtain more to sell at three times our present price. Send in your order before they are all sold at \$4.50 each, postage paid. Gold Shield Products, Room 14, Eleventh floor, 99 Hudson St., New York City.

COIL INDUCTANCE CHARTS—
complete set for any size coil; accurate; \$2.15 prepaid. Slide Rules—4 inch circular metal type \$2.00; 8" dia., 20" scale, \$5.00 prepaid. Dataprint Co., Box 322, Ramsey, N.J.

PATENT ATTORNEYS

INVENTORS, ALL PATENT AND
trademark cases submitted given personal attention by members of the firm. Form "Evidence of Conception" and instructions free. Lancaster, Alwine & Rommel, 436 Bowen Building, Washington, D. C.

QSL-CARDS-SWL

100 NEAT SWL CARDS PRINTED
with your name and address sent postpaid for \$1. (Bunch of samples and RST chart for five cent stamp. WHITE, 16 Stockbridge, Lowell, Mass.

QSL CARDS, 2 COLORS, 75
Cents per 100, postpaid. Radio Press, East Sullivan, N. H.

QSL, SWL CARDS, NEAT, AT-
tractive, reasonably priced, samples free. Miller, Printer, Ambler, Pa.

SALESMEN WANTED

MEN WITH CARDS TO SELL NEW
electric are welder to mechanics, repairmen, factories. Wholesale \$2.50. Five minute demonstration makes sales. Up to 150% profit. Trindl Products, 2225-11R Calumet, Chicago.

SHORT WAVE RECEIVERS

Sensational offer—Two tube short
wave radio completely wired and tested, two electric type tubes included, hand-spread tuning, enameled chassis—for limited time only—\$24.45 postpaid, less phones. Standard Radio Company, 186 William Street, N.Y.C.

Plans 36 Distance Record Crystal
Sets 50c; 18—25c; with "Radio Workbench." Laboratories, 151-A Liberty, San Francisco.

5 METER KITS \$1.59. GIFT:
stamp. Munson, 151 Quincey, Brooklyn.

SEE PAGE 340 ABOUT
RADIO AMATEUR COURSE
50c
At Your Radio Supply Store



FREE!! New 1938 Radio Catalog

SERVICEMEN—Radio Salesmen and Agents—
become a MODELL representative in your community without any investment. Earn up to \$100 a week in commissions selling Nationally Known Radios. Take orders from the largest and most complete catalog ever published, describing and illustrating the following 1938 makes: RCA—Philco—General Electric—Zenith—Motorola—Delco—Grunow—Crosley—Stromberg-Carlson—Kadette—Emerson. Join our nationwide organization. Territory is now being allotted to live wire men who are anxious to earn extra money in their spare time. Write for this big catalog and selling proposition today. No experience necessary.

Modell's Since 1889
AGENCY DIVISION Dept. K-1

CHICAGO, ILL. ATLANTA, GA. NEW YORK, N. Y.
56 W. Washington St. 57 Forsyth St. 58 Cortlandt St.

Please mention SHORT WAVE & TELEVISION when writing advertisers

IT'S BONUS TIME IN RADIO

Are You Getting
YOURS?

THIS year—Radio's banner year—ought to pay you a handsome bonus—\$25, \$50, \$100 EXTRA every month. But is it? Hundreds of Sprayberry trained men are making that much extra out of increased salaries, increased profits from their own businesses, from spare-time earnings. So can you.

BIG OUTFIT SENT

The Sprayberry course is complete. ADVANCED. Includes latest circuits and special series of spare-time BUSINESS BUILDERS. Also big PROFESSIONAL OUTFIT OF REAL RADIO TOOLS, TRIPLETT TESTER, 7-HIDER MANTLES, RBY ELECTRIC EYE, ETC.

EASY TO START

My terms, as low as \$3 a month, make it easy to start, easy to keep on, easy to collect big dividends as you go. New FREE BOOK, "More Money in Radio," fully explains. Get your copy. Write me, or use the handy coupon.

SPECIAL COURSE FOR SERVICEMEN

Servicemen—ask about my Special Course for YOU! Also fully explained in my big book, "More Money in Radio." Send for a copy—get complete facts.

MAIL NOW FOR FREE BOOK

F. L. SPRAYBERRY, Pres.,
SPRAYBERRY ACADEMY OF RADIO,
45-M, University Place, N. W., Washington, D. C.
Send me a FREE copy of "More Money in Radio,"
and facts about your new type of training.

Name AGE

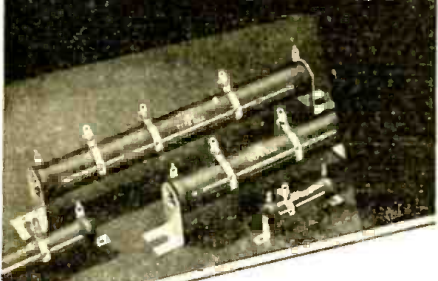
Address

City State

PASTE COUPON ON PENNY POSTCARD AND MAIL

I am interested in Service Course only, check here ☐

THEY'LL STAND THE OVERLOADS!



"IRC Cement Coated FOR DURABILITY"

Everywhere you'll find IRC Power Wire Wound Resistors specified for the most exacting industrial, aircraft, broadcasting, naval and commercial communications. They dissipate heat more rapidly; are built to stand heavy overloads, moisture, even salt water immersion—and have the added advantage of extreme mechanical strength. . . . A complete line of fixed and adjustable types for every need. Write for IRC Resistor Catalog No. 42.

INTERNATIONAL RESISTANCE CO.
401 N. Broad St.
Philadelphia, Pa.



TRANSMITTING POWER WIRE WOUNDS



\$175 A MONTH
Meet my student Joseph who says: "Now I'm in charge of the repair department of a big distributor—a permanent job. Thanks to your course, which was interesting and easy to understand, I'm making \$175 a month. You can do it too! Write today, get the facts!"

and quotes the heads of police radio chiefs in various cities, telling how their departments operate. Still another section covers the use of radio in aviation, and another considers ship radio, describing a number of thrilling rescues. All these sections are illustrated. Another valuable chapter is an interview with E. K. Cohan, chief engineer of the Columbia Broadcasting System, on "how to choose a radio receiver." Finally, there is a complete script of a "Jack Benny" broadcast, which shows how music, sound effects and informal "asides" are all carefully cued in.

The book is the most complete survey of broadcasting, though light in treatment, that has yet come to this reviewer's attention.

New Radio "Trouble" Charts

● HERE is a new idea—radio trouble shooting charts which show at a glance all the usual sources of noise or non-operation of a set. The first set of charts are for "Home" radio sets.

There is a separate card (printed on both sides) for each of the 8 common Home-radio trouble symptoms: 1. "Dead" Receiver; 2. "Intermittent" Reception; 3. "Fading"; 4. "Weak"; 5. Excessive "Hum"; 6. "Oscillation"; 7. "Noisy"; 8. "Distortion and Rattling."

For every one of these 8 trouble symptoms this device instantly directs you to what may be wrong in the: 1. Antenna System; 2. "A" Battery (if used); 3. "B" Battery (if used); 4. Tubes; 5. Receiver Circuits Proper; 6. Power Unit; 7. Loud Speaker; 8. General. Not only are the possible troubles listed, but now the "remedy" for each is given, and the exact test to make to definitely "spot" it is specified.

This "gadget" and twin for "auto" radio sets were prepared by Alfred A. Ghirardi, well known for his books on trouble-shooting for radio servicemen.

The new "Auto" radio trouble-shooting guide "Spots" 444 different troubles in auto-radio receivers and installations.

It contains a separate card (printed on both sides) for each of the following 11 common Auto-radio trouble symptoms: 1. "dead" Receiver; 2. "Intermittent" Reception; 3. "Fading"; 4. "Weak"; 5. Excessive "Hum"; 6. "Oscillation"; 7. "Distortion and Rattling"; 8. "Noisy" (when both car and engine are at rest); 9. "Noisy" when car is at rest with engine "idling"; 10. "Noisy" (when car is driven normally); 11. "Noisy" (when car is "coasting" with ignition off).

Let's Listen In

(Continued from page 390)

J5CC, 14430, Japan, heard once.
VS3AE, 14350 and 14370, operated by the Sultan of Johore, in the Non-Federated Malay States, reported often between 8-10 a.m. Also reported on 14240.

XU8MT, 14030, Shanghai, reported.
PK4WS, 14360, Sumatra, using this new frequency heard near 8-10 a.m.

VS7RA, 14130, Ceylon, reported by our Stamford DX Hound, Dave Styles, at 6:45 a.m., in QSO with K4SA. FB DX for East. Dave! Dave also reports VS2AK; that's real DX!

Continuing the Asiatic DX review.
XZ2DY, 14340, and XZ2JB, 14152, latter with 9 watts. This reported to Ashley Walcott by VK2ABG and W6ITH.

Also XU8SG, 14130, J2LU, 14260; all these Asiatics reported can be tuned for near 6-7 a.m.

Of the Africans, the West Coast seems to have by far the best of it, as Mr. Walcott sends in the following large list, some of which we hope to snare this November on 20:

ZE1JN, N-November, 14354; ZE1JR, 14255 and 14044, ZE1JA, 14320, all in Southern Rhodesia.

ZS1B, 14065; ZT2L, 14270; ZT2G, 14255; ZT2B, 14025; ZS1U, near 14290; ZT5P, 14060; ZS5AB, 14050; ZS6AJ, 14130; ZS6S, 14252; ZT6AK, 14030; ZT6AY, 14340; ZS6T, 14310; ZT6J, 14270; ZU6P, 14125; ZU6N, 14110.

According to ZT6AK, and ZU6N, the "Golden Voice of Madagascar," FB8AB is on 14348 every Sun. a.m., also at times during the week, looking for W stations, though FB8AB hasn't had any luck yet.

Other Africans heard: SU1WM, 14100, Egypt; CN8HA, 14210, Morocco; FA3HC, 14350, Algeria, 5 p.m. by Pedro Rodriguez and Ralph Gozen.

Miscellaneous DX: HA1M, 14350, Budapest, Hungary, heard here one morning at 12:38 a.m. in QSO with W2IXY.

Also, HA8N, 14130, Budapest, heard FB at 6:50 p.m., announcing H-Honolulu, A-America, No. 8, N-Norway.

Index to Advertisers

A	
Aerovox Corporation	374
Allied Engineering Institute	380, 388
Allied Radio Corporation	389
Astatic Microphone Laboratory, Inc.	374

B	
Bliley Electric Co.	374
Brush Development Co., The	380
Bud Radio, Inc.	390

C	
Cameradio Co.	386
Candler System Co.	384
Cannon, C. F., Company	390
Capitol Radio Engineering Institute	381
Classified Advertisements	399
Cornell-Dubilier Corp.	387
Coyne Electrical School	339
Crosley Radio Corporation, The	376

D	
Dataprint Company	390
Dodge's Institute	33

E	
Eilen Radio Laboratories	375

F	
First National Television, Inc.	395
Fleron, M. M., & Son, Inc.	384

G	
Gadgets Magazine	392
Goldstone Radio Co.	380
Gold Shield Products Co.	384

H	
Hallcrafters, Inc., The	Back Cover
Hammarlund Manufacturing Co., Inc.	391

I	
Instructograph Company	384
International Resistance Co.	400

K	
Kenyon Transformer Co., Inc.	374
Korrol Radio Products Co.	380

M	
McElroy, T. R.	384
Meissner Mfg. Co.	386
Midland Television, Inc.	383
Midwest Radio Corporation	397
Modell's	399

N	
National Company, Inc.	Inside Back Cover
National Radio Institute	337
National Schools	384
New Idens	390
New York Y.M.C.A. Schools	383

P	
Par-Metal Products Corporation	381

R	
Radio Amateur Course	340
Radio & Technical Publ. Co.	382
Radio Constructors Laboratories	379
Radio Craft	392
Radio Publications	392, 394
Radio Technical Institute	384
Radio Training Assn. of America	384
Raytheon Production Corporation	385
RCA Institutes, Inc.	384
RCA Manufacturing Company, Inc.	Inside Front Cover

S	
Sargent, E. M., Co.	381
Short Wave Coil Book	388
Short Wave League	396
Solar Mfg. Corp.	380
Sprayberry Academy of Radio	400
Standard Transformer Corporation	386
Superior Instruments Company	387

T	
Teleplex Co.	382
Triplett Electrical Instrument Co.	393
Tri-State College	383
Try-Mo Radio Co., Inc.	399

U	
Ultra High Frequency Products Co.	377
United Radio Company	388
Utah Radio Products Co.	380

W	
Wellworth Trading Company	380, 388
Wholesale Radio Service Co., Inc.	373

(While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.)

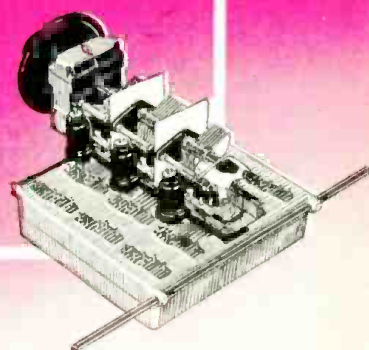
Please mention SHORT WAVE & TELEVISION when writing advertisers



No need to flatter the NC-100 in rosy terms on *this* page! Short Wave & Television readers know its advanced design and brilliant performance. They have proved its uncanny ability to pull weak signals into the clear under even the most adverse conditions. And they have appraised its dollar value and found it a wise investment.

NATIONAL NC-100X

NATIONAL COMPANY, INC.
MALDEN, MASS.



the hallicrafters

AMERICA'S MOST COMPLETE LINE OF COMMUNICATIONS RECEIVERS!

SUPER SKYRIDER

ULTRA SKYRIDER

SKY CHALLENGER

SKYRIDER COMMERCIAL

SKY CHIEF

SKY BUDDY

There's a precision-engineered Hallicrafters Receiver for every amateur or short wave listener, whether he's just a beginner on the air or an "Old Timer" who is playing with 5 meters, and whatever the state of his purse!

All Hallicrafters Receivers available on liberal time payments through your dealer.

Write for illustrated booklet fully describing the Hallicrafters Line.

Hallicrafters Receivers are licensed by RCA and Hazeltine.

AMERICA'S LEADING MANUFACTURER OF COMMUNICATIONS RECEIVERS

the hallicrafters inc.

2601 INDIANA AVENUE, CHICAGO, U. S. A. • CABLE ADDRESS "Hallicraft" CHICAGO