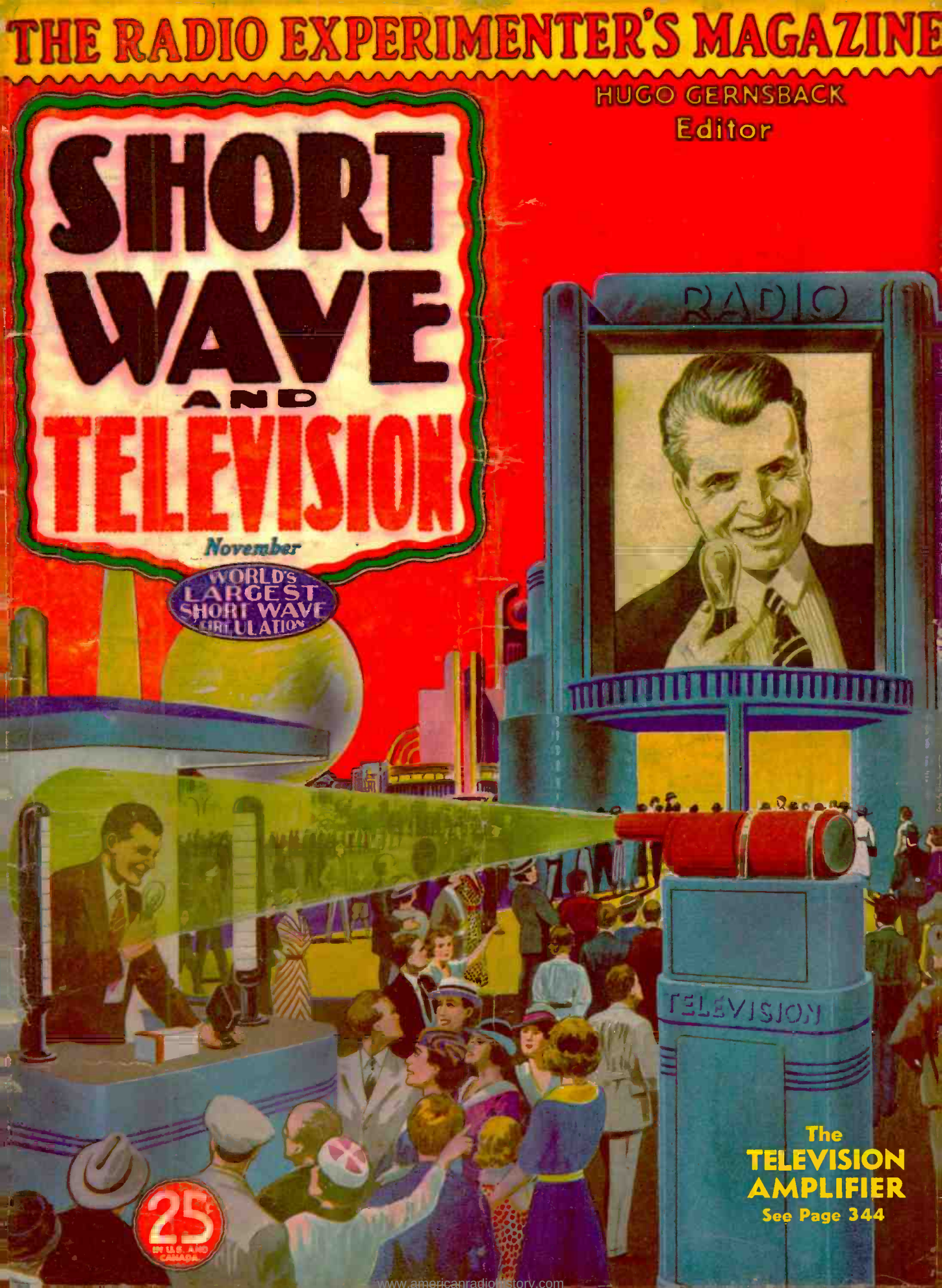
THE RADIO EXPERIMENTER'S MAGAZINE

HUGO GERNSBACK
Editor

SHORT WAVE AND TELEVISION

November

WORLD'S LARGEST SHORT WAVE CIRCULATION



25¢ IN U.S. AND CANADA

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 LOUDSPEAKER

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 9½" wide. Compare this with the usual ¼" 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 sensation 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

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 convincers 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 training of more men for the Radio Industry than any other man in America.

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

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.

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. FROEHNER, 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 COSTA, 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

GOOD FOR BOTH 64 PAGE BOOK SAMPLE LESSON FREE

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

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

IN THIS ISSUE: PROMINENT SHORT-WAVE AND TELEVISION AUTHORS

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

SHORT WAVE AND TELEVISION

HUGO GERNSBACK
Editor

H. WINFIELD SECOR
Managing Editor

GEORGE W. SHUART, W2AMN
Associate Editor

Combined With

Official SHORT WAVE LISTENER

Contents for November, 1937

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.

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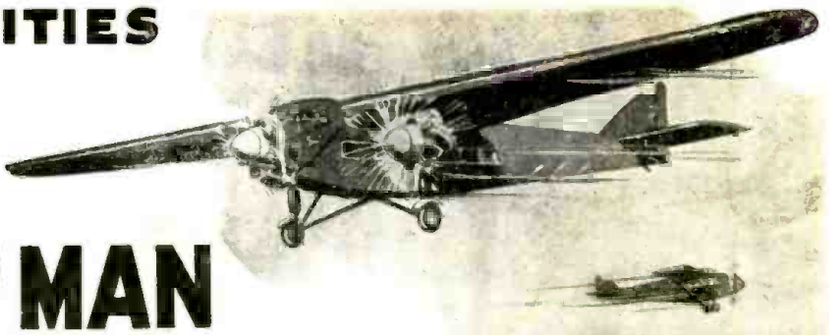
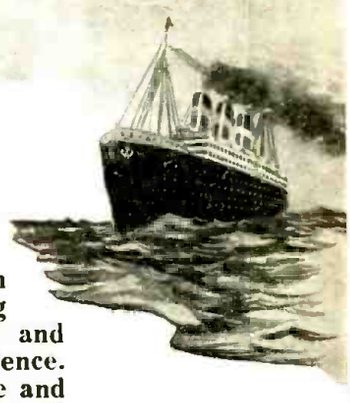
MANY OPPORTUNITIES FOR THE COYNE TRAINED RADIO MAN



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.

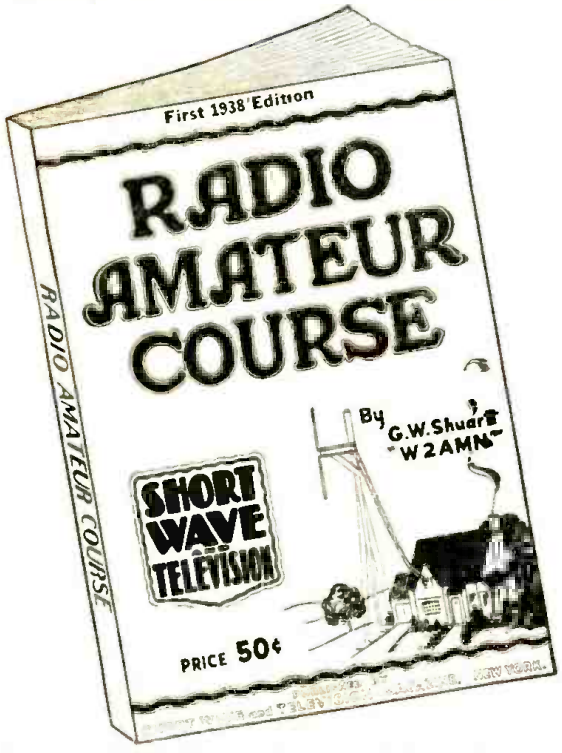
Dear Mr. Lewis:—Send me your Big Free Radio Book, and all details of your "Pay After Graduation" Plan **including valuable instruction in Electric Refrigeration, Air Conditioning and Automobile Electrical Work.**

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

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CALIFORNIA

Scott Wholesale Radio Co.,
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Offenbach Electric Co., Ltd.,
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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.

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,
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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.

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.

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

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

MEXICO

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

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

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 50c, 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.)

HUGO GERNSBACK, EDITOR H. WINFIELD SECOR, MANAGING EDITOR

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 various 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*.

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.

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)

Eleventh of a Series of "Guest" Editorials

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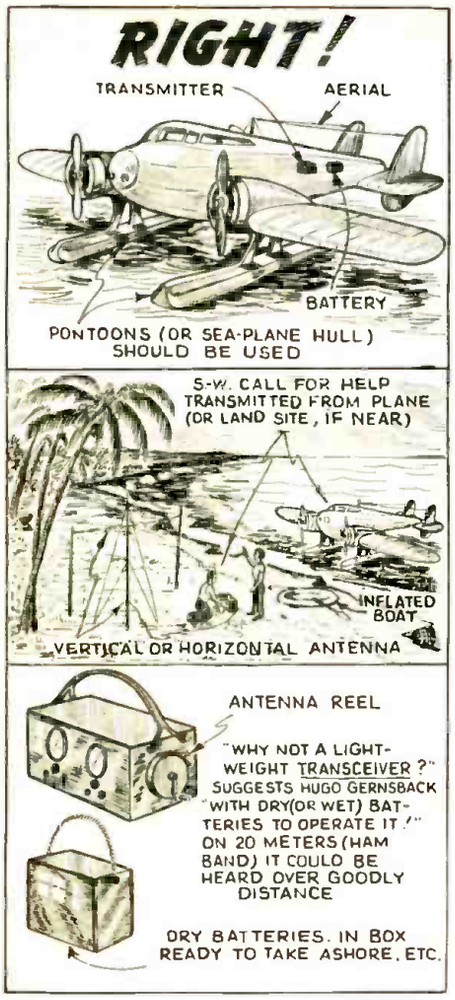
How Short Waves Could Have Saved Miss Earhart

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.



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 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.

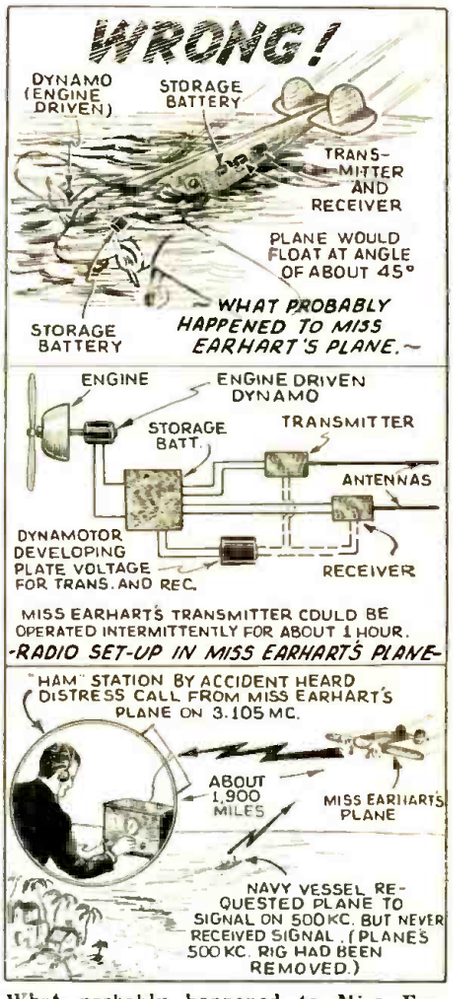
It may be argued that pontoons on a plane are not classifiable as radio equipment, but if operation of the radio in emergency is absolutely dependent upon pontons, it may equally be argued that the radio is not complete without pontoons.

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)

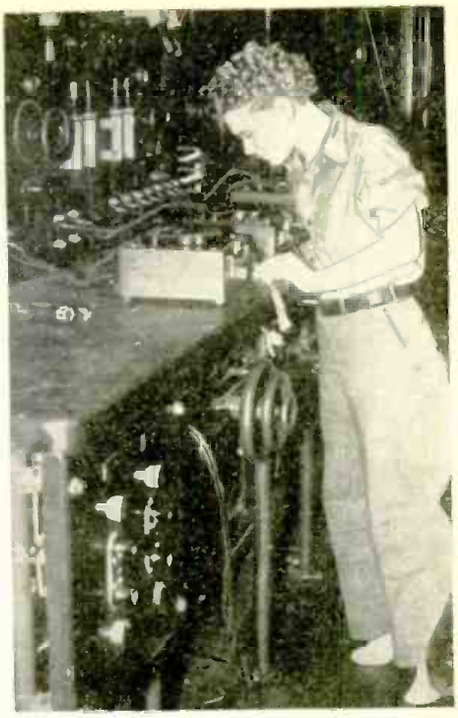


What probably happened to Miss Earhart's plane—with no pontoons the dynamo and probably the storage batteries also were quickly put out of commission. A "ham" heard the only authentic distress call on 3.105 mc.

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.

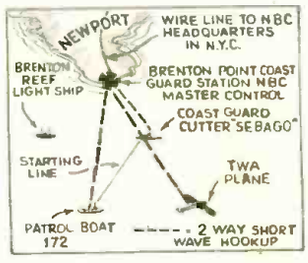
A peek into the television studio of the Farnsworth Co., at Philadelphia. The young lady's face is being made up for a televised scene, with the special colors found best for television reproduction. Image pick-up camera is seen at right of photo.



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 Spitalny'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 Aseanio and Carmen Serrano de Alfonzo. They are well-known to American S-W listeners.

Bernardire 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."

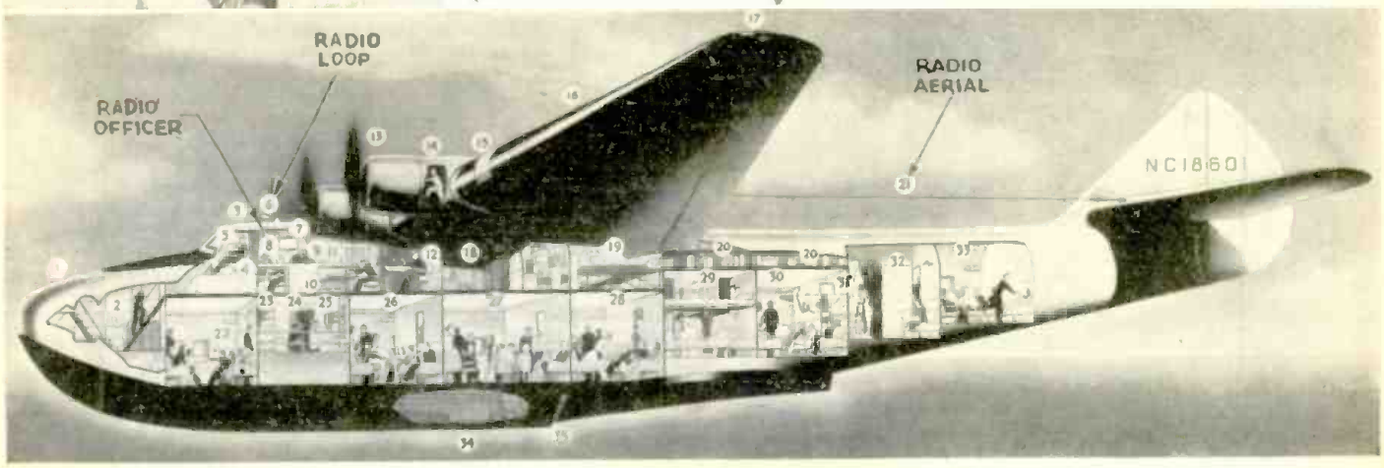


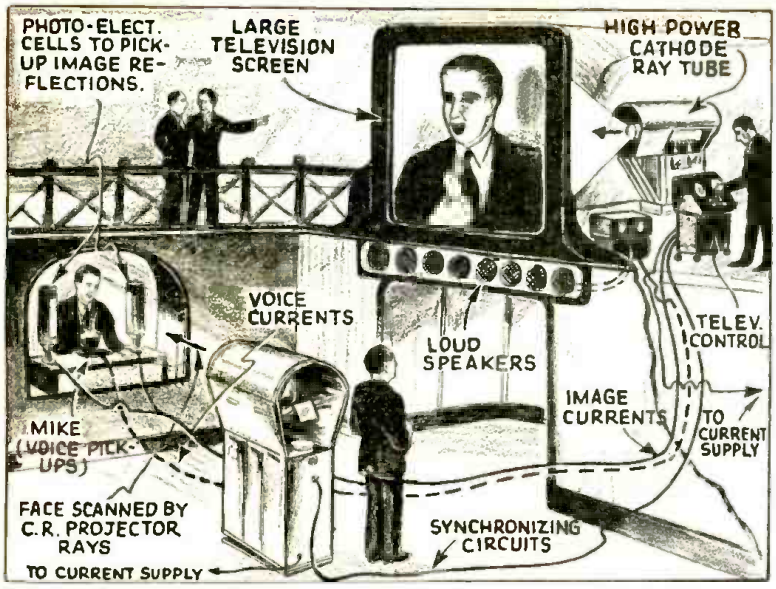
At left and above—Short-wave activities at the International Yacht races. Diagram shows "two-way" short-wave hook-up between observation boat, airplane and land station which carried description of the races to station networks.

Photo Courtesy Gen. Electric Co.

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.

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 demonstrater 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.

● 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.

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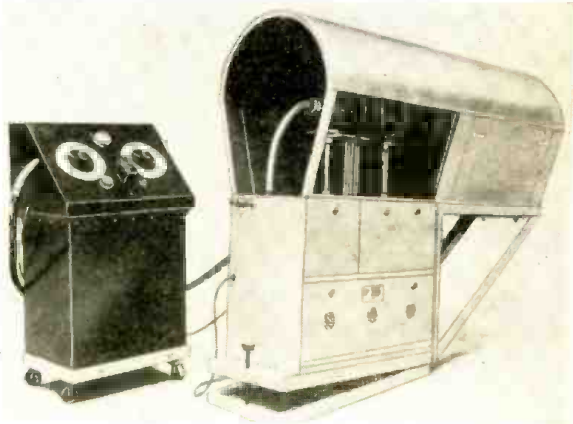
Left—Actual photo of reproduced image of the speaker's face. The lines visible in the photo are not noticeable in the actual image.



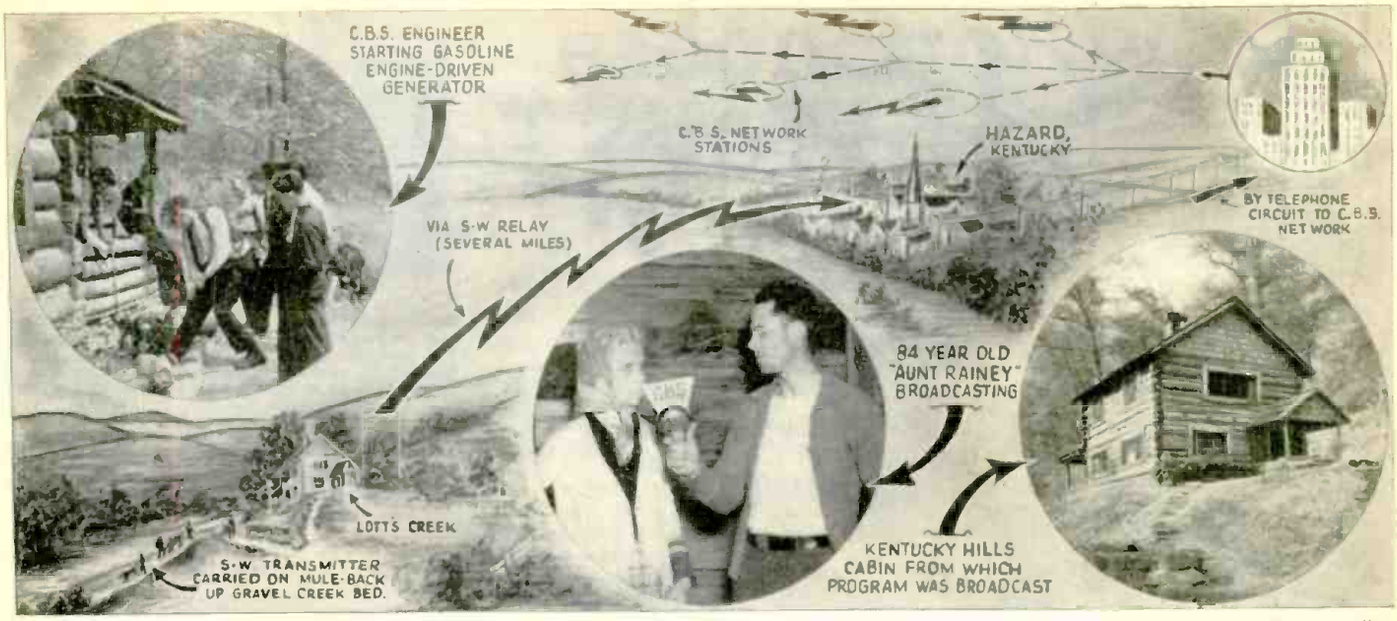
Special television image projector, with control unit at the left. It employs a plate potential of 20,000 volts and a powerful lens projects the image from the end of the tube onto the large screen.

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 consists 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.

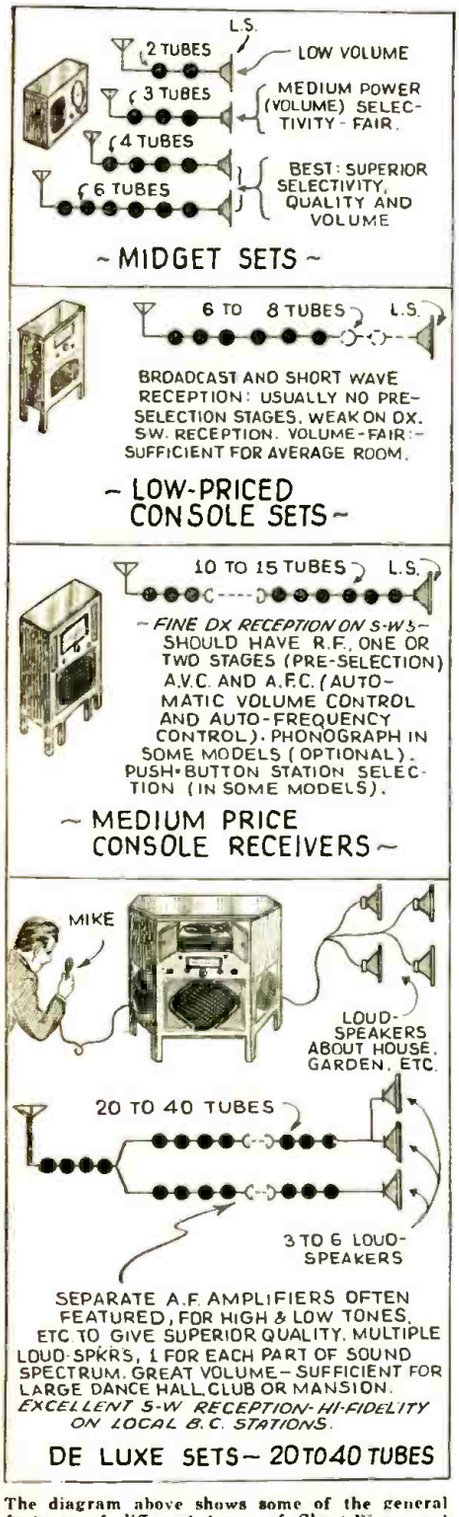
In 1910 rotary spark gaps were not used as extensively as they were at a later date, and fixed gaps were common. One of these fixed spark gaps can be seen in the accompanying picture. The louder the spark in those days, the more powerful the station, and the more respect all visitors had for the operator 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.

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

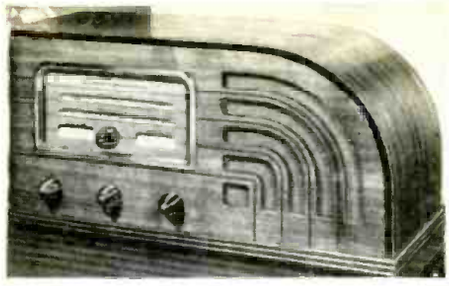
Ham stations often displayed a vast amount of electrical and other scientific apparatus, which of course, created a very awesome impression on those who entered the radio sanctum. It was undoubtedly true that many amateurs in those days, after visiting a station which had a (*Continued on page* 374)

How to Choose a Short-Wave Receiver

Including "All-Wave" Sets



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.



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 loudspeaker, so as to obtain good tone quality. Refer to No. 654.

By H. W. Secor

● 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 (oversea'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

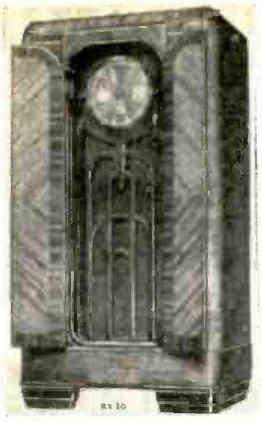
Leaving the field of *midget* receivers, we come to the person looking for a reasonably priced console set. Price, of course, is ever an important factor and the average customer does not want to be "sandbagged" into buying a $100.00 set, if he really has started out to look at sets in the $45.00 range. 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.

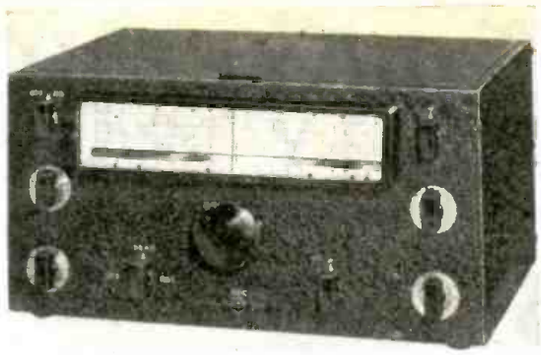
One of the leading companies makes a very good six-tube superhet, using the new metal tubes, and the writer has had a chance to observe several of these in the homes of his friends, and they have given excellent satisfaction. The quality has been noted as being very good, and on the *short-wave* band 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 ⅛" 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 multifrequency transmitter-receiver system.

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.

● 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 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 ¾ 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.

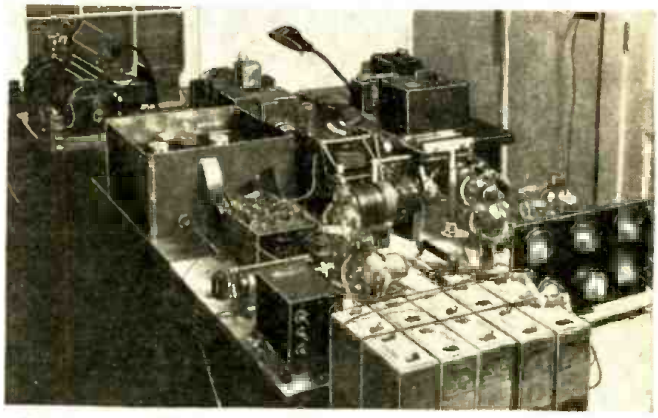


Fig. 3. A preliminary multifrequency automatic recorder of ionosphere heights and critical frequencies, originated at the National Bureau of Standards in 1932.

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 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)

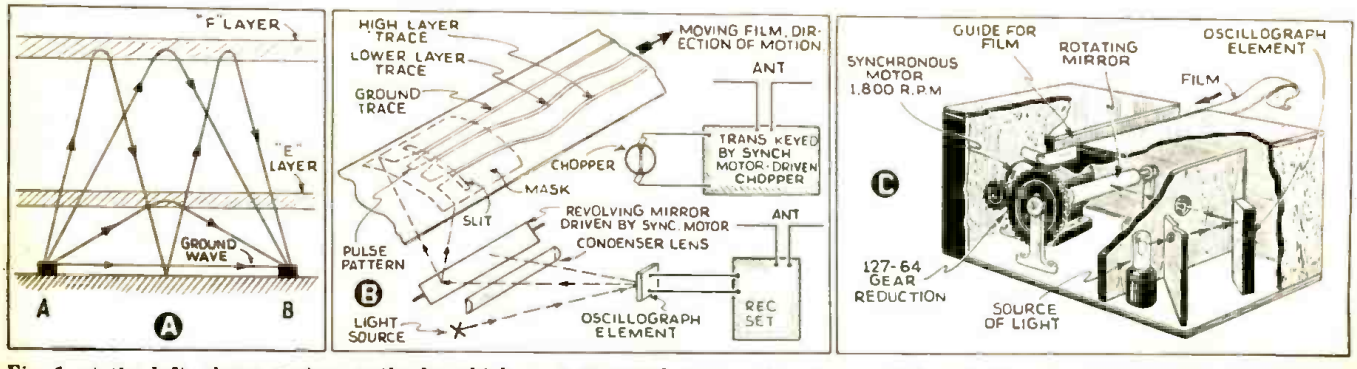


Fig. 1, at the left, shows various paths by which an S-W signal may arrive at a receiving station. Center, schematic diagram of system used with automatic layer-height recorder. Right—The assembled recorder with film driver and film container omitted.

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.

● 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.

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

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'sn.

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 aerials, 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.

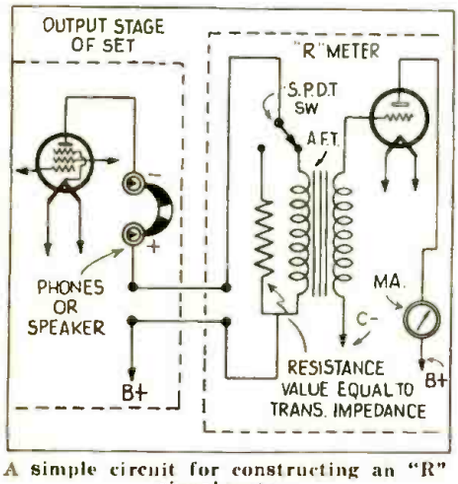
Hugh Carmichael's listening post in Belfast, Ireland.

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 desird.

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 always 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.

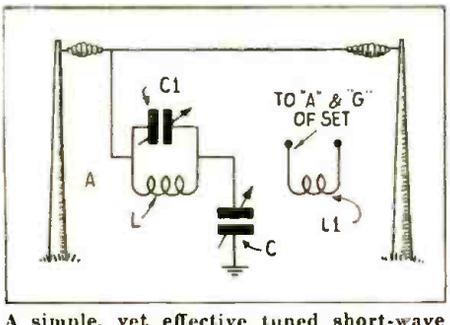
Such an aerial was described in a recent issue of *The Australasian Radio World (Sydney)*. It consisted of stranded aerial wire of a length of 75 ft. between points A and B in the accompanying sketch. The ground lead is as short as possible—C1 is 250 mmf.; C is 500 mmf.; L consists of 20 turns of 20 D.C.C. and L1 of 10 turns of 20 D.C.C. wire on a 1 in. diameter form. A space of ¼ 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 ¾-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 ¾-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.

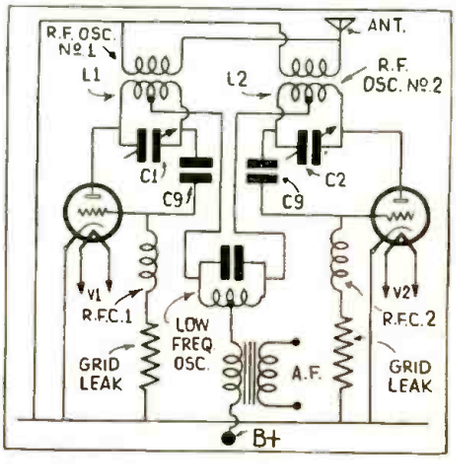
The only disadvantage of the system is the added controls which must be manipulated in tuning for distant stations—but this is a minor defect.



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 of 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

SHORT WAVE & TELEVISION 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 22½". The diameter of the base is 7¾". The diameter of the globe is 5¼". 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.

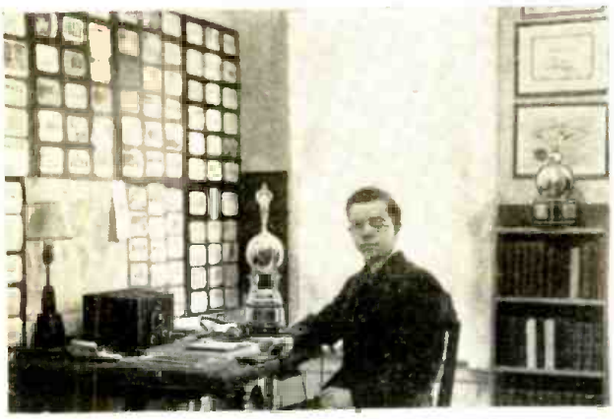
Closes Oct. 25th, when all veris from these countries must be in the Editor's hands.

Important! Note: the following special "continent" closing dates!

Contest closing Nov. 24th—North America (including Central America, 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."

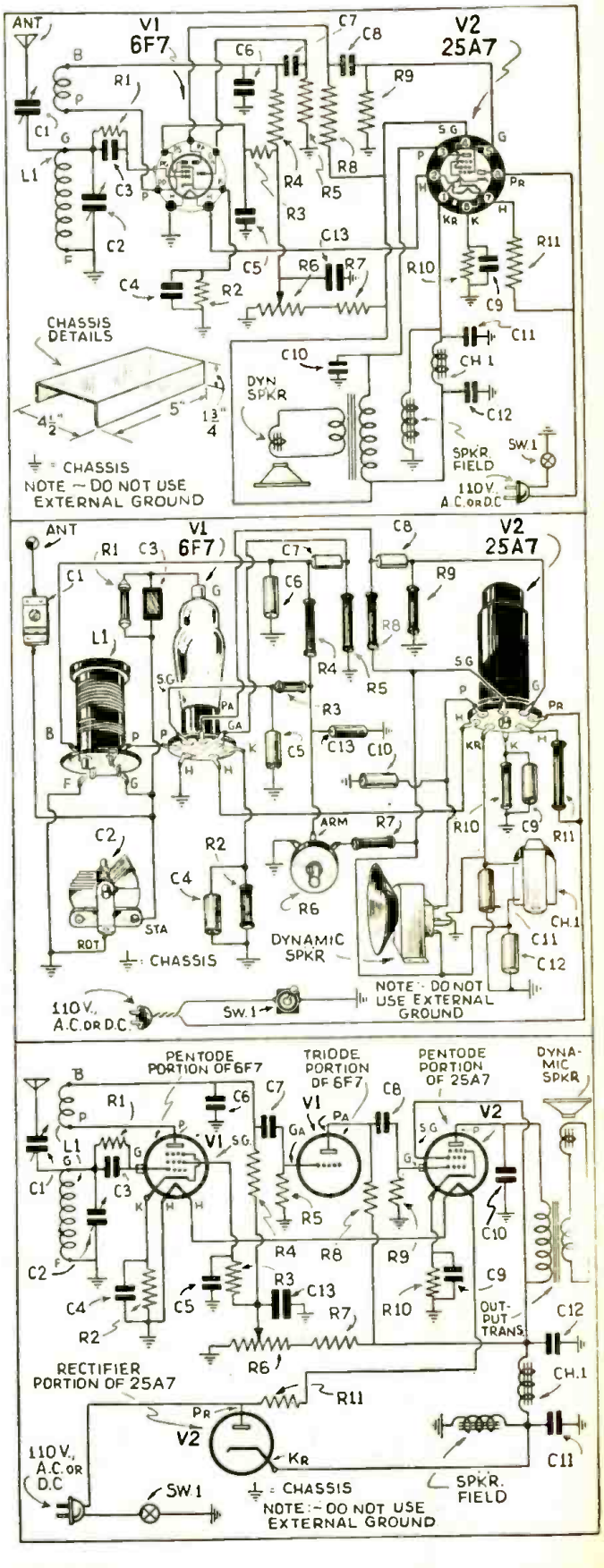
Space-Explorer

By H. G. Cisin, M.E.

The Midget Space-Explorer is mounted on a chassis 5" by 4⅜" by 1¾" 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.

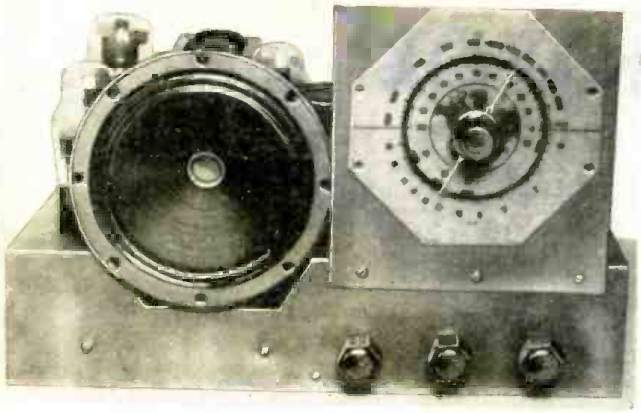
When the wiring is completed and the set is ready for test, insert the broadcast coil and the two tubes. Place the screen-grid clip on the cap of the 6F7 tube and plug into any 110 volt A.C. or D.C. socket. Be very careful not to use an external ground with this set. Connect the aerial and, after the 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)

The 1938 5-T All-Wave Receiver

By H. Georges



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

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.

● 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.

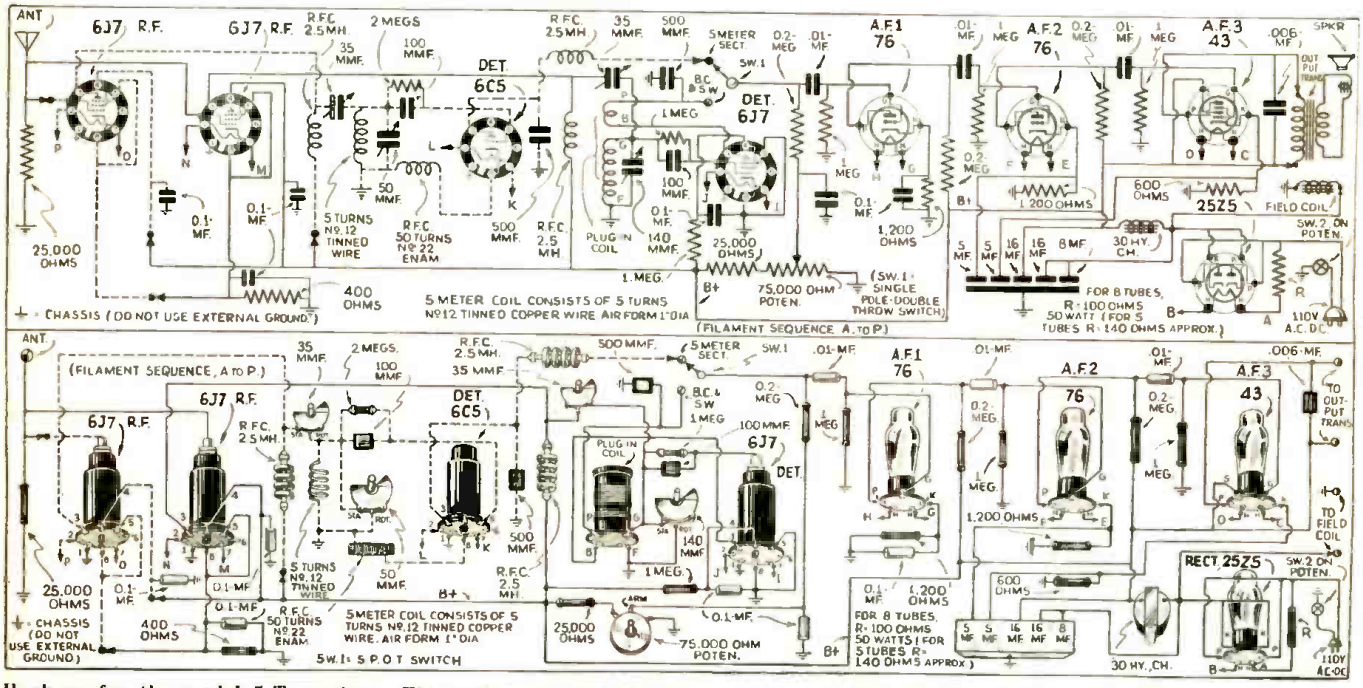
It is entirely feasible, however, to design and build an eight, nine, or ten tube radio set capable of performing certain predetermined functions with high efficiency.

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.

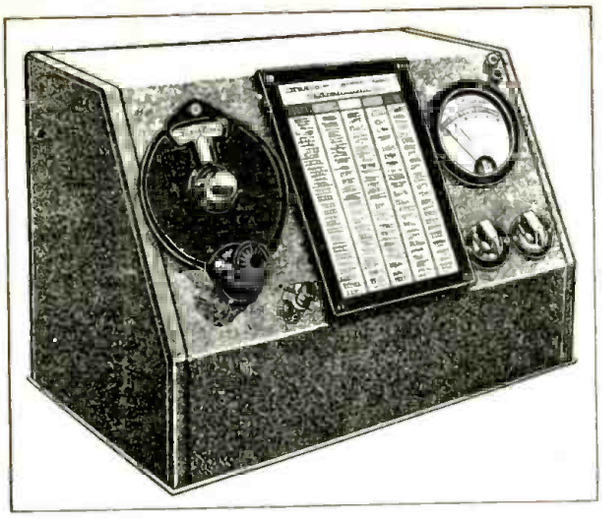
Thus, we find that this receiver uses two separate r.f. tubes and two separate detectors, totalling four tubes; three audio tubes and a rectifier. This eight-tube line-up can be improved still further by the addition of two more tubes. For example, instead of using a single power output tube, improved 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 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, midget 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, 1⅞ 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.

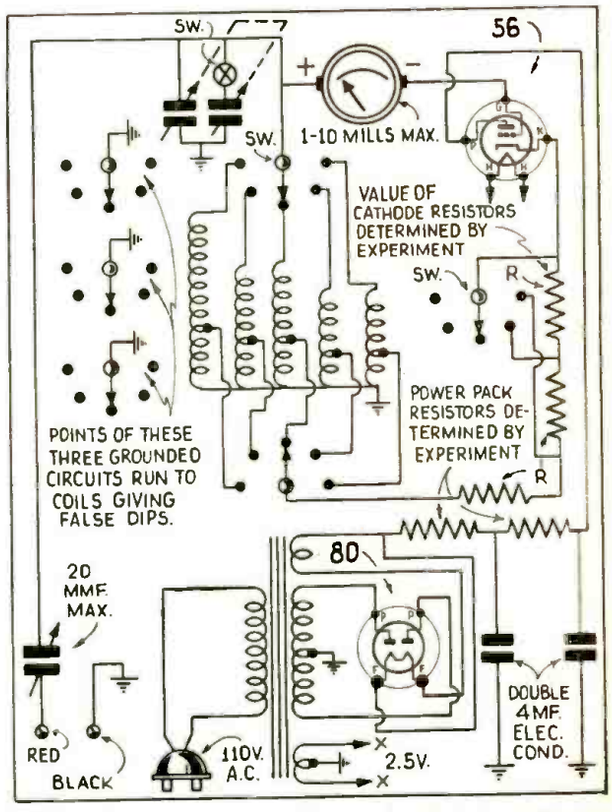
Eliminating False Dips

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 obivate 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.

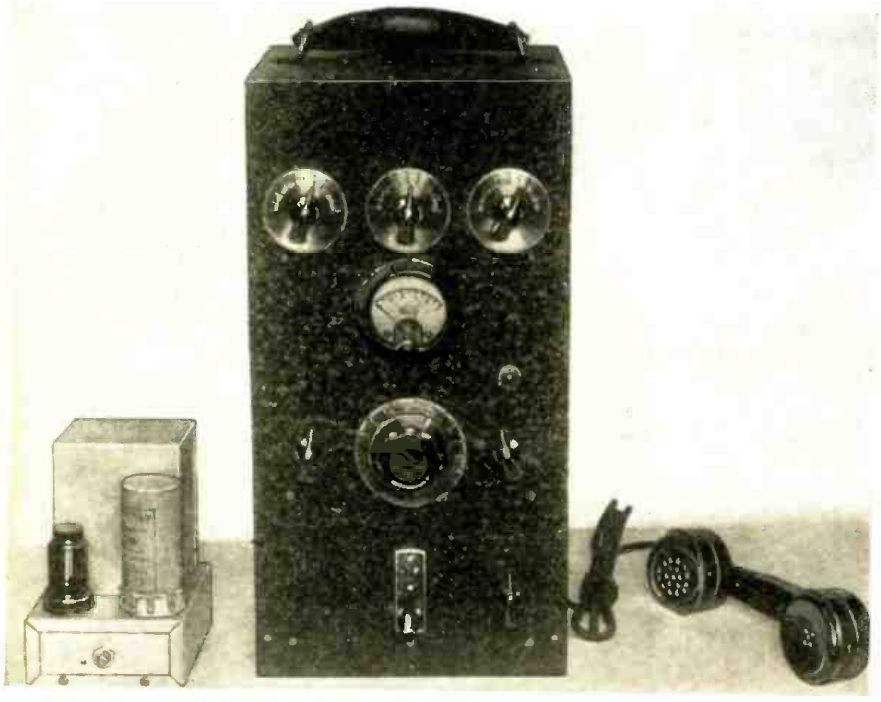
Setting coupling condenser: Setting of the coupling condenser affects calibration, so when doing any comparative work, do *not* move the coupling condenser.

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.

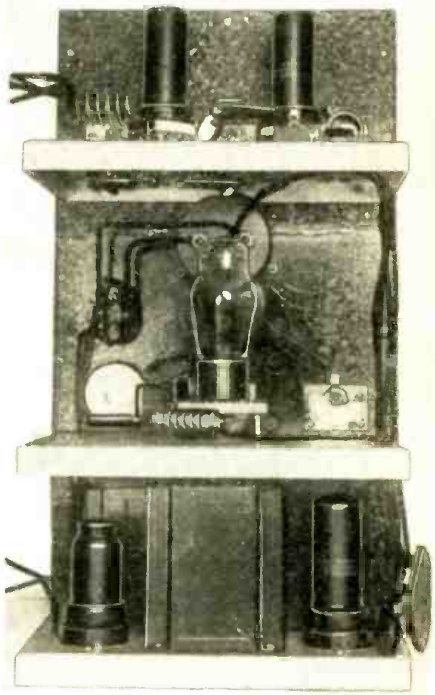
The input transformer to the first 6N6, is a combination transformer intended for transceiver operation. It has one winding for a carbon microphone and another which matches the plate of the triode super-regenerative detector. By employing this transformer and using the modulator system as an audio amplifier 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

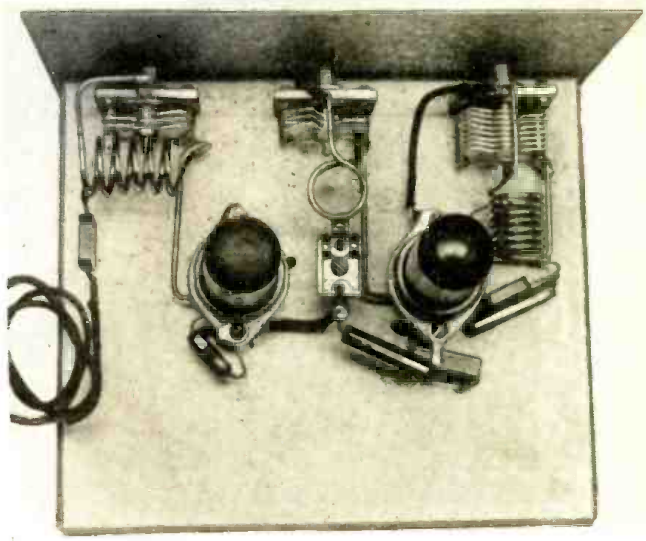
By George W. Shuart, W2AMN.

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.

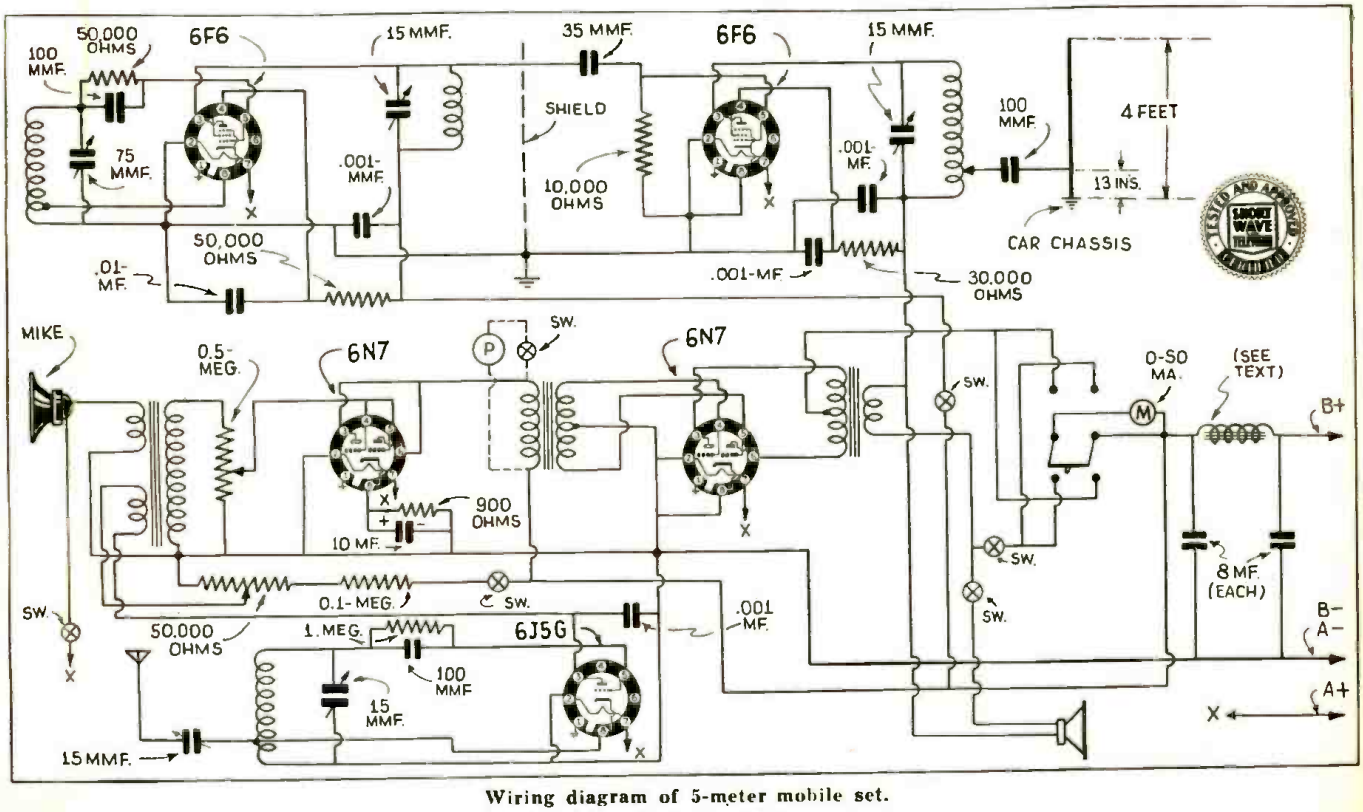
The entire *transmitter-receiver* is enclosed in a 15x7¾ x6½" crackle-finish carrying case which provides a really compact unit. The photographs show the various layouts of the parts and also show how each section is built in a separate compartment, so to speak, formed by the chassis. The top of course 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 supply, the latter being removed to be shown in the photograph.



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.

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.

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.

• 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.

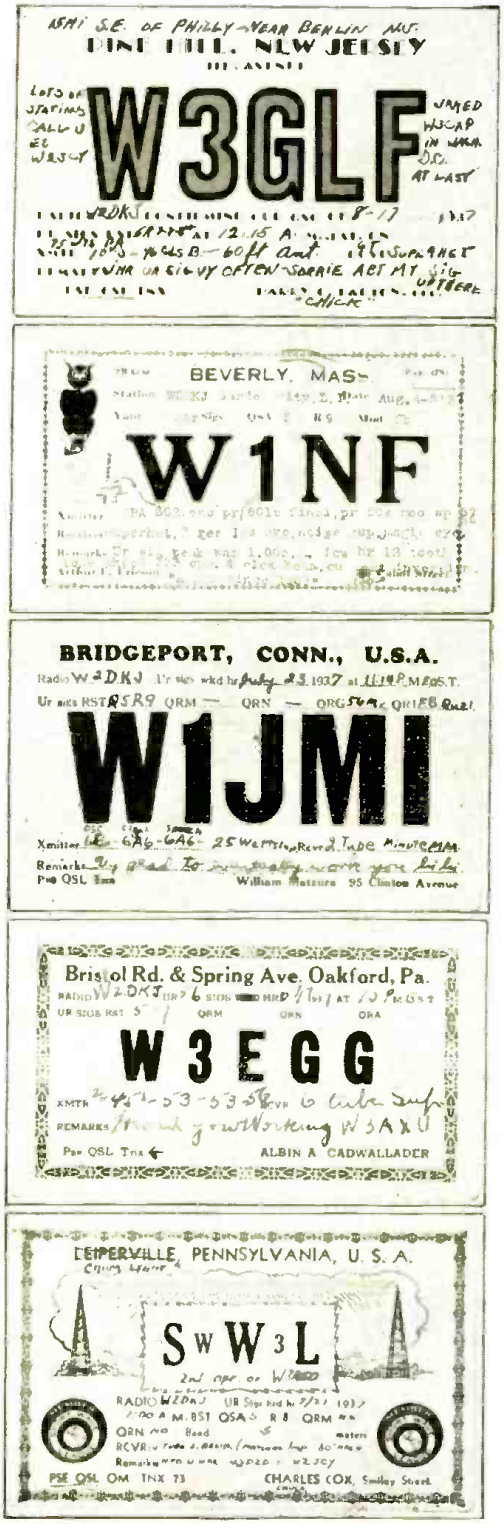
A couple of weeks ago we made a trip over to Philadelphia and, using the outfit which is permanently installed in our car, chatted with a great many of the fellows who are operating on the five-meter band in the Philadelphia area. Many of them tell us that they hear our Garden City station practically 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 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 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 radio receiver (a high voltage discharge is used in this device—Ed.) you will get some idea of the

(*Continued on page* 386)



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.

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.

New 5-Band 40-Watt Transmitter

By Frank Lester, W2AMJ

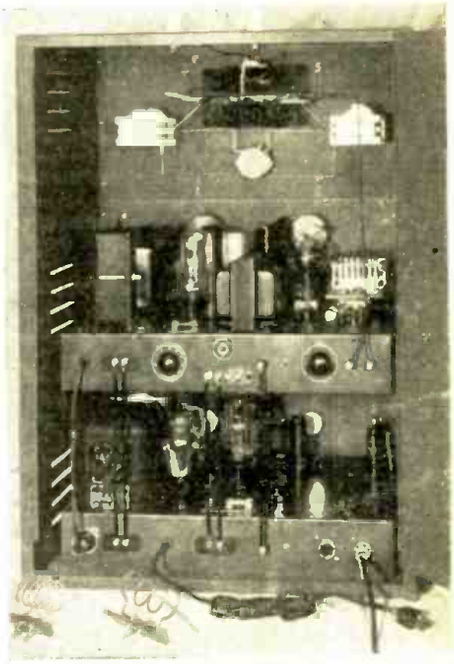
This transmitter will operate on any of the "Amateur" bands, from 10 to 160 meters. The special antenna tuning unit permits matching the transmitter to practically any type antenna.

Front view of the 40-watt transmitter.

● 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 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.

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 resistors 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.

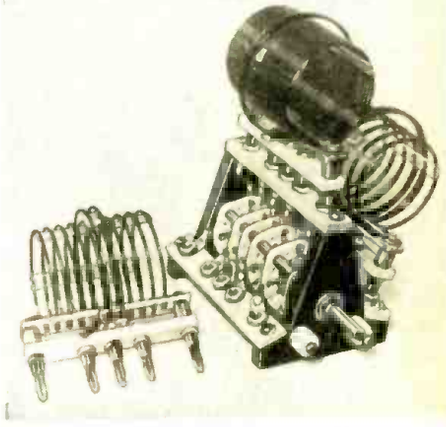
This article has been prepared from data supplied by courtesy of The Triplett Elec. Instrument Co.

Transmitter Switch-Coil

● 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.

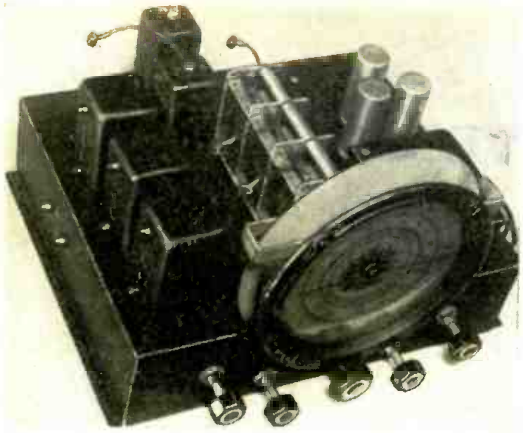
The coils shown with the switch in the photograph cover the 40-20 and 10 meter bands. For "hams" who like band-switching this coil unit would serve excellently in a compact 100-watt transmitter.

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.



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

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.

● THERE are two great problems for set-builders and experimenters which are very successfully solved in this new super-het 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 assures 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.

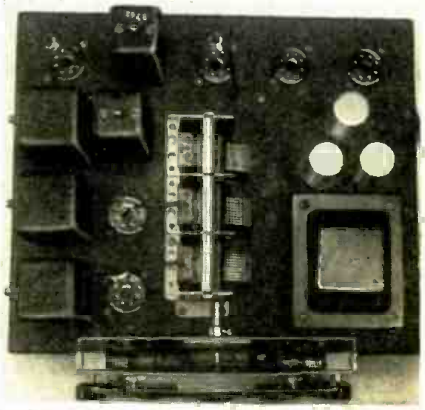
A radio frequency stage ahead of the modulator tube is always desirable as it permits a more favorable *signal-to-noise* ratio to be maintained on both bands.

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 secondary 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.

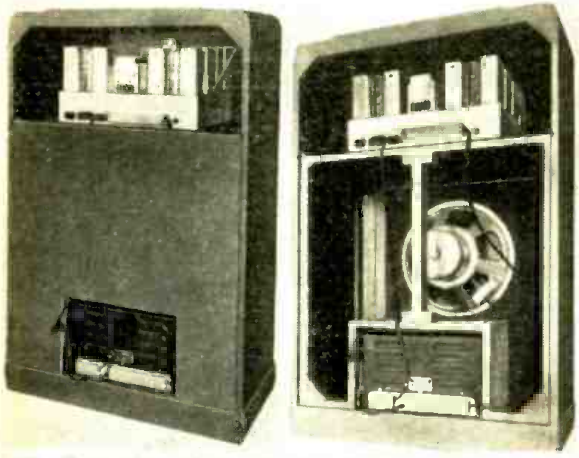
New "SUPER-PRO" Console Model

Has Simplified Tuning and "bass reflex" System

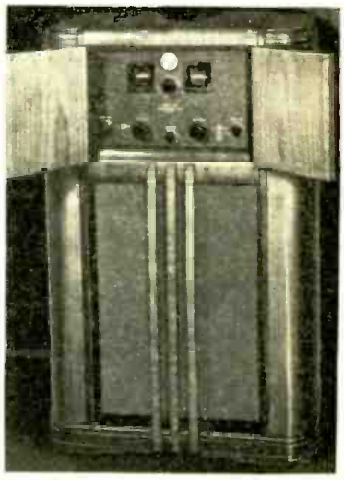
By Lewis Winner

● 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.



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



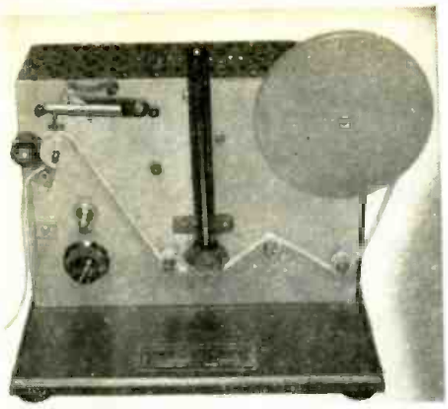
Front view of new Super-Pro, with simplified tuning and improved tone quality cabinet. (No. 658)

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)

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

New Device Records Code Signals on Paper Tape . . .



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 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.

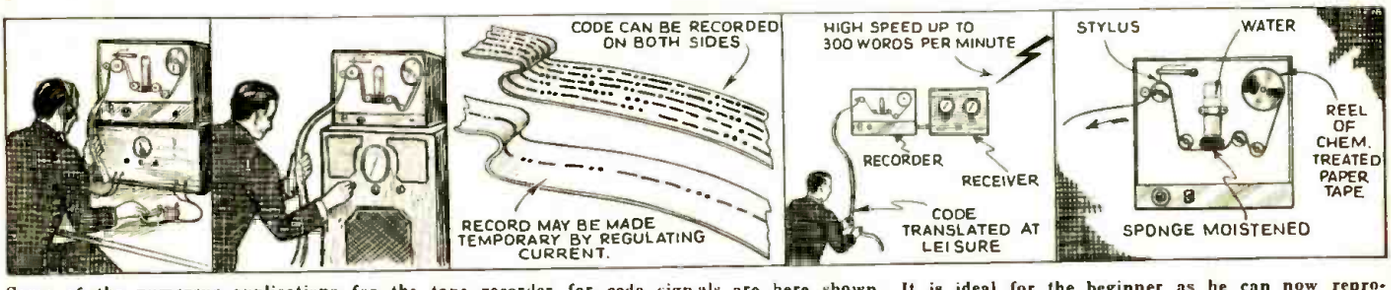
In this connection, it is suggested that the code table be arranged not alphabetically but according to the code tests, beginning with letters of *dots only*, followed by those of *dashes only* and then with *dot-dash and dash-dot* combinations in their proper sequence.

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 recordings. 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 head phones. 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.



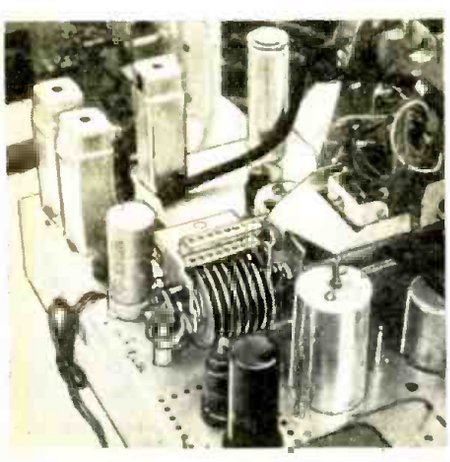
Some of the numerous applications for the tape recorder for code signals are here shown. It is ideal for the beginner as he can now reproduce the signals he taps out on a practice key and in this way actually "see" his mistakes.

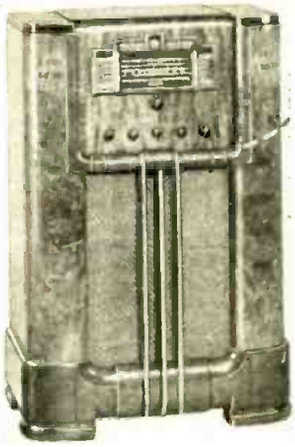
Armchair Tuning A Feature Of New All-Wave Sets

● 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.



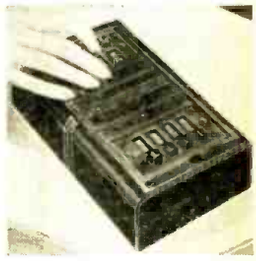


Right—New model RCA all-wave receiver, just one of the models which can be operated by remote control "push-button" tuning mechanism, close-up view of which appears at left.

A motor, mounted on the chassis of the receiver, 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 good idea of how the selector mechanism on this new line of all-wave receivers works.

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.

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

(*Continued on page 387*)

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

LET'S LISTEN In With

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

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 nightfall, 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 5WN'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 5WN QSOd on 20 CW, when 5WN 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.

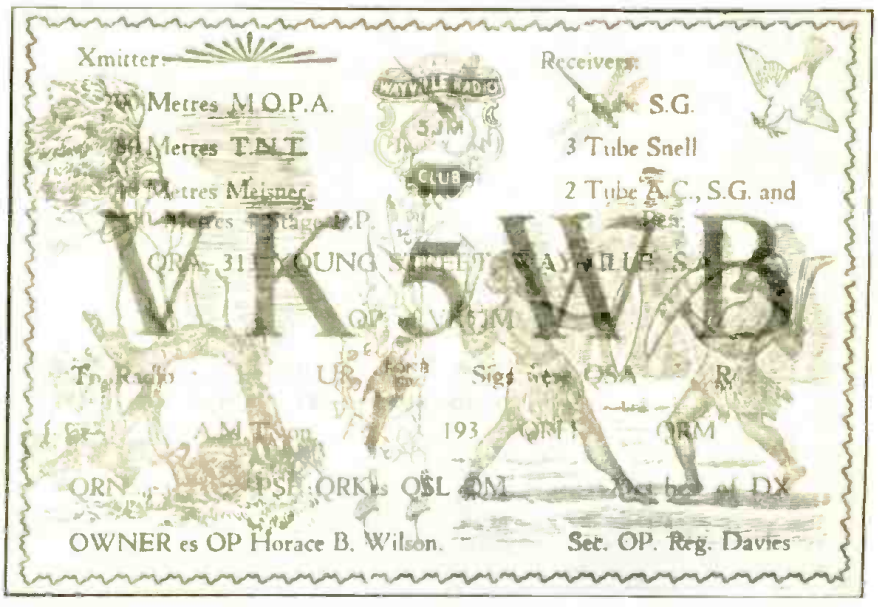
ZEA, 5.88 mc., at Salisbury is also on same sked as ZEB, although it is not heard as well. Try for ZEA when tuning for ZEB.

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)



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	
31.600	**W3XEY**	**BALTIMORE, MD.,** 9.494 m., Relays WFBR 4 pm-12m.
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.
31.600	**W4XCA**	**MEMPHIS, TENN.,** 9.494 m., Addr. Memphis Commercial Appeal. Relays WMC.
31.600	**W8XAI**	**ROCHESTER, N. Y.,** 9.494 m.. Addr. Stromberg Carlson Co. Relays WHAM 7.30-12.05 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.
31.600	**W9XPD**	**ST. LOUIS, MO.,** 9.494 m., Addr. Pulitzer Pub. Co. Relays KSD.
26.400	**W9XAZ**	**MILWAUKEE, WIS.,** 11.36 m., Addr. The Journal Co. Relays WTMJ from 1 pm.
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.
25.950	**W6XKG**	**LOS ANGELES, CAL.,** 11.56 m., Addr. B. S. McGlashan, Wash. Blvd. at Oak St. Relays KGFJ 24 hours daily.
21.550	**GST**	**DAVENTRY, ENG.,** 13.92 m., Addr. (See 26.100 mc.) Irregular at present.
21.540	**W8XK**	**PITTSBURGH, PA.,** 13.93 m., Addr. Grant Bldg. Relays KDKA 7-9 am.
21.530	**GSJ**	**DAVENTRY, ENG.,** 13.93 m., Addr. (See 26.100 mc.) 5.45-8.55 am. 9.15 am.-12n.
21.520	**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.
21.470	**GSH**	**DAVENTRY, ENG.,** 13.97 m. (See 26.100 mc.), 5.45-8.55 am., 9.15 am.-12 n.

S.W. BROADCAST BAND

21.420	WKK	**LAWRENCEVILLE, N. J.,** 14.01 m., Addr. Amer. Tel. & Tel. Co. Calls S. Amer. 7 am.-7 pm.
21.080	PSA	**RIO DE JANEIRO, BRAZ.,** 14.23 m.. Calls WKK daytime.
21.060	WKA	**LAWRENCEVILLE, N. J.,** 14.25 m. Addr. (See 21.420 mc.) Calls England morning and afternoon.
21.020	LSN6	**BUENOS AIRES, ARG.,** 14.27 m., Addr Cia. Internacional de Radio. Works N. Y. C. 7 am.-7 pm.
20.860	EHY-EDM	**MADRID, SPAIN,** 14.38 m., Addr. Cia. Tel. Nacional de Espana. Works S. Amer. mornings.
20.700	LSY	**BUENOS AIRES, ARG.,** 14.49 m., Addr. Transradio Internatl. Tests irregularly
20.380	GAA	**RUGBY, ENG.,** 14.72 m. Calls Arg., Brazil mornings.
20.040	OPL	**LEOPOLDVILLE, BELGIAN CONGO,** 14.97 m. Works ORG mornings.
20.020	DHO	**NAUEN, GERMANY,** 14.99 m.. Addr. Reichspostzenstralamt. Works S. Am. mornings.
19.900	LSG	**BUENOS AIRES, ARG.,** 15.08 m.. Addr. (See 20.700 mc.) Tests irregularly.
19.820	WKN	**LAWRENCEVILLE, N. J.,** 15.14 m., Addr. A. T. & T. Co. Calls England daytime.
19.680	CEC	**SANTIAGO, CHILE,** 15.24 m., Addr. Cia. Internacional de Radio. Calls Col. and Arg. daytime.
19.650	LSN5	**BUENOS AIRES, ARG.,** 15.27 m.. Addr. (See 21.020 mc.) Calls Europe daytime
19.620	VQG4	**NAIROBI, KENYA,** 15.28 m., Addr. Cable and Wireless, Ltd. Calls London 7.30-8 am.
19.600	LSF	**BUENOS AIRES, ARG.,** 15.31 m., Addr. (See 20.700 mc.) Tests irregularly.
19.480	GAD	**RUGBY, ENG.,** 15.4 m. Calls VQG4 7.30-8 am.
19.355	FTM	**ST. ASSISE, FRANCE,** 15.5 m. Calls S. America mornings.
19.345	PMA	**BANDOENG, JAVA,** 15.51 m. Works Holland 5.30-11 am.
19.260	PPU	**RIO DE JANEIRO, BRAZ.,** 15.58 m.. Addr. Cia. Radiotel. Brasileira. Works France mornings.
19.220	WKF	**LAWRENCEVILLE, N. J.,** 15.6 m.. Addr. A. T. & T. Co. Calls London and Paris daytime.
19.200	ORG	**RUYSSELEDE, BELGIUM,** 15.62 m. Calls OPL mornings.
19.160	GAP	**RUGBY, ENG.,** 15.66 m. Calls Australia 1-8 am.
19.020	HS8PJ	**BANGKOK, SIAM,** 15.77 m. Mondays 8-10 am.
18.970	GAQ	**RUGBY, ENG.,** 15.81 m. Calls S. Africa mornings.
18.890	ZSS	**KLIPHEUVEL, S. AFRICA,** 15.88 m., Addr. Overseas Comm. of S. Africa, Ltd. Calls GAQ 9-10 am.
18.830	PLE	**BANDOENG, JAVA,** 15.93 m. Calls Holland early am.
18.680	OCI	**LIMA, PERU,** 16.06 m. Tests with Bogota, Col.
18.620	GAU	**RUGBY, ENG.,** 16.11 m. Calls N. Y. daytime.
18.450	HBF	**GENEVA, SWITZERLAND,** 16.26 m., Addr. Radio Nations. Tests irregularly.
18.345	FZS	**SAIGON, INDO-CHINA,** 16.35 m. Works Paris early morning.
18.340	WLA	**LAWRENCEVILLE, N. J.,** 16.36 m., Addr. A. T. & T. Co. Calls England daytime.
18.310	GAS	**RUGBY, ENG.,** 16.38 m. Calls N. Y. daytime.
18.299	YVR	**MARACAY, VENEZ.,** 16.39 m. Works Germany mornings.
18.250	FTO	**ST. ASSISE, FRANCE,** 16.43 m. Works S. America daytime.
18.200	GAW	**RUGBY, ENG.,** 16.48 m. Works N. Y.C. daytime.
18.135	PMC	**BANDOENG, JAVA,** 16.54 m. Works Holland mornings.
18.115	LSY3	**BUENOS AIRES, ARG.,** 16.56 m.. Addr. (See 20.700 mc.) Tests irregularly. Broadcasts 4-5 pm. Friday.
18.040	GAB	**RUGBY, ENG.,** 16.83 m. Works Canada morning and afternoon.
17.810	PCV	**KOOTWIJK, HOLLAND,** 16.84 m. Works Java 6-8 am.

S.W. BROADCAST BAND

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.
17.785	JZL	**TOKIO, JAPAN,** 16.87 m. Tests irregularly.
17.780	W3XAL	**BOUND BROOK, N. J.,** 16.87 m., Addr. Natl. Broad. Co. 9 am.-9 pm.
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.
17.760	DJE	**BERLIN, GERMANY,** 16.89 m.. Addr. Broadcasting House. 12.05-5.15 am.; 5.55-11 am. Sun. 11.10am.-12.25 pm.
17.760	W2XE	**NEW YORK, N. Y.,** 16.89 m., Addr. Col. Broad. System. 485 Madison Ave.
17.755	ZBW5	**HONGKONG, CHINA,** 16.9 m., Addr. P. O. Box 200. 4-10 am. irregular.

S.W. BROADCAST BAND

17.741	HSP	**BANGKOK, SIAM,** 16.91 m. Works Germany 3-5 am., 8-9 pm. Works JVE 11 pm.-6 am.
17.650	XGM	**SHANGHAI, CHINA,** 17 m. Works London 7-9 am.
17.520	DFB	**NAUEN, GERMANY,** 17.12 m. Works S. America, near 9.15 am. Works Siam 3-5 am.. 8-9 pm.
17.480	VWY2	**KIRKEE, INDIA,** 17.16 m. Works London 7.30-8.15 am.
17.120	WOO	**OCEAN GATE, N. J.,** 17.52 m.. Addr. A. T. & T. Co. Works ships irregularly.
17.080	GBC	**RUGBY, ENG.,** 17.56 m. Works ships irregularly.
16.835	ITK	**MOGADISCIO, ITAL. SOMALILAND,** 18.32 m. Calls IAC around 9.30 am.
16.270	WLK	**LAWRENCEVILLE, N. J.,** 18.44 m., Addr. A. T. & T. Co. Works S. Amer. daytime.
16.270	WOG	**OCEAN GATE, N. J.,** 18.44 m., Addr. A. T. & T. Co. Works England Late afternoon.
16.240	KTO	**MANILA, P. I.,** 18.47 m., Addr. RCA Comm. Works Japan and U. S. 5-9 pm. irregularly.
16.233	FZR3	**SAIGON, INDO-CHINA,** 18.48 m. Calls Paris early morning.
16.030	KKP	**KAHUKU, HAWAII,** 18.71 m.. Addr. RCA Comm. Works Dixon 3-10 pm.
15.880	FTK	**ST. ASSISE, FRANCE,** 18.9 m. Works Saigon 8-11 am.
15.865	CEC	**SANTIAGO, CHILE,** 18.91 m. Calls Peru daytime irregular.
15.810	LSL	**BUENOS AIRES, ARG.,** 18.98 m., Addr. (See 21.020 mc.) Works London mornings and Paris afternoons.
15.660	JVE	**NAZAKI, JAPAN,** 19.16 m. Works Java and Siam 3-5 am.
15.620	JVF	**NAZAKI, JAPAN,** 19.2 m. Works Cal. near 5 am. and 8 pm.
15.450	IUG	**ADDIS ABABA, ETHIOPIA,** 19.41 m. Works Rome 9.15-10.30 am.
15.440	XEBM	**MAZATLAN, SIN., MEX.,** 19.43 m., Addr. Flores 103 Alto. "El Pregonero del Pacifico." Irregularly 7 am.-10 pm.
15.415	KWO	**DIXON, CAL.,** 19.46 m.. Addr. A. T. & T. Co. Works Hawaii 2-7 pm.
15.370	HAS3	**BUDAPEST, HUNGARY,** 19.52 m., Addr. Radiolabor. Gyali Ut 22. Sun 9-10 am.
15.360	DZG	**ZEESEN, GERMANY,** 19.53 m.. Addr. Reichspostzenstralamt. Tests irregularly.
15.355	KWU	**DIXON, CALIF.,** 19.53 m.. Addr. A. T. & T. Co. Phones Pacific Isles and Japan.

S.W. BROADCAST BAND

15.340	DJR	**BERLIN, GERMANY,** 19.56 m.. Addr. Br'dcast'g House. 8-9am., 4.50-10.45pm.
15.330	W2XAD	**SCHENECTADY, N. Y.,** 19.56 m.. Addr. General Electric Co. Relays WGY 11 am. to 9 pm.
15.310	GSP	**DAVENTRY, ENG.,** 19.6 m.. Addr. (See 26.100 mc.) 6.20-8.30 pm.
15.290	LRU	**BUENOS AIRES, ARG.,** 19.62 m., Addr. El Mundo. 7-9 am.
15.280	HI3X	**CIUDAD TRUJILLO, D. R.,** 19.63 m. Relays HIX Sun. 7.40-10.40 am. Weekdays 12.10-1.10pm.
15.280	DJQ	**BERLIN, GERMANY,** 19.63 m.. Addr. Broadcasting House. 12.05-5.15, 6-8, 8.15-11 am., 4.50-10.45 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.

(*Continued on page* 365)

(All Schedules Eastern Standard Time)

EAJ43—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 Prome 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 Telephone 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, India, 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 Buitekant, 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 QRMd 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	
15.260	GSI	**DAVENTRY, ENG.,** 19.66 m., Addr. (See 26.100 mc.) 12.20-3.45, 9-11 pm.
15.252	RIM	**TACHKENT, U.S.S.R.,** 19.67 m. Works RKI near 7 am.
15.250	W1XAL	**BOSTON, MASS.,** 19.67 m., Addr. University Club. Daily 2-4 pm.
15.245	TPA2	**PARIS, FRANCE,** 19.68 m., Addr. 98 bis. Blvd. Haussmann. "Radio Colonial." 6-11 am.
15.230	HS8PJ	**BANGKOK, SIAM,** 19.32 m. Irregularly Mon. 8-10 am.
15.230	OLR5A	**PRAGUE, CZECHOSLOVAKIA,** 19.32 m., Irregular.
15.220	PCJ	**HUIZEN, HOLLAND,** 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.
15.210	W8XK	**PITTSBURGH, PA.,** 19.72 m., Addr. (See 21.540 mc.) 9 am.-7 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.
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.
15.180	GSO	**DAVENTRY, ENG.,** 19.76 m., Addr. (See 26.100 mc.) 2-4.15 am., 4-6, 6.20-8.30 pm.
15.165	XEWW	**MEXICO CITY, MEXICO,** 19.78 m. Irregular 9 am.-6 pm.
15.160	JZK	**TOKIO, JAPAN,** 19.79 m., 3-4 pm., 4.30-5.30 pm., 12.30-1.30, 8-9 am.
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.
15.140	GSF	**DAVENTRY, ENG.,** 19.82 m., Addr. (See 26.100 mc.) 10.30 am.-12 n., 4-6, 6.20-8.30 pm.
15.120	HVJ	**VATICAN CITY,** 19.83 m., 10.30-10.45 am., except Sun., Sat. 10-10.45 am.
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 6-8 am.

4 S.W. BROADCAST BAND 4

18.088	WNC	**HIALEAH, FLORIDA,** 19.92 m., Addr. A. T. & T. Co. Calls Central America daytime.
18.038	RW96-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.
14.980	KAY	**MANILA, P. I.,** 20.03 m., Addr. RCA Comm. Works Pacific Islands.
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.
14.960	PSF	**RIO DE JANEIRO, BRAZIL,** 20.43 m., Works with Buenos Aires daytime.
14.950	HJB	**BOGOTA, COL.,** 20.07 m. Calls WNC daytime.
14.940	HI1	**CIUDAO TRUJILLO, D. R.,** 20.08 m., Phones WNC daytime.
14.940	HJA3	**BARRANQUILLA, COL.,** 20.08 m. Works WNC daytime.
14.845	OCJ2	**LIMA, PERU,** 20.21 m. Works South American stations daytime.
14.790	ROU	**OMSK, SIBERIA, U.S.S.R.,** 20.28 m. Works Moscow irregularly 7-9 am.
14.730	IQA	**ROME, ITALY,** 20.37 m. Tests irregularly.
14.653	GBL	**RUGBY, ENG.,** 20.47 m. Works JVH 1-7 am.
14.640	TYF	**PARIS, FRANCE,** 20.49 m. Works Saigon and Cairo 3-7 am, 12 m.-2.30 pm.
14.600	JVH	**NAZAKI, JAPAN,** 20.55 m. Broadcasts irregularly 5-11.30 pm. Works Europe 4-8 am.
14.590	WMN	**LAWRENCEVILLE, N. J.,** 20.56 m., Addr. A. T. & T. Co. Works England morning and afternoon.
14.535	HBJ	**GENEVA, SWITZERLAND,** 20.64 m., Addr. Radio Nations. Broadcasts Sat. 6.45-8 pm.
14.530	LSN	**BUENOS AIRES, ARG.,** 20.65 m., Addr. (See 20.020 mc.) Works N. Y. C. afternoons.
14.500	——	**ASMARA, ERITREA, AFRICA,** 20.69 m. Works Rome and Addis Ababa 6.30-7.30 am
15.500	LSM2	**BUENOS AIRES, ARG.,** 20.69 m., Addr. (See 21.020 mc.) Works RIO and Europe daytime.
14.485	TIR	**CARTAGO, COSTA RICA,** 20.71 m. Works Central America and U. S. A. daytime.
14.485	YSL	**SAN SALVADOR, SALVADOR,** 20.71 m. Irregular.
14.485	HPF	**PANAMA CITY, PANAMA,** 20.71 m. Works WNC daytime.
14.485	TGF	**GUATEMALA CITY, GUATEMALA,** 20.71 m. Works WNC daytime.
14.485	YNA	**NICARAGUA, MANAGUA,** 20.71 m. Works WNC daytime.
14.485	HRL5	**NACAOME, HONDURAS,** 20.71 m. Works WNC daytime.
14.485	HRF	**TEGUCIGALPA, HONDURAS,** 20.71 m. Works WNC daytime.
14.470	WMF	**LAWRENCEVILLE, N. J.,** 20.73 m., Addr. A. T. & T. Co. Works London and Paris daytime.
14.460	DZH	**ZEESEN, GERMANY,** 20.75 m., Addr. (See 15.360 mc.) Irregular.
14.440	GBW	**RUGBY, ENG.,** 20.78 m. Works U. S. A. afternoons.
14.200	EA9AH	**TETUAN, SPANISH MOROCCO,** 21.13 m. Daily except Sun. 2.15-5,7 and 9 pm.
13.990	GBA	**RUGBY, ENG.,** 21.44 m., Works Buenos Aires late afternoon.
13.820	SUZ	**ABOU ZABAL, EGYPT,** 21.71 m. Works with Europe 11 am. to 2 pm.
13.690	KKZ	**BOLINAS, CALIF.,** 21.91 m., Addr. RCA Communications. Irregular.
13.635	SPW	**WARSAW, POLAND,** 22 m., Mon., Wed. Fri., 12.30-1.30 pm.
13.585	GBB	**RUGBY, ENG.,** 22.08 m. Works Egypt and Canada afternoon.
13.415	GCJ	**RUGBY, ENG.,** 22.36 m. Works Japan and China early morning.
13.410	YSJ	**SAN SALVADOR, SALVAOOR,** 22.37 m. Works WNC daytime.
13.390	WMA	**LAWRENCEVILLE, N. J.,** 22.4 m., Addr. A. T. & T. Co. Works England morning and afternoon.
13.380	IDU	**ASMARA, ERITREA, AFRICA,** 22.42 m. Works Rome daytime.
13.345	YVQ	**MARACAY, VENEZUELA,** 22.48 m. Works WNC daytime.
13.285	CGA3	**DRUMMONDVILLE, QUE., CAN.,** 22.58 m. Works London and ships afternoons.
13.330	IRJ	**ROME, ITALY,** 22.69 m. Works Tokio 5-9 am. irregularly.
13.075	VPD	**SUVA, FIJI ISLANDS,** 22.94 m. Irregularly.
12.840	WOO	**OCEAN GATE, N. J.,** 23.36 m., Addr. A. T. & T. Co. Works with ships irregularly.
12.825	CNR	**RABAT, MOROCCO,** 23.39 m., Addr. Director General Tele. & Teleg. Stations. Works with Paris irregularly.
12.800	IAC	**PISA, ITALY,** 23.45 m. Works Italian ships mornings.
12.780	GBC	**RUGBY, ENG.,** 23.47. Works ships irregularly.
12.485	HIN	**CIUDAD TRUJILLO, D. R.,** 24 m. "Broadcasting National." 12 n.-2 pm. 6-11 pm. approx.
12.325	DAF	**NORDDEICH, GERMANY,** 24.34 m. Works German ships daytime.
12.300	CB615	**SANTIAGO, CHILE,** 24.39 m., Addr. Louis Desmaras, Casilla, 761. 11 am.-1 pm., 4-8 pm., Sun. 4-10 pm.
12.290	GBU	**RUGBY, ENG.,** 24.41 m. Works N. Y. C. evenings.
12.250	TYB	**PARIS, FRANCE,** 24.49 m. Irregular.
12.235	TFJ	**REYKJAVIK, ICELAND,** 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.
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	**ZEESEN, 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.
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.
11.991	FZS2	**SAIGON, INDO-CHINA,** 25.02 m. Phones Paris mornings.
11.960	HI2X	**CIUDAD TRUJILLO, D. R.,** 25.08 m., Addr. La Voz de Hispaniola. Relays HIX Tue. and Fri. 8.10-10.10 pm.
11.955	IUC	**ADDIS ABABA, ETHIOPIA,** 25.09 m. Works IAC around 12 midnight.
11.950	KKQ	**BOLINAS, CALIF.,** 25.1 m. Tests irregularly evenings.
11.940	FTA	**STE. ASSISE, FRANCE,** 25.13 m. Works Morocco mornings and Argentina late afternoon.

4 S.W. BROADCAST BAND 4

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.
11.895	HP5I	**AGUADULCE, PANAMA,** 25.22 m., Addr. La Voz del Interior. 7.30-9.30 pm.
11.880	TPA3	**PARIS, FRANCE,** 25.23 m., Addr. (See 15.245 mc.) 2-5 am., 12.15-5 pm.
11.870	W8XK	**PITTSBURGH, PA.,** 25.26 m., Addr. (See 21.540 mc.) 7-10.30 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.
11.860	GSE	**DAVENTRY, ENG.,** 25.29 m., Addr. (See 26.100 mc.) Irregular.
11.855	DJP	**BERLIN, GERMANY,** 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am. to 4 pm.
11.840	KZRM	**MANILA, P. I.,** 25.35 m. Addr. Erlanger & Gallinger, Box 283. 9 pm.-10 am.
11.840	CSW	**LISBON, PORT.,** 25.35 m. Nat'l Broad. Stat. 11.30 am.-1.30 pm.
11.840	OLR4A	**PRAGUE, CZECHOSLOVAKIA,** 25.35 m. Addr. Czech Shortwave Sta., Praha XII, Fochova 16. Daily 2-4.30 pm., Mon. and Thurs., 7-9.10 pm.
11.830	W9XAA	**CHICAGO, ILL.,** 25.36m., Addr. Chicago Federation of Labor. Irregular.
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.
11.820	XEBR	**HERMOSILLA, SON., MEX.,** 25.38 m., Addr. Box 68. Relays XEBH. 2-4 pm., 9 pm.-12m.
11.820	GSN	**DAVENTRY, ENG.,** 25.38 m., Addr. (See 26.100 mc.). Irregular.
11.810	2RO	**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.
11.805	OZF	**SKAMLEBOAEK, DENMARK.** 25.41 m. Addr. Statsradiofonien. Irregular.
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.
11.800	OER2	**VIENNA, AUSTRIA,** 25.42 m. Daily 10 am.-5 pm. Sat. until 5.30 pm.
11.795	DJO	**BERLIN, GERMANY,** 25.43 m., Addr. (See 15.280 mc.). Irregular.
11.795	OAX5B	**ICA, PERU,** 25.43 m., Addr. Radio Universal. 11 am.-12 n, 4-11.15 pm.
11.793	COGF	**MATANZAS, CUBA,** 25.45 m., Addr. Gen. Betancourt 51. Relays CMGF. 2-3, 4-5, 6-11 pm.
11.790	W1XAL	**BOSTON, MASS.,** 25.45 m., Addr. (See 15.250 mc.) Daily 4-5.30 pm. Sat. 5-5.30 pm.
11.770	DJD	**BERLIN, GERMANY,** 25.49 m., Addr. (See 15.280 mc.) 11.35 am.-4.30 pm., 4.50-11 pm.
11.760	OLR4B	**PRAGUE, CZECHOSLOVAKIA,** 25.51 m., Addr. (See 11.875 mc.) Irregular.
11.750	GSD	**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.

(*Continued on page* 367)

(All Schedules Eastern Standard Time)

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 Gershwins' "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.

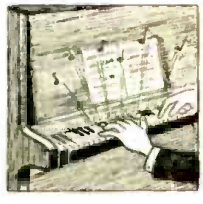
9.55 YDB B—Bandoeng, Java. See YDC, 15.15 mc. Check program heard with PLP, 11.00 mc. Programs emanate from same chain.

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, hallo, Oslo, Calling."* Interval signal six notes played on piano. Closes with piano selection. QRA: Ministere du Commerce, Administration des Telegraphes, Oslo, Norway.



9.525 ZBW3 B—Hong Kong, China. Infrequent announcements. *"ZBW, Hong Kong."* Usually relays Daventry 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 Telegraphes, 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	
11.730	———	**SAIGON, INDO CHINA,** 25.57 m., Addr. Radio Philco. 11pm.-1am., 5.30-9.30am.
11.730	PHI	**HUIZEN, HOLLAND,** 25.57 m., Addr. N. Y. Philips' Radio. Irregular.
11.720	CJRX	**WINNIPEG, CANADA,** 25.6 m., Addr. James Richardson & Sons, Ltd. 4-10pm.
11.718	CR7RH	**LAURENCO MARQUES, PORTUGESE, 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.
11.715	TPA4	**PARIS, FRANCE,** 25.61 m., (See 15.245 mc.) 6.15-8.15 pm., 10 pm.-1 am.
11.710	SBG	**MOTALA, SWEDEN,** 25.63 m., 7-9, 11 am.-1.30 pm. Sunday 3 am.-1.30 pm.
11.700	HP5A	**PANAMA CITY, Pan.,** 25.65 m. Addr. Radio Teatro, Apartado 954. 10 am.-10 pm.

S.W. BROADCAST BAND

11.680	KIO	**KAHUKU, HAWAII,** 25.68 m., Addr. RCA Communications. Irregularly.
11.595	VRR4	**STONY HILL, JAMAICA, B. W. I.,** 25.87 m. Works WNC daytime.
11.560	VIZ3	**FISKVILLE, AUSTRALIA,** 25.95 m., Addr. Amalgamated Wireless of Australasia Ltd. Tests irregularly.
11.500	XAM	**MERIDA, YUCATAN,** 26.09 m. Irregular 1-7.30 pm.
11.500	PMK	**BANDOENG, JAVA,** 26.09 m. Tests irregularly.
11.435	COCX	**HAVANA, CUBA,** 26.19 m. P. O. Box 32. 6.55 am.-1 am. Sun. till 12 m. Relays CMX.
11.413	CJA4	**ORUMMONDVILLE, QUE., CAN.,** 26.28 m. Tests irregularly.
11.402	HBO	**GENEVA, SWITZERLAND,** 26.31 m., Addr. Radio Nations. Sat. 6.45-8 pm.
11.280	HIN	**CIUDAD TRUJILLO, D. R.,** 26 m., Addr. La Voz del Partido Dominicano. Irregular.
11.050	ZLT4	**WELLINGTON, NEW ZEALAND,** 27.15 m. Works Australia and England early morning.
11.040	CSW	**LISBON, PORTUGAL,** 27.17 m., Addr. Nat. Broadcasting Sta. 1.30-5 pm.
11.000	PLP	**BANDOENG, JAVA,** 27.27 m. Relays YDB. 5.30-10.30 or 11 am. Sat. until 11.30 am.
10.970	OCI	**LIMA, PERU,** 27.35 m. Works Bogota, Col. evenings.
10.840	KWV	**DIXON, CALIF.,** 27.68 m., Addr. A. T. & T. Co. Works with Hawaii evenings.
10.770	GBP	**RUGBY, ENGLAND,** 27.85 m. Works Australia early morning.
10.740	JVM	**NAZAKI, JAPAN,** 27.93 m. Works U.S.A. 2-7 am.
10.675	WNB	**LAWRENCEVILLE, N. J.,** 28.1 m., Addr. A. T. & T. Co. Works with Bermuda irregularly.
10.670	CEC	**SANTIAGO, CHILE,** 28.12 m. Daily 7-7.15 pm.
10.660	JVN	**NAZAKI, JAPAN,** 28.14 m. Broadcasts daily 2-8 am. Works Europe irregularly at other times.
10.650	WOK	**LAWRENCEVILLE, N. J.,** 28.44 m., Addr. A. T. & T. Co. Works S. A. nights.
10.535	JIB	**TAIWAN, FORMOSA,** 28.48 m. Works Japan around 6.25 am.
10.520	VLK	**SYDNEY, AUSTRALIA,** 28.51 m., Addr. Amalgamated Wireless of Australasia Ltd. Works England 1-6 am.
10.430	YBG	**MEDAN, SUMATRA,** 28.76 m. 5.30-6.30 am., 7.30-8.30 pm.
10.420	XGW	**SHANGHAI, CHINA,** 28.79 m. Works Japan 12 m.-3 am.
10.410	PDK	**KOOTWIJK, HOLLAND,** 28.8 m. Works Java 7.30-9.40 am.
10.410	KES	**BOLINAS, CALIF.,** 28.8 m., Addr. RCA Communications. Irregular.
10.370	JVO	**NAZAKI, JAPAN,** 28.93 m. Broadcasts around 5 am.
10.370	EHZ	**TENERIFFE, CANARY ISLANDS,** 28.93 m. Relays EAJ43 2.15-3.15, 6.15-9.
10.350	LSX	**BUENOS AIRES, ARG.,** 28.98 m., Addr. Transradio International. Broadcasts 5-6 pm. Mon. and Fri. Tests irregularly at other times.
10.330	ORK	**RUYSSELEDE, BELGIUM,** 29.04 m. 2.30-4 pm.
10.300	LSL2	**BUENDS AIRES, ARG.,** 29.13 m., Addr. Cia. Internacional de Radio. Works Europe evenings.
10.290	DZC	**ZEESEN, GERMANY,** 29.16 m., Addr. (See 15.360 mc.) Irregular.
10.260	PMN	**BANDOENG, JAVA,** 29.24 m., Relays YDB 5.30-10.30 or 11 am., Sat. to 11.30 am.
10.250	LSK3	**BUENOS AIRES, ARG.,** 29.27 m., Addr. (See 10.310 mc.) Works Europe and U.S.A. afternoons and evenings.
10.230	CED	**ANTOFAGASTAN, CHILE,** 29.33 m. Tests 7-9.30 pm.
10.220	PSH	**RIO DE JANIERO, BRAZIL,** 29.35 m. Irregular.
10.170	RIO	**BAKOU, U.S.S.R.,** 29.15 m. Works Moscow 10 pm.-5 am.
10.140	OPM	**LEOPOLDVILLE, BELGIAN CONGO,** 29.59 m. Works Belgium around 3 am. and from 1-4 pm.
10.080	RIO	**TIFLIS, U.S.S.R.,** 29.76 m. Works Moscow early morning.
10.070	EDM-EHY	**MADRID, SPAIN,** 29.79 m. Works S. A. evenings.
10.065	JZB-TDB	**SHINKYO, MANCHUKUO,** 29.81 m. Works Tokio 6.30-7 am.
10.055	ZFB	**HAMILTON, BERMUDA,** 29.84 m. Works N. Y. C. irregular.
10.055	SUV	**ABOU ZABAL, EGYPT,** 29.84 m. Works Europe 1-6 pm.
10.042	DZB	**ZEESEN, GERMANY,** 29.87 m., Addr. Reichspostzenstralamt. Irregular.
9.990	KAZ	**MANILA, P. I.,** 30.03 m., Addr. RCA Communications. Works Java early morning.
9.950	GCU	**RUGBY, ENGLAND,** 30.15 m. Works N. Y. C. night time.
9.930	HKB	**BOGOTA, COL.,** 30.21 m. Works Rio evenings.
9.930	CSW	**LISBON, PORTUGAL,** 30.31 m., Addr. Nat. Broad. Station. 5-7 pm.
9.890	LSN	**BUENOS AIRES, ARG.,** 30.33 m., Addr. (See 10.300 mc.) Works N. Y. C. evenings
9.870	WON	**LAWRENCEVILLE, N. J.,** 30.4 m., Addr. A. T. & T. Co. Works England nights.
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.
9.830	IRM	**ROME, ITALY,** 30.52 m. Works Egypt afternoons.
9.810	COCM	**HAVANA, CUBA,** 30.59 m. Addr. Transradio Columbia, P. O. Box 33. 7 am.-12 m. Relays CMCM.
9.800	LSI	**BUENOS AIRES, ARG.,** 30.61 m., Addr. (See 10.350 mc.) Tests irregularly.
9.790	GCW	**RUGBY, ENGLAND,** 30.64 m. Works N. Y. C. evenings.
9.760	VLJ-VLZ2	**SYDNEY, AUSTRALIA,** 30.74 m., Addr. Amalgamated Wireless of Australasia Ltd. Works Java and New Zealand early morning.
9.750	WOF	**LAWRENCEVILLE, N. J.,** 30.77 m., Addr. A. T. & T. Co. Works London and Paris night time.
9.740	COCQ	**HAVANA, CUBA,** 30.78 m. Addr. 25 No. 445, Vedado, Havana. 6.55 am.-1 am. Sun. till 12 m.
9.710	GCA	**RUGBY, ENGLAND,** 30.89 m. Works S. A. evenings.
9.675	DZA	**ZEESEN, GERMANY,** 31.01 m., Addr. (See 10.042 mc.) Irregular.
9.670	TI4NRH	**HEREDIA, COSTA RICA,** 31.02 m., Addr. Amando C. Marin, Apartado 40. 8.30-10 pm., 11.30 pm.-12 m.
9.660	LRX	**BUENOS AIRES, ARG.,** 31.06 m., Addr. El Mundo. 9.30 am.-11.30 pm.
9.650	CT1AA	**LISBON, PORTUGAL,** 31.09 m., Addr. Radio Colonial. Tues., Thurs. and Sat. 4.30-7 pm.
9.650	DGU	**NAUEN, GERMANY,** 31.09 m., Addr. (See 20.020 mc.) Works Egypt afternoons.
9.645	HH3W	**PORT-AU-PRINCE, HAITI,** 31.1 m., Addr. P. O. Box A117. 1-2, 7-8 pm.
9.645	YNLF	**MANAGUA, NICARAGUA,** 31.1 m. 8-9 am., 12.30-2.30, 6.30-10 pm.
9.635	2RO	**ROME, ITALY,** 31.13 m., Addr. (See 11.810 mc.) Tues., Thurs. and Sat. 6-7.45 pm.
9.630	HJ2ABD	**BUCARAMANGA, COL.,** 31.14 m. 11.30 am.-12.30 pm., 5.30-6.30, 7.30-10.30 pm.
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.
9.615	HP5J	**PANAMA CITY, PANAMA,** 31.22 m. Addr. Apartado 867. 12 n. to 1.30 pm., 6-10.30 pm.

S.W. BROADCAST BAND

9.600	RAN	**MOSCDW, U.S.S.R.,** 31.25 m. Daily 7-9.15 pm.
9.600	CB960	**SANTIAGO, CHILE,** 31.25 m. Heard after 9.30 pm.
9.595	HBL	**GENEVA, SWITZERLAND,** 31.27 m., Addr. Radio Nations. Sat. 5.30-6.30 pm.
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.
9.590	VK6ME	**PERTH, W. AUSTRALIA,** 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd. 6-8 am. exc. Sun.
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.
9.590	W3XAU	**PHILADELPHIA, PA.,** 31.28 m. Relays WCAU 12 n. to 8 pm. Sun. and Wed. to 7 pm.
9.580	GSC	**DAVENTRY, ENGLAND,** 31.32 m., Addr. B. B. C., Portland Pl., London, W. 1. Irregular. 9-11 pm.
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.
9.575	HJ2ABC	**CUCUTA, COL.,** 31.34 m. 8 pm. to 12 m.
9.570	KZRM	**MANILA, P. I.,** 31.35 m., addr. Erlanger & Galinger, Box 283. 9 pm.-10 am.
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.
9.560	DJA	**BERLIN, GERMANY,** 31.38 m., Addr. Broadcasting House. 12.05-5.15 am., 4.50-10.45 pm.
9.555	HJ1ABB	**BARRANQUILLA, COL.,** 31.39 m., Addr. P. O. Box 715. 11.30 am. to 1 pm., 4.30-6 pm.
9.550	OLR3A	**PRAGUE, CZECHOSLOVAKIA,** 31.41 m. See 11.840 mc.
9.550	XEFT	**VERA CRUZ, MEX.,** 31.41 m, 11.30 am.-4 pm., 7 pm.-12 m.
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.
9.540	DJN	**BERLIN, GERMANY,** 31.45 m., Addr. (See 9.560 mc.) 12.05-5.15 am., 4.50-10.45 pm.
9.540	VPD2	**SUVA, FIJI ISLANDS,** 31.45 m., Addr. Amalgamated Wireless of Australasia, Ltd. 5.30-7 am.
9.535	JZI	**TOKIO, JAPAN,** 31.46 m., Addr. (See 11.800. JZJ)
9.530	W2XAF	**SCHENECTADY, N. Y.,** 31.48 m., Addr. General Electric Co. 4 pm.-1 am.
9.525	ZBW3	**HONGKONG, CHINA,** 31.49 m., Addr. P. O. Box 200. Irregular 11.30 pm. to 1.15 am., 4-10 am.
9.525	LKJ1	**JELOY, NORWAY,** 31.49 m. 5-8 am.
9.520	HJ4ABH	**ARMENIA, COLOMBIA,** 31.51 m. 8-11 am., 6-10 pm.
9.520	OZF	**SKAMLEBOAEK, DENMARK,** 31.51 m., Addr. Statsradiofonien, Copenhagen. 2-6.40 P.M.
9.520	XEDQ	**GUADALAJARA, GAL., MEXICO,** 31.5 m. Irregular 7.30 pm. to 12.30 am.
9.510	VK3ME	**MELBOURNE, AUSTRALIA,** 31.55 m., Addr. Amalgamated Wireless of Australasia. 167 Queen St. Daily except Sun. 4-7 am.

(*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

by *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.

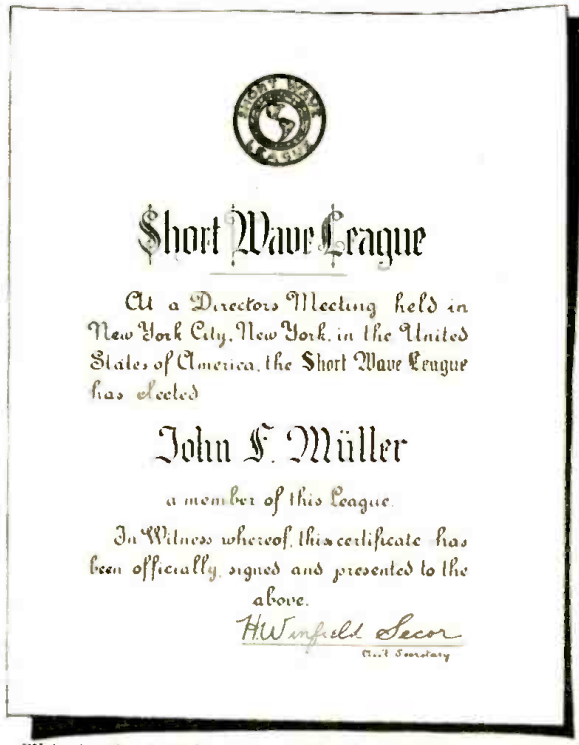
● **COCM MOVES** . . . COCM, Havana has been trying out 9.8 mc. for several weeks in place of its old frequency. Signals on the new frequency are excellent.

● **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. Bechuanaland, 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.



This is the handsome certificate that is presented FREE to all members of the SHORT WAVE LEAGUE. The full size is 7¼"x9½".

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 Skamleboaek 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 ¾ inch in dismeter 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	
9.510	GSB	**DAVENTRY, ENGLAND,** 31.55 m., Addr. (See 9.580 mc.—GSC) 2-4.15 am., 12.20-6 pm., 9-11 pm.
9.505	HJ1ABE	**CARTAGENA, COLOMBIA,** 31.57 m. Addr. P. O. Box 31. 5-10.30 pm.
9.500	XEWW	**MEXICO CITY, MEX.,** 31.58 m. Addr. Apart. 2516. Relays XEW.
9.500	HJU	**BUENAVENTURA, COLOMBIA,** 31.58 m., Addr. National Railways. Mon., Wed. and Fri. 8-11 pm.
9.500	PRF5	**RIO DE JANIERO, BRAZ.,** 31.58 m. Irregularly 4.45 to 5.45 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.

S.W. BROADCAST BAND

9.460	ICK	**TRIPOLI, N. AFRICA,** 31.71 m. Works Rome, 5.30-7 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.)
9.440	FZF8	**FORT de FRANCE, MARTINIQUE,** 31.78 m. 11.30 am., 12.30 pm., 6.15-7.15 pm., 8-9 pm.
9.440	HC2RA	**GUAYAQUIL, ECUADOR,** 31.78 m. Irregularly till 10.40 pm.
9.428	COCH	**HAVANA, CUBA,** 31.8 m., Addr. 2 B St., Vedado. 7 am.-1 am.
9.415	PLV	**BANDOENG, JAVA,** 31.87 m. Works Holland around 9.45 am.
9.350	COBC	**HAVANA, CUBA,** 32.09 m. Addr. P.O. Box 132. Relays CMBC. 6.55 am.-12.30 am.
9.350	HS8PJ	**BANGKOK, SIAM,** 32.09 m. Thursday, 1-2.30, 7.30-10 am.
9.330	CGA4	**DRUMMONDVILLE, CANADA,** 32.15 m. Works England irregularly.
9.330	OAX4J	**LIMA, PERU,** 32.15 m., Addr. Box 1166, "Radio Universal." 7 pm.-12 m.
9.300	YNGU	**MANAGUA, NICARAGUA,** 32.26 m. 12 n.-2 pm., 6-7 pm.
9.280	GCB	**RUGBY, ENGLAND,** 32.33 m. Works Canada and Egypt evenings and afternoons.
9.170	WNA	**LAWRENCEVILLE, N. J.,** 32.72 m. Works England evenings.
9.150	YVR	**MARACAY, VENEZUELA,** 32.79 m. Works with Europe afternoons.
9.125	HAT4	**BUDAPEST, HUNGARY,** 32.88 m., Addr. "Radiolabor," Gyali-ut, 22. Sun. and Wed. 7-8 pm., Sat. 6-7 pm.
9.060	TFK	**REYKJAVIK, ICELAND,** 33.11 m. Works London afternoons.
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 CMBZ
9.020	GCS	**RUGBY, ENGLAND,** 33.26 m. Works N. Y. C. evenings.
9.010	KEJ	**BOLINAS, CAL.,** 33.3 m. Relays NBC and CBS programs in evening irregularly.
8.957	VWY	**KIRKEE, INDIA,** 33.43 m. Works with England in morning.
8.960	TPZ	**ALGIERS, ALGERIA,** 33.48 m. Works Paris afternoons.
8.950	HCJB	**QUITO, ECUADOR,** 33.5 m. 7-10 pm. except Monday.
8.795	HKV	**BOGOTA, COLOMBIA,** 34.09 m. Mon. and Thurs. 7-7.30 pm.
8.775	PNI	**MAKASSER, CELEBES, N. I.,** 34.19 m. Works Java around 4 am.
8.765	DAF	**NORDDEICH, GERMANY,** 34.23 m. Works German ships irregularly.
8.760	GCQ	**RUGBY, ENGLAND,** 34.25 m. Works Africa afternoons.
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.
8.580	YNLG	**MANAGUA, NICARAGUA,** 34.92 m. 7.30-9.30 pm.
8.560	WOO	**OCEAN GATE, N. J.,** 35.05 m. Works ships irregularly.
8.400	HC2CW	**GUAYAQUIL, ECUADOR,** 35.71 m. 11.30 am.-12.30 pm., 8-11 pm.
8.380	IAC	**PISA, ITALY,** 35.8 m. Works Italian ships irregularly.
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.
8.185	PSK	**RIO DE JANEIRO, BRAZIL,** 36.65 m. Irregularly.
8.036	CNR	**RABAT, MOROCCO,** 37.33 m. Sun. 2.30-5 pm.
7.975	HC2TC	**QUITO, ECUADOR,** 37.62 m. Thurs. and Sun. at 8 pm.
7.901	LSL	**HURLINGHAM, ARGENTINA,** 37.97 m. Works Brazil at night.
7.860	SUX	**ABOU ZABAL, EGYPT,** 38.17 m. Works with Europe, 4-6 pm.
7.854	HC2JSB	**GUAYAQUIL, ECUADOR,** 38.2 m. Evenings.
7.797	HBP	**GENEVA, SWITZERLAND,** 38.48 m., Addr. Radio-Nations. Sat. 5.30-6.30 pm.
7.715	KEE	**BOLINAS, CAL.,** 38.89 m. Relays NBC and CBS programs in evening irregularly.
7.625	RIM	**TACHKENT, U.S.S.R.,** 39.34 m. Works with Moscow in early morning.
7.610	KWX	**DIXON, CAL.,** 39.42 m. Works with Hawaii, Philippines. Java and Japan, nights.
7.550	TI8WS	**PUNTA ARENAS, COSTA RICA,** 39.74 m., Addr. "Ecos Del Pacifico", P. O. Box 75. 6 pm.-12 m.
7.520	KKH	**KAHUKU, HAWAII,** 39.89 m. Works with Dixon and broadcasts irregularly nights.
7.510	JVP	**NAZAKI, JAPAN,** 39.95 m. Irregular.
7.500	RKI	**MOSCOW, U.S.S.R.,** 40 m. Works with RIM early am.
7.390	ZLT2	**WELLINGTON, N. Z.,** 40.6 m. Works with Sydney, 3-7 am.
7.380	XECR	**MEXICO CITY, MEX.,** 40.65 m., Addr. Foreign Office. Sunday 6-7 pm.
7.220	HKE	**BOGOTA, COL., S. A.,** 41.55 m. Tues. and Sat. 8-9 pm. Mon. and Thurs. 6.30-7 pm.
7.200	YNAM	**MANAGUA, NICARAGUA,** 41.67 m. Daily at 9 pm.
7.100	FO8AA	**PAPEETE, TAHITI,** 42.25 m.. Addr. Radio Club Papeete. Tues. and Fri. 11 pm.-12 m.
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.
6.977	XBA	**TACUBAYA, D. F., MEX.,** 43 m. 9.30 am.-1 pm., 7-8.30 pm.
6.976	HCETC	**QUITO, ECUADOR,** 43m.. Addr. Teatro Bolivar. Thurs. till 9.30 pm.
6.905	GDS	**RUGBY, ENG.,** 43.45 m. Works N.Y.C. evenings irregularly.
6.880	COCW	**HAVANA, CUBA,** 43.62 m. Addr. LaVoz de las Antillas, P. O. Box 130. 6.55 am.- 1 am. Sun. 10 am.-10 pm.
6.860	KEL	**BOLINAS, CALIF.,** 43.70 m. Tests irregularly. 11 am.-12 n., 6-9 pm.
6.850	XGOX	**NANKING, CHINA,** 43.8 m. Daily 6.40-8.40 am., Sun. 4.40-6.05 am.
6.800	HI7P	**CIUDAD TRUJILLO, DOM. REP.,** 44.12 m., Addr. Emisoria Diaria de Commerelo. 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
6.770	HIH	**SAN PEDRO DE MACORIS, DOM. REP.,** 44.26 m. 12.10-1.40 pm., 7.30-9 pm. Sun. 3-4 am., 4.15-6 pm., 4.40-7.40 pm.
6.775	WOA	**LAWRENCEVILLE, N. J.,** 44.41 m., Addr. A. T. & T. Co. Works England evenings.
6.750	JVT	**NAZAKI, JAPAN,** 44.44 m., Addr. Kokusai-Denwa Kaisha, Ltd., Tokio. Irregular.
6.730	HI8C	**LA ROMANA, DOM. REP.,** 44.58 m., Addr. "La Voz de la Feria." 12.30-2 pm., 5-6 pm.
6.720	PMH	**BANDOENG, JAVA,** 44.64 m. Relays NIROM programs. 5.30-9 am.
6.710	TIEP	**SAN JOSE, COSTA RICA,** 44.71 m., Addr. Apartado 257, La Voz del Tropico. Daily 7-10 pm.
6.672	YVQ	**MARACAY, VENEZUELA,** 44.95 m. Sat. 8-9 pm.
6.670	HC2RL	**GUAYAQUIL, ECUADOR, S. A.,** 44.95 m., Addr. P. O. Box 759. Sun. 5.45-7.45 pm., Tues. 9.15-11.15 pm.
6.650	IAC	**PISA, ITALY,** 45.11 m. Works ships irregularly.
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.
6.625	PRADO	**RIOBAMBA, ECUADOR,** 45.28 m. Thurs. 9-11.45 pm.
6.558	HI4D	**CIUDAD TRUJILLO, D. R.,** 45.74 m. Except Sun. 11.55 am.-1.40 pm.
6.550	XBC	**VERA CRUZ, MEX.,** 45.8 m. 8.15-9 am.
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.
6.545	YV6RB	**BOLIVAR, VENEZUELA,** 45.84 m., Addr. "Ecos de Orinoco." 6-10.30 pm.
6.530	YN1GG	**MANAGUA, NICARAGUA,** 45.94 m., Addr. "La Voz de los Lagos." 8-9 pm.
6.520	YV4RB	**VALENCIA, VENEZUELA,** 46.01 m. 11 am.-2 pm., 5-10 pm.
6.500	HIL	**CIUDAD TRUJILLO, D. R.,** 46.15 m., Addr. Apartado 623. 12.10-1.40 pm,. 5.40-7.40 pm.
6.500	TIOW	**PUERTO LIMON, COSTA RICA,** 46.15 m., Addr. Ondas del Caribe. Daily 12 n.-1.30 pm.
6.477	HI4V	**SAN FRANCISCO de MACORIS, D. R.,** 46.32 m. 11.40 am.-1.40 pm., 5.10-9.40 pm.
6.470	YNLAT	**GRANADA, NICARAGUA,** 46.36 m., Addr. Leonidas Tenoria. "La Voz del Mombacho." Irregular.
6.450	HI8A	**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.
6.420	HI1S	**SANTIAGO, D. R.,** 46.73 m. 11.40 am. -1.40 pm., 5.40-7.40, 9.40-11.40 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.
6.400	YV5RH	**CARACAS, VENEZUELA,** 46.88 m. 7-11 pm.
6.380	YV5RF	**CARACAS, VENEZUELA,** 47.02 m., Addr. Box 983. 6-10.30 pm.
6.360	HRP1	**SAN PEDRO SULA, HONDURAS,** 47.19 m. 7.30-9.30 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.
6.350	HRY	**TEGUCIGALPA, HONDURAS,** 47.24 m. 6.30-8.30 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.
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.
6.310	TG2	**GUATEMALA CITY, GUAT.,** 47.55 m., Addr. Secretaria de Fomento. Relays TG1 11 pm.-2 am.
6.300	YV4RG	**MARACAY, VENEZUELA,** 47.62 m. 8-10.30 pm.
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.
6.280	HIG	**CIUDAD TRUJILLO, D. R.,** 47.77 m. 7.10-8.40 am., 12.40-2.10, 8.10-9.40 pm.
6.270	YV5RP	**CARACAS, VENEZUELA,** 47.79 m.. Addr. "La Voz de la Philco." Irregular.

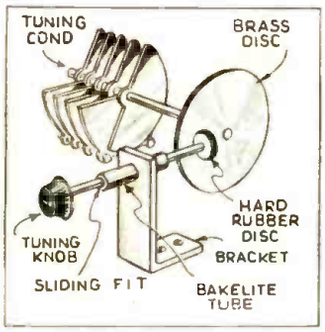
(Continued on page 371)

(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 ¼" shaft, which passes with a sliding fit through a piece of bakelite tubing mounted on the panel. To the end of this shaft a ½" 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 rolling out the tuning knob the amount of bandspread may be increased from 2-1 to 16-1.—J. Esterhuizen.

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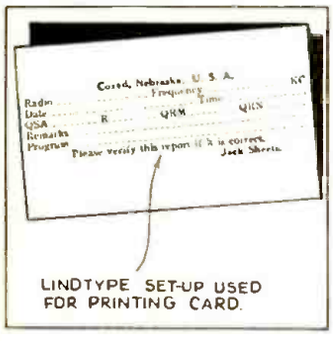
MAKE YOUR OWN QSL's



This Kink ought to be welcomed by financially embarrassed "Hams" and SWLs. 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.

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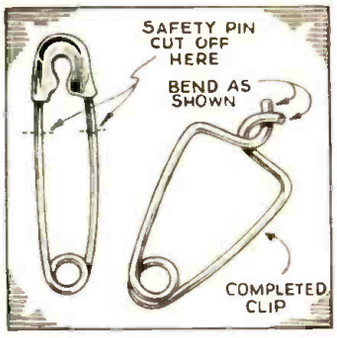

CLIP MADE FROM SAFETY PIN

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 snaphead 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, W1EOG.

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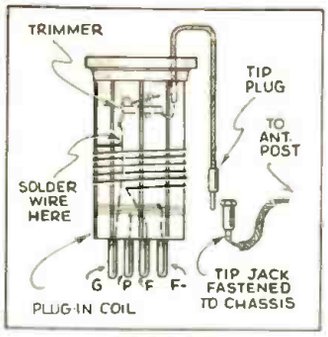
FIXED TRIMMERS

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



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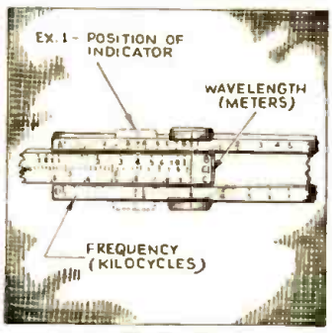
"SLIPSTICK" TRICK

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 reversed 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 1860 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
2,000	100
25,000	12
60,000	5

—Frederick A. Mason.



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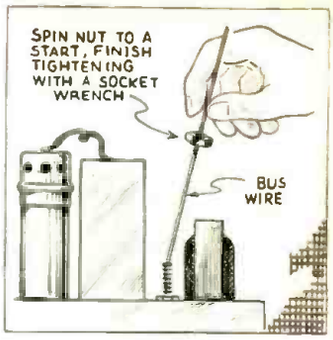
"NUT-STARTER"

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 portion with wire while you spin nut around, using another piece of bus wire or a small shank screw-driver. The diagram illustrates operation.—Roscue Walther.



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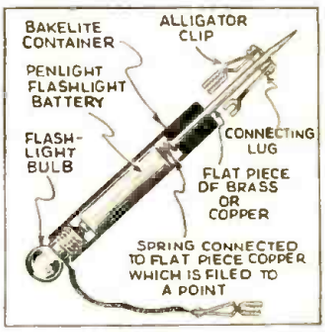
UNIVERSAL PROD

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 Podgorski.



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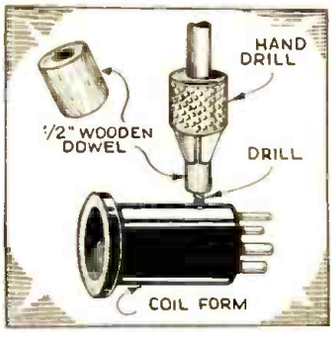
COIL WINDING KINK

To prevent the drill from going through the coil form too forcefully and damaging the form, make a hole in a ⅜" dowel just large enough for the drill to go through. The drill should protrude about ½". 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	
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.
6.235	HRD	LA CEIBA, HONDURAS, 48.12 m.,Addr. "La Voz de Atlantida." 8-11 pm.; Sat. 8 pm.-1 am.; Sun. 4-6 pm.
6.230	YV1RG	VALERA, VENEZUELA, 48.15 m. 6-9.30 pm.
6.230	OAX4G	LIMA, PERU, 48.15 m., Addr. Apartado 1242. Daily 7-10.30 pm.
6.210	YV5RI	CORO, VENEZUELA, 48.31 m., Addr. Roger Leyba, care A. Urbina y Cia. Irregular.

S.W. BROADCAST BAND

6.190	HI8Q	CIUDAD TRUJILLO, D. R., 48.47 m. 11.45 am.-1 pm., 4.45-6.45 pm.
6.185	HI1A	SANTIAGO, D. R., 48.5 m., Addr. P. O. Box423. 11.40am.-1. 40 pm.; 7.40-9. 40 pm.; Wed. 6-10.30 pm.
6.171	XEXA	MEXICO CITY, MEX., 48.61 m., Addr. Dept. of Education. 7-11 pm.
6.160	YV5RD	CARACAS, VENEZUELA, 48.7 m. 11 am.-2 pm., 4-10.40 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.
6.160	CSL	LISBON, PORTUGAL, 48.78 m. Irregular. 7-8.30 am., 2-7 pm.
6.150	CJRO	WINNIPEG, MAN., CANADA, 48.78 m., Addr. (See 11.720 mc.) 4-10 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.
6.147	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.
6.145	HJ4ABU	PEREIRA, COL., 48.8 m. 9.30 am.-12 m., 6.30-10 pm.
6.140	W8XK	PITTSBURGH, PA., 48.86 m., Addr. Westinghouse Electric & Mfg. Co. Relays KDKA 9 pm.-1 am.
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.
6.135	HJ1ABB	BARRANQUILLA, COL., 48.9 m., Addr. P. O. Box 715. 11.30 am.-1 pm., 4.30-10 pm.
6.135	HI5N	SANTIAGO, D. R., 48.9 m. 6.40-9.10 pm
6.130	TGXA	GUATEMALA CITY, GUAT., 48.94 m., Addr. Giornal Liberal Progressista. Irregularly.
6.130	VP3BG	GEORGETOWN, BRIT. GUIANA. 48.94 m. From 5 pm. on.
6.130	COCD	HAVANA, CUBA, 48.94 m., Addr. Calle G y 25, Vedado. Relays CMCD 10 am-10 pm.
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.
6.130	ZGE	KUALA LUMPUR, FED. MALAY ST., 48.94 m. Sun., Tue. and Fri. 6.40-8.40 am.
6.130	LKL	JELOY, NORWAY, 48.94 m. 11 am.-6 pm.
6.125	CXA4	MONTEVIDEO, URUGUAY, 48.98 m., Addr. Radio Electrico de Montevideo., Mercedes 823. 10 am.-12 n., 2-8 pm.
6.125	OAX1A	CHICLAYO, PERU, 48.98 m., Addr. La Voz de Chiclayo, Casilla No. 9. 8-11 pm.
6.122	OAX4P	HUANCAYO, PERU, 49 m. La Voz del Centro del Peru. 8 pm. on.
6.122	HP5A	PANAMA CITY, PAN., 49. m. Addr. Box 58. 12 n.-1 pm., 8-10 pm.
6.122	HJ3ABX	BOGOTA, COL., 49 m., Addr. La Voz de Col., Apartado 2665. 12 n.-2 pm., 5.30-11 pm.; Sun. 6-11 pm.
6.120	W2XE	NEW YORK CITY, 49.02 m., Addr. Col. B'cast. System, 485 Madison Ave. Irregular.
6.120	XEUZ	MEXICO CITY, MEX., 49.02 m., Addr. 5 de Mayo 21. Relays XEFO 1-3 am.
6.115	OLR2C	PRAGUE, CZECHOSLOVAKIA, 49.05 m. (See 11.875 mc.)
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.
6.110	VUC	CALCUTTA, INDIA, 49.1 m. Daily 3-5.30 am., 9.30 am.-12 m.; Sun 7.30 am.-12 m.
6.110	YUA	BELGRADE, JUGOSLAVIA, 49.18 m., 12.45-2.30, 4-8 am., 1-6 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.
6.100	W3XAL	BOUND BROOK, N. J., 49.18 m., Addr. Natl. Broad. Co. 9.15 pm.-1 am.
6.100	W9XF	CHICAGO, ILL., 49.18 m., Addr. N.B.C.
6.100	HJ4ABE	MEDELLIN, COL., 49.18 m. 11 am.-12 m., 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.
6.095	JZH	TOKIO, JAPAN, 49.22 m., Addr. (See 11.800 mc., JZJ.) Irregular.
6.092	OAX4Z	LIMA, PERU 49.25 m. Radio National 7-11 pm.
6.090	HJ4ABC	IBAGUE, COL., 49.26 m. 7 pm.-12 m.
6.090	CRCX	TORONTO, CAN., 49.26 m., Addr. Can. Broadcasting Corp. Daily 5.30-11.30 pm.; Sun. 5-11.30 pm.
6.090	ZBW2	HONGKONG, CHINA, 49.26 m., Addr. P. O. Box 200. Irregular.
6.085	HJ5ABD	CALI, COLOMBIA, 49.3 m., Addr. La Voz de Valle. 12m.-1.30 pm., 5.10-9.40 pm.
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., alsoTues. and Thurs. 8.30-9.30 am.;Sat. 11.30 am.-3.30 pm.; Sun. 11 am.-2 pm.
6.080	ZHJ	PENANG, FED. MALAY STATES, 49.34 m. 6.40-8.40 am., except Sun., also Sat. 11 pm.-1 am.
6.080	CP5	LAPAZ, BOLIVA, 49.34 m. 7-10.30 pm.
6.080	HP5F	COLON, PAN., 49.34 m., Addr. Carlton Hotel. 11.45am.-1.15 pm., 7.45-10 pm.
6.080	W9XAA	CHICAGO, ILL., 49.34 m., Addr. Chicago Fed. of Labor. Relays WCFL irregular
6.079	DJM	BERLIN, GERMANY, 49.34 m., Addr. Broadcasting House. Irregular.
6.070	VP3MR	GEORGETOWN, BRI.GUIANA, 49.42 m. Sun. 7.45-10.15 am ; Daily 4.45-8.45pm.
6.070	HJ3ABF	BOGOTA, COL., 49.42 m. 7-11.15 pm.
6.070	CFRX	TORONTO, CAN., 49.42 m. Relays CFRB 6.30 am-11 pm. Sun. 9.30 am.-11 p. m.
6.070	YV1RE	MARACAIBO, VEN., 49.42 m. 6-11pm.
6.070	VE9CS	VANCOUVER, B. C., CAN., 49.42 m. Sun. 1.45-9 pm., 10.30 pm.-1am.; Tues. 6-7.30 pm., 11.30 pm.-1.30 am. Daily 6-7.30 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.
6.065	SBG	MOTALA, SWEDEN, 49.46 m. Relays Stockholm 1.30-5 pm.
6.060	W8XAL	CINCINNATI, OHIO, 49.6 m., Addr. Crosley Radio Corp. Relays WLW 6.30 am.-8 pm., 11 pm.-2 am.
6.060	W3XAU	PHILADELPHIA, PA., 49.5 m. Relays WCAU 8-11 pm.
6.060	OXY	SKAMLEBOAEK, DENMARK, 49.5 m. Irregular.
6.050	HJ3ABD	BOGOTA, COL., 49.59 m., Addr. La Nueva Granada, Box 509. 12m.-2 pm., 7-11 pm.; Sun. 5-9 pm.
6.045	HI9B	SANTIAGO, D. R., 49.63 m. Irregular 6-11 pm.
6.042	HJ1ABG	BARRANQUILLA, COL., 49.65 m., Addr. Emisora Atlantico. 11 am.-11 pm.; Sun. 11 am.-8 pm.
6.040	W4XB	MIAMI BEACH, FLA., 49.65 m. Relays WIOD 12m.-2 pm., 5.30-6 pm., 10 pm.-12 m.
6.040	W1XAL	BOSTON, MASS., 49.65 m., Addr. University Club. Generally from 6-10 pm.
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.
6.030	HJ4ABP	MEDELLIN, COL., 49.75 m. 8-11 pm.
6.030	HP5B	PANAMA CITY, PAN., 49.75 m., Addr. P.O. Box 910. 12m.-1 pm., 7-10.30 pm.
6.030	VE9CA	CALGARY, ALTA., CAN., 49.75 m. Thur. 9 am.-2 am.; Sun 12 m.-12 m.
6.030	OLR2B	PRAGUE, CZECHOSLOVAKIA, 49.75 m. (See 11.875 mc.)
6.025	HJ1ABJ	SANTA MARTA, COL., 49.79 m. 5.30-10.30 pm. except Wed.
6.020	DJC	BERLIN, GERMANY, 49.83 m., Addr. (See 6.079 mc.) 11.35 am.-4.30 pm.
6.020	XEUW	VERA CRUZ, MEX., 49.83 m., Addr. Av. Independencia 98. 8 pm.-12.30 am.
6.018	ZHI	SINGAPORE, MALAYA, 49.18 m., Addr. Radio Service Co., 2 Orchard Rd. Mon., Wed. and Thu0 5.40-8.0 am.. Sat. 10.40 pm.-1.10 am.
6 .015	HI3U	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.
6.012	HJ3ABH	BOGOTA, COL., 49.91 m., Addr. Apartado 565. 12 n.-2 pm., 6-11 pm.; Sun. 12m.-2 pm., 4-11 pm.
6.010	COCO	HAVANA, CUBA, 49.92 m., Addr. P. O. Box 98. Daily 7.55 am.-12m., Sun. till 11 pm.
6.005	HP5K	COLON, PAN., 49.96 m., Addr. Box 33. 7-9 am., 11.30 am.-1 pm., 6-11 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.
6.005	VE9DN	DRUMMONOVILLE, QUE., CAN., 49.96 m., Addr. Canadian Marconi Co. Sat. 11.30 pm.-2 am.
6.000	ZEA	SALISBURY, RHODESIA, S. AFRICA, 50 m. (See 6.147 mc., ZEB.)
6.000	RV59	MOSCOW, U.S.S.R., 50 m. Irregular.
5.990	XEBT	MEXICO CITY, MEX., 50.08 m., Addr. P. O. Box 79-44. 8 am.-1 am.

S.W. BROADCAST BAND

5.970	HJ4ABD	MEDELLIN, COL., 50.26 m., Addr. La Voz Catia. 8-11.30 pm.
5.968	HVJ	VATICAN CITY, 50.27 m. 2-2.15 pm. daily; Sun. 5-5.30 am.
5.950	HJN	BOGOTA, COL., Radiodifusora Nacional, 50.42 m. 6-11 pm.
5.940	TG2X	GUATEMALA CITY, GUAT., 50.5 m. 4-6, 9-11 pm.; Sun. 2-5 am.
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.
5.925	HH2S	PORT-AU-PRINCE, HAYTI, 50.63 m., Addr. P. O. Box A103. 7-9.45 pm.
5.917	YV4RP	VALENCIA, VEN., 50.71 m. Irregular.
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.
5.900	TIMS	PUNTARENAS, COSTA RICA, 50.85 m. 6-10 pm.
5.898	YV3RA	BARQUISIMETO, VEN., 50.86 m.,Addr. La Voz de Lara. 12 m.-1 pm., 6-10 pm.
5.890	JIC	TAIHOKU, FORMOSA, 50.93 m. Works Tokio 6-9 am.
5.885	HCK	QUITO, ECUADOR, 50.98 m. 8-11 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.
5.855	HI1J	SAN PEDRO DE MACORIS, D. R., 51.25 m., Addr. Box 204. 12 m.-2 pm., 6.30-9 pm.
5.853	WOB	LAWRENCEVILLE, N. J., 51.26 m., Addr. A. T. & T. Co. Works Bermuda nights.
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* 389)

(All Schedules Eastern Standard Time)

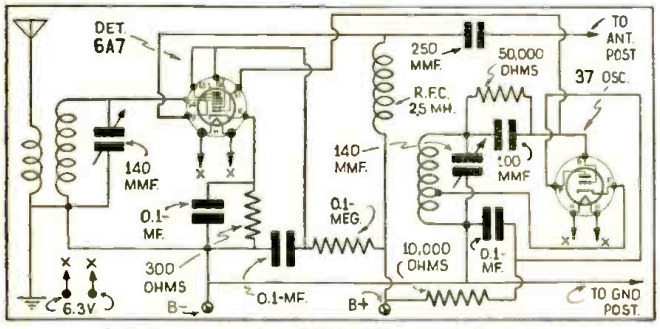
SHORT WAVE QUESTION BOX

EDITED BY G. W. SHUART, W2AMN

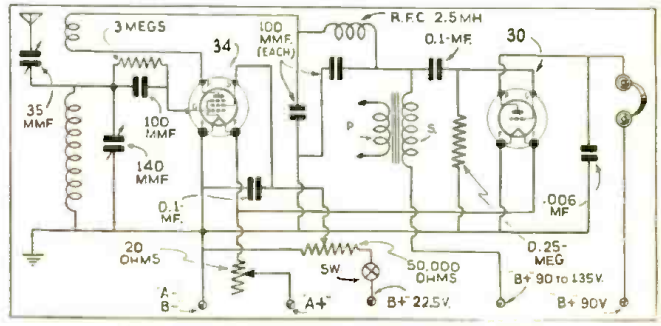
● Because the amount of work involved in the drawing of diagrams and the compilation of data, we are forced to charge 25c each for letters that are answered directly through the mail. This fee includes only hand-drawn schematic drawings. We cannot furnish "picture-layouts" or "full-sized" working drawings.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



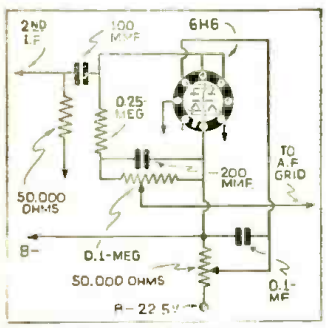
2-Tube Battery Set for Beginner—1096

SHORT WAVE CONVERTER

Edward Rusell. 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 37 as the oscillator. But due 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.



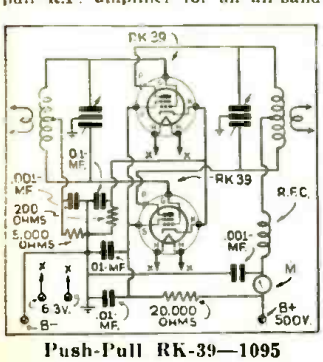
Noise Silencer for Resistance-Coupled Superhet—1094

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 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.



Push-Pull RK-39—1095

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 most certainly is possible for we have been using a noise-silencer in a resistance-coupled superhet at station W2AMN 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 usual triode second-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.

(Q.) 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.

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 diagram how the screen-grid type battery type tube is connected as a regenerative detector. It 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 ¼ 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.

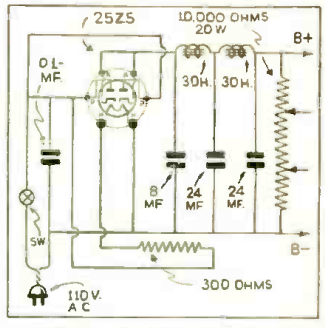
In receivers where adequate by-pass condensers are not connected between the various input voltage terminals and the common "B" negative, it is advisable to by-pass each one of the taps on the voltage divider with an 8 mf. electrolytic condenser.

2-TUBER WITH E.C. DETECTOR

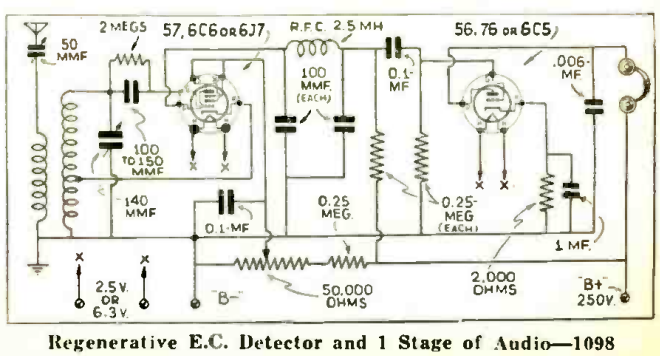
Chas. Mourmouris, Denver, Colo.

(Q.) Would you be kind enough to print in the forthcoming *Question Box* a circuit diagram of a receiver, using a 57 as an electron-coupled detector, and a 56 as resistance-coupled audio. I would like to tune this set with 2-winding coils and a 150 mmf. variable condenser.

(A.) In the diagram of the 2-tube receiver which we have illustrated, regeneration is controlled by the usual 50,000 ohm screen-grid resistor. 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, ½ turn and from ¼ to ½ turn for coils from 10 to 25 meters. For *band-spread* connect a 35 mmf. condenser in parallel with the main tuning condenser.



A.C.-D.C. Power-Supply—1097



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

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 tinfoil (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.

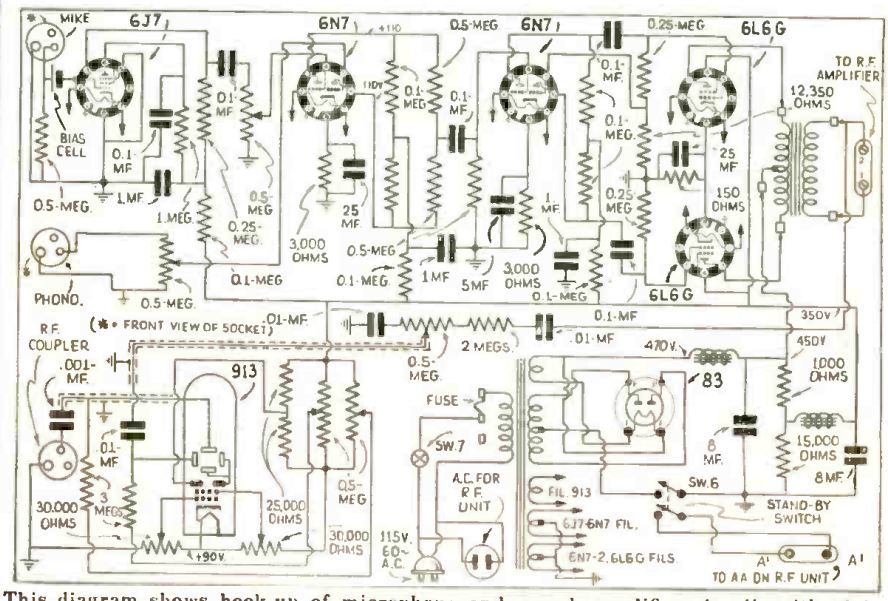
Dr. McVey's address outlined the beginnings of the centers, when discarded battery sets were used to set up receivers. But they did not prove adequate for long, and with the aid of Kentucky's business and civic leaders and organizations more modern equipment was supplied. Today, he said, most of the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

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 nickeled 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 frequencies. 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 Triplett 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 Triplett 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)

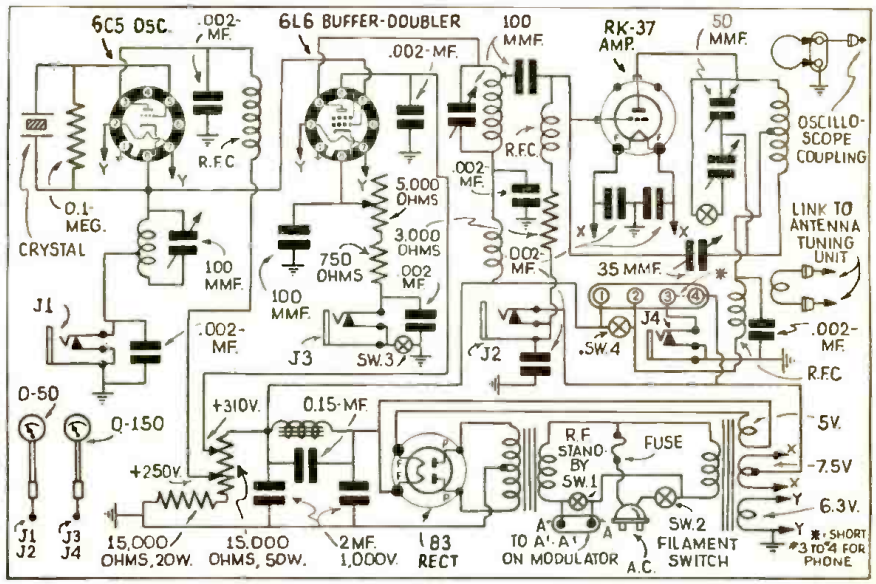
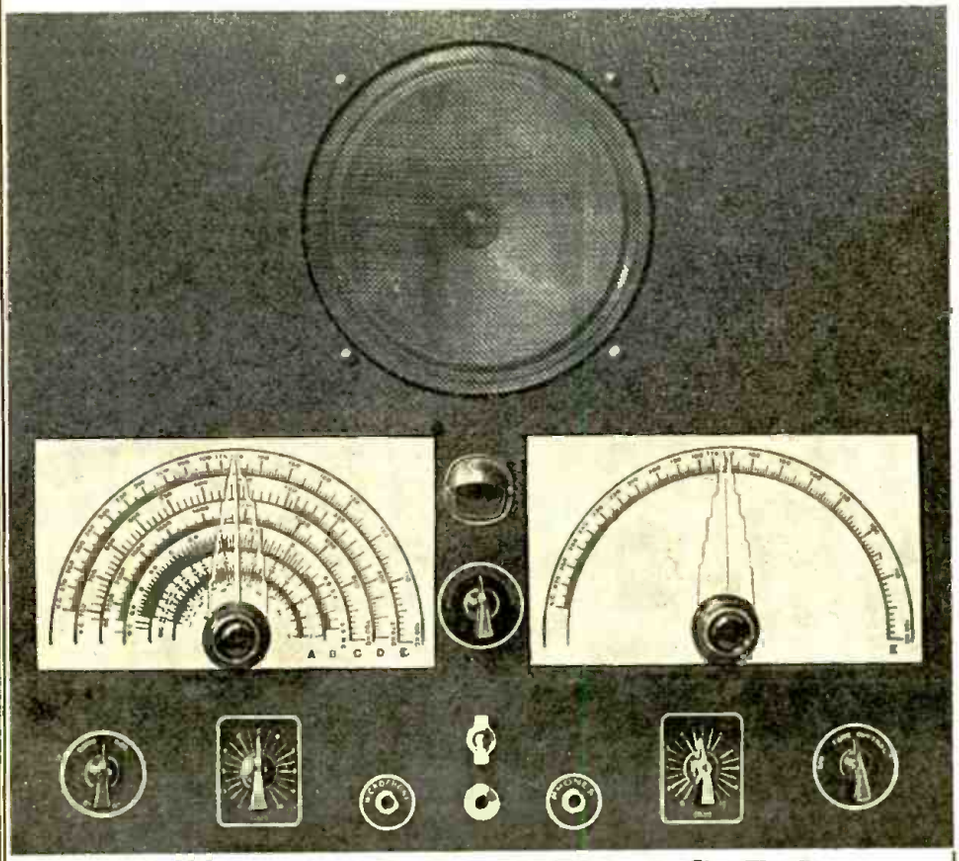


Diagram of crystal oscillator, buffer-doubler and amplifier, together with plate supply.

The New 1938 Ultra Stratosphere "10"



- 2½ 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 2½ to 4000 meters.
- *Transmits on 2½ & 5 meters.
- *8" Dynamic Speaker.
- *Calibrated R.F. Gain Control.
- *A.F. Gain Control.
- *Size—17½" x 19½"—16 gauge metal.
- *Tone control.
- *R.F. Resonator control.
- *Separate electrical bandspread.
- *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.

SENSATIONAL ULTRA A.C.+D.C.
2-TUBE TRANS-RECEIVERS 2½ to 4000 Meters

FEATURES

- ★ Transmits from 2½ to 5 meters
- ★ Receives from 2½ to 4000 meters (12 bands)
- ★ Separate electrical and mechanical bandspread
- ★ Loud speaker volume
- ★ Automatic super-regeneration from 2½ to 15 meters
- ★ House to house communication
- ★ Plate modulation
- ★ Builtin A.C.&D.C. power supply (any cycle)

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—2½ 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

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 2½ 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 2½ and 5 meter transmitter surprising results will be obtained when calling friends from afar.

Complete kit unwired less tubes, coils, cabinet microphone $7.15

Cabinet	.95
Matched set of tubes (12A7-6J5G)	1.65
Wired and tested	2.00
Set of 4 coils (2½ to 15 meters)	.30
Set of 4 coils (15-200 meters)	.95
Set of 5 coils (200 to 4000 meters)	1.75
American SB Hand mike	2.95
5" Magnetic Speaker	1.25

ULTRA DUPLEX 6 TUBE MOBILE OR A. C.
2½ 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.

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)

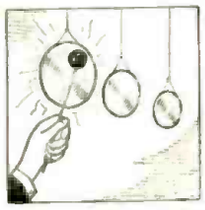
Slogan: "*La Voz de Armenia*," uses single musical note before announcements, giving call as "HJ4ABH y HJ4ABN." Signs off with "Spanish Soldiers" March.

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.

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-

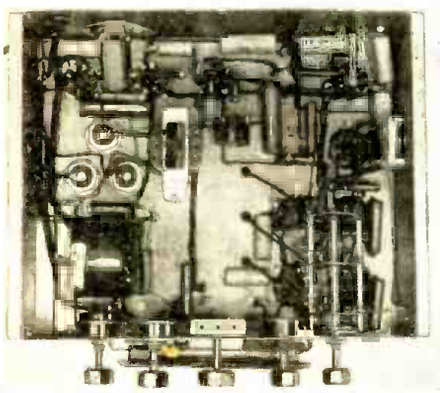
choke, electrolytic condensers and speaker socket should then be wired. It may be desirable to make all connections to the three coils and the two tubes near the band-switch before mounting the band-switch. It is a good idea to connect about a 6-inch length of wire to the terminals on these coils which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

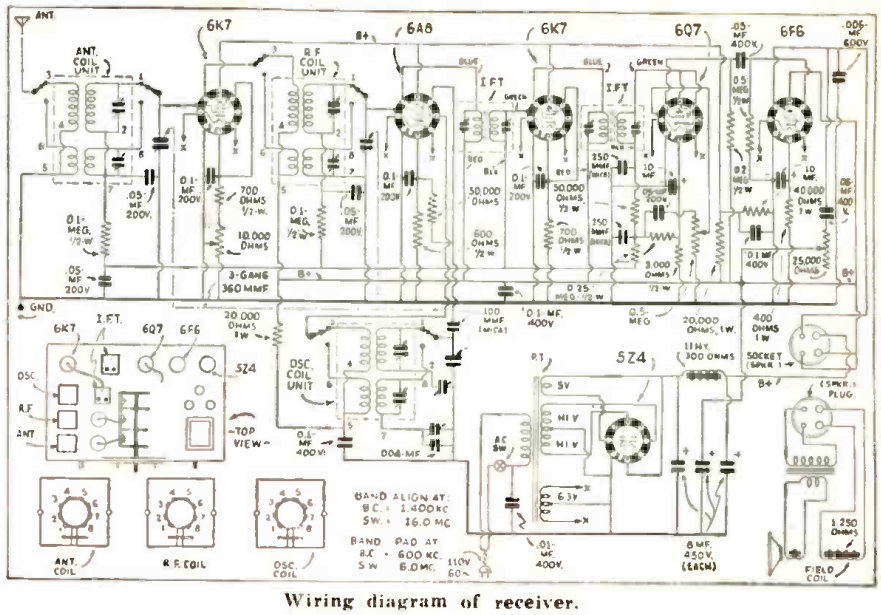


Bottom view of complete receiver.

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-



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 padder 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 aligning 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 micro-volts on the broadcast band, and from 10 to 20 micro-volts 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 pad condenser
1 .004-mf. fixed pad condenser
1 Ferrocart 456-kc. input I.F. transformer
1 Ferrocart 456-kc. 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

TUBES

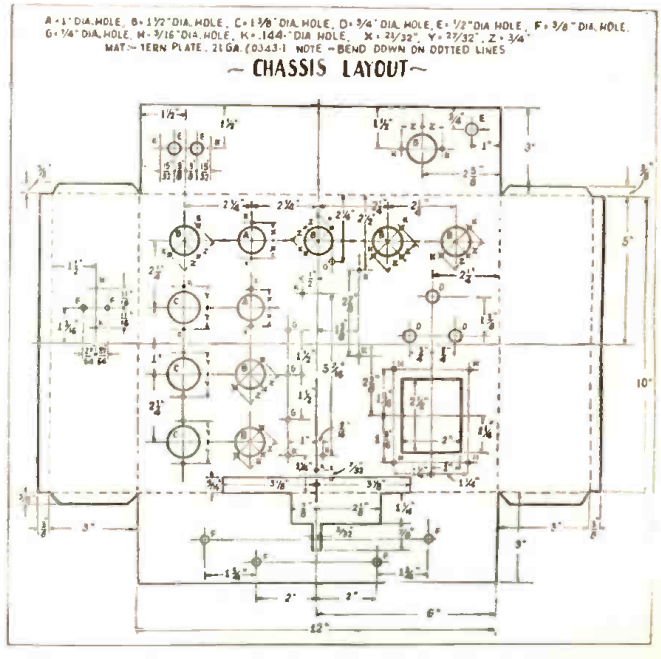
1—6A8 metal tube
2—6K7 metal tubes
1—6Q7 metal tube
1—6F6 metal tube
1—5Z4 metal tube

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, ½-watt resistors
1—400-ohm, 1-watt resistor
1—3,000-ohm, ½-watt resistor
1—200,000-ohm, ½-watt resistor
1—600-ohm, ½-watt resistor
2—20,000-ohm, 1-watt resistors
1—40,000-ohm, 1-watt resistor
2—50,000-ohm, ½-watt resistors
2—100,000-ohm, ½-watt resistors
2—250,000-ohm, ½-watt resistors
1—500,000-ohm, ½-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.



Chassis dimension layout. →

6.3-volt sec. @ 2-amp.
5-volt @ 2-amp. 2½" x 3⅛" mntg. centers
1—filter choke, 11-henry, 300-ohm, 60-ma. 2⅞" 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 hi-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!

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 devolped 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-

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
61 Drakefield Rd.
Tootings, S. W. 17
LONDON

Chas. E. Auclair
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, Wisc.

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 Bufis
625 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. Dezina
5024 House Ave.
Cleveland, Ohio

Eugene H. Dodds
c/o Dodds 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.
Paulding, Ohio

C. H. Johnson
1539 W. 12th St.
Casper, Wyo.

Harold Johnson
27 Third St.
Norwood, Mass.

Frederick Joslin
147 Everett St.
Southbridge, Mass.

See Page 398 for the 6 Best Short Wave Books.

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.)

"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.

The 4-in-2 Midget

(*Continued from page 353*)

HAMMARLUND
C1—Hammarlund Equalizer Antenna Trimmer, type EC-35 (3 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—0.1 mf. 400 V.

IRC
R1—1 meg., ½ watt Metallized Resistor
R2—1500 ohm, ½ watt Metallized Resistor
R3—Same as R1
R4—200,000 ohm, ½ watt Metallized Resistor
R5—Same as R1
R7—25,000 ohm, ¼ 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

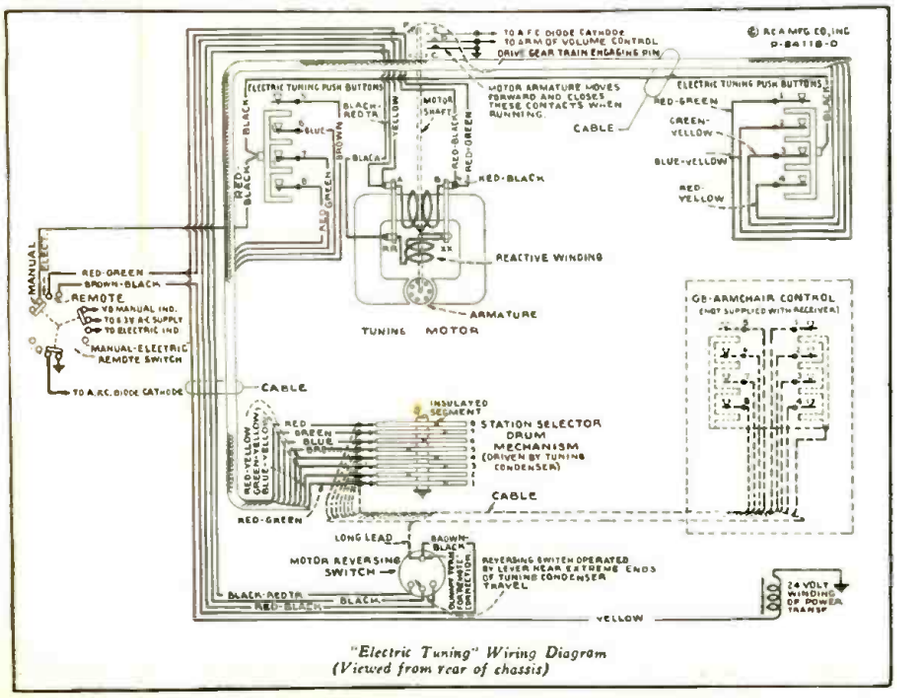
MISCELLANEOUS
1—3" Find-All Dynamic Speaker, 2500 ohm field, 43 output
1—Chassis (see sketch for dimensions)
1—Screen-Grid clip for cap of V1
1—R11 Hook-up Wire
Ch1—20 henry, 300 ohm choke
Sw1—Switch on R6
V1—6F7 Tube
V2—25A7 Tube (Name of Manufacturer on request)
2—Knobs
1—Station Selector Dial Plate
1—Volume Control Dial Plate
1—3-Terminal connection strip

ELECTRAD
R6—Electrad 75,000 ohm Potentiometer with Switch, type 202-S
R10—600 ohm, 10 watt Electrad Vitreous Enameled resistor

Armchair Tuning in New All-Wave Sets

(*Continued from page 361*)

all others) station-selector push-buttons respectively wired to eight adjustable station-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.

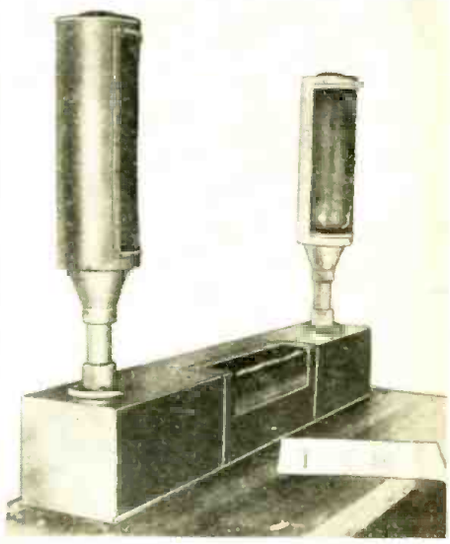


"Electric Tuning" Wiring Diagram (Viewed from rear of chassis)

The Television Amplifier

(*Continued from page* 344)

Readers with a knowledge of the present state of television technique have probably realized already that this "gun" is the scanning device which radio engineers would call a spotlight scanner or, described in other words, a device which divides the speaker's face and half of his figure into tiny *picture elements*. This division into separate picture elements is necessary because any image, in order to be transmitted by television, cannot be transmitted as a unit, but must be "cut" into little elements. The ultimate trick is to transmit these picture elements, piece by piece, to the *reproducer* and to assemble them on the screen in proper sequence. Since every picture element is reproduced on the screen in the form of light dots of various illuminating-power it is easy to understand how the electron-magnifier operates.



This photo shows how the desk of a lecturer or demonstrator will look, possibly at the World's Fair (New York) two years hence. The microphone which picks up the voice is seen in the center of the desk, while at either side we see the two photocells which pick up the reflected scanning rays from the speaker's face.

As stated before the very fine beam of light travels all over the face of the speaker in an exactly prescribed manner, in order to have a standard of speed and time which is duplicated at the reproduction end of the new image amplifier. Every part of the speaker illuminated by the beam naturally reflects, in accordance with his natural color, a greater or lesser amount of light. This reflected light is collected by two electric eyes (photo-electric cells). In order to obtain the highest possible efficiency, the two electric eyes are installed at both sides just in front of the speaker, as the diagram shows.

The front cover illustration gives the reader a very good idea of how the desk or platform of a lecturer will look in the future, when the new device will be as widely applied as microphones and loudspeakers are today. By the way, the microphone is installed behind the square opening in the center which is screened by a cloth-covered mesh wire.

The two electric eyes transform the gathered light pulses into electrical impulses. These impulses are sent via an amplifier to the large size image reproducer installed behind the translucent screen. These impulses are reproduced on this screen in the form of light-dots of the correct illumination power (and also the proper placement) and the audience sees the speaker's image reproduced many times greater than life size.

In order not to present to the audience a

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 (via 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 counterbalance all this jumping around by adjustment 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 ½ 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.
5.830	TIGPH	**SAN JOSE, COSTA RICA,** 51.5 m., Addr. Alma Tica, Apartado 800. 11 am.-1 pm., 6-10 pm. Relays TIX 9-10 pm.
5.800	YV5RC	**CARACAS, VEN.,** 51.72 m., Addr. Radio Caracas. Sun. 8.30am.-10.30pm. Daily 7-8 am., 10.45 am.-1.30 pm., 4-9.30 pm.
5.790	JVU	**NAZAKI, JAPAN,** 51.81 m. Irregular.
5.780	OAX4D	**LIMA, PERU,** 51.9 m., Addr. P. O. Box 853. Mon., Wed. and Sat. 9-11.30 pm.
5.758	YNOP	**MANAGUA, NICARAGUA,** 52.11 m. 8-9.30 pm.
5.740	TGS	**GUATEMALA CITY, GUAT.,** 52.26 m. Wed., Thur. and Sun. 6-9 pm.
5.730	HC1PM	**QUITO, ECUADOR,** 52.36 m. Irregular 10 pm.-12 m.
5.720	YV2RB	**SAN CRISTOBAL, VEN.,** 52.45 m., Addr. La Voz de Tachira. 6-11.30 pm.
5.500	TI5HH	**SAN RAMON, COSTA RICA,** 54.55 m. Irregular 3.30-4. 8-11.30 pm.
5.145	PMY	**BANDOENG, JAVA,** 58.31 m. 5.30-11 am.
5.077	WCN	**LAWRENCEVILLE, N. J.,** 59.7 m. Addr. A. T. & T. Co. Works England late at night irregularly.
6.025	ZFA	**HAMILTON, BERMUDA,** 59.7 m. Works N. Y. C. irregularly at night.
5.000	TFL	**REYKJAVIK, ICELAND,** 60 m. Works Europe nightime irregularly.
4.975	GBC	**RUGBY, ENG.,** 60.3 m. Works ships irregularly.
4.820	GDW	**RUGBY, ENG.,** 62.24 m. Works N.Y.C. nightime irregularly.
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.
4.752	WOO	**OCEAN GATE, N. J.,** 63.1 m., Addr. A. T.& T. Co. Works ships Irregularly
4.600	HC2ET	**GUAYAQUIL, ECUADOR,** 65.22 m. Addr. Apartado 249. Wed. and Sat 9.15-11 pm.
4.272	WOO	**OCEAN GATE, N. J.,** 70.22 m., Addr. A. T. & T. Co. Works ships irregularly.
4.250	RV15	**KHABAROVSK SIBERIA, U. S. S. R.,** 70.42 m. 1-10 am.

Are you a member of the Short Wave League? See Page 396.

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., Klipheuvel, 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 VWY2 in phoning GAU. VQG, 19.62 mc., Nairobi, Kenya Colony, phones GAU after VWY2 or between 7:30-8:30 a.m. So, by watching GAU daily and checking ZSS, VWY2 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*)

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.

Fig. 5—"Door open" view of receiver cabinet.

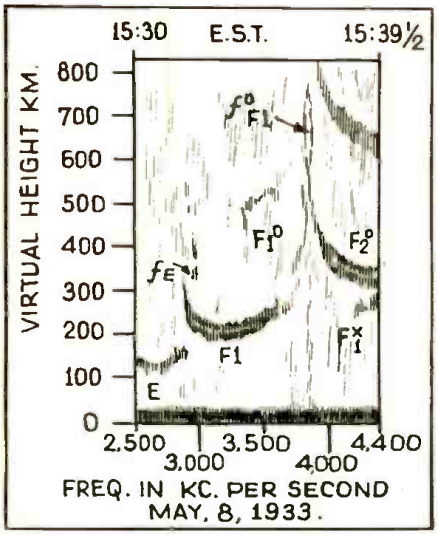


Fig. 2—Record made with original recorder in 1933.

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 fE. 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 above this point the wave is again retarded as the critical frequency for the F_1 layer is reached at 3850 kc. This is the critical frequency ($f^{o}_{F_1}$) for the ordinary component. As the frequency is increased still further, reflections for this component come from the F_2 layer. The trace at the right (F^{x}_{1}) 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.

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. ½ 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 7¾" x 6½"

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	¾"
Osc. plate	5	No. 12	⅝"
Amp. plate	5½	No. 12	⅞"
†Receiver	6	No. 12	1"
			by experiment

*Tapped at 2nd turn for cathode.
†Tapped at 1st turn for cathode.

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.) E.S.T.	heard at 8:05 p.m.
XTV—9,500 kc. (31.58 m.) E.S.T.	heard at 5:22 a.m.
XTC—9,280 kc. (32.32 m.) E.S.T.	heard at 5:19 a.m.

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.

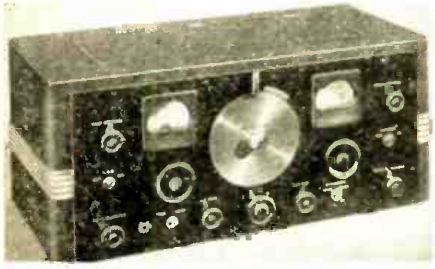
How to Choose a Short Wave Receiver

(*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 preselection 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 band-spread).

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.

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.

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 *calibrated* 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 aerials: 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.)
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 milliampere 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. 1¼ 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.

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)

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 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 12¼" by 5" by 2⅜" high. An aluminum plate 5½" 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 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.

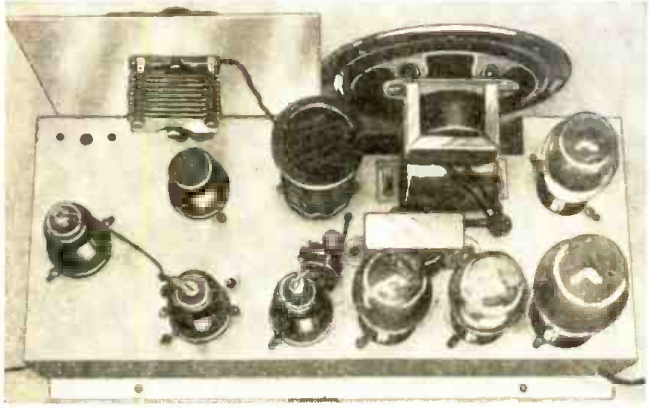
The completed receiver will give very satisfactory results, and will bring in the distant stations, with surprisingly good volume.

(If trouble from "motor-boating" is experienced, reduce the grid resistors to ¼ 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 (cardboard container, 16 mf., 16 mf., 8 mf., 5 mf., 5 mf.).

ELECTRAD

1—Electrad 75,000 ohm potentiometer with switch.
1—Truvolt 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

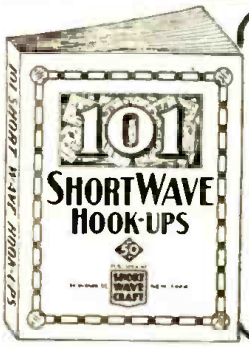
3—6J7 tubes.
1—6C5 tube.
2—76 tube.
1—43 tube.
1—25Z5 tube.

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 12¼" by 5" by 2⅜".
1—Aluminum plate, 5½" 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.

SHORT-WAVE BOOKS WITH A 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.

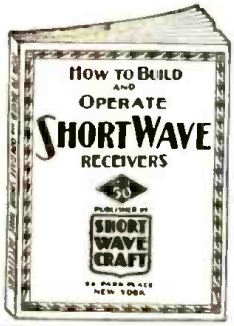
All the important sets which have appeared in print during the past few years are in this book. Sets such as the Doerle, Dinsmore, the "19" Twinplex, Oscillodyne, Denton "Stand-by," Megadyne Triple X 2, "Globe-Trotter," 2-Tube Superhet, Minidyne, "Loop" Receiver, "Doerle" 2-tube Battery, "Doerle" 3-tube 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-Oscillodyne" 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.

100 Illustrations, 72 Pages,
Stiff, flexible covers **50c**

HOW TO BUILD AND OPERATE SHORT-WAVE RECEIVERS

This is the most up-to-date book 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

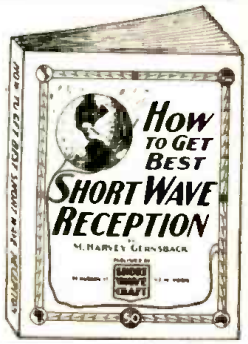
The author, a professional radio listener for many years, gives you his long experience in radio reception and all that goes with it.

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 receivers for short-wave reception.
6. Aerial systems for short-wave received 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.
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.

PARTIAL LIST OF CONTENTS

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.

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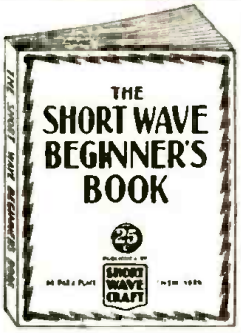

Ten Most Popular Short-Wave Receivers

HOW TO MAKE AND WORK THEM

SHORT WAVE CRAFT Editors selected ten out-standing short-wave receivers. Each receiver is fully described and illustrated with photographs, hook-up and all worth-while 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. Secor.
My De Luxe S-W Receiver, by Edward G. Ingram.
The Beginner's 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 COAT-POCKET Short-Wave Receiver, by Hugo Gernsback and Clifford E. Denton.
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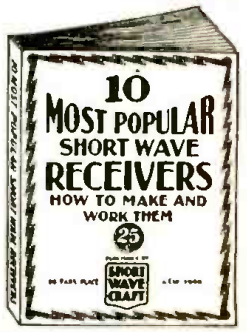

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Short Waves and Long Raves

(*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 annreciate this change.

Three cheers for *Short Wave & Television*.

Yours,

J. Esterhnigen,
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,

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.

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 service-men.

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; ZS4U, 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.

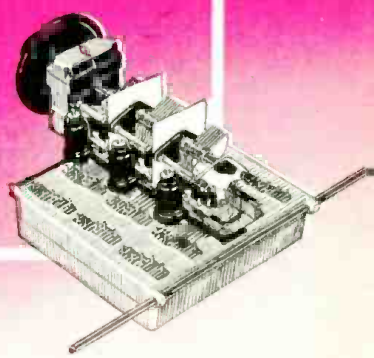
Also, HA8N, 14130, Budapest, heard FB at 6:50 p.m., announcing H-Honolulu, A-America, No. 8, N-Norway.

• Index to Advertisers •

(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.)

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



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