NEW METAL-TUBE CIRCUITS

RADIO NEWS
AND
SHORT WAVE RADIO

NOVEMBER, 25¢

IN CANADA 30¢

Build Your Own TALKING L GHT BEAM

WORLD-WIDE RADIO DX RECEPTION

PROFITS IN SERVICING

A Publication Devoted to Progress in Radio

DX Reception
Broadcasting
Television
Amateur Activity
Short Waves
Set Building
Experiments
Applications
Service Work
Electronics
Engineering
Measurements

EFFECTIVE SHIELDING

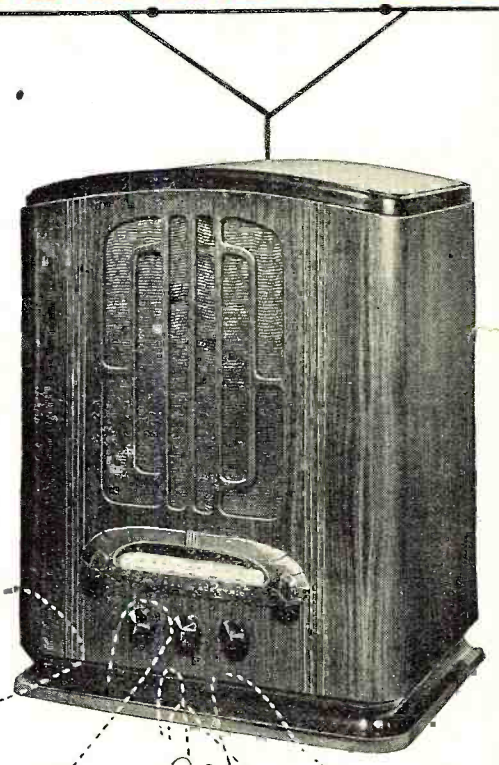
keeps out interference racketeers . . .

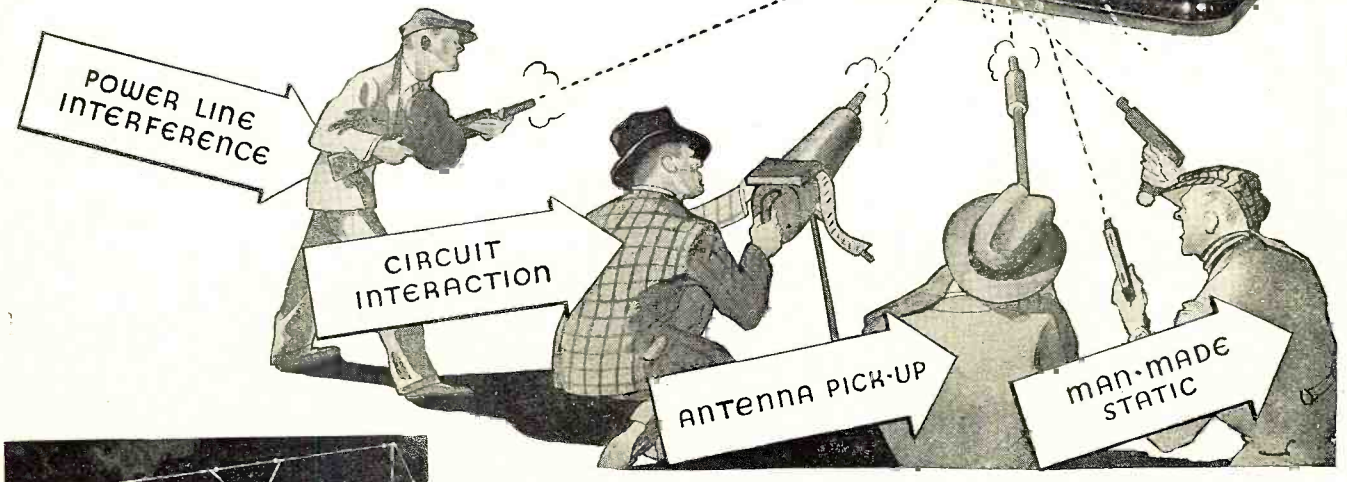
You can't keep destructive interference off the air by calling in the G-men, but you can rid your reception of this enemy to radio enjoyment by calling in the "G-E" men — by listening in on a General Electric Radio.

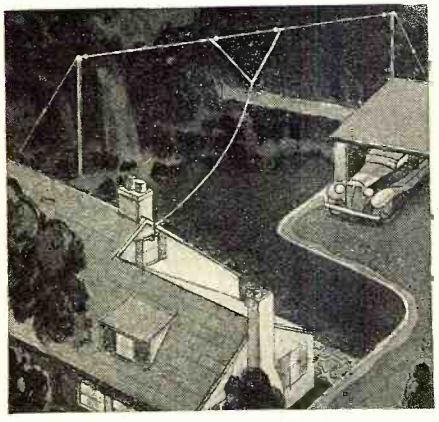
Here are five General Electric advantages that protect you from interference pumped into the ether:

1. Sentry Box—Shields and isolates each R.F. circuit.
2. Metal Tubes—A continuous metal envelope eliminates outside noise and interaction between circuits.
3. Shielded Power Transformer—Eliminates stray hum.
4. Line Condenser—Keeps out interference via the power line.
5. V-Doublet Antenna—Rejects all man-made interference on short-wave.

The 1936 General Electric Radio gives you a realism and fidelity of tone unlike anything you have ever heard before.







MODEL A-82 - IDEAL FOR DX-ERS

Short-wave listeners and amateur operators will find in Model A-82 many exclusive features that contribute to greatly improved performance — Permaliners • Sentry Box • Sliding-rule Tuning Scale • Stabilized Dynamic Speaker • Noise Control • Automatic Lo-note Compensation • Eight Metal Tubes • Four Bands of reception. CW Oscillator may be added. $94.50

(Eastern List Price)

G-E V-DOUBLET ANTENNA SYSTEM

This new antenna system, developed by General Electric, provides uniformally good reception on all short waves and all long waves alike . . . assures maximum receiver efficiency . . . minimum interference. This antenna is a V-Doublet below 55 meters and a conventional T-type broadcast antenna above 55 meters. Changeover from one type to another is automatic. $5.95

Write for complete details of 1936 General Electric Radio and the V-Doublet Antenna System.

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President
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Be a Radio Expert

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I will train you at home for many Good Spare Time and Full Time Radio Jobs

IF you are dissatisfied with your present job; if you are struggling along in a rut with little or no prospect of anything better than a skinny pay envelope—Clip the Coupon NOW. Get my BIG FREE BOOK on the opportunities in Radio. Read how quickly you can learn at home in your spare time to be a Radio Expert —what good jobs my graduates have been getting—real jobs with real futures.

REAL OPPORTUNITIES AHEAD IN RADIO FOR TRAINED MEN

It's hard to find a field with more opportunities awaiting the trained man. Why in 1934 the Radio Industry sold $235,000,000 worth of sets and parts! Over 300,000 people worked in the industry! It's a gigantic business, even in the poor business years. And look what's ahead! Millions of sets are going out of date annually. 20,000,000 sets are now in operation on which about $60,000,000 are spent EACH YEAR for repairs, servicing, new tubes, etc. Broadcasting Stations pay their employees (exclusive of artists) approximately $23,000,000 a year. Advertisers pay 600 great Broadcasting Stations over $75,000,000 a year for Radio time and talent. A few hundred jobs that paid $30, $50, $75 a week less than 20 years ago have grown to thousands. These figures are so big that they're hard to grasp. Yet they're all TRUE! Here's a new industry that has grown to be a commercial giant! No wonder business leaders predict a brilliant future for the great and growing Radio Industry.

GET INTO THIS FIELD WITH A FUTURE

There's opportunity for you in Radio. Its future is certain. Television, short waves, police Radio, automobile Radio, midget sets, loud speaker systems, aviation Radio—in every branch, developments and improvements are taking place. Here is a real future for hundreds of men who really know Radio. Get the training that opens the road to good pay and success! Send the coupon now and get full particulars on how easy and interesting I make learning at home. Read the letters from graduates who are today earning good money in this fascinating industry.

MANY MAKE $5, $10, $15 A WEEK EXTRA IN SPARE TIME WHILE LEARNING

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

MONEY BACK IF NOT SATISFIED

I am so sure that N. R. I. can train you at home satisfactorily that I will agree in writing to refund every penny of your tuition if you are not satisfied with my Lesson and Instruction Service upon graduation. You'll get a copy of this Agreement with my book.

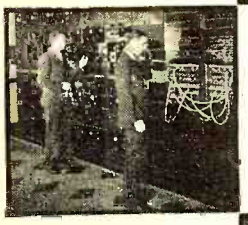
64-PAGE BOOK OF FACTS FREE

Get your copy today. It's free to any ambitious fellow over 15 years old. It tells you about Radio's spare time and full time job opportunities; it tells you all about my Course; what others who have taken it are doing and earning. Find out what Radio offers YOU without the slightest obligation. MAIL THE COUPON in an envelope, or paste it on a 1c post card NOW.

J. E. SMITH, President
NATIONAL RADIO INSTITUTE
Dept. 5MR, Washington, D. C.

SET SERVICING

Spare time set servicing pays many N.R.I. men $5, $10, $15 a week extra. Full time men make as much as $30, $50, $75 a week. Almost every community offers trained men opportunities to enter this profitable field.

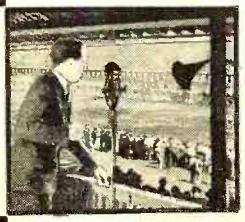


BROADCASTING STATIONS

employ managers, engineers, operators, installation and maintenance men for jobs paying up to $5,000 a year. The larger stations employ as many as 20 to 60 men. Over 600 Broadcasting Stations now in operation.

LOUD SPEAKER APPARATUS

Installing, servicing Loud Speaker Systems in auditoriums, for sporting events, political rallies, in schools, factories, etc., is another growing money-making field for which N.R.I. will train you.



TELEVISION

The coming field of many great opportunities is covered by my Course. Already there are Television stations on the air—and Television receivers are soon to be introduced. Get ready now!

GET MY FREE LESSON
on Radio Servicing Tips

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—the 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 and testing. Get this lesson Free. No obligation. Just mail coupon.

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This Coupon is Good For . . . One FREE Copy of My Book

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

Without obligating me, send your service manual "Radio Receiver Troubles—the 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. 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, Installation and Service
- ☐ Auto Radio Installation and Service
- ☐ Television Station Operator
- ☐ Designing and Constructing Testing Equipment
- ☐ 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.)

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ADDRESS.....

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RADIO NEWS

Edited by LAURENCE MARSHAM COCKADAY

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Vol. XVII November, 1935 No. 5

Reading Guide to this Issue—

As a matter of convenience for those having specialized interests in the radio field, the following lists the articles and features in this issue, classified under 14 heads. The numbers correspond with the article numbers in the Table of Contents on this page:

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Coming—

Next month there will be more dope on the "Ocean Hopper" short-wave receiver described this month—suggestions on operation, a report on its "on the air" tests, etc. There will also be a bang-up article on 5-meter equipment and another on a new, simple and inexpensive "ham" tuner kit which represents a radical departure from the usual design—both in circuit and construction.

A number of important projects are under way in the Lab—developments of definite interest to servicemen, P.A. men, short-wave fans, amateurs, and DX fans. As each is completed the models will be described in these pages. This will mean a wealth of vital information in the coming issues.

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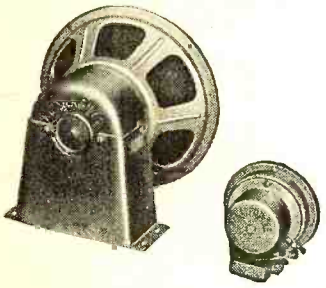
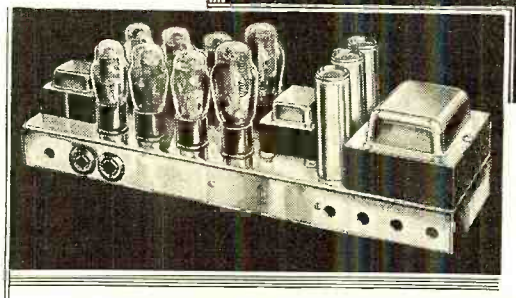
SILVER MASTERPIECE IV

Custom Built

ALL-WAVE
WORLD-WIDE
RECEIVER





25 NEW ADVANCED FEATURES!

- 19 Tubes, providing twenty-three distinct tube functions.
- Perfected Circuit.
- Unmatched Flexibility of Control.
- Unequalled freedom from noise.
- Selectivity, extreme and variable.
- Unmatched Tone Quality.
- Double High Fidelity.
- 35 Watt Undistorted Output.
- Amplified Automatic Volume Control.
- Airplane Dial with 5 accurately calibrated tuning scales.
- Band Spread Tuning.
- 2 Tuned R.F. Stages on all 5 bands.
- Air Dielectric Trimmer Condensers Throughout.
- No-loss R.F. Inductances.
- All R.F. and I.F. circuits Air Tuned.
- Doubly Amplified Tuning Meter.
- Calibrated Sensitivity Control.
- Complete Circuit Isolation.
- Completely Shielded.
- Public Address and Phonograph Operation.
- No Microphonic Howling.
- Two Matched Speakers.
- Every Part Individually Tested.
- Complete Professional Flexibility.
- One Year Free Service.

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

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

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

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

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

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

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

. . . the finest Radio of all time!

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

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

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

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

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

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11-RN

Short-Wave Stations in Brazil

RIO DE JANEIRO, BRAZIL — The Technical Radio Commission has recommended to the Minister of Transportation and Communication that the concessions for short-wave radio broadcasting stations shall be limited to nine for all of Brazil. It was decided that the nine licenses shall be granted from applications received, and that the seventy-two medium-wave stations now operating in Brazil may compete for such concessions.

A New Type of Loudspeaker

BERLIN, GERMANY — An entirely new type of loudspeaker has been developed by Eugen Beyer, who has a small factory at Nordbahnstrasse 17, Berlin-Pankow. This loudspeaker, known as the "Pneu X", derives its power from an air compressor. The sound is not directional and covers a sector of 90 degrees. The apparatus does not employ any radio tubes and the motor for the compressor uses a small amount of current and can be operated from a light socket. It is claimed that this loudspeaker will throw sounds as far as 6 kilometers (approximately 4 miles) and has a good fidelity handling sounds with a frequency up to 6,000 cycles.

Proposed Restrictions on Automobile Receivers

LONDON, ENGLAND—The Ministry of Transport is considering the advisability of prohibiting the use of radio sets in automobiles in congested districts—there where automobiles were restricted to a speed limit of less than 30 miles per hour. The Ministry considers the use of radio sets in these areas a risk of the road. There is no intention of prohibiting the use of automobile receivers in general.

Pages From A Serviceman's DIARY

MONDAY—Four calls this morning. Number one, Radiola 18 —complaint, hum. Very gracious lady, one of those who like to be helpful. Started to remove table lamp from top of set but stopped her in time. Turned on set and lamp—hum present. Removed lamp from set—hum disappeared. Checked set, replaced 26's. Set oscillated with new tubes. Readjusted feed-back condenser between sections of gang condenser. OK.

Five calls this afternoon. First three, just tube replacements. Number four, Radiola 80—Complaint, "My tubes all burned out at once." Lady, lady, what a gyp could do to you! Replaced blown fuse and one noisy 27. Lost, a $7.80 sale. Gained, a satisfied customer who will spend plenty more.

TUESDAY—Pouring rain. Postponed aerial jobs and picked up shop work, first of which was an RAE 26 chassis.

Still raining but I've got a few calls which must be taken care of. First one, a Majestic 130. Complaint, fades abruptly. Quizzed customer while I removed impediments from top of set. "No, the set has never had any work done on it before and has always been perfect until lately. Mr. T used to make radios himself years ago and he thinks the trouble is in the volume control because it comes blaring out sometimes without touching anything. . . . No, we never have any scratching or sputtering sounds.

Meanwhile, the set went bad. Turned it around and removed r.f. tube compartment shield, set immediately going into oscillation. Replaced shield momentarily to find normal operation had been restored. Went through routine of testing tubes for noise and pounding chassis for loose connections, with antenna lead disconnected. No results. The volume control gives no trouble in this model. Removed chassis and speaker and brought to shop. On bench, set went bad again, volume dropping off to a fraction of normal. Found any attempt to test voltages or even to touch chassis with test prod would restore normal operation, typical indications of an intermittently open condenser or a rosin joint. Repeated pounding operation and soon found that a less vigorous wallop was required to produce results if the massage treatment was confined to the last r.f. coil. Examined r.f. coil and resoldered all connections. Still bad. Checked r.f. filter assembly, finding two leaky condensers and a high resistance ground in assembly. Replaced same. Trouble still present. Removed gang condenser assembly shield and inspected area (*Continued on page* 308)

RAYTHEON

TRADE MARK

presents

"33 DEALS FOR YOU!"

Raytheon's 33 New Tube Deals offer a wide range of service equipment, designed to meet 1935-36 conditions including the special requirements of metal tubes and octal sockets.

and

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"TUBE TALKS" Modern Radio Service and Merchandising (including tube complements). This 48-page book is hot-off-the-press, full of sales ideas, service tips and constructive suggestions, which have been tried out and proved in actual practice. Subjects cover not only radio tubes but also include sound methods applicable to all radio products.

Finally, 30 of the 48 pages are devoted to a tube complement section which lists the types and numbers of tubes required by various model receivers of 25 well-known radio manufacturers. This data covers over 2,000 models. This information should be available for reference, in all dealers' sales and service departments and by all independent service men.

This is the start of a service reference library. The binding, designed especially for this book, permits the addition of supplementary pages which we will supply periodically . . . We believe this book is unique and is worth many times the price placed upon it. First edition is limited . . . . . **Mailed prepaid for 50c**

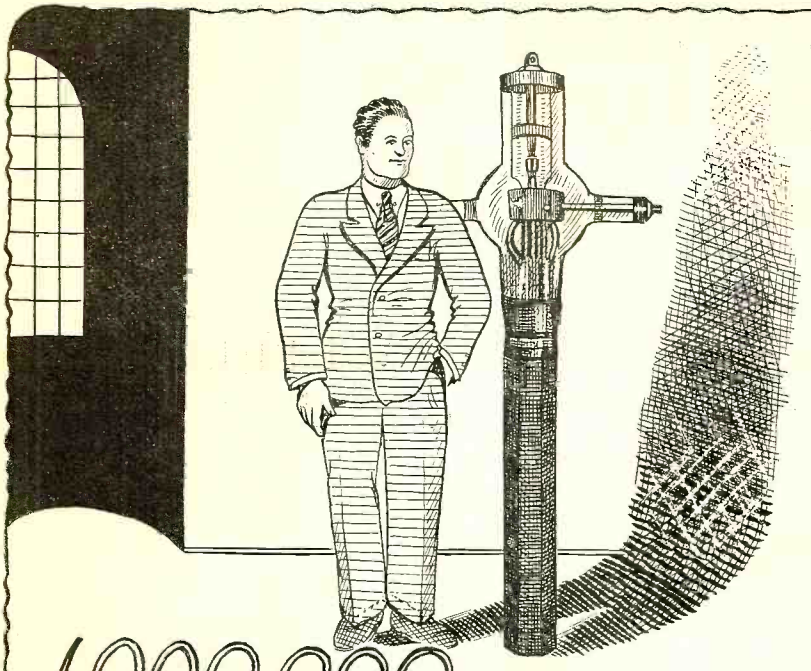
Ask your Jobber for complete details of Raytheon's New Tube Deals or write to

RAYTHEON PRODUCTION CORPORATION

General Sales Office: **Dept. D-11, 30 East 42nd Street, New York**

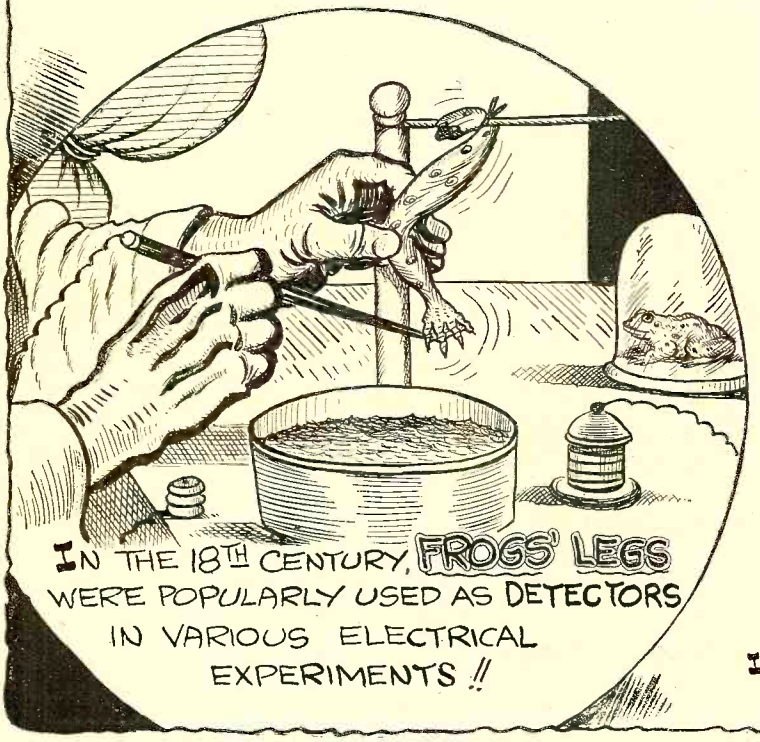
RADIO FACTS and ODDITIES ....

(Send in your Radio Oddities to "Elmo" and see them illustrated)

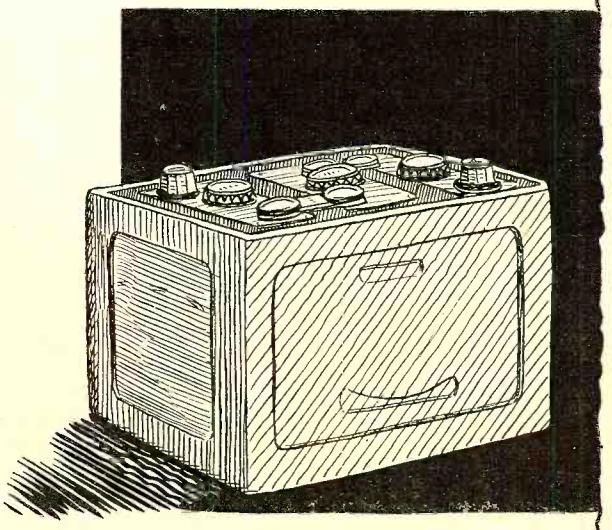


1,000,000 GALLONS OF WATER, EVERY DAY ARE REQUIRED TO COOL THE TWENTY-100,000 WATT TUBES IN THE LARGEST BROADCASTING STATION IN THE WORLD!!

YOU GET FINED IN SHANGHAII, CHINA, IF YOUR RADIO SET IS PLAYING TOO LOUD AND SOMEONE COMPLAINS !!



IN THE 18TH CENTURY, FROGS' LEGS WERE POPULARLY USED AS DETECTORS IN VARIOUS ELECTRICAL EXPERIMENTS !!



A STORAGE BATTERY DOES NOT STORE ELECTRICITY!! IT STORES CHEMICAL ENERGY!

Radio News

November, 1935

RADIO *Wins the World's* ENDURANCE RECORD

How amateur radio solved the problems of communication between the endurance plane and its ground station during nearly one month in the air

By B. H. Woodruff*

PERFECT radio contact with the ground, through the two-way amateur radio apparatus carried on their Curtiss-Robin plane, the "Ole Miss", is credited by the Key brothers for their new official world's re-fueling endurance flight record of 653 hours (nearly one month) in the air.

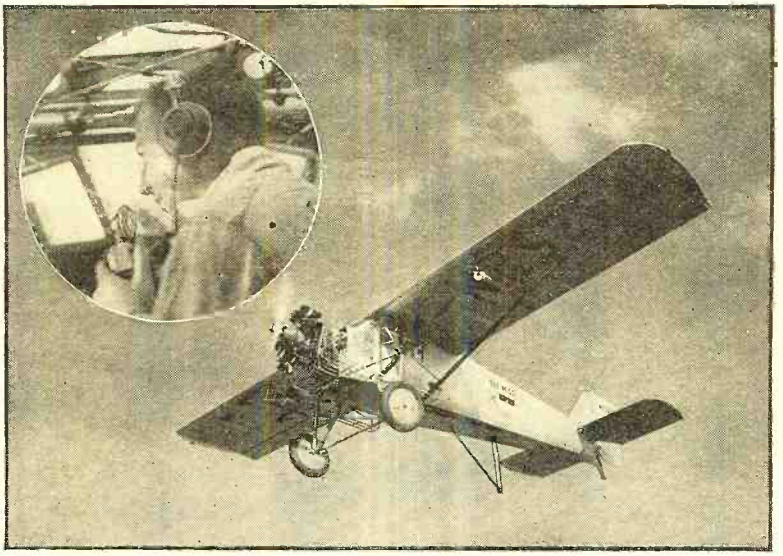
The Key Brothers, Algene and Fred, both hold amateur operator's licenses. They took a radio course in 1934 which enabled them to secure their licenses in preparation for the two attempts made last year for the record. The 1934 flights both were short of the record, the first one being ended by a cylinder head becoming so loose that it almost blew off before the ship could be landed. The second flight was forced to an end due to extremely bad weather conditions. Radio equipment was carried on both these flights and was of great value in the handling of weather reports.

The radio communication results obtained during the 1934 flights were carefully analyzed and an effort was made to establish more consistent communication for the 1935 flight. The plane last year carried duplex 5-meter equipment, which gave good results at times but reception was good only when the plane was in a certain area, the trouble being that the places in which the plane could reach the ground station best were not the same locations in which the plane signals came in best on the ground receiver. The plane then carried a horizontal doublet with quarter-wave feeders. This type transmitting aerial gave spotty transmissions. The ground transmitter used the same aerial equipment and the plane experienced the same reception results. In certain areas results were satisfactory in the first flights, but outside these relatively narrow limits it was necessary to make many repeat calls.

For the 1935 flight the writer decided to use the 160-meter amateur phone band at the ground station and accordingly constructed a 25-watt transmitter along much the usual lines. The transmitting aerial was 260 feet long of the end-fed variety and was located about 120 feet from the transmitter. The usual feeder system was employed, using 6-inch spacers on the feed wires. Particular attention was paid to the speech amplifier and modulator units employed, with the results that the voice transmissions from W5UE were at all times as clear as the transmissions from the average

"TIED TO EARTH" BY A RADIO LINK

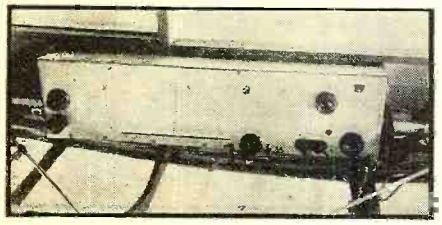
Here is the "Ole Miss," during the actual flight, with the 5-meter antenna suspended from the bottom of the plane. Insert shows Al Key talking from the plane to Amateur Station W5UE during the flight. This photo was snapped by Fred.

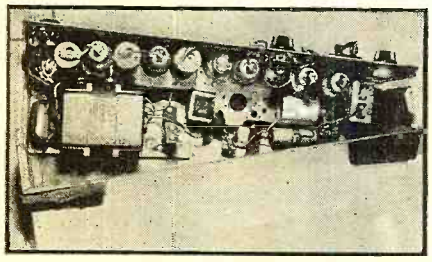


*Radio W5UE.

READY TO TAKE OFF

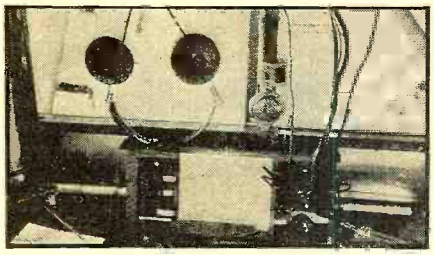
Al Key, left, and his brother Fred Key standing by the radio-equipped "Ole Miss" just before the start of their successful try for the world's refueling endurance flight record.

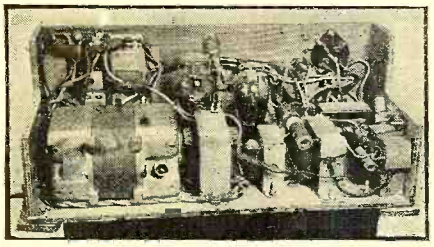




THE RADIO INSTALLATION

The pictures, above and below, illustrate the equipment on the plane; the two top views, being the outside and inside appearances of the 150-350-meter receiver, the two bottom pictures being the control-panel, power-supply, input-amplifier and modulator, inside and out. These were specially built to fit into unused spaces around the interior of the plane's cabin. The receiver was actually made triangular to fit the space at the end of the wing.





small broadcast station. W5UE received cards from S.W. listening posts in many states reporting reception during the flight. The ground receiver was a modified super-regeneration set in which the long wave oscillations were generated by a separate tube, otherwise the set was of the accepted type in use at most stations today.

The plane equipment was all built to fit the available space and to come within the 45 pounds allowed for the complete radio unit. The receiver was located in the end of the right wing, it being necessary to design the set with a step in the cabinet so the back of the box would slide into the wing space, with the tubes arranged in a row along the front. The receiver was a 4-tube superheterodyne using a 75, 77, 44, and 41. The coil system had been changed so the wave-band from 150 meters to 350 was covered. This enabled the persons flying to listen to the amateur band or to the lower part of the broadcast band, without having to switch coils. By throwing a knob the set was tuned to 260 k.c. for reception of the Department of Commerce "beam" station at Jackson, Mississippi. Inasmuch as this was the only nearby station which could be received with satisfactory volume in bad weather, it was decided that two extra steps of intermediate-frequency amplification would be installed in the receiver with a switch to cut the oscillation section out and give in effect a fixed tuned r.f. set on 260 k.c. For the special circumstances surrounding this particular installation, this arrangement worked perfectly, giving fine reception of the Jackson station in all kinds of weather.

The Receiving Antenna

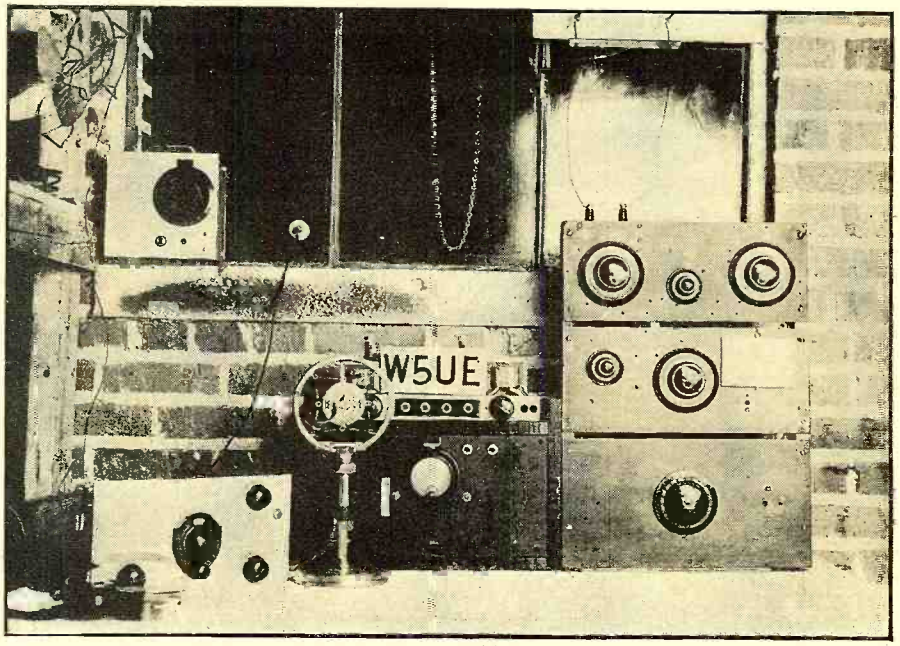
The receiving aerial was of the trailing type, with 100 feet of stranded wire on a reel with a lead weight on the end. This was left trailing at all times during the flight with the exception of an hour or two when the OLE MISS was in electrical storms. Then the aerial would pick up so much static electricity that it became a fire danger during severe near-by electrical flashes.

The transmitter in the OLE MISS was the result of last year's experiences together with the newest and best obtainable advice on 5-meter equipment.

The power supply was a special Carter 12-volt input Genemotor, rated at 300 volts 100 mils output. On test this little unit would deliver 350 volts on a 125-mil load. The microphone was a Universal double-button unit which fed through a transformer to a 37 tube. This tube operated at a plate voltage somewhat above its rated limit and gave fine results, though it probably would not have (*Turn to page* 282)

THE GROUND STATION

The ground station, W5UE, located in the airplane hangar at Key Field.



Demonstrates High-Definition *Television*

By Samuel Kaufman

TELEVISION! An economical receiver revealing large-sized images of live and filmed subjects! A row of dancing girls faithfully reproduced after transmission through the ether! An announcer discoursing and a cartoonist at work are viewed as well as heard on a home-type receiver!

A Special Demonstration

A Mickey Mouse cartoon with all of the famous rodent's capers clearly seen after transmission through the air! These were a few of the highlights of a special demonstration to the RADIO NEWS editorial staff at the Philadelphia laboratories of Farnsworth Television, Inc. The special tests were conducted by Philo T. Farnsworth, noted television inventor; A. H. Brolly, his chief engineer, and George Everson, secretary of the company, before the RADIO NEWS group, including Laurence M. Cockaday, editor. S. Gordon Taylor, managing editor, J. C. Meillon, Official Short-Wave Listening Post Observer for France, and the writer. The entire group was impressed with the clearness of images transmitted both through the air and over wires and reproduced on the convex end of a 9-inch diameter cathode-ray tube in a home-type set.

SCENES EASILY BROADCAST
The new Farnsworth system, the pick-up of which is shown at the left, easily transmits scenes such as this in which a number of characters are pictured with high definition.

Progress at the Philadelphia laboratories has gone ahead by leaps and bounds. The inventor said still greater refinements than those we viewed would shortly be applied. He is planning his own Philadelphia experimental station and expects it to be in operation at an early date.

"Television," Farnsworth declared, and his aides agreed, "has advanced to the point of having real entertainment value. We don't intend upsetting the radio industry but will make contributions to it. Interest in television throughout the world has grown tremendously in the last three or four months.

Need for Standardization

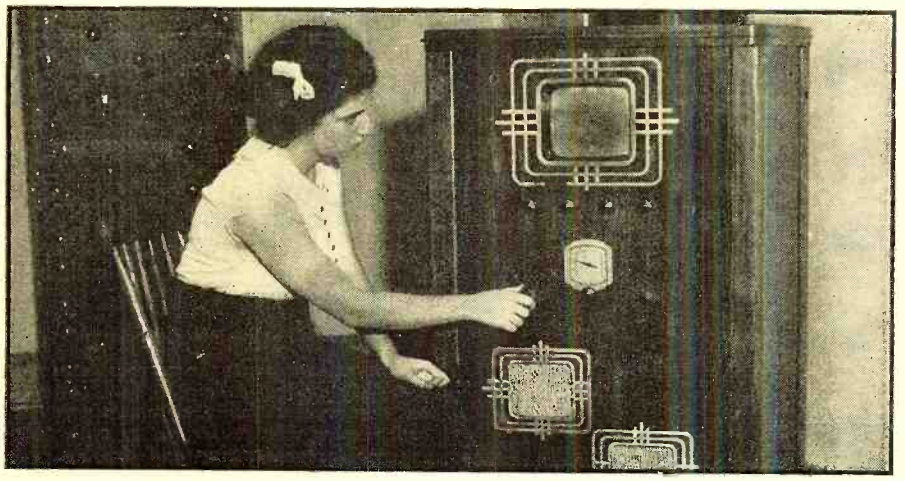
"Television has come through with some of the technical perfections but there are a few other things remaining to be ironed out in the art. For one thing, standardization should be done before commercialization. It is obvious that the Federal Communications Commission should apply the order. It is inevitable that all television groups would want it so, in order to clean up obstacles that are now apparent."

The Farnsworth transmitting and receiving systems depend entirely on the cathode-ray method. Two types of valves most in use at the Philadelphia Laboratories include a 15-inch diameter tube, yielding a 10 by 12 picture, and a 9-inch tube with a 6 by 7 image. Electro-magnetic focussing is employed exclusively, with the coils outside the tube.

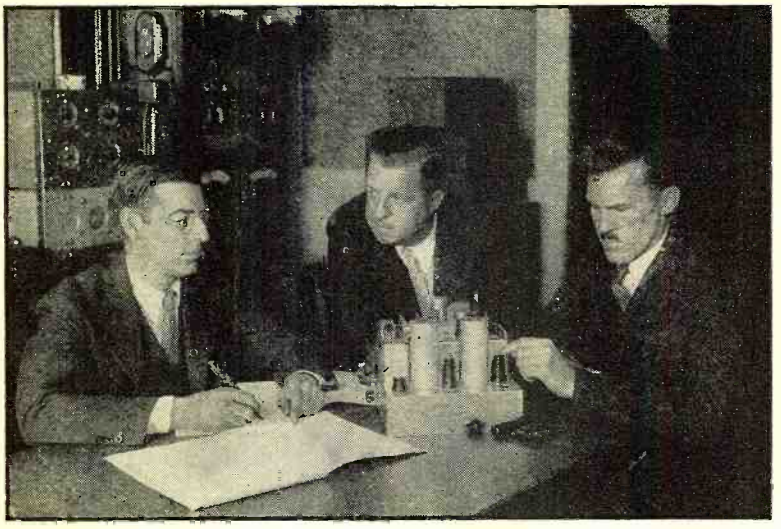
Image size of 12 by 14 is considered ideal for home reception, but the Farnsworth technicians declare that, for home use, a small type high intensity, cathode-ray tube must be used in conjunction with optical projection. This method, they declared, has already been completed. (*Turn to page* 308)

PLANS TELEVISION TRANSMISSIONS AT AN EARLY DATE
This is Philo T. Farnsworth, who told the author that he intends to erect a television radio transmitting station for experimental purposes in the near future to further demonstrate the practicability of his system for homes.

THE FARNSWORTH RECEIVER
Here is a complete receiver for home use, showing the cathode-ray tube screen at top and the high-fidelity speaker system in the lower grill. Tuning can be done by any person who knows how to tune a radio set.



Presenting the Taylor-"Ocean

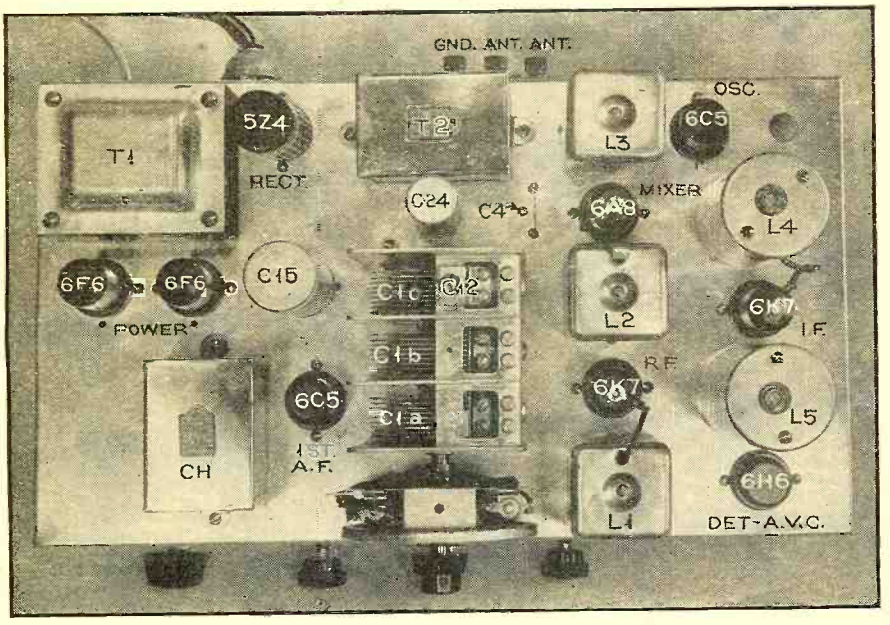


Build Your Own Short-Wave Receiver

¶ The short-wave listener who indulges in his hobby via the family all-wave receiver, or by means of a converter hooked ahead of the family broadcast receiver, runs into difficulties when the family insists on listening to their favorite broadcast programs at a time when he hankers for a session of short-wave globe trotting.

¶ It is distinctly an advantage to the short-wave listener to have a short-wave set of his own, perhaps in some isolated part of the house, a real DX Corner where he can listen in whenever the spirit moves him.

¶ It was with these thoughts in mind that Laurence M. Cockaday and S. Gordon Taylor, shown above with the author (left), undertook the design of the "Ocean Hopper," the purely short-wave broadcast receiver described in this article, particularly for those RADIO NEWS Short-Wave Listening Post Observers and others who may feel the need of a highly effective receiver, but may be limited in the amount of money they can spend.



By John

Part

IN developing this new receiver the designers' primary purpose was to provide a receiver which would *insure loudspeaker reception of short-wave broadcasts from every corner of the globe* but would include no frills not essential to this primary object. It must be simple to construct and operate—and as inexpensive as these requirements would permit. The result is the receiver described here. It is a single-range receiver covering the 19 and 49-meter bands and everything between. This range includes about 93 per cent of the world's short-wave broadcast stations and all of the most distant of these stations. It therefore provides just about everything desired—and the use of a single-range avoids the expense and construction difficulties of a coil-switching system which, unless factory built and assembled, is almost sure to cause absorption and other losses.

Employs Nine Metal Tubes

Metal tubes are employed throughout because recent experience definitely shows them to be more efficient, more sturdy, less microphonic and better shielded than glass equivalents.

A tuned preselector stage is used to provide a high signal-input to the mixer, thus materially improving the signal-to-noise ratio, and at the same time providing good signal selectivity. Gang tuning is employed but to insure highest efficiency, trimmers for both the tuned signal-circuits (r.f. and mixer inputs) are mounted on the front panel. This avoids the imperfect tracking of tuned circuits which occurs at some parts of the range in many receivers. As a result *exact* alignment at every part of the range can be readily obtained by slight readjustment of these two trimmer knobs, when tuning for the weakest stations. In ordinary tuning they need not be touched, as slight misalignment does not seriously affect reception of moderately good signals.

A pentagrid converter tube is used as the mixer. The normal oscillator

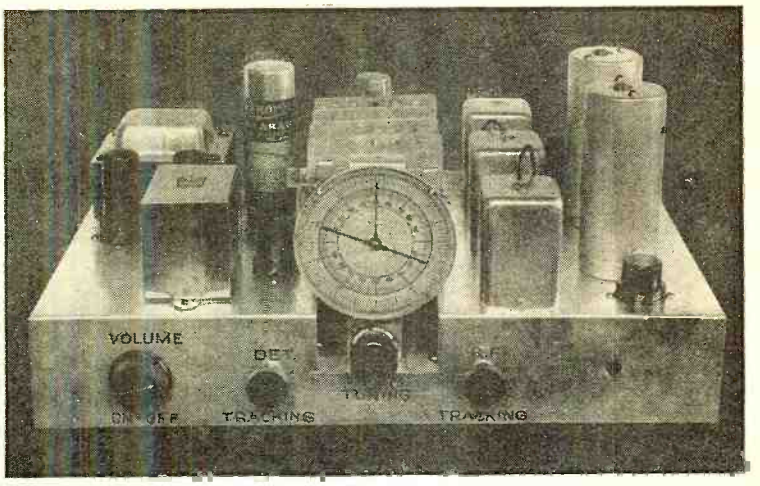
THE CHASSIS LAYOUT

Arrangements have been completed to place the drilled, cadmium-plated chassis on the market for the convenience of constructors who prefer not to undertake the task of cutting and drilling.

Cockaday "Hopper"

H. Potts

One



READY FOR SERVICE

A wood or metal front panel may be added if desired, carrying the escutcheon which is supplied with this 125 to 1 dual ratio dial. Hole at right and three in rear corner of chassis are provided for additional features to be added later if present test prove them desirable.

section of this tube is, however, used solely for coupling purposes and a separate tube serves as the oscillator. Experience indicates that this system provides the minimum interaction between the oscillator and mixer circuits and results in more quiet operation. So stable is the oscillator that a short-wave signal may be tuned in, the receiver turned off for an hour and upon turning it on again the signal will be there—tuned "right on the nose."

High Gain, Low Noise

Much time was devoted to the i.f. amplifier to determine the most practical frequency to employ and the amount of gain required. The frequency decided upon was about 540 kc. This frequency is higher than usually employed and was selected for two reasons. First, it insures an unusually high degree of freedom from image-frequency trouble and second, it permits the use of r.f. and oscillator coils which are available on the market. This latter is an important point because it means that constructors will be able to buy a matched set of these coils at a low price, whereas if the normal intermediate-frequency of 465 kc. were employed it would be necessary to have the r.f. and oscillator coils made up specially in order to cover the desired signal range. While the frequency of 540 kc. is unusual it is a fortunate fact that Hammarlund air-tuned i.f. transformers, type ATT525, are available which are designed for use at 525 kc. but are tunable anywhere in the range of approximately 500-550 kc. At 540 kc. they are slightly more efficient than at 525 kc.

A single stage of i.f. amplification is employed in this receiver after extensive experiments with both one and two-stage amplifiers. It was found that with highly-efficient transformers a single stage provided all the amplification and selectivity necessary and had the further advantage that absolute stability could be obtained, whereas, with two stages, the home constructor would be quite likely to run into difficulties. Another point in favor of the single stage, as determined in experiments, is that lower noise level is achieved. In this connection it will be noted that every part of this receiver has been worked out with the object of obtaining the lowest possible noise-level and therefore the highest signal-to-noise ratio.

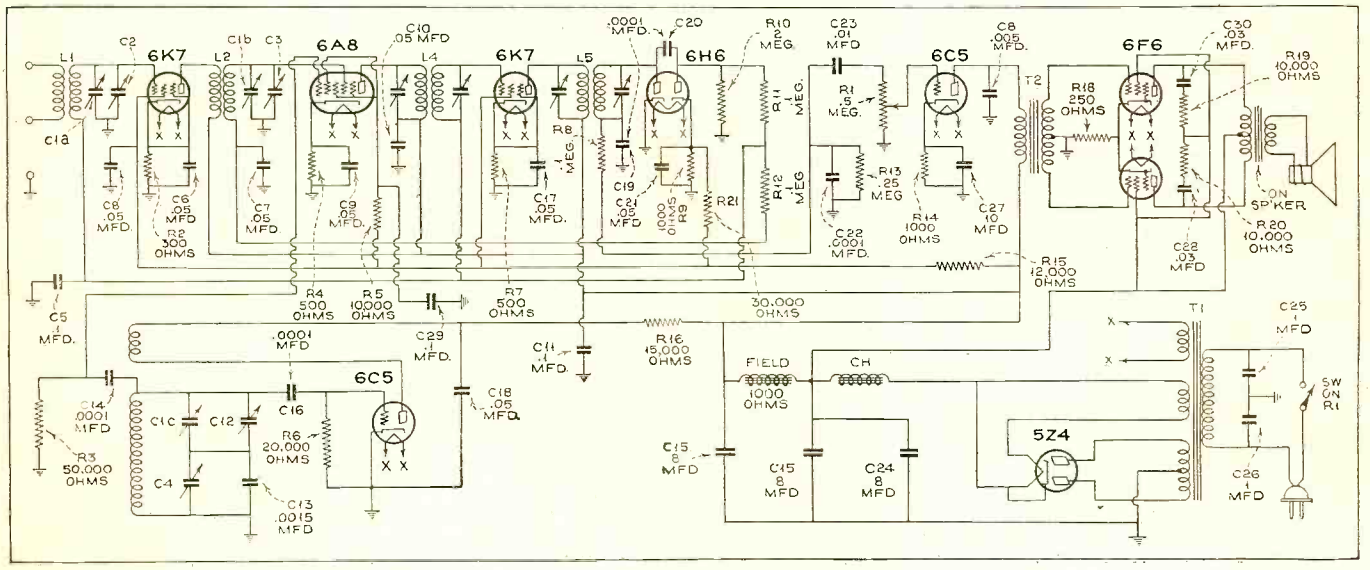
J's and VK's on First Try

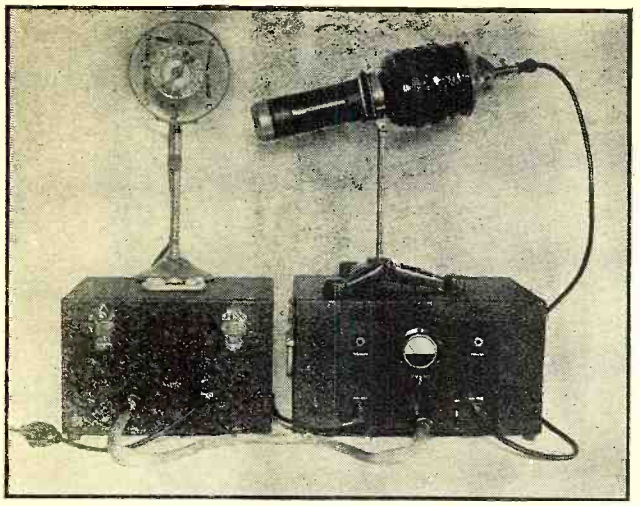
Diode detection is employed with one-half of the tiny double-diode metal tube functioning as the detector and the other half as the a.v.c rectifier. The automatic control system is of the delayed action type, affording maximum sensitivity on weak signals. It helps to maintain constant volume level for all stations and to compensate fading signals.

The audio amplifier is more or less conventional, employing a resistance-coupled stage which feeds the transformer coupled, push-pull, power-output stage.

The foregoing is not a detailed description of the circuit but a study of the circuit diagram in conjunction with this description will provide a complete understanding of the design.

That the careful thought given to the design of this receiver was worth-while, is evident from the results obtained when the final model was actually put on the air. A half-hour's test late the first night brought in everything receivable in that location and a ten-minute test the next morning brought in the two Australian stations then in operation (6:30 a.m.) with excellent loudspeaker volume, clarity, and freedom from noise. (*Turn to page* 316)





LIGHT-BEAM TRANSMITTING UNIT

The two cabinets comprise the a.c. power supply and the amplifier, with the double-button microphone and the modulated light-beam projector shown on top of them.

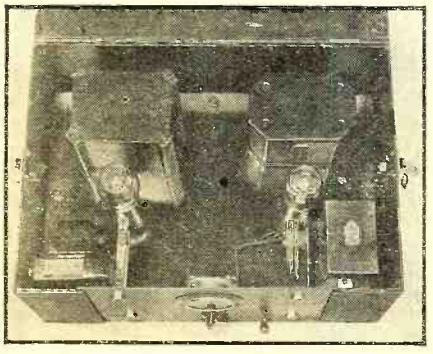
TALKING LIGHT—BEAM

Experimenters with new come this constructional light-beam telephone that quality of reproduction,

By C. A. Johnson

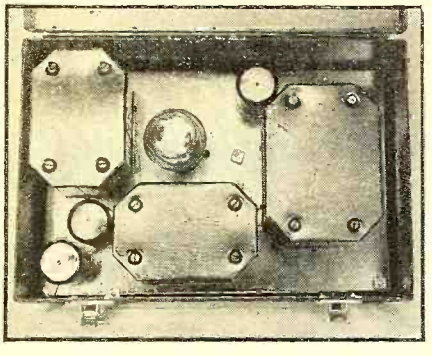
THE transmission of sound on a beam of light has been frequently described and demonstrated during the past decade. A brief history of this art is given in RADIO NEWS for December, 1931. The same article also describes and illustrates an experimental light-beam telephone in use at the General Science Department of New York University.

With the recent improvements in frequency range of audio equipment, we have found that there was too much difference in quality between the signal over the light-beam and the same signal over a wire transmission line. Accordingly, about six months ago, we set out to improve our equipment to the point where it would meet with present-day requirements. It is the purpose of this article to describe these changes, and to give the reader all the necessary data for building an outfit of his own.



CONSTRUCTIONAL DETAILS

Looking inside, above, the amplifier, and, below, the power supply cabinets.



LIKE most other problems in the transmission of signals between two points, the light-beam telephone involves a series of what the physicist calls "energy conversions." The original audio-frequency signal is in the form of sound energy in air. This must be converted into electric energy, which can be amplified to any desired amount; depending upon the gain and power output of the amplifier. The next step is the most difficult one; the amplified electric energy must be converted into light energy, which must vary in intensity exactly the same as the wave-form of the amplified electric signal. Once this is accomplished, the modulated light-beam may be directed (by means of lenses and mirrors) to a distance that is limited only by the intensity of the original light source. If a photo electric cell, or similar light sensitive device, is placed anywhere in the path of the beam, the light energy can be converted back into electric energy. This in turn can be amplified, and finally reproduced as sound on a loudspeaker.

The problem in any such a series of energy conversions is to avoid any changes in the quality of the original signal. Such changes constitute distortion. Complete freedom from distortion in a reproduced signal is an ideal to work for. In any practical case the problem is to reduce distortion to the point where it will not be noticeable to the listener. In checking distortion over the light beam, we compared its transmission with the transmission of a properly-matched wire line.

The circuit diagram of the transmitter is shown in Figure 1. Two type-53 tubes are employed. The first tube is used as a Class A driver, to operate the second tube as a Class B power amplifier. The design of the amplifier proper and the power supply follows conventional practice. It is necessary to use high-grade components throughout and to take the usual precautions to avoid too high a hum level or stray electric pickup.

Coupling Neon Lamp

The important feature about the circuit is the output network that couples the output of the -53 to the neon lamp. This network is designed, of course, for driving a discharge-tube type of light source. Other methods of modulating a light source (such as mechanical light valves, etc.), would require a different type of circuit. The electrical ratings specified for the parts in this network should be followed within tolerances of 10% or less.

The primary impedance of the input transformer can be of any desired value to suit the requirements of the signal source. In most of our demonstrations, we have used a 500-ohm phonograph pickup. It is very important to provide a suitable attenuator on the input circuit to avoid overloading the output of the transmitting amplifier. In our tests

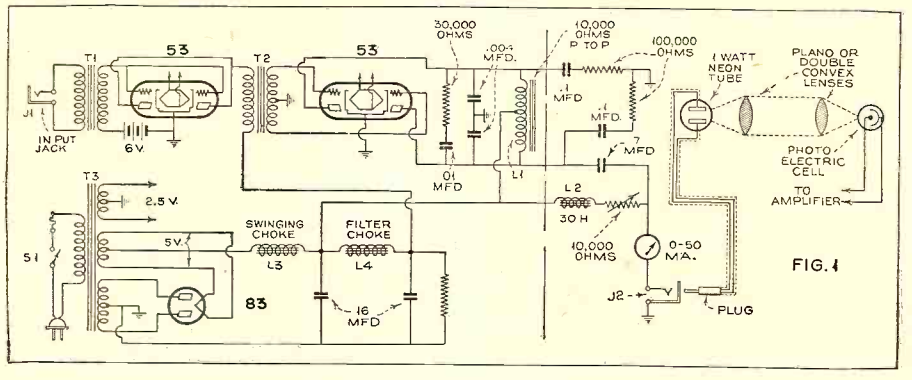


FIG. 1

over a Telephone

Talking to boats in the harbor, from skyscraper to skyscraper, across deep ravines or rivers, for classroom demonstrations, for stage tricks, are a few of the uses for a modern light-beam telephone.

SCENE ATOP THE COMMERCE BUILDING

The authors, right, with Wm. C. Dorf pointing, as the talking light-beam is projected down and across to another building from the roof of the School of Commerce, New York University.

electronic devices will welarticle on a working-model works efficiently, with good over considerable distance

and **Vernon Sharp**

we used a 500-ohm variable "T" pad, having a range of 0 to 45 decibles.

Amplifier and Power Supply

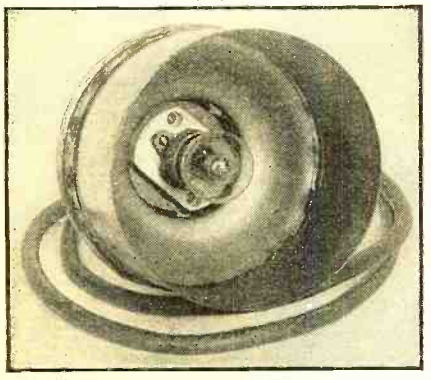
For use at the lecture desk, we built the amplifier and power supply as separate units; and mounted each in metal boxes built of 16 gauge sheet iron. The power supply was connected to the amplifier by means of a 7-wire shielded cable, consisting of two shielded pair for the heater leads and one shielded 3-conductor for the plate supply and negative. The transmitter can be built as a single unit, provided proper precautions are taken to shield the input transformer from the power supply. We experienced some difficulty with the problem of a suitable light source that could be modulated well. Since our previous work had been with recording and television lamps of the gas filled variety, we confined our experiments to this type. Our choice, however, was determined by several practical considerations. From the technical standpoint, we needed a light source that would give a small point of very high "specific intensity," (i.e. light-per-unit-of-area). From an economic standpoint, we were not justified in buying a special lamp that would cost several times as much as all the rest of the outfit. As a result, we made a series of tests with neon and argon lamps of the pilot lamp type. The sizes ranged from 3 watts to .5 watt. We found that a 1-watt neon lamp. of the type shown in Figure 2, gave us very good quality with ample volume.

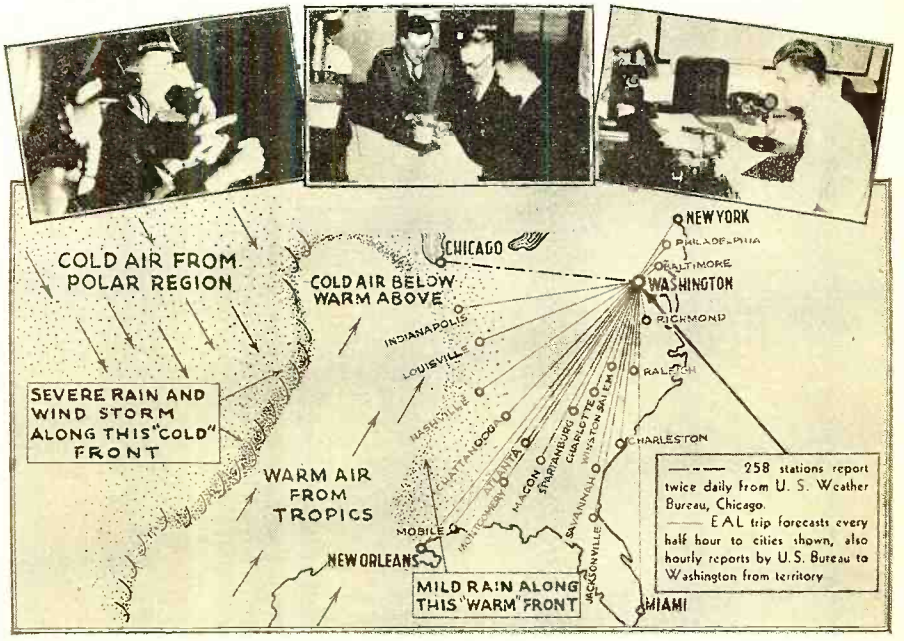
This lamp was mounted, horizontally, in a small spotlight housing. The glow discharge, when properly connected, in this type of lamp is between the outside spiral and the plate. This gives the effect of a concentrated light in a circle, which is desirable from the optical standpoint.

The choice of a projection lens depends upon the size (*Turn to page* 317)

THE "LIGHT THAT TALKS"

Here is the "magic lamp" in the projector housing. It is modulated by electric impulses fed to it from the amplifier.





Aviation-Radio

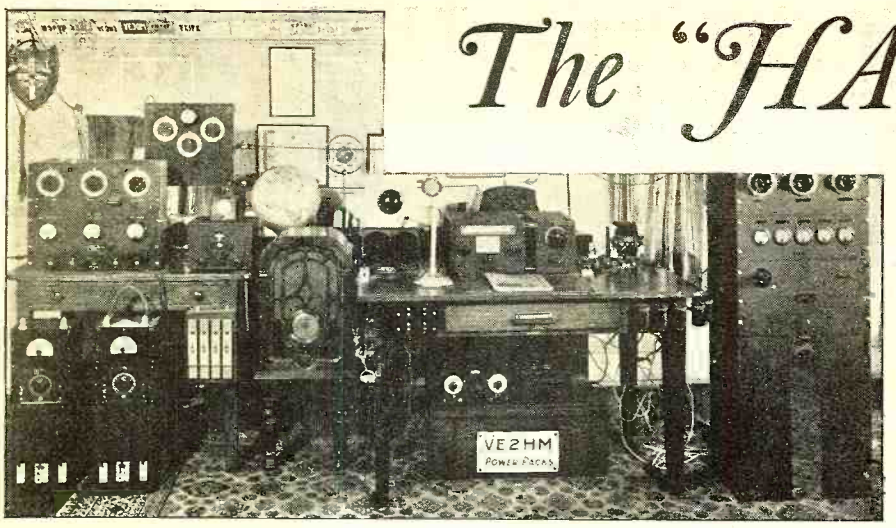
"WEATHER"

By William Austin

AN "octopus-like system of spreading radio channels, tapping twenty-five cities on the 3755 mile Eastern Air Lines routes is centered in the weather bureau office of the air line at Washington, D. C., comprising an elaborate new department operating twenty-four hours of the day and outguessing nature in all her angry moods.

The communication tentacles of this office comprise a number of radio channels following the three great air routes of the Lines; New York to Miami, New York to New Orleans, and Chicago to Miami. Weather information is received by radio from the 15 states served by the air line and two general and 46 trip forecasts are transmitted by radio from this octopus-like central office during each twenty-four hours or practically one transmission every half-hour.

The two general weather forecasts are sent to each station (*Turn to page* 318)



The "HAM" Shack

¶ A Department for the amateur operator to help him keep up-to-date

Conducted by
Everett M. Walker
Editor for Amateur Activities

THE Federal Communications Commission recently put into effect several new regulations that are decidedly to the advantage of amateur radio. Fundamentally they are designed to improve operating conditions on 'phone bands and at the same time provide additional fields for experimentation. Among these new rules (there were four issued simultaneously by the telegraph division of the commission) is a substitute for Rule 381, which concerns the proper manner of operating and adjusting the telephone transmitter.

THIS substitute regulation has caused considerable concern among 'phone operators. One phrase in particular, which says: "Means shall be employed to insure that the transmitter is not modulated in excess of its modulation capability" has raised the question whether henceforth it will be necessary for the amateur to invest in expensive equipment for measuring the percentage of modulation. The matter was taken up with an official representative of the Federal Communications Commission who denied that the new regulation was designed to require the amateur to purchase such apparatus. His interpretation of the rule was that adequate means must be available in all amateur 'phone stations to determine that the transmitter "is not modulated in excess of its modulation capacity." For this purpose there are a number of simple and inexpensive means which do not indicate accurately the percentage of modulation but they *do* show when a transmitter is being modulated in "excess of its modulation capability." Careful reading of the new regulation will bear out its meaning. It follows:

"Spurious radiations from an amateur transmitter operating on a frequency below 30,000 kilocycles shall be reduced or eliminated in accordance with good engineering practice and shall not be of sufficient intensity to cause interference on receiving sets of modern design which are tuned outside the frequency band of emission normally required for the type of emission employed. In the case of A-3 emission (radio-telephony) the transmitter shall not be modulated in excess of its modulation capability to the extent that interfering spurious radiations occur, and in no case shall the emitted carrier be amplitude-modulated in excess of 100 per cent. Means shall be employed to insure that the transmitter is not modulated in excess of its modulation capability. A spurious radiation is any radiation from a transmitter which is outside the frequency band of emission normal for the type of transmission employed, including any component whose frequency is an integral multiple or sub-multiple of the carrier frequency (harmonics and sub-harmonics), spurious modulation products, key clicks and other transient effects, and parasitic oscillations."

This rule requiring 'phone operators to be equipped with means of checking over-modulation is a good one. There are hundreds of operators who rely entirely upon mathematical means of checking probable modulation percentage on the theory that the audio power should equal 50 per cent of the modulated amplifier's input. Such computations usually are made on the basis of readings from utility meters which give different scale readings by means of switching in different values of series resistors. Such series resistors unless of a very expensive and carefully calibrated type may result in voltage readings in error as much as 10 per cent, and such errors will give misleading results when computing probable audio power for modulation purposes.

Checking Overmodulation

The most accurate and dependable means of determining over-modulation, of course, is by means of an oscilloscope. These instruments vary in price over a wide range, the mimimum being about $35. While many may argue that they could find other uses for such a sum, the station operator equipped with a cathode-ray oscilloscope will find it a valuable piece of apparatus to have about the shack. While the new regulation is not construed as meaning the 'phone operator should purchase such a device, it is one of the most reliable means "to insure that the transmitter is not modulated in excess of its modulation capability."

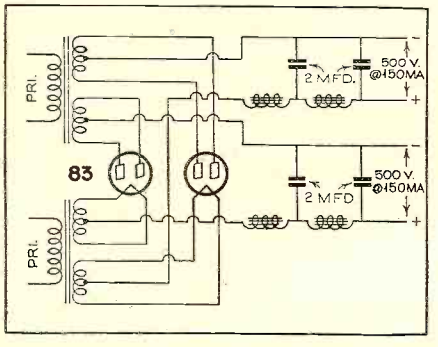
For the amateur whose pocketbook does not warrent the purchase of an oscilloscope there are a number of other means of determining over-modulation which satisfy the requirements of the commission's rule. Several of these methods were discussed in this department in the November, 1934, issue of RADIO NEWS. One of the most inexpensive and reliable devices for this purpose is neon "tune-o-lite" which was described in that issue. Briefly in review, the device consists of a coil and condenser designed to tune the band on which the transmitter is operated and the tubular neon lamp connected across the tuned circuit. By coupling the tuned circuit to the tank circuit of the modulated amplifier and leaving it permanently in one position with respect to the tank circuit, it is possible to calibrate the amount of ionization for indicating modulation percentage with the use of an oscilloscope.

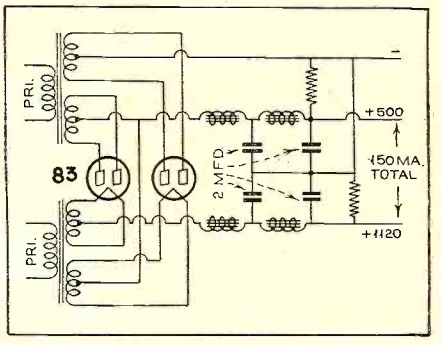
It has been more or less definitely proved that some of the "old reliable" means of checking for over-modulation are far from reliable. The one which many amateurs use for determining "100 per cent" modulation is the rule that the antenna current should increase 22 per cent when 100 per cent modulation is reached. Many operators have the idea that the antenna current meter should swing the 22 per cent when they are talking into the "mike." However, when such a swing takes place during conversation it is reasonably certain peak modulation may be of the order of 150 to 200 per cent. It is such modulation the new commission regulation seeks to eliminate.

The "22 percent" rule applies only to modulation of a pure sine wave. When one analyzes the conglomeration of amplitudes the voice sets up when viewed in an oscilloscope it may be seen readily that the sine wave rule cannot be applied to the mixture of frequencies and the variations in intensities that result from the human voice. Furthermore, most antenna current meters are very sluggish. They merely indicate an average of the conglomeration of voice frequencies while at the same time some sounds such as "sh" will swing the class C modulated amplifier 50 per cent be-

NEW DOUBLE TRANSFORMER POWER SUPPLIES

At left: Arrangement for two 500-volt, 150-milliampere supplies. At right: One 1120-volt and one 500-volt source for delivering 150 miliamperes.





yond the desired 100 per cent maximum. Therefore, when using the antenna current meter as a supplementary means of checking modulation it should never be allowed to swing more than 5 to 10 per cent for voice modulation. As a matter of fact a good thermo-coupled ammeter should never be allowed to more than barely move.

Another means the amateur has relied upon for checking over-modulation is the plate meter in the modulated amplifier stage. The rule has been that the speech gain should be adjusted so that this meter shows no tendency to swing when the amplifier is being modulated. However, it has been proved with oscilloscope tests that this rule is misleading, particularly so if the positive peaks are greater than the negative ones, or vice versa. A direct current meter in the plate circuit, of course, does not indicate the A. C. component, because each half of the cycle cancels the other. The theory has been that when too much audio power is applied to the plate, the excess would be indicated by the swinging of the needle.

However, the class C stage easily may be over-modulated and at the same time the plate current may appear to be stable. If this method is employed, it is desirable to borrow some one's oscilloscope to make sure. It probably will be found that carrier shift or over-modulation will continue until the audio gain is reduced considerably below the point where the plate current meter stopped jumping.

A "means" for checking carrier shift that has proved quite reliable is an ordinary field strength measuring device. These units usually consist of a tuned circuit and a D.C. milliammeter of a low reading value and a rectifying device such as a diode or crystal detector (preferably the

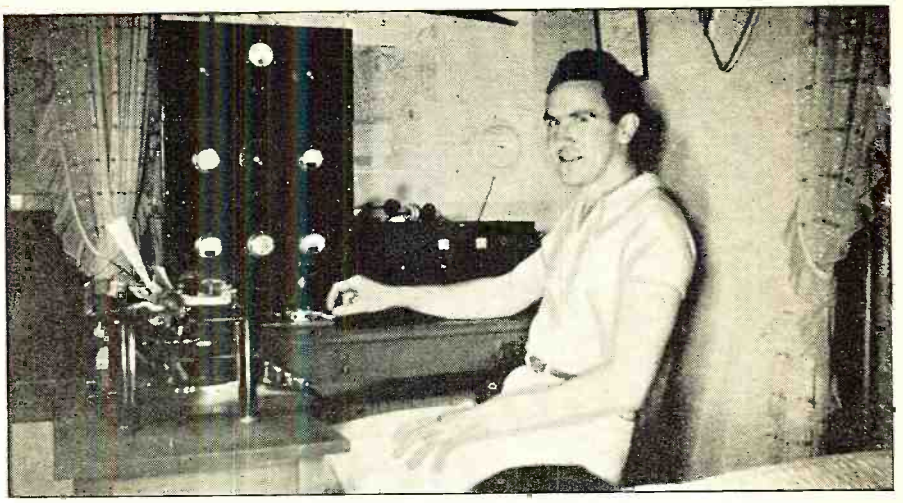
(*Turn to page 308*)

RADIO NEWS Sponsors New Opportunity for Code Practice at Home

RADIO NEWS takes pleasure in publishing the following schedule of code transmissions in the United States especially for those who wish to learn the code over the air. All one has to do is to tune in to the proper frequency as specified at the proper time and day and start copying the special code transmissions for practice. A daily schedule is given for the present month (beginning October 1st and ending November 1st). In the first column is the time (a.m. or p.m.); in the second column are the symbols. E, C, M and P (where E is used for E.S.T., C for C.S.T., M for M.S.T. and P for P.S.T.). In the third column are the call letters of the transmitters of amateur members of the Guild and the fourth column contains the frequencies of transmission in all cases, except where otherwise noted. Each CSCG transmitting station will begin his program at stated time by sending "CSG" 6 times, followed by his station call repeated 3 times, slowly.

HE DOES HIS PART

This is A. P. Bloser, owner and operator of Station W2HCP who transmits a code practice schedule for the CSCG and who thinks code listeners should greatly benefit by this service under RADIO NEWS *sponsorship.*



CLEARLY, INTERESTINGLY WRITTEN

I HAVE been a regular reader of RADIO NEWS for the past five or six years. Each new development in radio line is clearly and interestingly written. Many helpful hints are included in each issue which have been, in the past, very useful to me. Now that the magazine carries the CSCG schedules it should gain many new friends, especially among the amateurs.

(*Signed*) *Harold B. Dougherty, USNR, N3CJD*

At intervals of 5 minutes, he will repeat "CSG" 6 times and his call letters 3 times. All who listen to CSCG programs are requested to write a card to the transmitting station telling him how his signals come in and, if possible, sending him copies of transmissions.

MONDAY

8:30 A.	E.	W1AMH	56,100-3536½
9:00 A.	ED.	W2HZJ	3577
9:00 A.	E.	W3AEJ	3785
4:00 P.	E.	N1FNM	3510
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
6:30 P.	E.	N1DUZ	3638
7:00 P.	E.	W2HCP	3795
7:00 P.	C.	W9SFT	3585
8:00 P.	E.	W8MCP	3580

TUESDAY

8:15 A.	E.	VE3UU	3865
9:00 A.	ED.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
4:00 P.	E.	N1FNM	3510
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
6:30 P.	C.	W9RPD	3514.5
7:00 P.	M.	W9HHW	7276
7:00 P.	M.	W6IQY	14380
7:30 P.	C.	W8HKT	3750
8:00 P.	C.	W5CPV	7149
8:00 P.	E.	W8MCP	3580
8:00 P.	M.	W7DBP	3607

WEDNESDAY

6:00 A.	C.	W5DDC	7200
9:00 A.	E.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
4:00 P.	E.	N1FNM	3510
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W6MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
6:30 P.	C.	W9RPD	3514. 5
7:00 P.	E.	W2HCP	3795
7:00 P.	E.	W3AEJ	3785
7:00 P.	C.	W9SFT	3585
7:00 P.	M.	W9HHW	7276
8:00 P.	M.	W7DBP	3722

THURSDAY

8:15 A.	E.	VE3UU	3865
9:00 A.	E.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
6:30 P.	C.	W9RPD	3514.5
7:00 P.	M.	W6IQY	14380
8:00 P.	M.	W7DBP	3607

FRIDAY

9:00 A.	E.	W3AEJ	3785
9:00 A.	ED.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	E.	N1DUZ	3638
6:30 P.	C.	W9LKK	3757
7:00 P.	E.	W2HCP	3795
9:30 P.	E.	W4BHR	3867

SATURDAY

6:30 P.	C.	W5BXA	3610
8:15 A.	E.	VE3UU	3865
8:30 A.	E.	W1AMH	56.100-3536½
9:00 A.	ED.	W2HZJ	3577
6:00 P.	E.	W8MHE	3830
11:50 P.	P.	W7WE	3637-7274

SUNDAY

6:30 P.	C.	W5BXA	3610
8:15 A.	E.	VE3UU	3865
9:00 A.	ED.	W2HZJ	3577
10:30 A.	E.	W3EEY	3628
10:30 A.	C.	W5DDC	7200
11:00 A.	E.	W8KGM	3807
1:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3830
6:30 P.	C.	W9RPD	3514.5
7:00 P.	C.	W9LUS	3631
8:00 P.	M.	W7DBP	3722

Active Members Candler System Code Guild

W1AMH—Harold J. Morse, 48 Hebron St., Hartford, Conn.

N1DUZ—J. E. Vermeiren, 137 Middlesex St., Springfield, Mass.

N1FNM—G. W. Wabrek, New Hartford, Conn.

W2HCP—A. P. Bloser, 82 Dove St., Albany, New York.

W2HZJ—Walter G. Germann, 905 E. 169th St., New York, N. Y.

W3EEY—Dr. H. A. D. Baer, BAER HOSPITAL, Allentown, Penna.

W3AEJ—Geo. W. Knowles, 82 Elgin Avenue, Westmont, N. J.

VE3UU—Gordon Murray, 53 Elm Grove Ave., Toronto, Ont., Canada.

W4BHR—James D. Randolph, Warren Plains, N. C.

W5BXA—H. Trosper, Box 225, Whittenburg, Texas.

W5DDC—Herbert Leo, 1420 Hawthorne St., Houston, Texas.

W5CPV—Grady L. Hardin, 132 Oak St., Hot Springs, Ark.

W61QY—E. L. Troutman, Box 85, Flagstaff, Ariz.

W7WE—Loren C. Maybee, 3516 Hudson St., Seattle, Washington.

W7DBP—F. W. Stuart, R. F. D. 2—Boise, Idaho.

W8HKT—F. T. McAllister, 807 Michigan Ave., St. Joseph, Mich.

W8MCP—Chas. Hedrich, 30 DeKalb St., Tonawanda, N. Y.

W8MHE—Charles L. Gibson, 9 Sycamore St., Natrona, Pa.

W8EEZ—Tauno M. Alanen, 512 New Street, Fairport Harbor, Ohio.

W8KGM—E. J. Goodison, 300 E. Edward St., Endicott, N. Y.

W9HHW—Denzel Begley, Box 46, Ft. Meade, S. Dak.

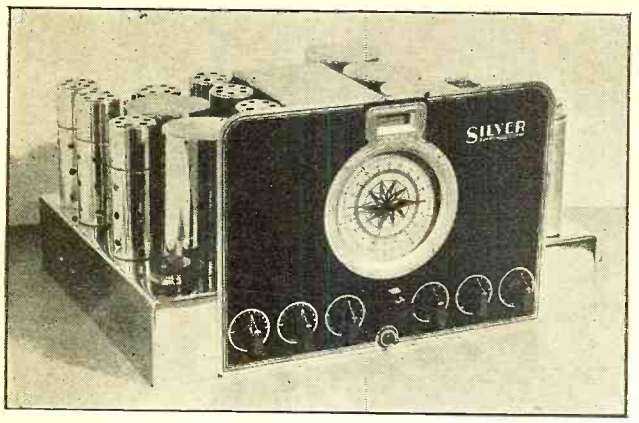
W9RPD—R. J. Lawrence, Fort Lincoln, N. Dak.

W9SFT—Gerald Broughton, CCC Co. 735, Scammon, Kansas.

W9TE—A. L. Braun, 5211 Brookville Rd., Indianapolis, Indiana.

W9LKK—Sidney Schulz, 3132—4th St. S. E. Minneapolis, Minn.

W9LUS—Clarence Read, 3401 Parnell Ave., Chicago.



You Can BUILD or

By McMurdo

THE FINISHED RECEIVER

In appearance it is everything the "Ham" or serious short-wave listener could desire. Performance? Now under test in the R. N. Listening Posts and a full report on results will appear in a later issue.

AMONG receivers available to the serious amateur or short-wave b.c.l.'s superheterodynes predominate today due to their high selectivity, especially with crystal filter, and their ease and dependability of operation. Further, the past year has brought increasing appreciation of the image-selectivity and noise-elimination benefits of not one, but of two, r.f. stages, of a quiet low-gain i.f. amplifier and stable air tuned and temperature isolated circuits throughout.

THE receiver described herewith satisfies these latter-day requirements. If it satisfies, as it does, serious amateur needs, it is automatically an excellent short-wave broadcast receiver as well.

The first requirement set up for this design was that any receiver good enough for serious amateur use should be well enough and cleanly enough designed for amateur construction, not just for laboratory building and testing, since all complications allowing of only such treatment would automatically spell expense.

This decided, the only remaining considerations were that the ideal receiver must have "everything" and cost nothing. On these points its many designers fell down—it has almost everything any amateur or short wave b.c.l. could desire, but it costs something more than nothing.

High Sensitivity

For the engineer its performance is easily described by saying that its four "low-C" 200 mmfd. tuning bands cover 1700 to 33,000 kc. (9.1 to 177 meters), which includes the 160, 80, 40, 20 and 10 meter amateur, and all short-wave broadcast bands; its sensitivity is below a microvolt all over this range; its inherent noise never exceeds 10 milliwatts at maximum sensitivity; its selectivity is variable from 150 cycles (at 10,000 times down) to 10 kc.; its fidelity is controllable from "flat to 4 db." from 30 to 4000 cycles, to peaked audio for C.W. reception; its undistorted power output is 3.0 watts, rising to a maximum of about 4.0 watts. Add to this that it has everything but hot and cold running water, and you have the essence of this story. While considering the really ideal performance described above, let's take a brief look at its other features.

CIRCUIT: Superheterodyne, with two 6D6 tuned r.f. stages on all four bands, suppressor grid injected 6D6 s.g. first detector, 76 electron coupled h.f. oscillator, one 6D6 i.f. stage, high gain 6C6 tetrode second detector, 6B7 amplified a.v.c., optimum inductively coupled variable pitch 76 beat oscillator, 42 output pentode and 5Z3 rectifier.

BAND CHANGE: Individual coils for each band, with dependable eight-gang wave-change switch.

FREQUENCY STABILITY: Individually shielded coils, all circuits air-dielectric (not compression mica), tuned and trimmed, plenty of ventilation, and temperature isolation make for the ability to stay "zero beat" on a good 20 meter signals for hours.

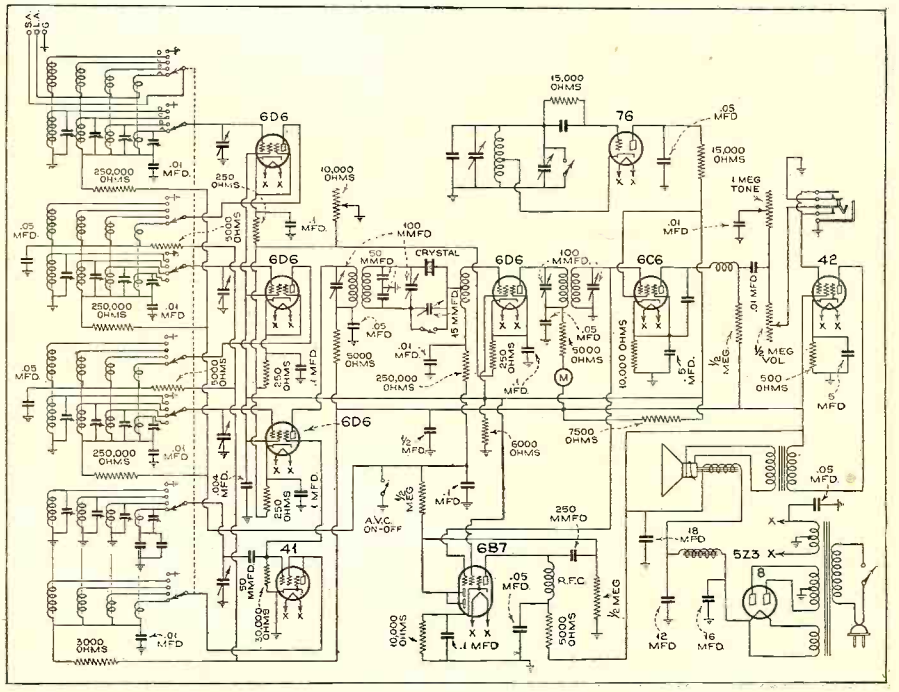
I.F. AMPLIFIER: Set at 25 microvolts absolute sensitivity to place the limit of inherent noise at the level of thermal agitation in the antenna circuit where it belongs, not at the first detector where weak signals are lost in set noise. Two of the new iron core 465 kc. i.f. transformers, air tuned, and variable as to selectivity to suit your taste. Crystal i.f. transformer dual tuned.

SELECTIVITY: Variable so you can adjust it with two knobs from 50 cycles wide to 10 kc.—or a socket wrench pushed through two i.f. can holes lets you vary the i.f. transformer coupling and selectivity even further.

CRYSTAL FILTER: As much, and usually more sock in series circuit as when cut out; in parallel, the ability to drop an unwanted heterodyne completely out without ruining phone signal quality.

BAND SPREAD: One tuning dial, accurately calibrated (the builder can so align it without any extra test equipment) with geared, no slip, band-spread pointer on 200 division, 360 degree inside scale which accurately and positively relogs. Fast and slow tuning ratios, 23:1 and 130:1 spread, 1000 degrees on 160 meters, 700 degrees on 80 meters 400 on 40, 120 on 20, and 200 degrees on 10 meters. Effective feet, not inches, of dial space on the amateur and short-wave broadcast bands, since 360 degrees of band spread equals about one foot of dial space, and five full turns of slow knob for 360 degree band spread pointer rotation.

A.V.C.: amplified so it really does a job on weak signals, and speeded up so



A 10-TUBE, 1.7-33.0 MEGACYCLE SUPERHET

BUY IT!

Silver

17 Important Features

1. *2 tuned r.f. stages on all ranges*
2. *Air-dielectric padders and trimmers*
3. *High signal-to-noise ratio*
4. *Better than 1 microvolt sensitivity*
5. *Selectivity variable from 150 cycle to 10 kc.*
6. *Peaked audio for c.w. reception*
7. *Bandspread ratio 130 to 1*
8. *Crystal i.f. filter*
9. *Beat-frequency oscillator*
10. *Audio range 30-4000 cycle*
11. *Dial calibrated in frequency*
12. *Tuning or "R" meter*
13. *Amplified a.v.c.*
14. *Output 3 to 4 watts*
15. *Copper coil shields*
16. *1.7-33 megacycle tuning range*
17. *Chromium plating throughout*

it does likewise on c.w. A switch cuts a.v.c. out for c.w., and in for phone if so preferred.

CONTROLS: Enough and no more. Not usual blind knobs, but every one labeled as to what it does, and calibrated so you can tell that QSO just how much better he comes in tonight than he did with the old rig last night.

R-METER: A sensitivity meter that lets you actually measure signals as weak as 5.0 microvolts absolute—and that's not an R9 signal, it's about R2-R3.

CONSTRUCTION: Finish is polished chromium, like the finest custom built jobs, yet costs only a little more than black enamel. But, does it stand up, and does it trim up the shack! Assembly is simple indeed, for all low-frequency wiring comes all laced up in a complete color coded cable—only the few "hot" bus-bar leads to be cut and fitted, and with complete instructions.

ALIGNMENT: The sensitivity meter is the output meter in aligning, the crystal in a temporary circuit using no extra parts except that odd '99 or 30 tube, its socket and a couple of flashlite batteries does the i.f. job, while signals do the whole r.f. job. The air-dielectric trimmers make all this a pleasure, not the usual uncertain headache.

Layout and Controls

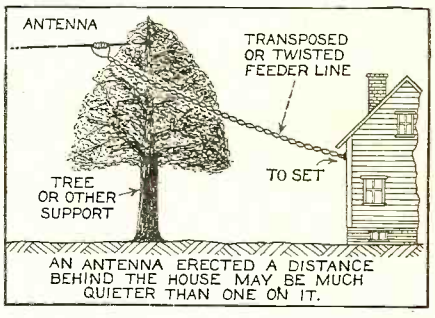
In the photo, the knobs left to right are crystal phasing and parallel switch, beat oscillator pitch—on-off switch, audio volume control, a.v.c. on-off switch, five position (one dead for "send") wave change switch, tone control and sensitivity or manual volume control. The dial is shown 0-100—actually its outside carries four calibrated bands, and the inside 0-200 division, full circle band-spread pointer scale. The "dog house" behind the dial houses the four-gang low minimum capacity 200 mmfd. tuning condenser, rubber mounted to kill microphonism (as is the whole chassis). At its right are the big copper shields housing the 1st r.f., second r.f., first detector and oscillator coils and trimmers for three bands—the high frequency (16 to 33) megacycle band being below the gang condenser. To the right, back to front are: power transformer, 5Z3 rectifier, filter choke and three wet electrolytics—two self-regulating to save wear and tear on other circuits parts, though all are safely rated.

The row of four tubes at the left of the "dog house" are back to front: 6D6 first r.f., 6D6 second r.f., 6D6 first detector and 76 electron coupled (connected only to 6D6 suppressor grid, hence only electron coupled to its load) h.f. oscillator. Left front to rear, are: first i.f. transformer, crystal, 6D6 i.f. tube, second i.f. transformer, 6C6 second detector, 76 beat oscillator (*not* electron coupled-harmonics are *not* wanted) 6B7 amplified a.v.c. and 42 output pentode. Phone jack and speaker plug are on left rear. Speaker: 8-inch electro-dynamic (a matched 12-inch speaker can be had if preferred).

The net result, is a honey of an amateur and short-wave broadcast receiver, nice and pretty in black enamel panel and polished chromium. If you like more chromium, a dust cover can be had to hide the works, dropping over everything but (*Turn to page* 309)

Hints for the Short-Wave BEGINNER

Robert Hertzberg



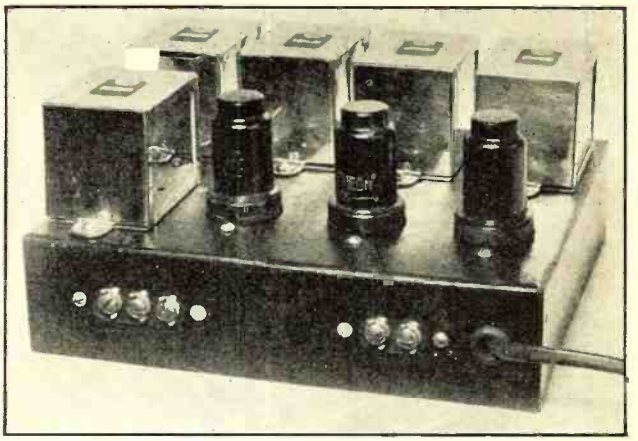
AN ANTENNA ERECTED A DISTANCE BEHIND THE HOUSE MAY BE MUCH QUIETER THAN ONE ON IT.

THE writer recently helped to organize a club of short-wave listeners in New York and conducted the first half-dozen meetings, the attendance at which ran as high as 200. What impressed him particularly was the recurrence of certain technical questions, indicating a general misunderstanding or ignorance of the true facts involved.

The topic that definitely drew the greatest number of queries was "noise reducing antennas." In spite of the huge amount of literature that has been published on the subject, people still entertain the queerest notions about it. Let's get the fundamentals straightened out first. To start, it is not the antenna that reduces local noise, but the lead-in. If the antenna itself cannot be placed outside of the noise zone, it will continue to feed noise as well as radio signals to the receiver, regardless of the fanciness of the lead-in or whether it consists of twisted wire or a transposed or parallel line. This goes for end-fed half-wave wires, for center-connected dipoles and for double-doublets, regardless of who makes them or what magical properties are attached to them by advertising copy writers who themselves have never climbed a water tank or hung precariously over the edge of a roof with arms and legs entangled with wire.

Every location presents an individual problem as far as the placement of the antenna is concerned. (*Turn to page* 303)

Amateurs! *Do You Need a Modern* Metal-Tube PRE-AMPLIFIER?



By I. A. Mitchell

THE last few years have seen a very great increase in the frequency range of audio equipment, from microphone to loudspeaker. However, there has been practically a proportionate decrease in the sensitivity of input devices, requiring additional gain in the amplification circuits. This is readily apparent when a number of modern types of microphones are compared. A check recently made on modern input devices indicates the following average output levels (reference level=0.006 watts). Only average values are indicated, as there is quite a difference in output level for the same type of microphone as manufactured by different organizations.

Carbon Microphone	−34db.
Condenser Microphone	−82db.
Dynamic Microphone	−88db.
Velocity Microphone	−97db.
Crystal Microphone	−70db.
Magnetic Pickup	−25db.
Crystal Pickup	−15db.

Another factor to consider is the variation in output of microphones due to distance from the sound source and directional effects.

Considering the above as a whole, the necessity for pre-amplification in both amateur transmitters and P.A. Systems is quite obvious. To allow sufficient range in gain control, an amplification system should have at least 10 db. greater gain than the difference between normal input and output powers. For comparison, let us now consider the output of a number of power amplifiers, commonly used.

Tubes	*Type*	*Output above .006 watt*	*Bias*
1 245	Class A	plus 24db.	Self
1 50	Class A	plus 28db.	Self
2 245 or 1 53	Class B	plus 32db.	Self
2 50	Class A	plus 33db.	Self
2 2A3	Class A	plus 34db.	Fixed
2 WE300A	Class A	plus 35db.	Fixed
2 46 or 59	Class B	plus 36db.	Self

Based on the above method of determining required amplifier gain, the gain required between a dynamic mike and the output of a pair of 2A3's would be 34 plus 88 plus 10, or a total of 132 db. If the power amplifier has a gain of 80 db., it is seen that an additional gain of 52 db. is required in the pre-amplifier.

Using the above method of attack, the required amplifier gain for any input device and output power can be quickly approximated.

Up to approximately 2 years ago, practically all pre-amplifiers were battery operated! Continuous research has changed this condition, so that now an all-a.c. operated pre-amplifier is entirely practical.

There is no doubt by this time that metal tubes will eventually replace glass tubes in most radio receivers. While the cost of metal tubes is at present greater than that of comparable glass tubes, the several valuable performance characteristics of these tubes have already taken the radio industry by storm. This does not mean that glass tubes should be retired to obsolescence, but reflects the general progressiveness of the radio field as a whole. The advantages of metal tubes in P.A. work are readily enumerated.

1. Reduction in tube noise and microphonics
2. Compactness, which lends itself to the modern trend toward simplified equipment
3. Positive self shielding
4. Simplified self aligning base plug
5. Increased ruggedness

Increased ruggedness is of great importance in P.A. work due to the great abuse tubes normally get in such service. In addition to the unbreakable shell, these tubes have a more rugged internal structure as the elements are supported by at least seven wires leading directly to the base pins. The psychological effect of metal tubes on the ultimate purchaser or user of P.A. equipment, also plays an important role.

FEATURES:

FULL A.C. OPERATION
FREE FROM HUM
LOW COST
METAL TUBES
COMPACT SIZE
EXCELLENT FIDELITY
55 DB. GAIN

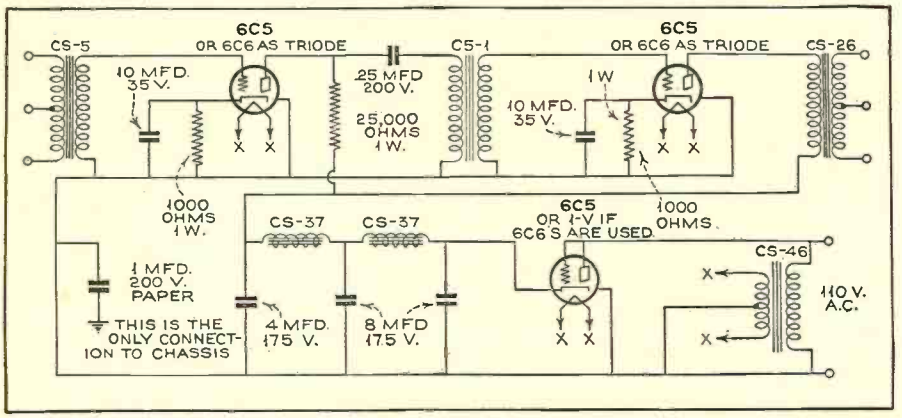
Keeping in mind all the aforementioned metal tube advantages, the low level pre-amplifier described below was designed and developed in the laboratory of the United Transformer Co. to form a unit which would be ideal from the engineering standpoint and at the same time inexpensive.

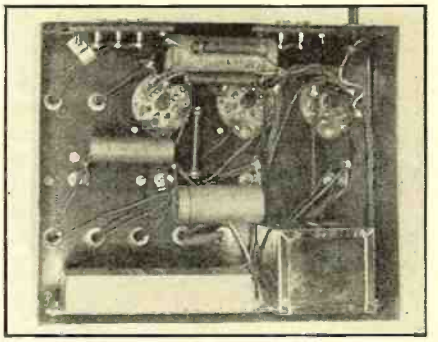
Five major factors determined the design of this amplifier. These were:

1. Adaptability to metal, metal glass, and glass tubes
2. High efficiency
3. Low harmonic distortion and phase shift
4. Low hum level
5. High Power Output

Adaptability

The circuit is designed to accommodate either metal, metal glass, or glass tubes. If all metal tubes are used, three 6C5's are employed. Two serve as voltage amplifiers while the third is used as a half wave rectifier. In this way there is no possibility (*Turn to page* 318)





Service Applications of the POTTS V. T. VOLTMETER

By John H. Potts

Part Three

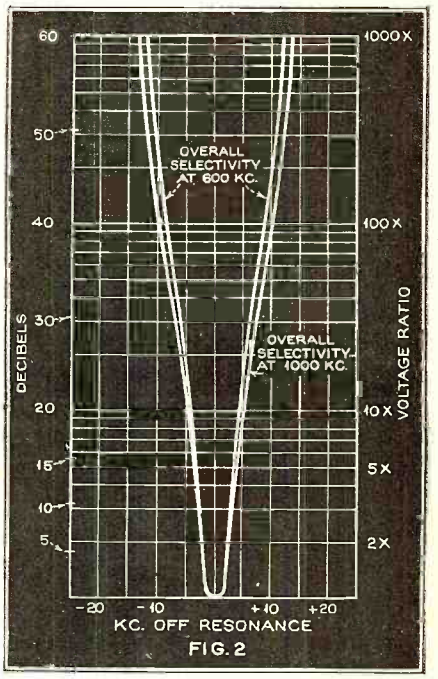


FIG. 2

IN two preceding articles (August and October issues) the design and construction of a super-sensitive tube voltmeter and a high-frequency attenuator were presented. In this article, their application to high-grade radio servicing and dynamic receiver analysis is discussed. The technique of testing condensers for "opens" without disconnecting them from shunted resistors, even when the set is operating, is also covered. This method is of major importance in locating causes of fading and intermittent reception, when substitution methods are misleading.

THE importance of quantitative methods in radio servicing cannot be too strongly emphasized. The public demands and pays for tangible, definite information. A doctor does not need to read a clinical thermometer to a tenth of a degree in order to determine if a patient has a high fever nor does he have to use a watch to take a pulse reading. He knows that this routine builds confidence, aids recovery and helps him to collect for his services. While the serviceman deals with inanimate objects, he must likewise collect for his services from customers who are all too human. From the customer's standpoint, the serviceman who merely tests and replaces a set of tubes has not earned a service charge, since he has done little more than deliver merchandise at a profit. The tube testing operation, being free at the store even when the customer makes no purchases, is not a valid basis for a charge. If he supplements this service with a quick measurement of sensitivity before and after replacing tubes and reports the results of his tests to his customer with the statement that the sensitivity has been increased 400 or 500 percent, as the case may be, a definite service has been performed which cannot fail to impress the customer.

Giving Real Service

This same procedure is equally convincing before and after aligning and many other types of service, often leading to requests for periodic tests even when no trouble is present. Best of all, it lifts the work out of the "handyman" category into the more remunerative classification of a professional technical service.

While it is unnecessary to make such sensitivity tests to a laboratory degree of precision, it is desirable that a reasonably reliable calibration of the signal generator attenuator be made. This can be done as outlined in the article which appeared in the October issue. If the attenuator with which the signal generator is already equipped is unsatisfactory at high frequencies, as it usually the case, a supplementary attenuator may be installed as described in the same article. This may be constructed as a separate, shielded unit.

Sensitivity Rating

Sensitivity rating is usually expressed as the number of microvolts input required to give 50 milliwatts output across a resistance equal to, and substituted for, the voice coil. The input voltage is impressed in series with a dummy antenna which, for the standard broadcast band, conforms to the specifications of Figure 1a. The inductance of 20 microhenries may be made by winding 34 turns of number 24 d.c.c. wire on a 1-inch form. For short wave bands, a 400 ohm resistor is substituted for the dummy antenna. If a resistance type attenuator is used, its output value forms a part of the resistance component, as indicated in Figure 1a. If a capacitor attenuator is used, the capacitance across the output of the attenuator is considered as part of the dummy antenna and the resistance and inductance components are placed in series, as shown in Figure 1b. If a shielded cable is used, its capacitance forms a part of the dummy antenna. Low capacitance shielded cable, consisting of a single insulated wire in ½-in. shielding has a capacitance of approximately 52 micro-microfarads per foot.

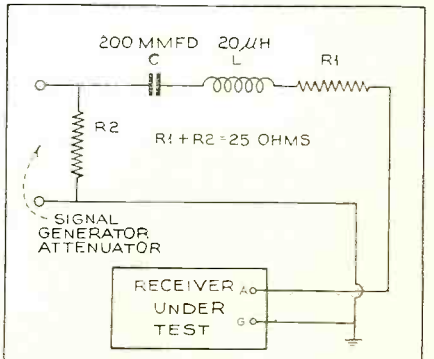
"Absolute" Readings

If an a.c. voltmeter of the copper-oxide rectifier type is used as an output meter, the voltage across the output necessary to give 50 milliwatts power may be obtained from the formula.

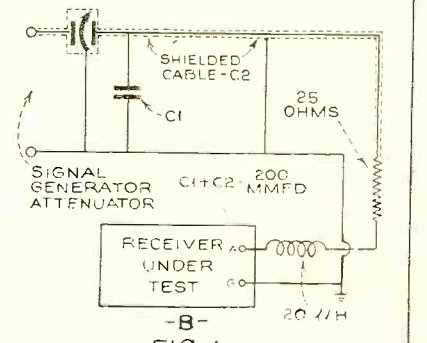
$$E = \sqrt{.05R}$$

For a 15 ohm voice coil this should be .87 volts.

Measurements made as outlined above give results in microvolts, absolute. This type of rating is standard at the present time. Formerly it was the custom to rate sensitivity in microvolts-per-meter, abbreviated mv/m. With this system, the dummy antenna was assumed to be equivalent to an (*Turn to page* 282)



-A-
FIG. 1



-B-
FIG. 1

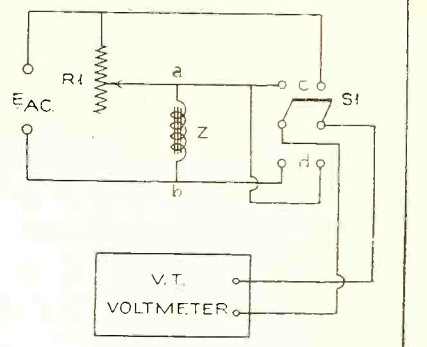
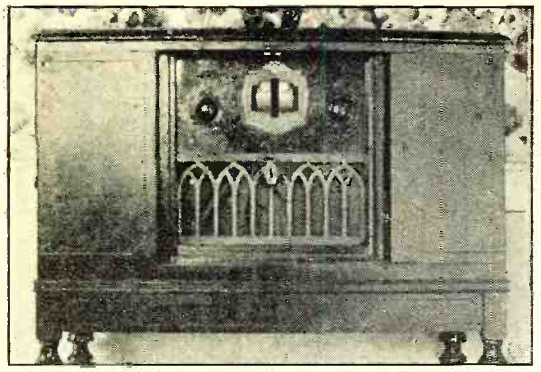
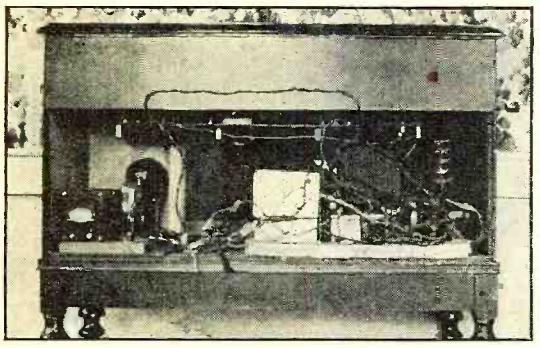


FIG. 3





BEFORE

At top: An early model receiver which one serviceman was asked to modernize. Notice the old-fashioned dial. Below: The conglomeration of tubes, wires and power packs in this receiver, as shown from the rear.

8,000,000 MODERN

SERVICEMEN: HERE IS

What with the insistent demand, today, for tion and with many other improvements in has a wonderful opportunity to modernize old their services to the household up to date, at the

By **Zeh**

THE modernization of antiquated receivers has always been a profitable part of the serviceman's business. Today it is more so than ever! Statistics indicate that there are, in American homes, approximately eight million receivers which were purchased prior to the advent of the truly modern radio. Millions were bought before 1931. These radios are obviously out-of-date and will be replaced by modern installations.

THERE are millions of obsolete radio receivers still in use, in America! These sets have been kept and operated by their owners, up to now, for several reasons. First, they represent a sizable investment, many having been purchased during a period over which the average price for sets was in the neighborhood of $170.00. Secondly, they are often examples of beautiful cabinet work, in many instances chosen to harmonize with some definite scheme of decoration. Third, is the intangible element of sentimental attachment. A fourth reason considers the depressed conditions of the past few years. Many people did not have money to spend on new receivers. Last, and perhaps most important, is the fact that these sets have only fairly recently become antiquated. As receivers of their kind, even today, they are not really bad. The sensitivity and selectivity are often fair, and the tone quality of many a 1930 vintage set was acceptable. However, the advent of automatic volume control and all-wave reception definitely shelves them as wonders of the past. They are rapidly being replaced by new receivers or by "modernization."

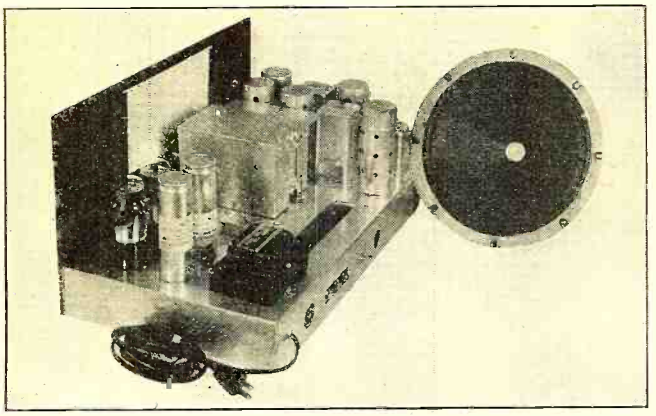
The very factors that have been responsible for folks holding on to these sets for the last five years bias the owner in favor of modernization rather than the purchase of a new set. The serviceman should take every advantage of these considerations. Representing an original investment of perhaps $200.00 or more, the owner is naturally reluctant to turn in his set as a part payment of only a few dollars against a new one. Money is still not too over-abundant and the average price of new receivers, which hit an all-time low in 1933-34, has advanced at least 15% to 25%. People who have invested considerable money in a cabinet which fits in with the rest of their furniture, or who have a sentimental attachment for the old set, are more than partial to the efficient "modernization" idea.

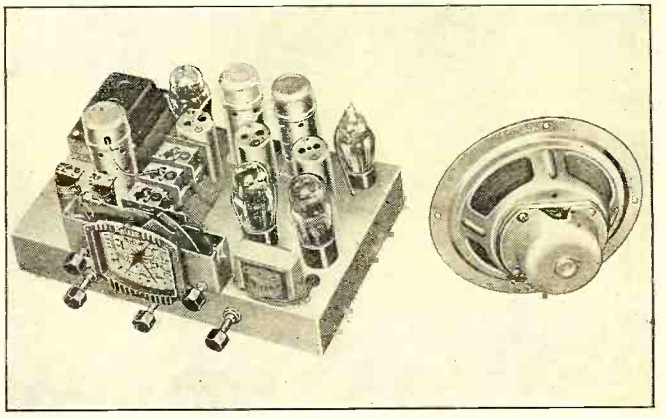
Modern Modernization

"Modernization," today, is a procedure quite different from the methods of a few years back, which consisted of a revamped audio system and occasionally the modification of the r.f. circuits to permit the use of improved tubes. As implied above, modernization, to justify the term, must include automatic volume control and the all-wave feature. While it is possible to modify any receiver in this respect, the changes required would ordinarily place heavy demands on the serviceman's time and inventory—not to mention his ability—which would make modernization more costly than the purchase of a new re-

HERE IS THE AMMUNITION!

In Figures 1 and 2, left and right, below, are shown the Browning 35 all-wave chassis and the Allied Radio 7 tube all-wave chassis, which are two alternate units that can be used very satisfactorily as replacement units for a large number of obsolete installations.



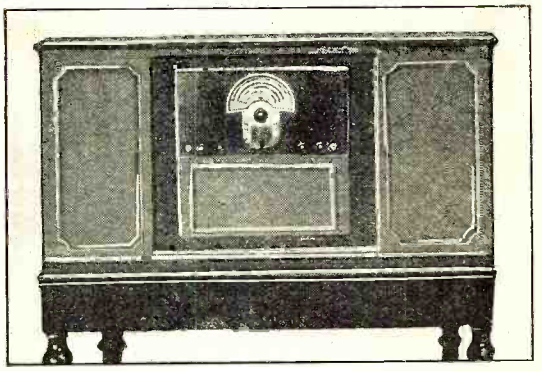


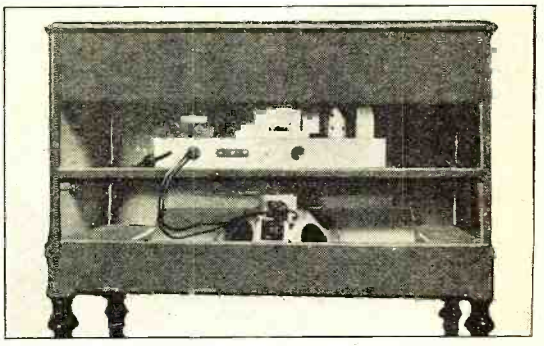
SETS NEED ...ZATION!

YOUR CHANCE TO CASH IN

all-wave reception, with high-fidelity reproduc- circuit and tube design, the alert serviceman now but high-priced radio installations and bring same time making a fair but attractive profit

Bouck





AFTER

At top: The radio installation after having been modernized with an all-wave chassis and a powerful dynamic speaker. Notice the modern tuning dial. Below: How the new chassis and the speaker were mounted, as seen from the rear.

ceiver and probably less satisfactory.

The solution to the problem, guaranteeing profit to the serviceman and satisfaction to his client, is the substitution of an all-wave chassis for the old receiver. There are several of these on the market, and the net cost to the serviceman is from about $30.00 up. Illustrated in Figure 2 is a 7-tube all-wave superheterodyne chassis made by Allied Radio priced at a figure which enables the serviceman to do a profitable modernization job for $40.00.

Another method, using the Browning-35 (Figure 1) with the Tobe tuner is ideal for the purpose of modernization though the cost is somewhat higher.

How One Serviceman Does It

The following is a concrete example of modernization profitably and satisfactorily undertaken from the casebook of a serviceman in rural New York State. The set originally was a Priess Straight Nine receiver, costing over $200.00 when purchased in 1927. Three years after purchase, the receiver was modernized by taking out the entire works and substituting a Pilot Super-Wasp, a Ferranti 250 push-pull audio system and an external Jensen auditorium speaker. Excellent reception kept the owner well satisfied until the receiver developed a bad and subtle case of noise in the summer of 1935. The serviceman was called in, and decided to remove the set to his shop for observation. As it might take anywhere from an hour to a week to locate the trouble, he left a Browning-35, which he had mounted in a "junked" cabinet, to pinch-hit. The serviceman explained the all-wave feature, tuned in a few foreign stations and police broadcasts, and left his client entranced with a new toy. The trouble with the "noisy" set turned out to be an easily repaired connection in an r.f. coil, and when the serviceman returned the receiver the following evening the owner expressed his delight with the Browning, and, as was expected, asked the price. The serviceman replied that the set wasn't for sale as he needed it for just such emergencies. However, he could install a similar set in the (*Turn to page* 319)

PANEL DRILLING DATA

Here is the data for drilling the new panels for the Browning replacement unit.

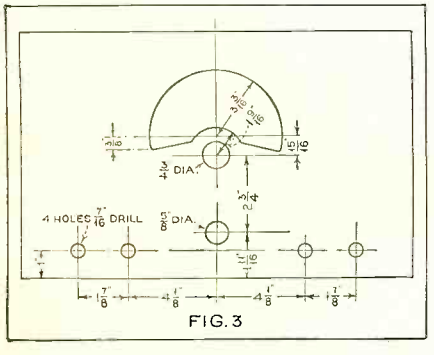


FIG. 3

Non-Directional "MIKE"

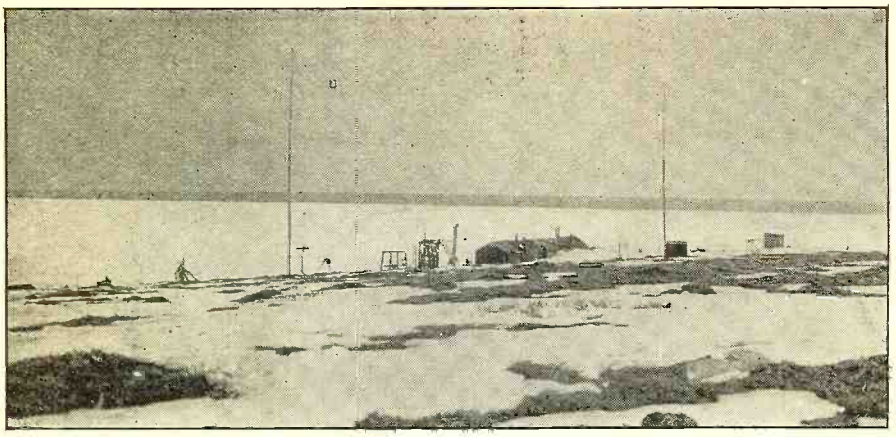
By

Frederick Siemens

A NEW, spherical, non-directional dynamic microphone, somewhat resembling the familiar 8-ball in billiard terminology, with a high-quality frequency response between 40 and 10,000 cycles has been recently designed and released by the Western Electric Company. It is well-known that the mere presence of a microphone or any object of considerable size, placed in a sound field tends to produce a distortion of that field. Such distortion appears in the output of such a device as a non-uniformity of response.

By applying acoustic principles and working out mechanical proportions for a balance of acoustic forces, engineers have succeeded in designing a microphone which can make a faithful electrical replica of the sound pressures existing in an undistorted field. The new microphone is of the dynamic or moving-coil type, well-known for its freedom from noise and other electrical interferences.

The microphone is small in size and may be obtained with floor, table, or suspension-type mountings. The circuit terminates in a plug and a recessed jack at the bottom of the microphone. The cord, then, is passed through the center of the microphone stand and its usual haphazard or unsightly appearance shielded from view. The microphone itself is only 2½ inches in diameter and is surmounted by a flat-disk opening, at the top, through which the sound enters the sphere.



ARCTIC LISTENING POST

Observer Tucker's listening post at Bluff, Alaska, on the Bering Sea. Opposite is the dog team that carries RADIO NEWS *to Alaskan readers during the winter months.*

THE DX CORNER

S. GORDON TAYLOR

(For Broadcast Waves)

AN invitation is once again extended to DX'ers to apply for appointment as Official Broadcast-Band Listening Post Observers. In making such application describe briefly what you have accomplished as a DX'er and the equipment you use.

BEGINNING with the next issue we expect to again resume the tabulation of BB foreign "best bets." Official Observers are requested to give in their reports the foreign stations heard, together with the frequency and the time when each is best heard. It is also suggested that such stations be listed in column or tabular form as this greatly simplifies assembling the data. Also be sure to specify whether the hours given are E.S.T. time or local time.

ALL responsible DX Clubs are invited to apply for appointment as associate members in the DX Corner. Such associate members will be consulted from time to time on various DX questions, particularly those concerned with the development and promotion of Broadcast Band DX reception.

IT is suggested that all DX fans not now affiliated with any DX club seek such an affiliation at once. The DX Clubs are doing an excellent work which they can extend still further as membership increases. Readers desirous of following this suggestion may obtain information concerning the various clubs by addressing an inquiry to Broadcast Band DX Editor.

LETTERS are piling in from DX'ers concerning the fine results they have been obtaining through the use of the RADIO NEWS Trap Circuit Tenatuner described in the July issue. For instance, A. Belanger of Quebec writes: "I must say that the antenna tuner does all that you claim. After using it for over a month I find that it boosts inaudible signals to R7 and R5 signals to R9—this with a special home-built 6-tube air cell receiver." This gadget is so simple to build and so inexpensive that its construction is certainly justified for any DX'er who is looking for maximum results.

RADIO NEWS Specials for September

The programs which were dedicated to RADIO NEWS during September by stations WIRE, WSYR, WPAX, and WDAS were all widely received, judging from reports which have reached this office. It is hoped that readers sent reports to these stations in droves and flocks.

Early reports show that the two-hour special put on by WIRE was heard all over the United States. This is not surprising as the transmitter employed is a 1000-watt high-fidelity job of the latest type, 100 per cent class B modulated.

The WPAX special was especially fine. The owner, Mr. H. Wimpy, had some very complimentary things to say over the air about RADIO NEWS.

New DX Tips Broadcasts

KQBC, Vicksburg, Miss., 1360 kc., has inaugurated a weekly tips broadcast which takes place at 3:00 p.m., E.S.T., Saturdays. It is an interesting fact that this is an "all-ladies" broadcast with our own official L.P.O. (Mrs.) L. R. Ledbetter preparing the material and Mrs. Martelle Menter, WQBC artist and an ardent s.w. fan, doing the announcing.

Mrs. Ledbetter would appreciate receiving BB and SW tips from RADIO NEWS readers and L.P.O.'s. She is doing a fine work in arousing interest in DX reception among the listeners living within the daytime range of WQBC—a section of the country where the DX hobby is practically unknown, and she deserves the full cooperation of fellow DX'ers. So when you have tips from time to time shoot them along to Mrs. L. R. Ledbetter, c/o WQBC, Hotel Vicksburg, Vicksburg, Miss.

As announced in the DX calendar this month this station is dedicating its tips broadcast of October 12th to RADIO NEWS Listening Post Observers. Be sure and listen in if you are within daytime range of this station.

DX Calendar

(Eastern Standard Time)

SPECIALS

Oct. 12. Saturday, 3 p.m., WQBC, Vicksburg, Miss., 1360 kc., 1 kw. (RADIO NEWS)

Oct. 20, Sunday, 4:00-6:00 a.m., WTRC, Elkhart, Ind., 1310 kc., 50 w.

Nov. 4, Sunday, 3:00-3:30 a.m., Radio Normandie, (Fecamp) 1113 kc., 10 kw. (I.D.A.) Address reports: International Broadcasting Corporation, 11 Hallam Street, London, England.)

PERIODIC

Tuesdays, 2:30-3:00 a.m., KSEI, Pocatello, Ida., 900 kc., 250 w.
(Third Tuesday each month) 1:00-4:00 a.m., WDAY, Fargo, N. D., 940 kc., 1 kw.

Wednesdays (except first Wednesday of each month) 2:01 a.m., KIUL, Garden City, Kans., 1210 kc., 100 w.

Thursdays, 8:00 p.m., WORK, York, Pa., 1320 kc., 1 kw. (NRC)

Fridays, 11:00-11:30 p.m., KDKA, Pittsburgh, Pa., 980 kc., 50 kw. (DX tips)

Saturdays, 3:00 p.m., WQBC, Vicksburg, Miss., 1360 kc., 1 kw., (DX tips)
3:00-4:00 a.m., XEMO, Tiajuana, Mex., 865 kc., 5 kw.

Sundays, 12:45-1:00 a.m., WTCN, Minneapolis, Minn., 1250 kc., 1 kw., (DX tips),
1:00 a.m., KFI, Los Angeles, Calif., 640 kc., 50 kw., (DX tips)
1:00-5:00 a.m., CMBX, Havana, Cuba, 1380 kc., 250 w.

Monthly, 13th, 2:00-5:00 a.m., CMOX, Havana, Cuba, 1320 kc., 250 w.

American Rebroadcasts by KGMB

Numerous listeners have heard KGMB, Honolulu, rebroadcasting programs originating at

Official RADIO NEWS Broadcast Band Listening Post Observers

United States

Alabama: Ray Wood
California: Frank D. Andrews, Roy Covert, Bill Ellis, Randolph Hunt, Walter B. McMenamy, Radio Fellowship, Warren E. Winkley, George C. Sholin
Connecticut: Fred Burleigh, James A. Dunigan, Philip R. Nichols, R. L. Pelkey
Georgia: W. T. Roberts
Illinois: Herbert H. Diedrich, Ray E. Everly, H. E. Rebensdorf, D. Floyd Smith
Indiana: E. R. Roberts
Iowa: Lee F. Blodgett, Ernest Byers
Kansas: Vernon Rimer
Maine: Danford Adams, Steadman O. Fountain, Floyd L. Hammond, Roger Williams
Maryland: Louis J. McVey, William L. Bauer, William Rank, Henry Wilkinson, Jr., Frank Zelinka
Massachusetts: William W. Beal, Jr., Walter C. Birch, Russell Foss, Simon Geller, Robert A. Hallett, Evan B. Roberts, Warren C. Reichardt
Michigan: John DeMyer, Howard W. Eck
Minnesota: F. L. Biss, Walter F. Johnson
Mississippi: Mrs. L. R. Ledbetter
Missouri: Dudley Atkins, III.; C. H. Long
Montana: R. W. Schofield
New Jersey: Henry A. Dare, Jack B. Schneider, Alan B. Walker
New York: Jacob Altner, Murray Buitekant, Stephen Flynn, Ray Geller, Edward F. Goss, Robert Hough, Robert Humphrey, John C. Kalmbach, Jr., Harry E. Kentzel, Maynard J. Lonis, Harold Mendler, R. H. Tomlinson, William Wheatley, Robert C. Schmarder
North Carolina: Marvin D. Dixon
North Dakota: O. Ingmar Oleson
Ohio: Stan Elcheshen, Donald W. Shields, Richard J. Southward, Irwin Beitman
Oregon: David Hunter, Walter Weber
Pennsylvania: Robert W. Botzum, Robert Hoffman Cleaver, Edward Kocsan, J. Warren Routzahn, Joseph Stokes
Rhode Island: Spencer E. Lawton
South Dakota: Mrs. A. C. Johnson
Tennessee: W. S. Jackson
Texas: E. L. Kimmons
Vermont: Harry T. Tyndall
Virginia: A. J. Parfitt, C. C. Wilson
Washington: John Marshall Junior High School Radio Club
West Virginia: Clifford Drain
Wyoming: J. H. Woodhead

Foreign

Alaska: S. A. Tucker
Australia: Albert E. Faull, Victoria; George F. Ingle, New South Wales; Aubrey R. Jurd, Queensland
Canada: William H. Ansell, Saskatchewan; C. R. Caraven, British Columbia; Claude A. Dulmage, Manitoba; C. Holmes, British Columbia; Philip H. Robinson, Nova Scotia; Art Ling, Ontario, John W. Ker, British Columbia
Cuba: Rafael Valdes Jiminez, Camaguey
England: R. T. Coales, Hants; F. R. Crowder, Yorkshire; George Ellis, North Stockport; Charles E. Pellatt, London
Irish Free State: Ron. C. Bradley
Newfoundland: A. L. Hynes, Clarenville
New Zealand: P. T. Kite, Auckland; L. W. Mathie, Hawke's Bay; R. H. Shepherd, Christchurch; Eric W. Watson, Christchurch
Philippine Islands: George Illenberger
Puerto Rico: Ralph Justo Prats, Santurce
South Africa: A. C. Lyell, Johannesburg
Sweden: John S. Bohm, Malung
Switzerland: Dr. Max Hausdorff, Viganello

KSL Salt Lake City. L. M. Jensen of Cowley, Wyoming, sends us a copy of a letter describing how the rebroadcasts are made. They are picked up direct at the Schofield Barracks (near Honolulu) of the U. S. Army by means of 2 Scott receivers, 1932 and 1935 models. The programs picked up are distributed to loudspeakers at various parts of the Schofield Barracks and over a wire line to KGMB. It will interest many listeners to know that these regular rebroadcasts are made possible over this 4000 mile stretch of the Pacific through the use of the standard receivers mentioned. The regular programs rebroadcast last season are expected to continue this season and are a regular feature of KSL at 12:30 a.m., E.S.T., Monday mornings.

U. S. Station Changes

The following changes were announced by the Federal Communications Commission in the month of August. Abbreviations employed are: CP—construction permit; unltd—unlimited; Auth.—authority or authorization; Spec.—special; Mod.—modification; Temp.—temporary; L. S.—local sunset; Lic.—license.

1180	WDGY	Minneapolis, Minn. Granted mod. of C.P. to extend completion date to 10/8/35.
1420	WPRP	Ponce, Puerto Rico. Granted mod. of C.P. to extend completion date to 10/18/35.
700	WLW	Cincinnati, Ohio. Granted ext. spec. exp. authorization to operate with 500 kw night with directional antenna system such that the signal delivered in Niagara Falls area does not exceed the effective signal in this area when operating with 50 kw and regularly licensed antenna.
880	WGBI	Scranton, Pa. Granted ext. of spec. auth. to operate with 500 w. to March 1, 1936.
710	KPCB	Seattle, Wash. Granted ext. of spec. auth. to operate on 710 kc, 250 w., unltd. time, to Feb. 1, 1936. Also granted license covering C.P. authorizing installation of new eqpt.; 650 kc, 250 watts, ltd. time.
1420	WELL	Battle Creek, Mich. Granted license to cover local move of station and increasing power to 100 watts; unltd. time.
1310	KVOL	Lafayette, La. Granted license for new station to operate on 1310 kc, 100 watts; unltd. time.
1420	New	Palestine, Tex. Granted C.P. for new station, 100 watts, daytime.
1500	New	Valley City, N. Dak. Granted C.P. for new station, 100 watts, unltd. time.
1210	WJW	Akron, Ohio. Granted C.P. to increase daytime power from 100 to 250 watts.
1200	WHBC	100 watts night, unlimited time. Canton, Ohio. Granted C.P. to increase daytime power from 100 to 250 watts, 100 watts night, unltd. time.
1350	New	Washington, Pa. CP amended to read: 1350 kc, 250 watts daytime.
1310	New	Jamestown, N. Dak. CP amended so as to read: 1310 kc, 100 watts unltd.
1310	New	Sacramento, Cal. CP amended to read: change freq. from 1500 kc to 1310 kc; 100 watts, unltd. time.
550	KSD	Granted auth. to use 1 KW night and day.
620	WFLA-WSUN	Clearwater, Fla. Granted auth. to use 1 KW with directional antenna night, 5 KW day.
890	WJAR	Providence, R. I. Granted auth. to use frequency 890 kc.
1210	WJIM	Lansing, Mich. Granted an additional 150 watts from local sunrise to local sunset only. Unltd.
920	WRAX	Philadelphia, Pa. Granted an additional 250 w. from local sunrise to local sunset only. Shares with WPEN.

OFFICIAL L.P.O. McVEY

Observer McVey, Sparrow's Point, Md., with his first assistant (Mrs. McVey). He also boasts three other assistants, aged respectively 7, 5½, and 2½ years.

F. C. C. Monitor Schedule

The following is the monitor schedule of the Federal Communications Commission, corrected to Aug. 22, 1935. These stations are on the air twenty minutes each, beginning with the time shown. During these transmissions these stations operate on cleared channels and each station announces its call letters at three-minute intervals. This list enables DX'ers to log these low-power stations, most of which cannot normally be heard at a distance because of numerous other stations operating on the same frequencies.

First Monday of Each Month

E.S.T. a.m.	Freq.	Call	Location	Watts
2:00	1500	WCNW	Brooklyn, N. Y.	100
	1310	WJAC	Johnstown, Pa.	100
2:10	1210	WFAS	White Plains, N. Y.	100
	1370	WRAK	Williamsport, Pa.	100
2:20	1500	WNBF	Binghamton, N. Y.	100
	580	WCHS	Charleston, W. Va.	500
2:30	1420	WAGM	Presque Isle, Me.	100
	1370	WBTM	Danville, Va.	100
2:40	1310	WMFF	Plattsburg, N. Y.	100
	1200	WLVA	Lynchburg, Va.	100
2:50	1420	WHDL	Olean, N. Y.	100
3:00	1200	WCAX	Burlington, Vt.	100
3:10	1500	WSYB	Rutland, Vt.	100
	1310	WTEL	Philadelphia, Pa.	100
3:20	1200	WIBX	Utica, N. Y.	100
3:30	1370	WQDM	St. Albans, Vt.	100
	1210	WKOK	Sunbury, Pa.	100
3:40	1310	WMBO	Auburn, N. Y.	100
	1420	WLEU	Erie, Pa.	100
3.50	1370	WABY	Albany, N. Y.	100
	1210	WBAX	Wilkes-Barre, Pa.	100
4:00	1220	WCAD	Canton, N. Y.	100
	1310	WHAT	Philadelphia, Pa.	100
	1200	KOOS	Marshfield, Ore.	250
4:10	1370	WRDO	Augusta, Me.	100
	1210	WBBL	Richmond, Va.	100
	900	KGBU	Ketchikan, Alaska	500
4:20	1290	WNBZ	Saranac Lake, N. Y.	100
	1310	WBRE	Wilkes-Barre, Pa	100
	1260	KGVO	Missoula, Mont.	1000
4:30	1420	WMAS	Springfield, Mass.	100
	1500	KPQ	Wenatchee, Wash.	100
4:40	1310	WRAW	Reading, Pa.	100
	1210	KGY	Olympia, Wash.	100
4:50	940	WAAT	Jersey City, N. J.	500
	1370	KRKO	Everett, Wash.	50
5:00	570	WSYR–WSYU	Syracuse, N. Y.	250
	1200	KFXD	Nampa, Idaho	100
5:10	1370	KVL	Seattle, Wash.	100
	600	WCAC	Storrs, Ct.	500
5:20	1310	KGEZ	Kalispell, Mont.	100
5:30	1370	KUJ	Walla Walla, Wash.	100
5:40	1310	KGCX	Wolf Point, Mont.	100
5:50	780	KFQD	Anchorage, Alaska	250
6:00	900	KSEI	Pocatello, Idaho	250
6:10	1200	KVOS	Bellingham, Wash.	100
6:20	1310	KIT	Yakima, Wash.	100
6:30	1120	KRSC	Seattle, Wash.	100
6:40	1310	KXRO	Aberdeen, Wash.	100
6:50	1120	KFIO	Spokane, Wash.	100
7:00	1210	KFJI	Klamath Falls, Ore.	100
7:10	1310	KMED	Medford, Ore.	100
7:20	1420	KORE	Eugene, Ore.	100
7:30	1370	KAST	Astoria, Ore.	100
7:40	1420	KRLC	Lewiston, Idaho	100
7:50	1310	KINY	Juneau, Alaska	100

First Tuesday of Each Month

2:00	1210	WPAX	Thomasville, Ga.	100
2:10	1200	WBHS	Huntsville, Ala.	100
2:20	1370	WHBQ	Memphis, Tenn.	100
2:30	1420	WEED	Rocky Mount, N. Car.	100
2:40	1500	WOPI	Bristol, Tenn.	100
2:50	1320	WSMB	New Orleans, La.	1000
3:00	1370	WMBR	Jacksonville, Fla.	100
3:10	1420	WNRA	Muscle Shoals, Ala.	100
3:20	1310	WSJS	Winston-Salem, N. Car.	100
3:30	1500	WHEF	Kosciuski, Miss.	100
3:40	1200	KMLB	Monroe, La.	100
3:50	1370	WAGF	Dothan, Ala.	100
4:00	1290	WNEL	San Juan, P. R.	500
	1200	KWG	Stockton, Calif.	100
4:10	1310	WTJS	Jackson, Tenn.	100
	1500	KPJM	Prescott, Ariz.	100
4:20	1370	WPFB	Hattiesburg, Miss.	100
	1370	KERN	Bakersfield, Calif.	100
4:30	1420	WGPC	Albany, Ga.	100
	1500	KXO	El Centro, Calif.	100
4:40	1200	WBNO	New Orleans, La.	100
	1210	KIEM	Eureka, Calif.	100
4:50	1310	WROL	Knoxville, Tenn.	100
	1440	KLS	Oakland, Calif.	250
5:00	1500	WDNC	Durham, N. Car.	100
	950	KHSL	Chico, Calif.	250
5:10	1200	WJBW	New Orleans, La.	100
	1320	KGMB	Honolulu, Hawaii	1000
5:20	1310	WAML	Laurel, Miss.	100
	1370	KRE	Berkeley, Calif.	100
5:30	1210	WSIX	Springfield, Tenn.	100
	750	KGU	Honolulu, Hawaii	2500
5:40	1370	KGAR	Tucson, Ariz.	100
5:50	1310	KCRJ	Jerome, Ariz.	100
6:00	1100	KGDM	Stockton, Calif.	1000
6:10	1200	KSUN	Lowell, Ariz.	100
6:20	740	KTRB	Modesto, Calif.	250
6:30	1420	KUMA	Yuma, Ariz.	100
6:40	1310	KFBK	Sacramento, Calif.	100

First Wednesday of Each Month

2:00	1310	WEBR	Buffalo, N. Y.	100
2:10	920	WPEN	Philadelphia, Pa.	250
2:20	1310	WSAJ	Grove City, Pa.	100
2:30	1410	WHIS	Bluefield, W. Va.	250
2:40	1310	WFBG	Altoona, Pa.	100
2:50	880	WPHR	Petersburg, Va.	500
3:00	1370	WDAS	Philadelphia, Pa.	100
	1500	WKBB	East Dubuque, Ill.	100
	1210	KIUL	Garden City, Kans.	100
3:10	1410	WRBX	Roanoke, Va.	250
	1200	WHBC	Canton, Ohio	100
	1420	KGIW	Alamosa, Colo.	100
3:20	1210	WMBG	Richmond, Va.	100
	1310	WTRC	Elkhart, Ind.	50
	1370	KICA	Clovis, N. Mex.	100
3:30	1370	WSVS	Buffalo, N. Y.	50
	1410	WBCM	Bay City, Mich.	500
	1200	KGHI	Little Rock, Ark.	100
3:40	1310	WGH	Newport News, Va.	100
	630	WGBF	Evansville, Ind.	500
	1420	KIDW	Lamar, Colo.	100
3:50	1210	WOCL	Jamestown, N. Y.	50
	1410	WROK	Rockford, Ill.	500
	1200	KBTM	Paragould, Ark.	100
4:00	880	WQAN	Scranton, Pa.	250
	1310	WBOW	Terre Haute, Ind	100
	1280	KFBB	Great Falls, Mont.	1000
4:10	1430	WHEC	Rochester, N. Y.	500
	570	WOSU	Columbus, Ohio	750
	1370	KGFL	Roswell, N. Mex.	100
4:20	1190	WSAZ	Huntington, W. Va.	1000
	1310	WBEO	Marquette, Mich.	100
	1200	KADA	Ada, Okla.	100
4:30	1500	WGAL	Lancaster, Pa.	100
	570	WKBN	Youngstown, Ohio	500
	1250	WCAL	Northfield, Minn.	1000
4:40	1070	WCAZ	Carthage, Ill.	100
	1200	KFJB	Marshalltown, Ia.	100

OFFICIAL L.P.O. BOHM, SWEDEN

Observer Bohm, Malung, Sweden, is one of the leading DX'ers of Europe and a regular contributor of information to this department.

4:50	1400	WKBF	Indianapolis, Ind.	500
	1420	WACO	Waco, Texas	100
5:00	1070	WDZ	Tuscola, Ill.	100
	1200	KGDE	Fergus Falls, Minn.	100
5:10	900	WLBL	Stevens Point, Wisc.	2500
	1250	WLB	Minneapolis, Minn.	1000
5:20	890	WBAA	West Lafayette, Ind.	1000
	1200	WIL	St. Louis, Mo.	100
5:30	900	WTAD	Quincy, Ill.	500
	1320	KGHF	Pueblo, Colo.	500
5:40	1240	WXYZ	Detroit, Mich.	1000
	1370	KFRO	Longview, Tex.	100
5:50	1500	WTMV	E. St. Louis, Ill.	100

First Thursday of Each Month

2:00	1210	WSOC	Charlotte, N. Car.	100
2:20	1370	WMFD	Wilmington, N. C.	100
2:40	1420	WJBO	Baton Rouge, La.	100
2:50	1210	WGCM	Miss. City, Miss.	100
3:00	1500	WRDW	Augusta, Ga.	100
	1200	WHBY	Green Bay, Wisc.	100
	1310	WDAH	El Paso, Tex.	100
3:10	1240	WKAQ	San Juan, P. R.	1000
	1420	WJMS	Ironwood, Mich.	100
	1370	KLUF	Galveston, Tex.	100
3:20	1360	WCSC	Charleston, S. Car.	500
	1210	WEDC	Chicago, Ill.	100
	1310	KTSM	El Paso, Tex.	100
3:30	1440	WBIG	Greensboro, N. Car.	500
	550	WKRC	Cincinnatti, Ohio	1000
	1370	KGKL	San Angelo, Tex.	100
3:40	1370	WMFO	Decatur, Ala.	100
	1210	WJIM	Lansing, Mich.	100
	1310	KFPM	Greenville, Tex.	15
3:50	1360	WQBC	Vicksburg, Miss.	1000
	1420	KFIZ	Fond du Lac, Wisc.	100
	1370	KMAC	San Antonio, Tex.	100
4:00	580	WDBO	Orlando, Fla.	1000
	1210	WEBQ	Harrisburg, Ill.	100
	1310	KFYO	Lubbock, Texas	100
4:10	1430	WNBR	Memphis, Tenn.	500
	1200	WMPC	Lapeer, Mich.	100
	1370	KONO	San Antonio, Texas	100
4:20	560	WQAM	Miami, Fla.	1000
	1210	WHBF	Rock Island, Ill.	100
	1420	KABR	Aberdeen, S. D.	100
4:30	1220	WDAE	Tampa, Fla.	1000
	1500	WKBZ	Muskegon, Mich.	100
	1370	KFJM	Grand Forks, N. Dak.	100
4:40	1210	WMFN	Clarksdale, Miss.	100
	1420	WCBS	Springfield, Ill.	100
	1310	KIUJ	Santa Fe, N. Mex.	100
4:50	1310	KVOL	Lafayette, La.	
	1500	WKBV	Richmond, Ind.	100
	1370	KFGQ	Boone, Iowa	100
5:00	1300	WIOD	Miami, Fla.	1000
	1210	WTAX	Springfield, Ill.	100
	1310	KGBX	Springfield, Mo.	500
5:10	620	WFLA	Clearwater, Fla.	1000
	1370	WPAY	Portsmouth, Ohio	100
	1420	KCMC	Texarkana, Ark.	100
5:20	1500	KPLC	Lake Charles, La.	100
	1210	WHBU	Anderson, Ind.	100
	1200	WBBZ	Ponda City, Okla.	100
5:30	1200	WAIM	Anderson, S. C.	100
	1370	WIBM	Jackson, Mich.	100
	1420	KGFF	Shawnee, Okla.	100
5:40	1420	WMFJ	Daytona Beach, Fla.	100
	1210	WOMT	Manitowoc, Wisc.	100
	1500	KNOW	Austin, Texas	100

First Friday of Each Month

3:00	1210	WJW	Akron, Ohio	100
	1310	KRMD	Shreveport, La.	100
3:10	1420	WPAD	Paducah, Ky.	100
	1500	KOTN	Pine Bluff, Ark.	100
3:20	1210	WCOL	Columbus, Ohio	100
	1310	KFXR	Oklahoma City, Okla.	100
3:30	1420	WELL	Battle Creek, Mich.	100
	1200	KGEK	Sterling, Colo.	100
3:40	1210	WALR	Zanesville, Ohio	100
	1310	KFPL	Dublin, Texas	100
3:50	1420	WMBC	Detroit, Mich.	100
	1200	WCAT	Rapid City, S. Dak.	100
4:00	1310	WFDF	Flint, Mich.	100
	1240	KGCU	Mandan, N. Dak.	250
4:10	1200	WFBE	Cincinnati, Ohio	100
	1370	KWYO	Sheridan, Wyo.	100
4:20	1450	WGAR	Cleveland, Ohio	500
	1240	KLPM	Minot, N. Dak.	250
4:30	1200	WCLO	Janesville, Wisc.	100
	1370	KGFG	Oklahoma City, Okla.	100
4:40	1310	WCLS	Joliet, Ill.	100
	1420	KABC	San Antonio, Tex.	100
4:50	1200	WJBL	Decatur, Ill.	100
	1370	KFJZ	Ft. Worth, Tex.	100
5:00	1500	WJBK	Detroit, Mich.	100
	1430	KSO	Des Moines, Iowa	250
5:10	1210	WIBU	Poynette, Wisc.	100
	1500	KGFI	Corpus Christi, Texas	100
5:20	1370	WHDF	Calumet, Mich.	100
	1420	WLBF	Kansas City, Kans.	100
5:30	1210	WCRW	Chicago, Ill.	100
	1500	KGKB	Tyler, Texas	100
5:40	1330	WTAQ	Eau Claire, Wisc.	1000
	1420	WMBH	Joplin, Mo.	100

First Saturday of Each Month

2:10	1210	WBRB	Red Bank, N. J.	100
2:20	1500	WWRL	Woodside, L. I.	100
2:30	1210	WGNY	Chester, N. Y.	100
2:40	1500	WMBQ	Brooklyn, N. Y.	100
2:50	1210	WGBB	Freeport, N. Y.	100
3:00	1430	WOKO	Albany, N. Y.	500
	1200	WJBC	Bloomington, Ill.	100
	1330	KTRH	Houston, Texas	1000
3:10	550	WDEV	Waterbury, Vt.	500
	1370	WGL	Ft. Wayne, Ind.	100
	1210	KFPW	Ft. Smith, Ark.	100
3:20	1200	WWAE	Hammond, Ind.	100
	1120	WTAW	College Station, Tex.	500
3:30	1310	WLBC	Muncie, Ind.	50
	1210	KASA	Elk City, Okla.	100
3:40	1200	WFAM	South Bend, Ind.	100
	1270	KWLC	Decorah, Iowa	100
3:50	1280	WCAP	Asbury Park, N. J	500
	1310	WEXL	Royal Oak, Mich.	50
	1200	KGEK	Sterling, Colo.	100
4:00	1380	WNBC	New Britain, Conn.	250
	610	WJAY	Cleveland, Ohio	500
	1270	KGCA	Decorah, Iowa	100
4:10	1280	WTNJ	Trenton, N. J.	500
	1430	WBNS	Columbus, Ohio	500
	1210	KFVS	Cape Girardeau, Mo.	100
4:20	1310	WLNH	Laconia, N. H.	100
	920	WWJ	Detroit, Mich.	1000
	780	KGHL	Billings, Mont.	1000
4:30	1380	KQV	Pittsburgh, Pa.	500
	1210	KDLR	Devils Lake, N. Dak.	100
4:40	1420	WLAP	Lexington, Ky.	100
	1370	WOC	Davenport, Iowa	100
4:50	1380	WSMK	Dayton, Ohio	200
	1200	KFXJ	Grand Junction, Colo.	100
5:00	940	WAVE	Louisville, Ky.	1000
	560	KFDM	Beaumont, Texas	500
5:10	1320	WADC	Tallmadge, Ohio	1000
	1210	KGCR	Watertown, S. Dak.	100
5:20	1340	WSPD	Toledo, Ohio	1000
	760	WEW	St. Louis, Mo.	1000
5:30	1390	WHK	Cleveland, Ohio	1000
	1210	KWEA	Shreveport, La.	100
5:40	1310	WCMI	Ashland, Ky.	100
	880	WSUI	Iowa City, Iowa	500
5:50	1230	KGGM	Albuquerque, N. Mex.	250

First Sunday of Each Month

3:00	1290	KLCN	Blytheville, Ark.	100
3:30	1440	KXYZ	Houston, Texas	500
3:50	1400	KTUL	Tulsa, Okla.	250
4:00	1260	KPAC	Port Arthur, Texas	500
4:10	1340	KGDY	Huron, S. Dak.	250
4:20	1260	KRGV	Weslaco, Texas	500
4:50	890	KARK	Little Rock, Ark.	250
5:00	1240	KGKO	Wichita Falls, Texas	250
5:20	1010	WNAD	Norman, Okla.	500
5:40	1260	KUOA	Fayetteville, Ark.	1000

Our Readers Report—

Donald C. Truax (Illinois): reports the early morning hours (E.S.T.) at which a number of popular stations can be heard as follows:

KJR, Seattle, 970 kc., 5 kw., 12-3 daily.
KOL, Seattle, 1270 kc., 1 kw., 1-3 daily.
XEMO, Tiajuana, Mexico, 865 kc., 5 kw., 1-3 daily.
KLZ, Denver, 560 kc., 1 kw., 12-1:30 daily.
KHQ, Spokane, 590 kc., 1 kw., 1:30-3 daily.
KOIN, Portland, 940 kc., 1 kw., 2-3 daily.
KHJ, Los Angeles, 900 kc., 1 kw., 2-3 daily.
KMPC, Beverly Hills, 710 kc., .5 kw., 2-3 daily.

Observer Scholin (California): "Two new Japanese stations will soon be operating on 760 and 1060 kc. with 500 watts each. Two new Chinese stations, XGOK on 800 kc. and XGOH on 560 kc. will soon be operating, using 10 kw. each. Chinese ZEK is now on the air, 620 kc., 2 kw."

Observer Hunt (California): "DX during 1934-1935 season was much better than the previous season. TP's were heard nearly every week during May, June and July and the first week of August. The second week in August was dead, but the third week came back strong with 17 transpacific stations heard between 2:30 4 a.m. on August 16th. Best reception on stations over 5000 miles distant was accomplished here during cloudy, foggy or rainy weather—5 times as many good catches being made than during clear weather. JFCK is a new Jap, 580 kc., 1 kw. JBAK is another new one on 1030 kc., .15 kw. JOAK I and II will increase power to 150 kw. next spring."

Observer Kentzel (New York): "HJ3ABH, Bogota, Colombia, 1005 kc., .05 kw., is on the air 11:30 a.m.-2 p.m. and 6 p.m.-11 p.m."

Observer Hunter (Oregon): "XEBC, Tiajuana, Mexico, 730 kc., 5 kw., is off the air."

Observer Reichardt (Massachusetts) is hearing the TP's. Like Observer Hunt, he found August 16th an unusual day and succeeded in logging 2BL, 4RK, 4BC, and 1YA shortly after 5:15 a.m. Australian 2BL is his most consistent TP and is received as early at 2 a.m., E.S.T., during the season.

Howard Morse (sec'y-treas. U. S. R. D. X. C.): "3YA, 720 kc., has increased its power to 10 kw. A new station is under construction in Dunedin, Australia to go on the air with 10 kw. in place of 4YA."

Observer Prats (Porto Rico): "HIX, Santo Domingo, has moved from 580 kc. to 800 kc!"

Observer Lawton reports hearing TIRCA, San Jose, Costa Rica on 1100 kc. He would like to correspond with foreign DX'ers who may address him at 15 Hillside Avenue, Westerly, Rhode Island.

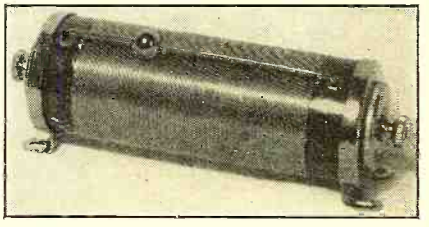
Observer Pellatt (England): "I would like to correspond with DX'ers anywhere. Will guarantee to answer all letters received. A French station heard testing on about 1245 kc. will probably be the new 100 kw. station at Le Brague (Nice). The hours for the British stations as given in my note on page 123 of the August issue should have been one hour later. If one hour is added to each of the times given they will be correct."

Observer Kite (New Zealand): "7NT, Tasmania, 750 kc., 7 kw., has been heard testing. Will be glad to supply information about this side of the world desired by your readers." Mr. Kite's address is 45 Fauldner Ave., Auckland W2, New Zealand.

Norman Keyes (Australia): "I would like to correspond with DX'ers in the U. S. and Canada and will answer every letter received." He says further: "Australian amateurs are allowed to operate on the broadcast band, 200-260 meters, at night. They are limited to 25 watts power and many of them are on the air Sunday nights beginning at 10:30 p.m. (Australian E.S.T.)."

Inexpensive Antenna Tuner

There are so many trick gadgets on the market for replacing or for tuning the antenna that most of us are inclined to give them little attention. Recently however, William M. Eastwood a DX reader of Baltimore, Maryland, brought to our attention the "3-In-1" radio tuner obtainable at many 5, 10 & 20-cent stores and manufactured by the Insuline Corporation of America. Mr. Eastwood spoke so highly of



this unit that RADIO NEWS Lab obtained one for test and was agreeably surprised with the results it produced when employed as an antenna tuner. Considering its insignificant price it is well worth while. A higher priced de luxe model is shown in a photograph in these pages and is similar to the lower priced model except for some refinements in construction and materials. It is felt that this tip-off will be helpful to many other DX'ers.

Foreign Station Addresses

Submitted by Observer Sholin (San Francisco):

ZBW Sec'y, Hong Kong Broadcasting Committee, P. O. Box 200. Hong Kong, China.
LR4 Radio Splendid, Callao 1526, Buenos Aires, Argentina.
HJ3ABH "La Voz de la Victor", Apartado Postal 565 Bogota, Col.
VUC Indian State Broadcasting Service, 1 Garstin Pl., Calcutta, India.
LS2 Radio Prieto LS2, S.A., S.A.R.P., 1352 Bolivar 1358, Buenos Aires, Argentina.
XGOA T. Y. Woo, Administration of the Central Broadcasting Stations, Central Exec. Committee of Kuomintang, Nanking, China.
XGOB (Same address as XGOA.)
CKFC Radio Service Engineers, 734 Davie St., Vancouver B. C., Canada.
CJRC James Richardson & Sons, Ltd., Royal Alexandra Hotel, Winnipeg, Manitoba, Canada.
JOAK Tokyo Transmitting Station JOAK, Nippon Hoso Kyokai, Hibiya Park, Tokyo, Japan.
JOIK Sapporo Sending Station JOIK, Sapporo, Hokkaido, Japan.
JQAK J. Migate, Darien Transmitting Station JQAK, Darien, Manchukkwo.
JOCK Nagoya Central Broadcasting Station,

(*Turn to page* 311)

BROADCAST STATION LIST

(Africa, Australia, Asia)

AFRICA

ALGERIA

Call	Location	kc.	kw.
.....	Algiers	943	16.0

CANARY ISLANDS

EAJ50	Las Palmas	1500	0.25

EGYPT

.....	Cairo (Abu Zabal)	630	30.0
.....	Alexandria (Ras-el-Tin)	1124	0.5
.....	Alexandria (Ras-el-Tin)	1340	0.5
.....	Cairo (Abu Zabal)	1348	0.5

KENYA

VQ7LO	Nairobi	750	1.0

MOROCCO (French)

CNO	Casablanca	983	0.025
CNR	Rabat	724	2.0

MOROCCO (Spanish)

EAJ21	Melilla	1492	0.2
EAJ46	Ceuta	1492	0.2

RHODESIA

.....	Bulawayo	618.5	....
.....	Salisbury	682	....

TUNISIA

TUA	Tunis	583	0.5

UNION OF SOUTH AFRICA

ZTU	Grahamstown	560	10.0
ZTC	Capetown	600	10.0
ZTJ	Johannesburg	645	15.0
ZTD	Durban	750	1.0
ZTE	Bloemfontein	809	0.75
ZTP	Pretoria	952	0.05

ASIA

CEYLON

Call	Location	kc.	kw.
.....	Colombo	700	1.75

CHINA

XLHB	Shanghai	560	0.045
XGOH	Shanghai	560	10.0
XGSS	Hsing-shih	610	0.015
ZEK	Hong Kong	620	2.0
.....	Shanghai	640	0.1
XGOA	Nanking	660	75.0
XGOY	Yunnan	698	0.25
XMHC	Shanghai	700	0.5
XGOS	Chunching	711	1.0
XGML	Kiashing	714.3	0.0075
XLHC	Shanghai	720	0.05
XHGS	Huchow	730	0.05
XHHB	Shanghai	740	0.05
XLHI	Shanghai	760	0.0075
XLHJ	Shanghai	760	0.1
XHHC	Shanghai	780	0.1
XLHL	Shanghai	800	0.1
XGOK	Canton	800	10.0
XLKB	Tientsin	825	0.055
XGWH	Wuhu	830	0.03
XHHA	Shanghai	840	0.15
ZBW	Hong Kong	845	2.0
.....	Chekeang	850	0.05
XGOF	Tsi-nan	852	0.5
XHHD	Shanghai	860	0.05
XLIL	Suchow	870	0.02
XHHV	Shanghai	880	0.1
XGKA	Kiashing	895	0.015
XLIM	.....	910	0.050
XHHX	Shanghai	920	0.1
XTGM	Tsin-tao	930	0.1
XHHE	Shanghai	940	0.1
XGOP	Peiping	950	0.1
XHHF	Shanghai	960	0.5
XHIB	Wusi	970	0.075
XMHB	Shanghai	980	0.5
XGCK	Chu-tsing	990	0.0075
XGOD	Hangchow	1000	1.0
XGOT	Peiping	1000	0.05
XGOW	Hanghow	1010	5.0
XHHG	Shanghai	1020	0.1
XGOF	Tsi-nan	1030	1.0
XHHH	Shanghai	1040	0.1
XGOZ	.....	1050	0.1
XHKA	Tientsin	1050	0.1
XHHI	Shanghai	1060	0.1
XGOX	Nanking	1070	0.2
XKR1	Canton	1071	0.1
XHHJ	Shanghai	1080	0.2
XHHS	Shanghai	1100	0.1
XLHM	Shanghai	1120	0.05
XLIN	Shanghai	1120	0.2
XHHL	Shanghai	1140	0.1
XGGW	Tsing-tao	1150	0.05
XKYY	Kau-you	1150	0.015
XHHU	Shanghai	1160	0.1
XLIF	Wusi	1170	0.03
XHHM	Shanghai	1180	0.1
XHHN	Shanghai	1200	0.1
XLPH	Ping-lo	1210	0.015
XGOT	Peiping	1220	0.5
.....	Chekeang	1230	0.05
XHHY	Shanghai	1240	0.1
XLWU	Wusi	1250	0.05
MABS	.....	1250	0.035
XHHP	Shanghai	1260	0.1
XDYF	Wuhu	1270	0.015
XHHQ	Shanghai	1280	0.08
.....	Tientsin	1280	0.1
XQHC	Shanghai	1300	10.0
XGOE	Nanning, Kwang-si	1300	1.0
XLIJ	Wusi	1310	0.05
XLIA	Ninpo	1320	0.015
XLIK	Changchow	1330	0 075
XHHR	Shanghai	1340	0.05
XQHD	Shanghai	1360	0.2
XHHA	Hangchow	1370	0.05
XLHE	Shanghai	1380	0.075
XLHF	Shanghai	1380	0.05
XLIN	Wusi	1390	0.05
XLHO	Shanghai	1400	0.015
XLHQ	Shanghai	1440	0.05
XLIB	Suchow	1450	0.015
XOMO	Peiping	1450	0.25
XGDZ	Changchow	1470	0.01
XQHF	Shanghai	1480	0.05
XLKS	Kiashing	1490	0.02
XHHT	Shanghai	1500	0.1
XOCL	Tsi-nan	1500	0.0075

FRENCH INDO-CHINA

F3ICD	Saigon	838	1.0

INDIA

VUM	Madras	770	0.2
VUC	Calcutta	810	3.0
VUB	Bombay	855	3.0
.....	Delhi (under construction)	882	20.0
VUA	Lahore	1200	0.1
VUL	Allahabad	1071	....
VUP	Peshawar	1500	....

JAPAN

JFCK	Taichu, Formosa	580	1.0
JOAK-II	Tokyo	590	10.0
JODK-II	Keijo	610	10.0
JOTK	Matsue	625	0.5
JONK	Nagano	635	0.5
JODG	Hamamatsu	635	0.5
JOUK	Akita	645	0.3
JOCG	Asahigawa	655	0.3
JFAK	Taihoku, Formosa	670	10.0
JOLK	Fukuoka	680	0.5
JOVK	Hajodate	680	0.5
JOKK	Okayama	700	0.5
JOJK	Kanazawa	710	3.0
JFBK	Tainan, Formosa	720	1.0
JORK	Kouchi	720	0.5
JOSK	Kokura	735	1.0
JOBK-I	Osaka	750	10.0
.....	Kagashima	760	0.5
JOPK	Shizuoka	780	0.5
JOHK	Sendai	770	10.0
JOGK	Kumamoto	790	10.0
JOCK-I	Nagaya	810	10.0
JOIK	Sapporo	830	10.0
JOFK	Hiroshima	850	10.0
JOAK-I	Tokyo	870	10.0
JODK-I	Keijo	900	10.0
JOQK	Niigata	920	0.5
JOAG	Nagasaki	930	0.5
JOOK	Kyoto	960	0.3
JOBG	Maehashi	970	0.5
JOXK	Tokushima	980	0.5
JOFG	Fukui	990	0.3
JBAK	Fuzan, Chosen	1020	....
.....	Toyama	1060	0.5
JOBK-II	Osaka	1085	10.0
JOCK-II	Nagoya	1175	10.0

MANCHUKUO

MTCY	Hsinking	560	100.0
JQAK	Dairen	650	0.5
MTFY	Harbin	675	1.0
MOHB	Harbin	675	1.0
MTBY	Mukden	890	1.0
ZILY	Hoten	900	2.0

PHILIPPINE ISLANDS

KZRM	Manila	619	50.0
KZEG	Manila	780	0.85
KZIB	Manila	900	0.95

SIAM

HSP1	Bangkok	857	2.5
HS7PJ	Bangkok (Sala Daeng).....	882	....

OCEANIA

AUSTRALIA

Call	Location	kc.	kw.
2CR	Central Regional, N.S.W.	550	10.0
6WA	S.W. Reg., Western Austr.	560	10.0
3WV	West Regional, Vic.	580	10.0
7ZL	Hobart, Tasmania	590	1.0
4QN	North Regional, Queensland	600	7.0
2FC	Sydney, N.S.W.	610	3.5
3AR	Melbourne, Vic.	630	4.5
5CK	Crystal Brook. S. Austr.	640	7.5
2CO	Corowa, N.S.W.	670	7.5
6WF	Perth, W. Austr.	690	3.5
2NR	Nortb. Rivers, Reg., N. S. W.	700	7.0
6GF	Kalgoorlie, W. Austr.	720	2.0
5CL	Adelaide S. Austr.	730	2.0
2BL	Sydney, N.S.W.	740	3.0
7NT	North Regional, Tasmania	750	7.0
3LO	Melbourne, Vic.	770	3.5
4QG	Brisbane, Queensland	800	2.5
7HO	Hobart, Tasmania	820	0.05
3GI	Grippsland Regional, Vic.	830	7.0
5RM	Renmark, S. Aust.	850	1.0
2GB	Sydney, N.S.W.	870	1.0
6PR	Perth, West. Aust.	880	0.5
3MA	Mildura, Vic.	900	0.05
4WK	Warwick, Queensland	900	0.05
4RK	Rockhampton, Queensland	910	2.0
3UZ	Melbourne, Vic.	930	0.6
2UE	Sydney, N.S.W.	950	1.0
5DN	Adelaide, S. Austr.	960	0.3
3BO	Bendigo, Vic.	970	0.2
6BY	Bunbury, West. Aust.	980	0.05
4AY	Ayr, Queensland	980	0.03
.....	Central, N.S.W.	990	....
4GR	Toowomba, Queensland	1000	0.05
3HA	Hamilton, Vic.	1010	0.3
2KY	Sydney, N.S.W.	1020	1.0
3DB	Melbourne Vic.	1030	0.6
5PI	Port Pirie, S. Austr.	1040	2.0
2CA	Kingston	1050	0.5
3YB	Mobile, Vic.	1060	0.05
4MB	Maryborough, Queensland	1060	0.05
2KB	Katoomba, N.S.W.	1070	....
6AM	Northam, W. Aust.	1070	0.5
3SH	Swan Hill, Vic.	1080	0.05
7LA	Launceston, Tasmania	1100	0.3
2UW	Sydney, N.S.W.	1110	1.0
4BC	Brisbane, Queensland	1120	0.75
6ML	Perth, W. Austr.	1130	0.3
2HD	Newcastle, N.S.W.	1140	0.5
2WG	Wagga, N.S.W.	1150	0.05
4MK	Mackay, Queensland	1160	0.1
4TO	Townsville, Queensland	1170	0.2
3KZ	Melbourne, Vic.	1180	0.6
2CH	Sydney, N.S.W.	1190	1.0
5KA	Adelaide, S. Austr.	1200	0.3
2GF	Grafton, N.S.W.	1210	0.05
6KG	Kalgoorlie, W. Aust.	1210	0.5
4AK	Toowoomba, Queensland	1220	1.0
2NC	Newcastle, N.S.W.	1230	2.0
3TR	Sale, Vic.	1240	0.05
3WR	Wangaratta, Vic.	1260	0.05
2SM	Sydney, N.S.W.	1270	1.0
3AW	Melbourne, Vic.	1280	0.6
4BK	Brisbane, Queensland	1290	0.5
2TM	Tamworth, N.S.W.	1300	....
5AD	Adelaide, S. Austr.	1310	0.3
3BA	Ballarat, Vic.	1320	0.05
4RO	Rockhampton, Queensland	1330	0.05
2XN	Lismore, N.S.W.	1340	0.05
3GL	Geelong, Vic.	1350	0.05
2BH	Broken Hill, N.S.W.	1360	0.1
4PM	Port Moresby, N. Guinea	1360	....
7BU	Burnie, Tasmania	1360	....
3HS	Horsham, Vic.	1370	0.05
4BH	Brisbane, Queensland	1380	0.6
2GN	Goulburn, N. S. W.	1390	0.1
6IX	Perth, W. Aust.	1400	0.3
2KO	Newcastle, N. S. W.	1410	0.5
3XY	Melbourne, Vic.	1420	....
2WL	Wollongong, N. S. W.	1430	0.05
4GY	Gympie Qsld.	1430	....
2MO	Gunnedah, N. S. W.	1440	0.05
4IP	Ipswich Qsld.	1440	....
5MU	Murray Bridge, S. Aust.	1450	0.1
7UV	Ulverstone, Tasmania	1460	0.25
....	Bega	1470	....
4CA	Cairns, Queensland	1470	....
2AY	Albury, N. S. W.	1480	0.05
....	New South Wales	1490	0.05
....	Hobart, Tasmania	1500	....
3AK	Melbourne, Vic.	1500	0.05

NEW ZEALAND

2YA	Wellington	570	5.0
4ZP	Invercargill	620	0.5
1YA	Auckland	650	10.0
3YA	Christchurch	720	10.0
2YB	N. Plymouth	750	0.1
1ZH	Hamilton	770	0.045
4YA	Dunedin	790	10.0
2ZH	Napier	820	0.065
2YC	Wellington	840	0.25
1YX	Auckland	880	0.5
2ZP	Wairoa	900	0.105
3ZR	Greymouth	940	0.4
2ZF	Palmerston North	960	0.15
2ZJ	Gisborne	980	0.25
4ZB	Dunedin	1050	0.07
4ZM	Dunedin	1050	0.1

4ZO	Dunedin	1050	0.025	3ZE	Greymouth	1300	0.025
1ZB	Auckland	1090	0.2	1ZJ	Auckland	1310	0.05
4YO	Dunedin	1140	0.2	4ZR	Balilutha	1340	0.005
2ZM	Gisborne	1150	0.017	2ZR	Nelson	1360	0.05
2ZD	Masterton	1170	0.0075	2ZO	Palmerston North	1400	0.2
3YL	Christchurch	1200	0.5	3ZM	Christchurch	1470	0.14
4ZL	Dunedin	1220	0.1				
2ZL	Hastings	1240	0.05		SAMOA		
1ZM	Manurewa	1260	0.05				
4ZC	Cromwell	1280	0.005	ZL5ZA	Apia	940	0.005

RADIO

Wins the World's

ENDURANCE RECORD

(*Continued from page 264*)

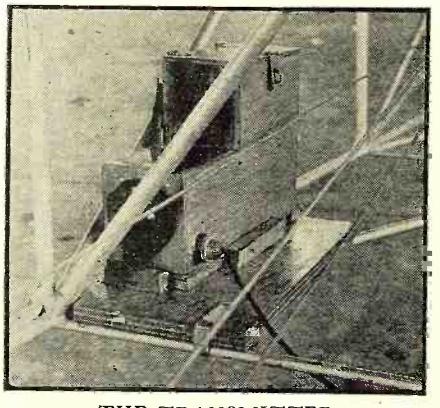
lasted its normal life. The 37 tube was transformer-coupled to a 6A6, in Class B, with the full 350 volts on the plate. The output of this tube was used to modulate the plate supply of the oscillator, another 6A6 in a unity-coupled, oscillator for transmitting. This arrangement gave excellent results. The oscillator was contained in a plywood case located back in the fuselage of the plane. The fabric of the *Ole Miss* was renewed for the flight and advantage was taken of this to install, very rigidly, the plywood base securely fastened to the tube-frame of the ship. This was about ⅔ the distance from the front of the plane. The unity-coupled oscillator was built in a long narrow case to clear the control cables, as may be seen from the picture. The case was held in place by strong rubber bands hooking to one side and end and rests on a rectangle of square sponge rubber. Two high-frequency bushings project through the bottom of the oscillator box and the brass rods are long enough to come through the bottom of the ship, after the covering was applied. The fabric was cut to clear the bushings after the covering job was finished and the hinged quarter wave aerial was attached just in front of the opening. A short piece of tinned braid connected the aerial to one side of the antenna coil, while the other side was grounded to the frame of the ship at the point of leaving the box.

After the ship took off the transmitting aerial was allowed to swing backward and was held vertically by the wind blast pulling against a heavy water-proof cord which was fastened to the lower end of the aluminum aerial rod by a small airplane-type insulator. The hinged joint was a rather nice machine job consisting of a brass insert in the aluminum tubing with a ground pin bearing against a turned-steel sleeve, which was pressed into the brass insert. This gave a minimum amount of side play. There was only a single guy cord, secured directly forward, and during the 27 days this aerial was in the tremendous propeller blast, it did not vibrate or give any noticeable trouble. It is suggested here that the mounting of a single guy thin-wall aluminum tube aerial must be done so the aerial presents a uniform resistance to the air blast in the direction of flight, or it will surely break due to vibration. This aerial was drawn up before the ship landed and was in perfect condition when examined. It can be seen behind the radio equipment in the picture showing the side of the *Ole Miss*.

The Key Brothers state that the two-way radio was of equal importance with their engine and oil in making the flight possible. The results of all the preparatory work have been justified in the perfect functioning of the radio equipment. The *Ole Miss* was in radio contact with W5UE ten minutes after the flight started and during the long 27 days the ship was aloft no less than 287 satisfactory two-way contacts were made, averaging a contact once every two and one-quarter hours throughout the flight.

The routine public schedules were at 8, 9 and 10 P.M. each day. Both sides of these contacts were handled through a powerful public-address system so that thousands of persons on the ground heard each conversation. On the loud-speaker contacts numerous questions of general interest were asked back-and-forth and many humorous situations arose. Each night the airport was packed with cars and the roads were jammed as far as could be seen with people wanting to hear the Key Brothers and the engine of the *Ole Miss* while they were actually setting the world's record. There were, however, many contacts handled in the privacy of the radio room of a serious nature and many anxious moments were spent while arranging to take care of some emergency which threatened the success of the flight. It was for these rapid-fire contacts that the radio proved its invaluable worth. At one time during the flight Algene Key developed a serious tooth-ache which for a time seemed sure to force an end to the flight. A local dentist was called in and after getting all details by radio he sent up a prescription, with instructions for handling, in an attempt to get the aching tooth to abscess and drain. After numerous consultations the desired results were obtained, with Al handling an improvised lance on his own gums. Without the quick back-and-forth contacts made possible by amateur radio it is probable that relief could not have been obtained in time to save the flight.

On several occasions the mechanical department was called in during the night to learn of some serious failure which necessitated the promptest possible attention. The cast bracket which was part of the oil-filter system broke one night and caused excessive vibration, which in a short time would have broken the main oil line. The *Ole Miss* radioed down for the mechanical department and immediately it was determined just where the break was and what kind of brace could be used to make a repair. The broken part was an odd shaped arm, hard to get to, and with little clearance for a surrounding brace, but these points were covered thoroughly so that when a newly made fitting was sent up and installed at day-break, the *Ole Miss* reported that the repair was better than the original mounting. A number of other fittings were sent up as ordered by radio, including some special cast aluminum rocker-box covers which were dropped during the greasing of the engine. A sample casting was obtained from the motor of the refueling ship, a new one cast and machined, and sent up all in the space of 6 hours, thanks to the perfect coordination of the radio department with the mechanical department.



THE TRANSMITTER

The 5-meter transmitting equipment installed in the plane before it was recovered for the flight.

The *Ole Miss* was fitted with a small light on the under side and a key in the cabin, which was used to signal for the radio if a contact was desired between schedules at night. In the day the engine would be speeded up and retarded three times to attract the attention of ground operator, while a flag would be waved on the ground to attract the plane between contacts during the day and the sock light would be blinked at night.

One of the radio high-lights of the flight was the program arranged to be given at the moment the record was broken. At this time word was sent up that the name of the airport had been officially changed to "Key Field," that the Key Brothers had been named Colonels by the Governor of the State of Mississippi, that a number of cash prizes had been received, and that they had actually broken the record, by the official log kept on the ground.

Radio also played an important part in the conclusion of the flight. The Key Brothers were physically exhausted, but determined to keep the *Ole Miss* up until forced to land, due to the failure of "something." At the end of the twenty-sixth day a general discussion was held by those directly interested in the welfare of the flyers and it was decided to ask that they land at 6 P.M. on the following day, July 1. This was in view of their own condition and that of the plane which had begun to show signs of the tremendous strain of 26 days' continuous vibration. The brace on the left stabilizer had worked loose, the right tire was flat, making it necessary to land on one wheel, and several other smaller items had started to fail.

When the suggestion that a voluntary landing be made next day was made over the radio to the then flying colonels, they very forcefully expressed their desire to stay aloft as long as it was in any way possible. However, after the matter had been thoroughly discussed with them and they had had an opportunity to know the wishes of those nearest to them, they sportingly agreed to land their faithful ship at 6 P.M. July 1, and all those so keenly interested in the safety of the flyers and their ship breathed a sigh of relief to know that through radio it had been possible to conclude a glorious and brave flight without the great danger to the flyers that a forced landing would have been, under the circumstances. The next day the flying Keys made a perfect one-wheel landing at 6:05 P.M.

The Potts' V. T. Voltmeter

(*Continued from page 275*)

antenna with an effective height of 4 meters. The sensitivity rating in mv/m was determined by dividing by 4 the actual input in microvolts. Thus, a sensitivity rating of 20 microvolts absolute is the same as one of 5 microvolts-per-meter.

From a service standpoint, it is unnecessary to substitute a resistor for the voice coil when making sensitivity tests. Adequate accuracy may be obtained by reading the voltage with the output meter directly across the voice coil.

Selectivity Measurements

Selectivity measurements are becoming of increasing interest in service work in view of the present trend toward high-fidelity receiver design. This type of test is made using the same set-up as for sensitivity measurements. The sensitivity is measured in the usual manner. The test voltage applied to the receiver is then increased by a factor of 10 and the signal generator detuned until the receiver output meter again indicates 50 milliwatts output. The number of kilocycles change from the original test point is noted. Additional readings are taken in the same manner for input voltage increases of 100, 1000 and perhaps 10,000 times the original value. For each step, the signal generator is detuned to points giving normal output at frequencies both above and below that at which the sensitivity test was made. From these data a curve may be drawn, such as that of Figure 2. An unsymmetrical curve indicates circuit misalignment. A sharply-peaked curve indicates side-band cutting and perhaps loss of high frequencies.

Impedance Set-up

A setup for measuring impedance is shown in Figure 3. The impedance shown is a choke, but the same system is applicable to condensers. R1 is calibrated directly in ohms. With S1 set at point d, the voltage across the impedance is measured. Adjust R1 until the same voltage reading is secured with the switch in either position. The resistance reading of R1 is then equal to the impedance of the unit under test at the frequency used. Using a test frequency of 60 cycles, a 30 henry choke or a .25 microfarad condenser will have an indicated impedance of between 10,000 and 15,000 ohms. The reactance values may be determined from measurement of the resistive components and vectorial subtraction from the impedance indicated, as described in text-books. When the test frequency is low and the d.c. resistance is small compared with the impedance, reactance tables or charts form a convenient guide.

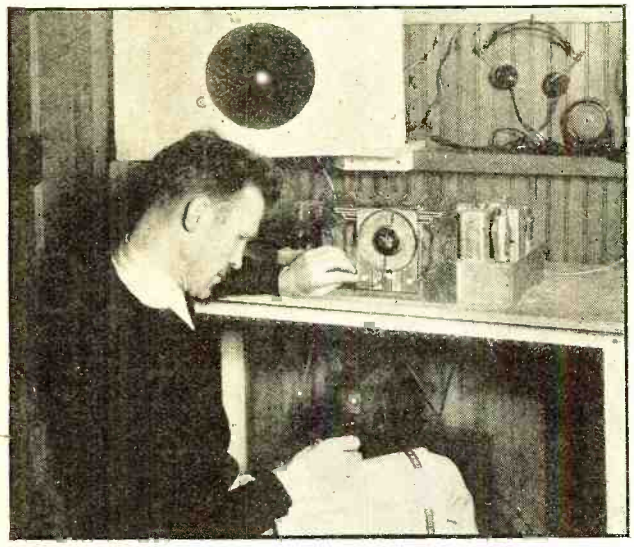
As applied to service testing, tests of condensers for "opens" may be made in the same manner even when the set is operating. A blocking condenser is employed between the test voltage supply and the circuit being tested. The test frequency for cathode by-pass condensers may be of the order of 100 kc. If the condenser is open-circuited, the impedance will of course be very high, and the impedance indicated will be substantially that of the cathode resistor which it shunts. If the condenser is okay, the impedance will be much lower than that of the resistor. Chokes or transformers may be tested for short-circuited turns, under load, in a similar manner.

There are a great many other simple applications of the tube voltmeter which cannot be covered in this short article, but it is hoped that we may be able to present more along this line in an early issue.

SPANNING THE GLOBE IN TESTS ON A NEW 4.5-2400 Meter SUPERHET

(Midwest 18-Tube 1936 Model)

By **S. Gordon Taylor**



TESTING THE RECEIVER

The author logging foreign stations during one of the series of "on the air" tests at the Fairfield Listening Post.

AN 18-tube receiver which offers such features as metal tubes, 4.5 to 2400 meters in 6 completely calibrated ranges, resonance indicator, amplified a.v.c., 20 watts output, beat-frequency oscillator, high fidelity, push-button silencer, full-range tone control and heavy-duty speaker—is not an every-day occurrence . . . and when such a receiver sells for well under $100 it's news!

SUCH is actually the receiver covered in this article. Space does not permit anything like a detailed description of this new receiver, so this article will concern itself for the most part with a description of the results obtained in tests conducted at the Fairfield Listening Post, and observations on its operating features based on experience during the tests. But first a word about the circuit.

The tuned preselector stage employs a 6K7 variable-mu r.f. pentode and is followed by the mixerstage employing another 6K7 and a separate 6C5 triode oscillator. 6K7 tubes are also used in the 2-stage i.f. amplifier. The second detector is a 6H6 double diode which feeds a 6F6 pentode (used as a triode) driver through a 6C5 detector amplifier stage. The driver in turn feeds four 6F6's used as triodes and connected in push-pull parallel for the power output stage. Another 6H6 double diode serves as the a.v.c. rectifier and a 6K7 as the a.v.c. amplifier. One 6C5 triode is used for the beat-frequency oscillator and another for the resonance indicator lamp amplifier. The power supply rectifier consists of two 5Z4 rectifier tubes in a full-wave, heavy-duty circuit.

While designed to use metal tubes the new "G" tubes are equally applicable. These "G" tubes have the same bases as the metal tubes and are similar in application but differ in that they are made up in the conventional glass envelope.

No Tapped Coils

Individual coils are employed in each range to avoid the complications frequently encountered with tapped coils. The wave-change switch is positive in operation with sure-fire contacts and each coil range is individually padded and trimmed.

For further information on the circuit the reader is referred to the schematic diagram shown herewith.

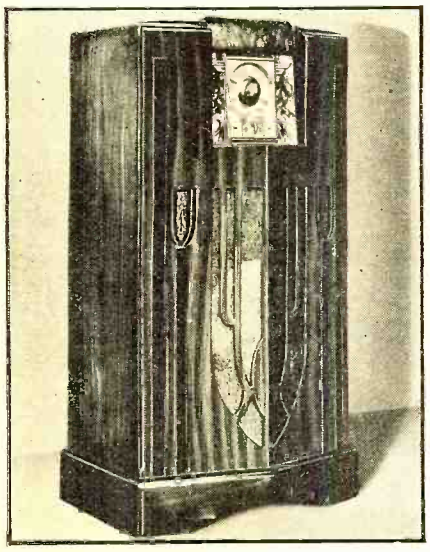
The RADIO NEWS tests of this new Midwest were carried on at the Fairfield (Connecticut) Listening Post during August.

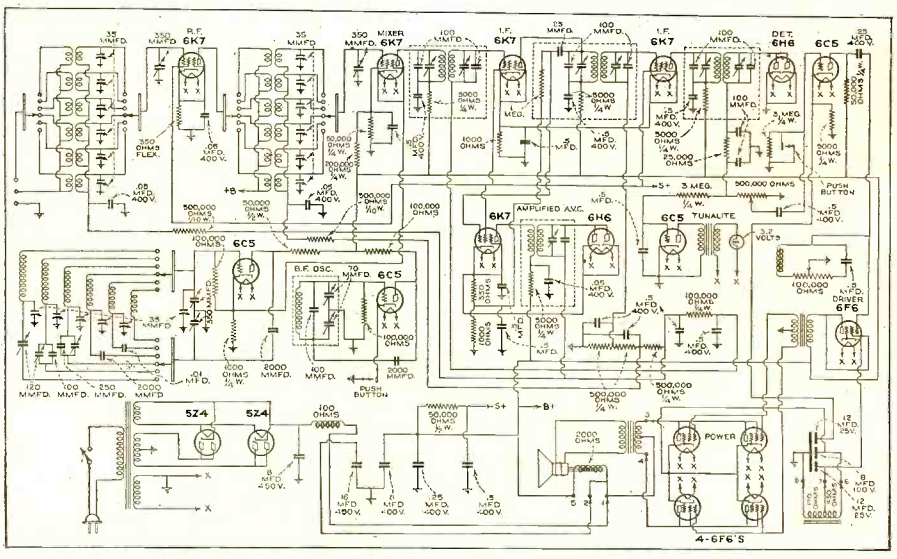
In the regions below 16 meters and above 850 meters there is at present so little of interest that tests in these ranges were limited, only enough being done to make sure that the receiver was operating properly throughout these ranges. During the coming winter season this long-wave band should be of special utility in tuning in the high-power long-wave European broadcasts.

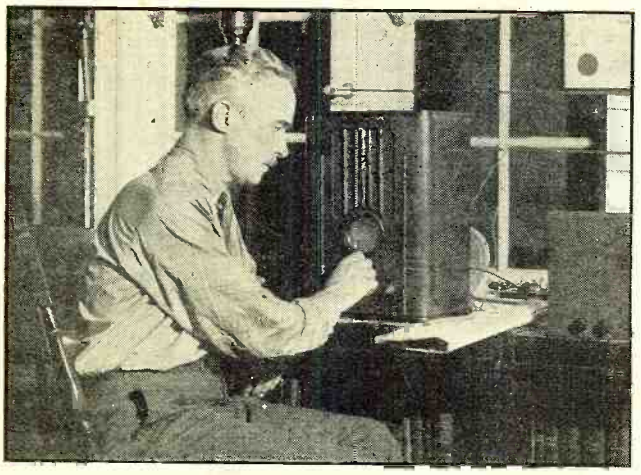
Russia and Japan Heard

Considerable attention was given to testing the popular ranges between 16 and 550 meters. It is unfortunate that the static level was extremely high on the regular broadcast band, precluding any sort of real DX, but in spite of this numerous good summertime catches were made, including KFI, KPO and KNX on the west coast occasionally; and WCCO, WBAP-WFAA, KOA, WWL and numerous Cuban and Mexican stations regularly.

The short-wave reception conditions during the tests need no apology. While not exceptional, they were good and as a result it was found possible on numerous occasions to bring in *and hold* Japanese, Australian and Russian stations—sometimes at a volume level comparable with (*Turn to page* 319)







CHECKING RECEPTION ABILITY

The new-metal tube set being tested at the Westchester Listening Post for its ability to receive European and American stations on the short waves and for tone quality, selectivity and sensitivity on the broadcast band.

Receives FOREIGN *and* DOMESTIC *Broadcasts*

Emerson Model 34C

***By* William C. Dorf**

DUE to the enormous interest in shortwave reception, a very definite demand has been created for a small table-model receiver that will cover the foreign and domestic short-wave stations and the amateur, airplane and police ranges, in addition to the regular 200-555 meter broadcast spectrum. Short-wave fans will find that the little 6-tube, triple-band receiver described in this article meets these requirements and in addition, offers a set equipped with four of the new metal type tubes.

Antennas Used in Tests

The receiver was put through its operating paces at both the Westchester Listening Post and at a New York City Listening Post. The straight "L" type aerial was used on all tests; the aerial at the Westchester Post had an approximate overall length of 150 feet and the antenna utilized at the City Post measured about 70 to 80 feet in length. Reception can be had from a very short antenna, but it is recommended that the aerial used with this set is at least 50 to 75 feet in length (including the lead-in) and it should be erected as high and as clear of obstructions as possible.

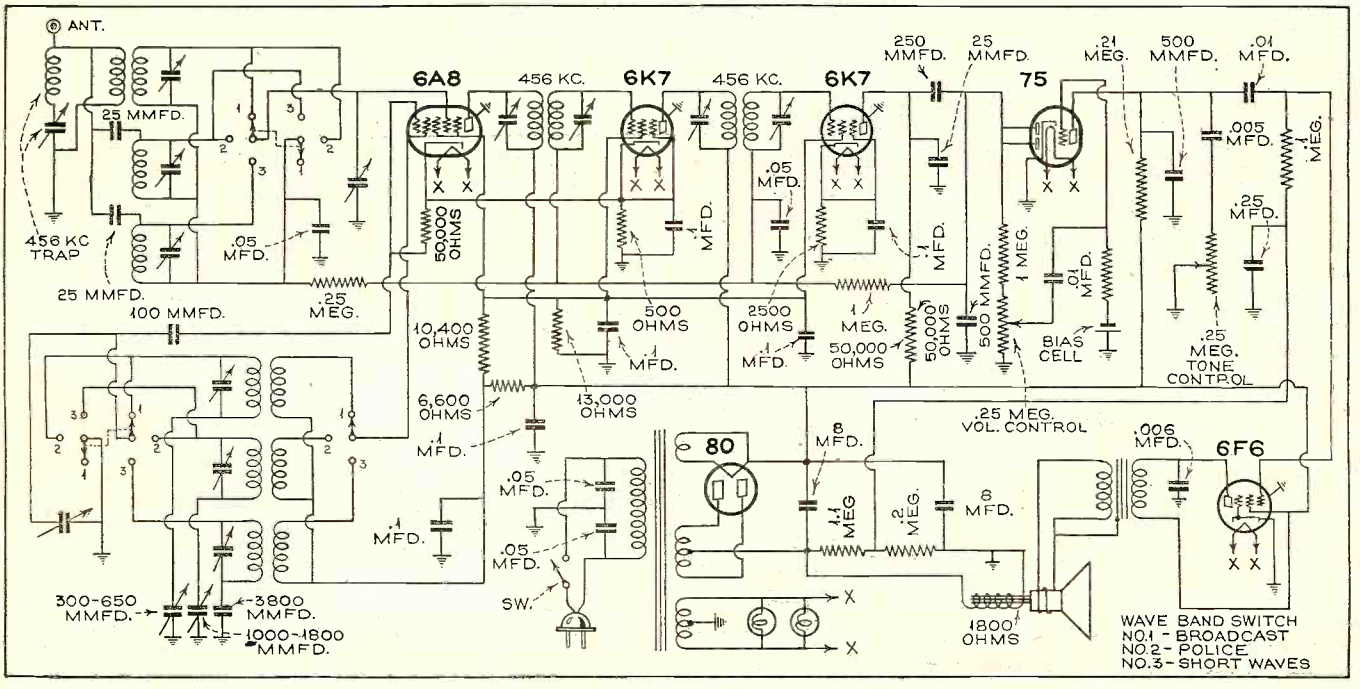
A review of the operating results showed that the following European short-wave stations were easily tuned-in on the 25, 31 and 49 meter bands: GSI, GSF, GSD, GSC and GSB; DJD, DJC, and DJN; HBL, FYA, I2RO, and EAQ. Among the South American stations received were COC, COH, HP5B, HJ1ABB, HJ4ABA, HJ4ABB, HJ5ABE, PRF5, T1RCC, T1EP, YV1RC, YV5RMO, YV3RC. The North American stations included W1XK, W2XAF, W2XE, W3XAL, W3XAU, W8XK, W8XAL, W9XF, VE9GW and CJRX. Many other short-wave stations were brought in and the above report is just a representative log for these countries.

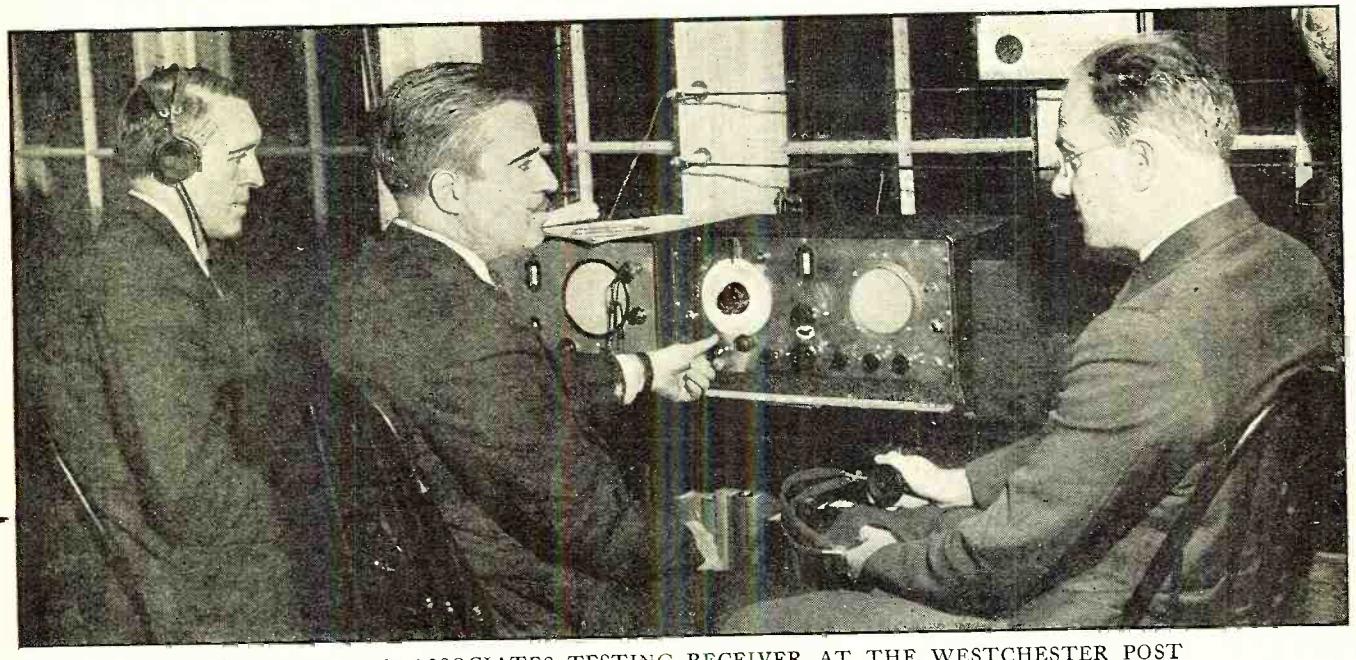
Operating tests on the broadcast band indicated good distance-getting ability and quality of musical reproduction.

The circuit diagram shows that the receiver employs four metal-type tubes and two glass-type tubes and their functions are as follows: a type 6A8 pentagrid-converter metal tube is used as a combined first detector and oscillator; two type 6K7 triple-grid super-control metal tubes are used in the two intermediate frequency stages which, by the way, are set at 456 kcs.; a type-75 glass tube functions as a combined detector, automatic volume control and audio amplifier and a type 6F6 power-pentode metal tube is used in the output stage.

High-Power Output

A standard type-80 glass tube is used for rectification. The high-power output capability of the new 6F6 metal tube is used to the fullest extent in the resistance capacity coupled output stage to attain power output of 3 watts. A further review of the circuit diagram will show that (*Turn to page* 319)





THE EDITOR AND ASSOCIATES TESTING RECEIVER AT THE WESTCHESTER POST

Stepping-Out With A

METAL-TUBE RECEIVER

(Tests on the New Super Skyrider)

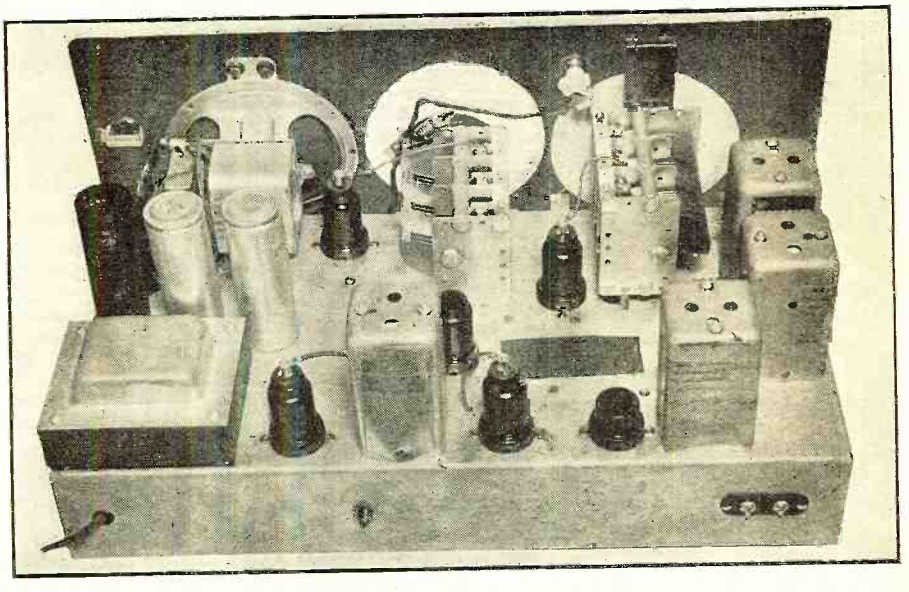
By Laurence M. Cockaday

THE article in the last issue described this receiver thoroughly, so this one is given over to a description of tests made on this new metal-tube job that incorporates so many new features. We feel that amateurs and short-wave listeners alike should hear of these unbiased reception results from a communication type receiver whose design embodies these principles. The first model of this receiver to leave the manufacturing laboratory "landed" at the Fairfield Listening Post about two weeks before this article was written. S. Gordon Taylor ran it through its preliminary tests for about a week, with some fine results on the short-wave bands.

The receiver, being a communication job, he set up and adjusted to the 20-meter band and immediately began to receive American phone signals from all U. S. districts. As an indication of these results, there follows a list of amateur phone calls he picked up and held, from a number of foreign countries. From Cuba: (*Turn to page* 310)

MAKING THE WHEELS GO ROUND

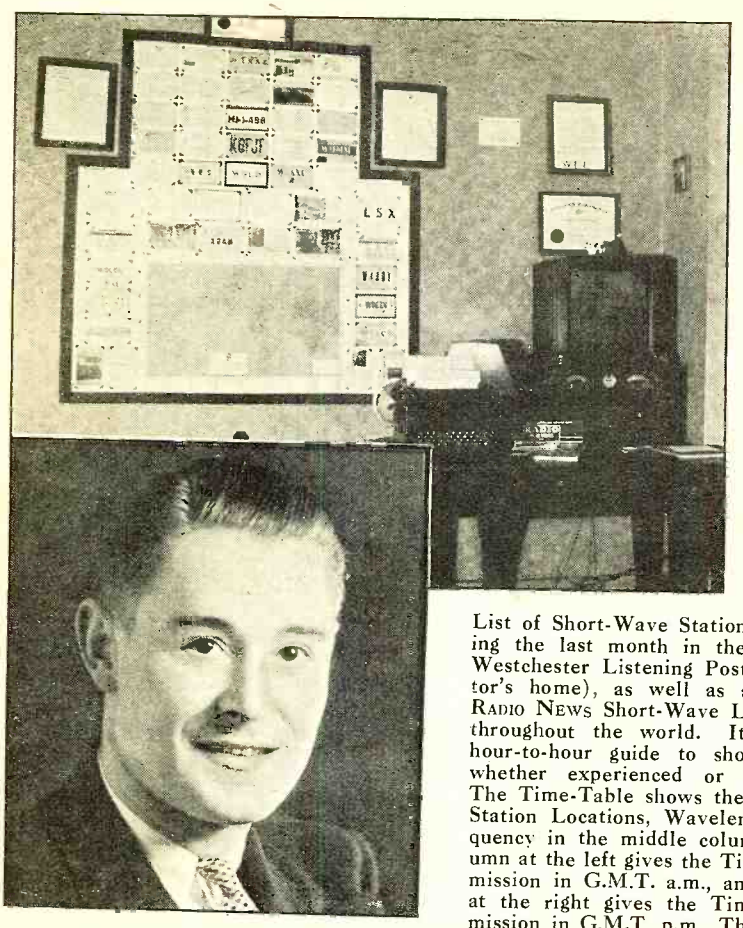
Two views of the "works," Figure 1, at left, showing the new iron-core transformer and its associated metal tube, and the bottom view, a close-up of the general parts arrangement.



The DX Corner for the Short Waves

Conducted by

Laurence



ENTHUSIASM AND FELLOWSHIP RADIATES FROM CALIFORNIA

Meet L.P.O. James E. Moore, Jr., who keeps a weather eye on DX for our organization. Above: Notice the ship-shape layout of his DX Corner and the coveted Listening Post certificate.

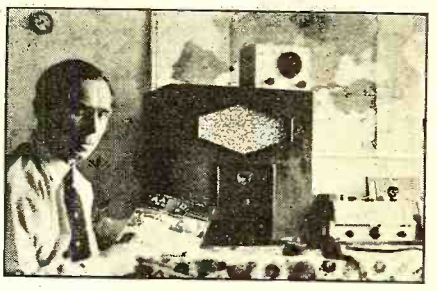
THE thirty-second installment of the DX Corner for Short Waves contains the World Short-Wave Time-Table for 24-hour use all over the world. The list starts at 01 G.M.T. and runs 24 hours through 00 G.M.T., right around the clock! This Time-Table contains a List of Short-Wave Stations, logged during the last month in the RADIO NEWS Westchester Listening Post (in our Editor's home), as well as at our official RADIO NEWS Short-Wave Listening Posts throughout the world. It provides an hour-to-hour guide to short-wave fans, whether experienced or inexperienced. The Time-Table shows the Call Letters, Station Locations, Wavelength and Frequency in the middle column. The column at the left gives the Times of Transmission in G.M.T. a.m., and the column at the right gives the Times of Transmission in G.M.T. p.m. The corresponding time in E.S.T. is also given and space has been left for filling in your own Local Time. At the end of the Time-Table is given a List of Symbols covering the various irregularities of transmission, etc.

Affiliated DX Clubs

We are hereby placing a standing invitation to reliable DX Clubs to become affiliated with the DX Corner as Associate Members, acting as advisers on short-wave activities, in promoting short-wave popularity and reception efficiency. A list of associate organizations follows: **International DX'ers Alliance**, President, Charles A. Morrison; **Newark News Radio Club**, A. W. Oppel, Executive Secretary; **Society of Wireless Pioneers**, M. Mickelson, Vice-President; **U. S. Radio DX Club**, Geo. E. Deering, Jr., President; the **Radio Club Venezolano**, Venezuela, President, R. V. Ortega; **The World-wide Dial Club**, President, Howard A. Olson; **International 6000- to 12,500-Mile Short-Wave Club**, Oliver Amlie, President, Joseph H. Miller, Vice-President; **Globe Circlers DX Club**, W. H. Wheatley, President; **Radio Fellowship**, M. H. Ryder, Chair-

A CZECH KEEPS CHECK

Presenting Joe Clar, Official RADIO NEWS *Short-Wave Listening Post Observer for Czechoslovakia, shown at his Post checking European transmissions for* RADIO NEWS.



THE WORLD'S ORIGINAL ORGANIZATION OF S.W. PIONEERS

Official RADIO NEWS Listening Post Observers

LISTED below by states are the Official RADIO NEWS Short-Wave Listening Post Observers who are serving conscientiously in logging stations for the DX Corner.

United States of America

Alabama, J. E. Brooks, L. T. Lee, Jr., William D. Owens; **Alaska**, Thomas A. Pugh; **Arizona**, Geo. Pasquale; **Arkansas**, James G. Moore, Don Pryor, Caleb A. Wilkinson; **California**, Eugene S. Allen, A. E. Berger, C. H. Canning, Earl G. DeHaven, G. C. Gallagher, Werner Howald, Wesley W. Loudon, Robert J. McMahon, Oriente I. Noda, Jr., Geo. C. Sholin, James E. Moore, Jr., Phil E. Lockwood, Hank G. Wedel, H. H. Parker, Fred A. Pilgrim, Douglas S. Catchim, Frank C. Andrews, Fred M. Craft, Radio Fellowship; **Colorado**, Wm. J. Vette; **Connecticut**, H. Kemp, Geo. A. Smith, Philip Swanson, J. Herbert Hyde; **District of Columbia**, Phillip R. Belt; **Florida**, James F. Dechart, George H. Fletcher, E. M. Law; **Georgia**, C. H. Armstrong, Guy R. Bigbee, James L. Davis, John McCarley, R. W. Winiree; **Idaho**, Bernard Starr, Lawrence Swenson; **Illinois**, E. Bergeman, Larry Eisler, Robert Irving, Charles A. Morrison, Phillip Simmons, Samuel Tolpin, Ray A. Walters, Floyd Waters, Robert L. Weber, J. Ira Young, Evert Anderson, Eddie C. Zarn, Louis Horwath, Jr.; **Indiana**, Freeman C. Balph, Arthur B. Coover, J. R. Flannigan, Henry Spearing, B. L. Cummins; **Iowa**, J. Harold Lindblom; **Kansas**, C. W. Bourne, Wm. Schumacher; **Kentucky**, Geo. Krebs, Charles Miller, Wm. A. McAlister, James T. Spalding, W. W. Gaunt, Jr.; **Louisiana**, Roy W. Peyton; **Maine**, Danford L. Adams, M. Keith Libby, Vincent M. Wood, R. C. Messer; **Maryland**, Howard Adams, Jr., J. F. Fritsch, James W. Smith, August J. Walker, Forrest W. Dodge; **Massachusetts**, Armand A. Boussey, J. Walter Bunnell, Walter L. Chambers, Arthur Hamilton, Sydney G. Millen, Harold K. Miller, Elmer F. Orne, Roy Sanders, Donald Smith, Robert Loring Young, James B. Robbins; **Michigan**, Ralph B. Baldwin, Stewart R. Ruple, Jerry M. Hynek; **Minnesota**, M. Mickelson, E. M. Norris, Dr. G. W. Twomey, Walter F. Johnson; **Mississippi**, Mrs. L. R. Ledbetter; **Missouri**, C. H. Long; **Montana**, Henry Dobravalny; **Nebraska**, Hans Andersen, P. H. Clute, Harold Hansen, G. W. Renish, Jr., Louis T. Haws; **Nevada**, Don H. Townsend, Jr.; **New Hampshire**, Paul C. Atwood, Alfred J. Mannix; **New Jersey**, Wm. F. Buhl, Wm. Dixon, Morgan Foshay, George Munz, R. H. Schiller, Paul B. Silver, Earl R. Wickham; **New Mexico**, G. K. Harrison; **New York**, Donald E. Bame, John M. Borst, H. S. Bradley, Wm. C. Dorf, Capt. Horace L. Hall, Robert F. Kaiser, John C. Kalmbach, Jr., I. H. Kattell, W. B. Kinzel, Wm. Koehnlein, T. J. Knapp, A. J. Leonhardt, Joseph M. Malast, S. Gordon Taylor, Edmore Melanson, Joseph H. Miller, R. Wright, Harry E. Kentzel, Howard T. Neupert, A. C. Doty, Jr., Thaddeus Grabek, Ken L. Sargent, Robert J. Flynn; **North Carolina**, W. C. Couch, E. Payson Mallard, H. O. Murdoch, Jr.; **North Dakota**, Bill Bundlie; **Ohio**, Paul Byrns, Charles Dooley, Stan Elcheshen, Albert E. Emerson, Samuel J. Emerson, R. W. Evans, Clarence D. Hall, William Oker, Donald W. Shields, C. H. Skatzes, Carl P. Peters, Orval Dickes, Edw. DeLaet, M. L. Gavin, Charles W. Krier; **Oklahoma**, H. L. Pribble, Robert Woods, W. H. Boatman; **Oregon**, Harold H. Flick, Geo. R. Johnson, James Haley, Ernest R. Remster, Ned Smith, Virgil C. Tramp; **Pennsylvania**, Oliver Amlie, Harold W. Bower, Roy L. Christoph, R. O. Lamb, John Leininger, Geo. Lilley, Edward C. Lips, Chas. Nick, Hen. F. Polm, C. T. Sheaks, K. A. Staats, F. L. Stitzinger, Walter W. Winand, J. B. Canfield, Charles B. Marshall, Jr., S. G. De Marco; **Puerto Rico**, Manuel F. Betances, A. N. Lightbourn; **Rhode Island**, Carl Schradieck, Joseph V. Trzuskowski; **South Carolina**, Edward Bahan, Ben F. Goodlett; **South Dakota**, Paul J. Mraz; **Tennessee**, Chas. D. Moss, Eugene T. Musser, Darrell Barnes; **Territory of Hawaii**, O. F. Sterneman, A.

Corner SHORT WAVES

M. Cockaday

man; Short Wave Club of New York, H. C. Lange, President.

Any DX fan wishing to join any one of these Clubs or Associations may write for information to the Short-Wave DX Editor, and his letter will be sent to the organization in question. Other Clubs who wish to become affiliated should make their application to the Short-Wave DX Editor. Clubs associated with the DX Corner have the privilege of sending in Club Notes for publication in RADIO NEWS.

A CUBAN DX CORNER

J. L. Lopez, an ardent short-wave listener from Santa Catalina, Cuba, is also an expert photographer. He is shown at his s.w. receiving set.

Your DX Logs Welcome

Please keep on sending in your information on any S.W. stations that you hear during the coming month, getting them in to the short-wave DX Editor by the 20th of the month. In this way you share your "Best Catches" with other readers and they, in turn, share with you, making for improved knowledge on short-wave reception. Also send in any corrections or additions that you can make to the short-wave identification charts, including station addresses, station slogans, station announcements, and any identifying signals the stations may have. Our Editors are doing the same thing, working with you day and night to bring you the best and most reliable short-wave information. Your logs are welcome and are sincerely invited.

To save a lot of wasted effort for our editors it would be best if our Observers use a standard form for their reports of new stations or station changes. We have found a system of paragraphs, in exactly the following procedure, most convenient:

"JVH, Nazaki, Japan, 20.5 meters, 14,600 kc., daily 12 m. to 1 a.m., EST, irregularly testing 3 p.m. EST."

OFFICIAL OBSERVER FOR SOUTH AFRICA

Introducing to our readers L.P.O. Mike Kruger of Johannesburg, South Africa, who hears not only everything going on in that continent, but in most other parts of the world, on short wave and broadcast bands.

In other words, use one paragraph to an item and also indicate whether data was from a veri, an announcement or other source.

Listening Post Observers and Other Fans Please Notice

Listed on next column is this month's partial information regarding short-wave stations heard and reported by our World Wide Listening Posts. Each item in the listing is credited with the Observer's surname. This will allow our readers to note who obtained the information given. If any of our readers can supply actual Time Schedules, actual Wavelengths, correct Frequencies, or any other Important Information regarding these items, the DX Corner Editor and its readers will be glad to get the informa-

(*Turn to page* 290)

SHORT-WAVE LISTENING POST OBSERVERS

Fabius; Texas, James Brown, Heinie Johnson, Carl Scherz, Bryan Scott, James W. Sheppard, John Steward, Overton Wilson; Utah, Earl Larson, Harold D. Nordeen, A. D. Ross; Vermont, Eddie H. Davenport, Jos. M. Kelley, Dr. Alan E. Smith, John Eagan; Virginia, G. Hampton Allison, L. P. Morgan, D. W. Parsons, Gordon L. Rich, Gaines Hughes, Jr., E. L. Myers; Washington, Glenn E. Dubbe, A. D. Golden. Charles G. Payne, J. W. Partner; West Virginia, Kenneth R. Boord, R. E. Sumner, Fred C. Lowe, Jr.; Wisconsin, Willard Hardell, Walter A. Jasiorkowski; Wyoming, L. M. Jensen, Dr. F. C. Naegeli, Eric Butcher.

S.W. PIONEERS

Official RADIO NEWS Listening Post Observers

LISTED below by countries are the Official RADIO NEWS Short-Wave Listening Post Observers who are serving conscientiously in logging stations for the DX Corner.

Argentina, J. F. Edbrooke, Santiago E. Roulier.

Australia, Albert E. Faull, A. H. Garth, H. Arthur Matthews, C. N. H. Richardson, R. H. Tucker, Harold F. Lower.

Belgium, Rene Arickx.

Bermuda, Thursten Clarke.

Brazil, W. W. Enete, Louis Rogers Gray.

British Guiana, E. S. Christiani, Jr.

British West Indies, E. G. Derrick, Edela Rosa, N. Hood-Daniel, Aubrey H. Forbes.

Canada, J. T. Atkinson, A. B. Baadsgaard, Jack Bews, Robert Edkins, W. H. Fraser, Fred C. Hickson, C. Holmes, John E. Moore, Charles E. Roy, Douglas Wood, Claude A. Dulmage, A. Belanger, Robert B. Hammersley.

Canal Zone, Bertram Baker.

Canary Islands, Manuel Davin.

Central America, R. Wilder Tatum.

Chile, Jorge Izquerdo.

China, Baron Von Huene.

Colombia, J. D. Lowe, Italo Amore.

Cuba, Frank H. Kydd, Dr. Evelio Villar.

Czechoslovakia, Ferry Friedl.

Denmark, Hans W. Priwin, Hilbert Jensen.

Dominican Republic, Jose Perez.

Dutch East Indies, E. M. O. Godee, A. den Breems, J. H. A. Hardeman.

Dutch West Indies, R. J. van Ommeren.

England, N. C. Smith, H. O. Graham, Alan Barber, Donald Burns, Leslie H. Colburn, Frederick W. Cable, C. L. Davies, Frederick W. Gunn, R. S. Houghton, W. P. Kempster, R. Lawton, John J. Maling, Norman Nattall, L. H. Plunkett-Checkemian, Harold J. Self, R. Stevens, L. C. Styles, C. L. Wright, John Gordon Hampshire, J. Douglas Buckley, C. K. McConnon, Douglas Thwaites, J. Rowson, A. J. Webb.

France, J. C. Meillon, Jr., Alfred Quaglino.

Germany, Herbert Lennartz, Theodor B. Stark.

India, D. R. D. Wadia, A. H. Dalal, Terry A. Adams, Harry J. Dent.

Irish Free State, Ron. C. Bradley.

Iraq, Hagop Kouyoumdjian.

Italy, A. Passini, Dr. Guglielmo Tixy.

Japan, Massall Satow, Tomonobu Masuda.

Malta, Edgar J. Vassallo.

Mexico, Felipe L. Saldana, Manuel Ortiz Gomez.

New Zealand, Dr. G. Campbell Macdiarmid, Kenneth H. Moffatt.

Newfoundland, Frank Nosworthy.

Norway, Per Torp.

Palestine, W. E. Frost.

Panama, Albert Palacio.

Peru, Ramon Masias.

Philippine Islands, Victorino Leonen, Johnny Torres.

Portugal, Jose Fernandes Patrae, Jr.

Scotland, Duncan T. Donaldson.

South Africa, Mike Kruger, A. C. Lyell, H. Mallet-Veale, C. McCormick.

Spain, Jose Ma. Maranges.

Straits Settlements, C. R. Devaraj.

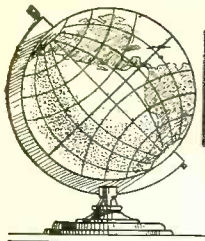
Sweden, B. Scheierman.

Switzerland, Dr. Max Hausdorff, Ed. J. DeLopez.

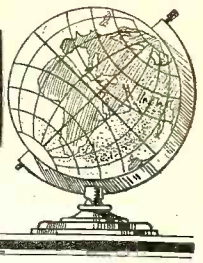
Turkey, Herman Freiss, M. Seyfeddin, A. K. Onder.

Venezuela, Francisco Fossa Anderson.

Applications for Official Observers in the remaining countries should be sent in immediately to the DX Corner.



WORLD SHORT WAVE TIME-TABLE

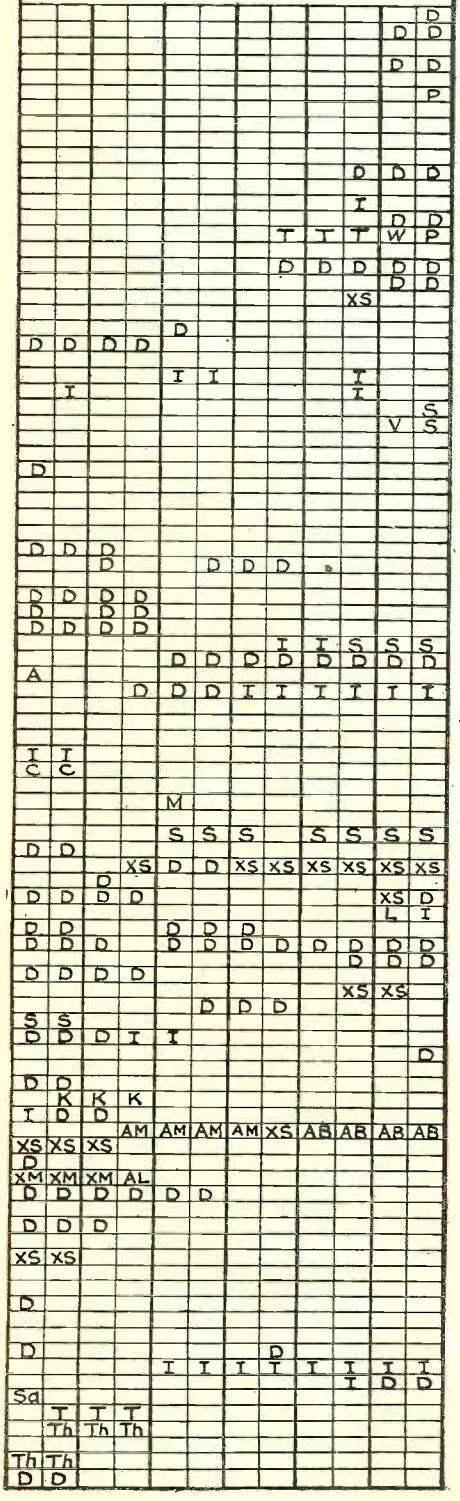


Compiled by LAURENCE M. COCKADAY

Hours of transmission for the World's Short Wave Broadcast Stations

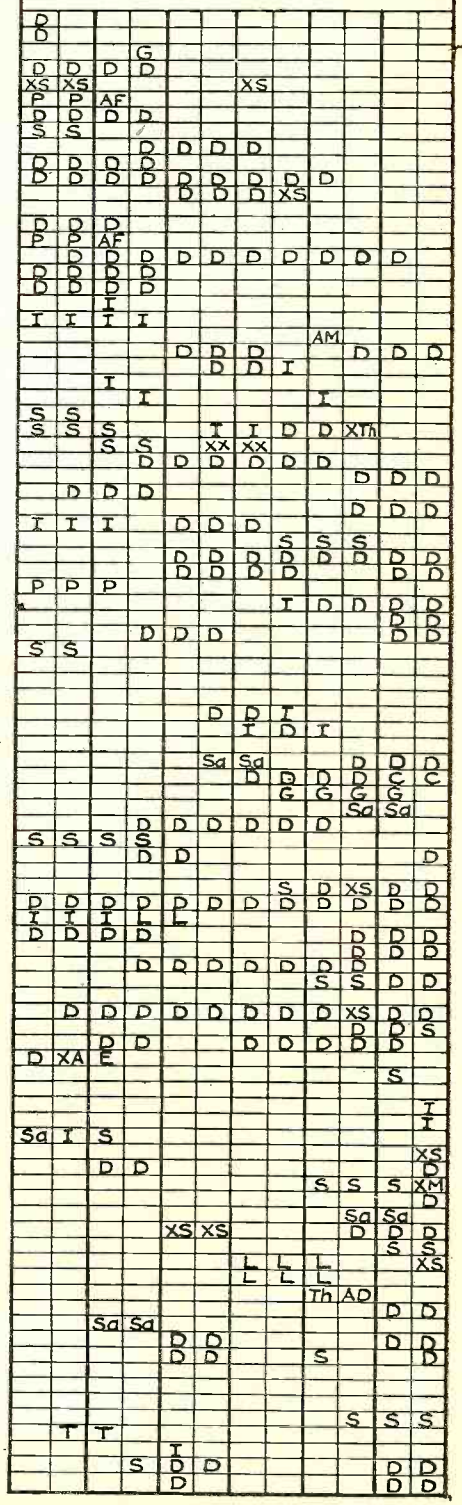
FILL IN LOCAL TIME	8	9	10	11	M	1	2	3	4	5	6	7
EASTERN STANDARD TIME	8	9	10	11	N	1	2	3	4	5	6	7
GREENWICH MEAN TIME	13	14	15	16	17	18	19	20	21	22	23	00

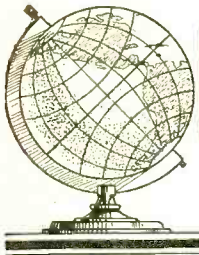
HOURS OF TRANSMISSION



Wave-length Meters	Call Letters	Frequency Kc.	City Country
13.9+	W8XK	21540	Pittsburgh, Pa.
13.9+	GSJ	21530	Daventry, England
15.9+	PLE	18830	Bandoeng, Java
16.8+	GSG	17790	Daventry, England
16.8+	W3XAL	17780	Bound Brook, N. J.
16.8+	PHI	17775	Huizen, Holland
16.8+	DJE	17760	Zeesen, Germany
19.5	HAS3 (HAS)	15370	Budapest, Hungary
19.5	W2XAD	15330	Schenectady, N. Y.
19.6+	DJQ	15280	Zeesen, Germany
19.6+	W2XE	15270	New York, N. Y.
19.6+	GSI	15260	Daventry, England
19.6+	W1XAL	15250	Boston, Mass.
19.6+	FYA	15245	Pontoise, France
19.7	PCJ	15220	Huizen, Holland
19.7	W8XK	15210	Pittsburgh, Pa.
19.7	DJB	15200	Zeesen, Germany
19.8	GSF	15140	Daventry, England
19.8	HVJ	15123	Vatican City
19.9+	RKI	15040	Moscow, U.S.S.R.
20.5+	JVH	14600	Nazaki, Japan
21.2+	HJ5ABE	14110	Cali, Colombia
22.7+	ORP	13200	Ruysselede, Belg.
22.9+	VP1A (VPD)	13075	Suva, Fiji Islands
24.5+	TFJ	12235	Reykjavik Iceland
24.8+	CT1CT	12082	Lisbon, Portugal
24.9+	RV59 (RNE)	12000	Moscow, U.S.S.R.
25.2	CT1GO	11900	Parede, Portugal
25.2	FYA	11890	Pontoise, France
25.2+	W8XK	11870	Pittsburgh, Pa.
25.2+	GSE	11860	Daventry, England
25.3+	W2XE	11830	New York, N. Y.
25.3+	I2RO	11810	Rome, Italy
25.4+	W1XAL	11790	Boston, Mass.
25.4+	DJD	11770	Zeesen, Germany
25.5+	GSD	11750	Daventry, England
25.5+	PHI	11730	Huizen, Holland
25.5+	CJRX	11720	Winnipeg, Canada
25.5+	FYA	11720	Pontoise, France
25.6+	HJ4ABA	11710	Medellin, Col.
27.2+	PLP	11000	Bandoeng, Java
27.9+	JVM	10740	Nazaki, Japan
28.1	CEC	10670	Santiago, Chile
28.1+	JVN	10660	Nazaki, Japan
29.0+	ORK	10330	Ruysselede, Belgium
29.5+	OPM	10135	Leopoldville, Belgian Congo, Africa
30.4+	EAQ	9860	Madrid, Spain
31.1+	I2RO	9635	Rome, Italy
31.2+	CT1AA	9600	Lisbon, Portugal
31.2+	HBL	9595	Geneva, Switzerland
31.2+	W3XAU	9590	Philadelphia, Pa.
31.2+	VK2ME	9590	Sydney, Australia
31.2+	HP5J	9590	Panama City, Pana.
31.3	VK3LR	9580	Lyndhurst, Australia
31.3	GSC	9580	Daventry, England
31.3+	W1XK	9570	Springfield, Mass.
31.3+	VUY (VUB)	9565	Bombay, India
31.3+	DJA	9560	Zeesen, Germany
31.4+	DJN	9540	Zeesen, Germany
31.4+	LKJ1	9530	Jeloy, Norway
31.4+	W2XAF	9530	Schenectady, N. Y.
31.5+	VK3ME	9510	Melbourne, Australia
31.5+	GSB	9510	Daventry, England
31.5+	PRF5	9501	Rio de Janerio, Braz.
31.8	COH	9428	Havana, Cuba
31.8+	PLV	9415	Bandoeng, Java
32.8+	HAT4	9125	Budapest, Hungary
32.8+	CP6	9120	La Paz, Bolivia
33.0+	TFK	9060	Reykjavik, Iceland
34.0+	HKV	8795	Bogota, Col.
34.2+	ZCK (ZBW)	8750	Hong Kong, China
35.6+	HC2AT	8400	Guayaquil, Ecuador
36.4+	ZP10 (ZP3AC)	8220	Asuncion, Paraguay
36.5	HCJB	8214	Quito, Ecuador
38.1+	HC2JSB	7854	Guayaquil, Ecuador
38.4+	HBP	7797	Geneva, Switzerland
40.4+	HJ3ABD	7406	Bogota, Colombia
40.6+	XECR	7380	Mexico City, Mex.
41.1+	HJ1ABD	7281	Cartagena, Col.
41.7+	CR6AA	7177	Lobito, Angola, Afr.
42.1+	HB9B	7118	Basle, Switzerland
42.2+	HJ1ABE	7100	Sincelejo, Col.
42.3+	PI1J	7082	Dordrecht, Holland
43.4+	HI3C	6900	La Romana, D. R.
44.0	HIH	6818	San Pedro, D. R.
44.4+	JVT	6750	Nazaki, Japan
44.6+	TIEP	6710	San Jose, Costa Rica
44.9+	VVQ	6672	Maracay, Ven.
44.9+	HC2RL	6658	Guayaquil, Ecuador
45.3	PRADO	6616	Riobamba, Ecuador
45.3+	RV72	6611	Moscow, U.S.S.R.
45.7+	TIRCC	6550	San Jose, Costa Rica
45.9+	YV6RV	6520	Valencia, Ven.

HOURS OF TRANSMISSION





WORLD SHORT WAVE TIME-TABLE

(*Continued from the Previous Page*)

Hours of transmission for the World's Short Wave Broadcast Stations

FILL IN LOCAL TIME											
8	9	10	11	M	1	2	3	4	5	6	7
EASTERN STANDARD TIME											
01	02	03	04	05	06	07	08	09	10	11	12
GREENWICH MEAN TIME											

Wave-length Meters	Call Letters	Frequency Kc.	City Country	HOURS OF TRANSMISSION
46.2	HJ5ABD	6490	Cali, Colombia	
46.2 +	HI4D	6482	San Domingo, D. R.	
46.4 +	YN1GG	6450	Managua, Nicaragua	
46.5	HJ1ABB	6447	Barranquilla, Col.	
47.0	YV4RC	6375	Caracas, Venez.	
47.4 +	HIZ	6315	San Domingo, D. R	
47.5 +	VUC	6300	Calcutta, India	
48.1 +	OAX4G	6230	Lima, Peru	
48.1 +	HJ1ABH	6225	Cienaga, Colombia	
48.4 +	HI1A	6188	Santiago de Los Caballeros, D. R.	
48.5 +	HJ3ABF	6180	Bogota, Colombia	
48.7 +	CJRO	6160	Winnipeg, Manitoba	
48.7 +	HJ2ABA	6150	Tunja, Colombia	
48.7 +	YV3RC	6150	Caracas, Venezuela	
48.7 +	VE9CL	6150	Winnipeg, Man.	
48.7 +	HJ5ABC	6150	Cali, Colombia	
48.7 +	CO9GC	6150	Santiago, Cuba	
48.8 +	W8XK	6140	Pittsburgh, Pa.	
48.9	ZGE	6132	Kuala Lumpur, F. M. S.	
48.9 +	COCD	6130	Havana, Cuba	
48.9 +	CT1GO	6130	Parede, Portugal	
49.0 +	W2XE	6120	New York, N. Y.	
49.0 +	HRP1	6115	San Pedro Sula, Honduras	
49.0 +	HJ1ABE	6115	Cartagena, Col.	
49.0 +	VV2RC	6112	Caracas, Ven.	
49.0 +	VE9HX	6110	Halifax, N. S.	
49.0 +	GSL	6110	Daventry, England	
49.1 +	W3XAL	6100	Bound Brook, N. J.	
49.1 +	W9XF	6100	Chicago, Ill.	
49.1 +	HJ4ABB	6100	Manizales, Col.	
49.1 +	ZTJ (JB)	6098	Johannesburg, Africa	
49.1 +	CRCX	6090	Toronto, Can.	
49.3 +	CP5	6080	La Paz, Bolivia	
49.3+	W9XAA	6080	Chicago, Ill.	
49.3 +	ZHJ	6080	Penang, S. S.	
49.3 +	CQN	6073	Macao, Asia	
49.3 +	OER2	6072	Vienna, Austria	
49.3 +	HH2S	6070	Port au Prince, Haiti	
49.3 +	VE9CS	6070	Vancouver, B. C.	
49.4 +	HJ4ABL	6065	Manizales, Col.	
49.4 +	VQ7LO	6060	Nairobi, Kenya, Afr.	
49.4 +	W8XAL	6060	Cincinnati, Ohio	
49.4 +	W3XAU	6060	Philadelphia, Pa.	
49.4 +	QXY	6060	Skamlebaek, Den.	
49.5 +	GSA	6050	Daventry, England	
49.6	HJ3AB1	6045	Bogota, Colombia	
49.6 +	HJ1ABG	6042	Barranquilla, Col.	
49.6 +	PRA8	6040	Pernambuco, Brazil	
49.7 +	HP5B	6030	Panama City, Pan.	
49.7 +	VE9CA	6030	Calgary, Alberta, Can.	
49.8	DJC	6020	Zeesen, Germany	
49.8 +	ZHI	6018	Singapore, Malaya	
49.8 +	COC	6010	Havana, Cuba	
49.9 +	HJ1ABJ	6006	Santa Marta, Col.	
49.9 +	VE9DN	6005	Montreal, Canada	
49.9 +	XEBT	6000	Mexico City, Mex.	
50.1 +	HIX	5980	San Domingo, D. R.	
50.1 +	XECW	5975	Xantocam, Mexico	
50.2 +	HJ3ABH	5970	Bogota, Col.	
50.2 +	HVJ	5969	Vatican City	
50.3 +	HJ4ABE	5950	Medellin, Colombia	
50.8 +	HJ2ABC	5900	Cucuta, Colombia	
50.9 +	YV8RV	5880	Barquisimeto, Ven.	
51.2 +	YV5RMO	5850	Maracaibo, Ven.	
51.6	YV7RMO	5810	Maracay, Ven.	
51.8 +	OAX4D	5780	Lima, Peru	
52.4 +	YV10RSC	5740	San Cristobal, Ven.	
70.2	RV15	4273	Khabarovsk, Siberia	
79.5 +	HB9B	3770	Basle, Switzerland	
79.9 +	CT1CT	3750	Lisbon, Portugal	
84.6 +	CR7AA	3543	Lourenzo Marques, Mozambique	

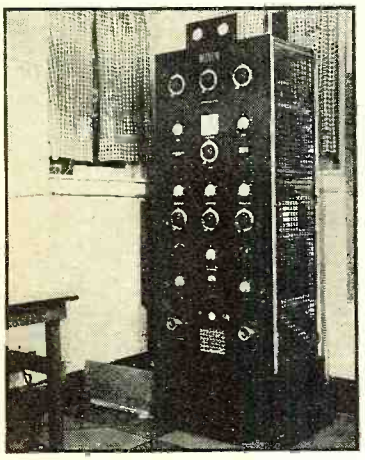
8	9	10	11	N	1	2	3	4	5	6	7
13	14	15	16	17	18	19	20	21	22	23	00

List of Symbols

A—Thursday, Sunday
B—Sunday, Monday, Wednesday, Friday
C—Monday, Wednesday, Friday
D—Daily
E—Tuesday, Thursday
G—Tuesday, Thursday, Saturday
I—Irregularly
K—Monday, Friday
L—Wednesday, Saturday
N—Monday, Wednesday, Thursday
O—Monday, Tuesday, Wednesday, Friday
P—Except Tuesday, Wednesday
R—Thursday, Friday, Saturday
S—Sunday
T—Tuesday
Th—Thursday
V—Sunday, Wednesday
XTh—Except Thursday
Z—Tuesday, Friday
AB—Tuesday, Wednesday, Friday, Saturday
AC—Monday, Thursday, Saturday
AD—Monday, Thursday, Friday
AE—Tuesday, Friday, Sunday
AF—Saturday, Sunday
AG—Tuesday, Sunday
AH—Monday, Wednesday, Saturday
AL—Except Monday, Sunday
AM—Monday, Thursday
AN—Tuesday, Saturday
M—Monday
Sa—Saturday
XA—Except Saturday, Sunday
XM—Except Monday
XR—Except Thursday, Saturday
XS—Except Sunday
XSa—Except Saturday
XX—Tuesday, Thursday, Friday
XY—Except Tuesday, Sunday

Last Warning on the Columbus Day Special!

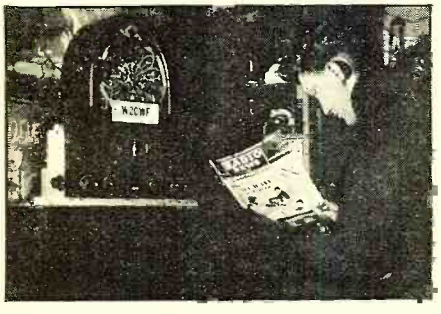
ALL short-wave listeners please take note of the date of the first RADIO NEWS short-wave "Exploration Party," which will be held on October 12th, Columbus Day. Three short-wave transmissions will be made on that date by Station W2HFS, owned and operated by Henry B. Lockwood, of Mount Vernon, New York. These transmissions will take place on a frequency of 14230 kc. in the 20-meter amateur band. They will occur at 12.00 G.M.T., 23.00 G.M.T. and at 05.00 G.M.T. Far Eastern and Australian listeners will hear the first transmission best. Listeners in North and South America should hear the second one and European and African listeners should hear the third, although all transmissions could be tried for.

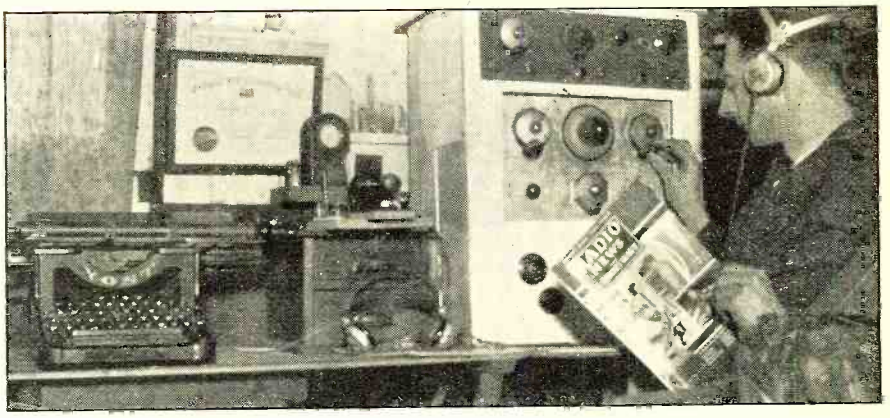


W2HFS Transmitter

These transmissions will be scheduled conversations between W2HFS and another amateur station on the same band, whom you will have to identify yourself. Here is a chance to explore the ether and report all you hear of *both* conversations, signal strength, fading, etc. Reception will be verified. Send in reports to both stations c/o RADIO NEWS and they will be forwarded.

All Official RADIO NEWS Short-Wave L.P.O.'s are requested to listen and report. All members of short-wave clubs and other short-wave listening organizations are invited to cooperate and report. All amateurs throughout the world are invited to do likewise in helping out with this amateur research. There is a special "verie" awaiting all who accurately identify these transmissions.





The DX Corner

(Short Waves)

(*Continued from page 287*)

tion. There are some hard stations to pull in in these listings, but we urge our Listening Posts and other readers to try their skill in logging the stations and getting correct information about them. When you are satisfied that you have this information correct, send it in to the editor; or if you have received a "veri" from any of the hard-to-get stations, send in a copy of the "veri" so that the whole short-wave fraternity may benefit. The list containing this information follows:

Invicta Radio, Portugal, 5790 kc. has been heard testing irregularly 7-9 p.m. E.S.T. No call has been authorized by the Government as yet. Official L.P.O.'s kindly watch out for this station and obtain its call and schedule. (Myers.)

HB9B, Basle, Switzerland, is reported transmitting now on 3770 kc. and on 7118 kc. Mondays, Thursdays and Fridays, 5-6 p.m. E.S.T. (Styles).

HBJ, Geneva, Switzerland, 17.3 meters, 14550 kc. reported heard transmitting 5:50 a.m. E.S.T. (Gunn, Miller, Kentzel).

GSJ, Daventry, England, 13.9 meters, 21530 kc. reported heard 6-9 a.m. E.S.T. (Peyer, Winand).

DJO, Zeesen, Germany, reported variously, as approximately 12000 kc., and 11790 kc., reported heard 5:15-6 p.m. E.S.T. (Gibson, Andrews). (We are wondering if this might not be RW59 with a German program? In the case of Mr. Andrews' reports, however, of 11790 kc., this could not be so.—Editor.)

I2RO, Rome, Italy, reported on 25.4 meters, 11810 kc., 8:15-10:15 a.m. E.S.T. irregularly and from 12-2:30 p.m. E.S.T. daily, on 31.1 meters, 9635 kc. They are reported on the air 2:40-6 p.m. daily with the American hour on Mondays, Wednesdays and Fridays, 6-7 p.m. E.S.T. and later on same days from 8-9 p.m. E.S.T. (Lyell, Coover, McCormick, Zarn, Klar, Chambers).

HVJ, Vatican City, reported heard on 20 meters, 14535 kc., recently (Frost).

HVO has been reported on 26 meters, 11385 kc. Who has heard this transmission? Any information? (Frost).

RW59, (RNE), Moscow, U.S.S.R. 12000 kc, reported heard 3-6 p.m. daily and from 6-7 a.m. and 10-11 a.m. Sundays, and from 6-7 a.m. Wednesdays (Chambers, Sargent).

W2CWF AT HIS POST

An amateur and short-wave listener, G. Dseisch, of Richmond Hill, New York, perusing a copy of the "famous old mag."

"ANOTHER COUNTY HEARD FROM"

Essex County, England, boasts of an L.P.O. Mr. F. W. Gunn pictured in his efficient DX Corner for Short Waves.

RTZ, Irkutsk, Siberia, has been reported heard on 14780 kc. at 10:30 a.m. E.S.T. (Bradley, Andrews and Radio Fellowship).

RIO, Baku, U.S.S.R. reported heard 7-10 a.m. E.S.T. (Gallagher).

PLP, Java, 27 meters 11000 kc., 3 kw. reported heard on Sundays irregularly 3-10 a.m. E.S.T. (Miller, Sholin, Fabius, Mallet-Veale, Gallagher, Kemp, Chambers).

PMN, Java, 28 meters, 10260 kc., 3 kw. reported heard at the same time as PLP with the same programs. (Miller, Sholin, Fabius, Mallet-Veale, Gallagher, Kemp, Chambers).

PMA, Java, 15.4 meters, 19345 kc. reported heard irregularly 8-10:30 a.m. E.S.T. (Miller, Marshall, Munz, Ortiz).

PLE, Java, 15.93 meters 18830 kc. reported on the air Tuesdays, Thursdays, and Saturdays, 11-11:30 a.m. E.S.T. irregularly. (Kemp, Peper, Alan Smith, Stevens).

PMY, Java, 5.15 megacycles reported heard irregularly 7-10 a.m. E.S.T. (Gallagher).

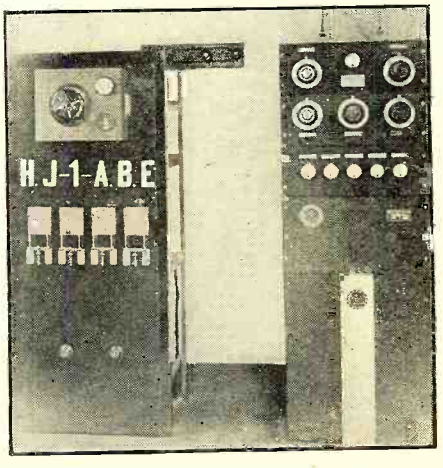
PLV, Bandoeng, Java, 31.8 meters, 9415 kc., 40 kw. reported heard irregularly Tuesdays and Thursdays 10-10:30 a.m. E.S.T. (Lyell, J. E. Moore, Croft, Gallagher, Mallet-Veale).

YDB, Java, 4.47 megacycles reported transmitting daily 5:30-9 a.m. E.S.T. (Croft).

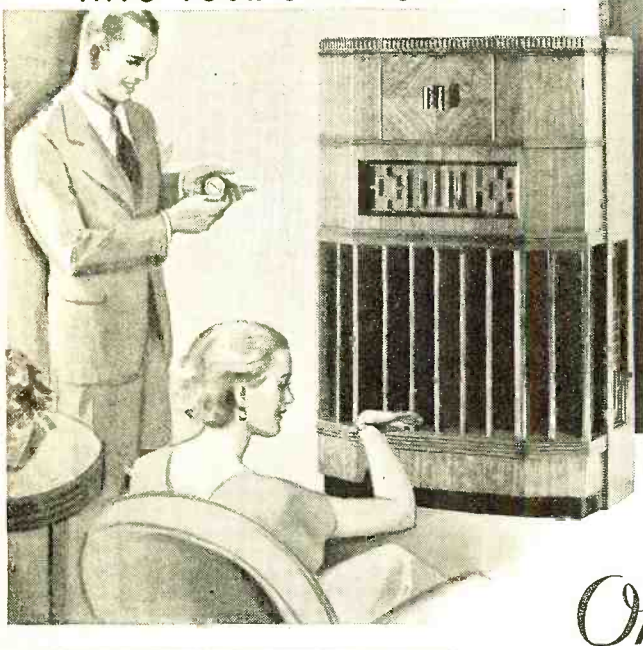
(*Turn to page 292*)

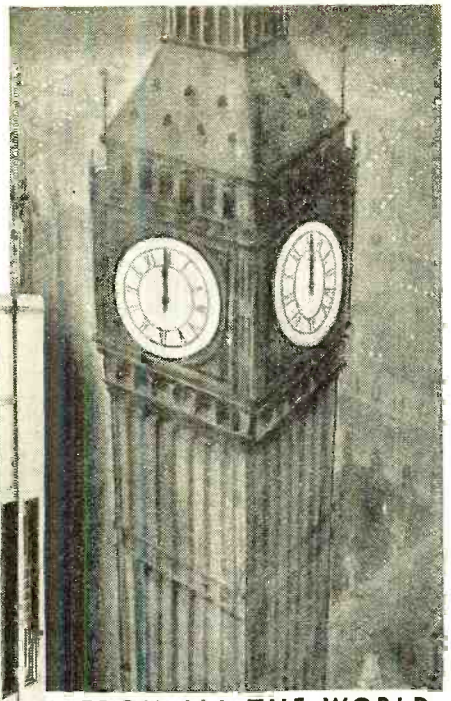
HEARD ON SHORT WAVES

This is the transmitting equipment of HJ1ABE, which includes a Collins 30FXB 100-watt transmitter. The station's slogan is "Laboratorios Fuentes" and they are located at Cartagena, Colombia.

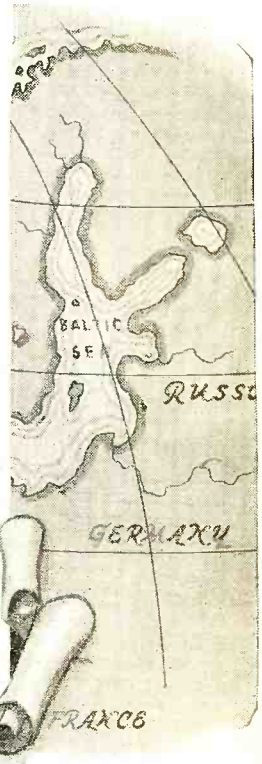


INTO YOUR OWN HOME —





—FROM ALL THE WORLD



Only the SCOTT Full Range Hi-Fidelity ALL-WAVE

Brings YOU PARLIAMENT'S MIDNIGHT CHIMES WITH SUCH THRILLING TRUE TONE

London midnight — full of stars and historic towers! And the great chimes of Big Ben booming the hour across the darkness!

And in another quarter of the world: at the same instant—at a touch of the dial of your new SCOTT — you set your own watch to the same thundering measure of these great chimes ringing out over the British Parliament!

THE YARDSTICK FOR ALL DX RECEPTION

A nightly modern miracle — yours with the magnificent new SCOTT! World events—world views—inspiring music from foreign stations you have never heard before, brought in with a power and tonal splendor that stop your breath, so thrilling is the realism of SCOTT *re-creation*.

SCOTT distance records are unchallenged throughout the radio world. London — Paris — Madrid — Geneva — Brussels — Berlin — Rome — all with the clear, enjoyable sparkle possible only with the SCOTT Higher Useable Sensitivity.

Reserve power not even claimed for any other receiver. "Peak" fortissimos of a Beethoven symphony or popular dance arrangement with a brilliance and freedom from distortion that elevates the SCOTT to a class by itself.

DOUBLE THE TONAL RANGE OF ANY RECEIVER

The SCOTT Full Range Hi-Fidelity AllWave is the only receiver today which captures all the dazzling overtones of voice, violin, oboe, and trombone, from the 16,000 cycle high fidelity stations. Regular high fidelity radios with 7,500 cycle limit miss more than half the overtone range.

BULLET DIRECT SELECTIVITY—Piercing the most powerful adjacent wave length stations to bring you more foreign stations than you have ever heard before. 2 to 16 K. C.

HIGHEST USEABLE SENSITIVITY—guaranteeing less noise on distance reception than any receiver today.

PERFECTED AUTOMATIC VOLUME CONTROL—keeps distant world programs at even level.

DISTORTIONLESS PEAK RECEPTION — 35 Watts pure Class "A" output. Six times average power for unwarped tone.

SHORT WAVE STATION LOCATOR—gives clear momentary whistle when you tune in distant stations.

SOUND DIFFUSION—the only radio today with scientifically designed sound diffusers for perfect distribution of all tones.

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

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The unparalleled performance of the SCOTT is backed by a five year guarantee of perfect service on all parts except tubes. Custom-built and sold direct from the laboratories on a thirty day home trial (U. S. A. only). Send TODAY for complete information on the new SCOTT Full Range Hi-Fidelity AllWave — the receiver owned by Toscanini, Jeritza, Rudy Vallee, Guy Lombardo, Walter Winchell, and many other celebrities.

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Send me complete details of the new SCOTT Full Range Hi-Fidelity AllWave, "94 PROOFS" of its superior tone and DX performance, and particulars of your 30 day trial offer.

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Street_____

City_____ State_____

CHECKS UP ON MIDDLE WEST

Evert Anderson, L.P.O. for Illinois, in his DX Corner, which includes both reception and transmitting apparatus.

The DX Corner
(Short Waves)

(*Continued from page* 290)

ZHJ, Penang, Straits Settlements, is reported heard on a new frequency of 7.63 megacycles, 7-9 a.m. E.S.T. (Meyers). (Can anyone check this? It was not mentioned on our last report from the station, which follows below.—Editor.)

ZHJ, Penang, Straits Settlements, 49.3 meters, 6080 kc., 49 watts officially reports it is transmitting from 7-9 a.m. Reception reports are welcome. (T. A. Crossley.)

ZCK (ZBW), Hongkong, China, 3750 kc. now reported heard from 5-5:25 a.m. E.S.T and also reported heard from 7-9 a.m. E.S.T. (Miller, Gallagher, Torres).

JIB, Taiwan, Formosa, 28.4 meters, 10535 kc. reported heard, during the summer, 5:30-6 a.m. rebroadcasting JFAK. This frequency is only used during the summer-time (Sholin).

JIA, Taiwan, Formosa, 15740 kc., used for experiments and testing (Sholin).

JIC, Taiwan, Formosa, 5890 kc. is used during the wintertime sometimes rebroadcasting JFAK (Sholin).

JVN, Nazaki, Japan, 10660 kc. is usually heard from 11 p.m. to 1:30 a.m. E.S.T. with baseball games or other sports (Libby, Sholin, J. E. Moore, Torres, Flynn).

A WEST-COAST ENTHUSIAST

David Geiser, of Los Angeles, contributes this picture of his DX Corner to let other listeners see how things look out his way.

JVM, Nazaki, Japan, 10740 kc. This station is probably the best heard Japanese throughout the United States at the present time, being heard nearly every day from around midnight to 8 a.m. E.S.T (J. E. Moore, Craft, Akins, Coover, Bundlie, Alan Smith, Gallagher, Lyell, Hamilton, Atkinson).

JVH, Nazaki, Japan, 14600 kc. reported heard with an English program at 12-1 a.m. E.S.T. and also at 4-5 p.m. E.S.T., regularly (Schumacher, Marshall, Gallagher, Kentzel, Kemp, Pilgrim, Craft, Akins, Haws, J. E. Moore).

RV59 (RNE), Moscow, U.S.S.R. Latest official notification from Moscow states that the right call of he broadcaster on 12000 kc. is RV59. This same transmitter is used for commercial telephone under the call RNE (Ina Marr).

PHI, Huizen, Holland. This station will leave the air on the wavelength of 16.8 on October 6th and renew its broadcasting on the 25.5 meter wavelength for the winter.

HSJ, Bangkok, Siam, 17750 kc. reported heard working JVG, Tokio, Japan at 10:30 p.m. E.S.T. and also testing with music (Radio Fellowship, Andrews). L.P.O. Craft says he hears this station at 4:30 a.m. E.S.T.

Colombo, Ceylon, India has been heard on 49.5 meters from 10:30 a.m. to 12:30 p.m. E.S.T. (Mallet-Veale).

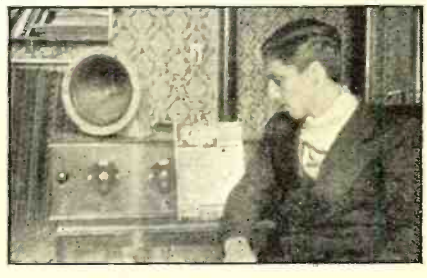
VQ7LO, Nairobi, Kenya, Africa is back on its wavelength of 49.5 meters, 6060 kc. (Mallet-Veale).

CNR, Rabat, Morocco is again reported heard on 32.24 meters from 1-2

(*Turn to page* 304)

AN ARGENTINA LISTENER

This is R. A. Fernandez, a regular short-wave fan, at his Listening Post in Buenos Aires, Argentina.



SHORT-WAVE PAGE

WHAT is a short-wave fan (who lives in a city of any size) going to do about electrical interference? What can he do? These two questions have been discussed by nearly every short-wave listener since this hobby was taken out of the laboratories and placed in every modern home. Groups of fans have gotten together, in each other's homes or at club rooms and through various periodicals wrangled over how this most important feature of the "city dweller" listener could be overcome.

LET us, right now, go into some detail about this subject covered by the two words "local interference." A prospective short-wave listener will go into a store to look at and possibly purchase an all-wave receiver. The salesman will usually inform Mr. John Public that he cannot demonstrate the receiver's performance on the short waves due to the surrounding local interference, but wisely suggests that Mr. Public buy the receiver on a 30-day guarantee. This seems very plausible to the newcomer in short waves and the transaction is completed. Mr. Salesman (in his heart) hopes that Mr. Public lives in a quiet neighborhood!

Just what is a quiet neighborhood? No children, dogs, etc? No! no! A quiet neighborhood, in the opinion of an experienced short-wave listener, means no elevators dashing up and down to the 60th floor all day and night; no motors, such as old-time ice boxes, old electric fans, vacuum cleaners, generators and such like, within a "reasonable" distance. No busy thoroughfare on which traffic passes by at all hours.

To return to Mr. Public with his newly acquired pride and joy. Upon reaching home he informs Mrs. Public he is erecting a good antenna and then, "My dear, we will hear the world!" To which we might add the cryptic word—maybe.

The aerial is erected and tuning starts. Mr. Public reads in this magazine that such and such a station is on. Nothing daunted, he tries for it. Within a few minutes the station is easily tuned in. Mr. Public only wishes "all the boys at the club" were here now to hear ——— rolling in. The set works fine for half an hour, when—click, crash, buz-z-z! "What's that!" says Mrs. Public. "Well," John meekly answers, "I don't know!" After listening to this veritable sawmill for 15 minutes, Mrs. Public becomes jumpy and poor John relinquishes his rights to the head of the house and reluctantly returns to a local program that savors of tooth pastes, salad dressings and cures for bald heads. This same scene takes place for several nights until even hard-to-down John promises Mrs. John to return the "noise box."

How are we, earnest short-wave listeners, going to bring the future Mr. John Publics into our fold and hold them? We want them! We need them!

To deviate from this discussion for just a few minutes, what one country can accomplish any country can do and generally improve on. Australia and Germany have laws that makes it a misdemeanor to own and operate electrical equipment that interferes with radio broadcasting. We ourselves have a law [Communications Act of 1934, Sec. 303 (m) (5)] that reads, in part: . . . "has willfully or maliciously interfered with any other radio communications or signals." To what extent has this law ever been enforced? The commercial broadcast stations are protected; the amateur is protected to a certain extent. But the short-wave or broadcast listener is *not protected!* We took this matter up with an executive of the electric company of our city. His answer will cause you, as it did me, to smile: "Well, short waves are still in the laboratories and it would not really pay to have any equipment changed." If this is so, then every living-room is a laboratory.

One who talks about a subject is supposed to offer some solution. This is the writer's:

(1) Have a law passed by the Federal Government that all motors, vibrators, elevators, automobiles or other equipment causing electrical interference must be replaced or properly filtered to eliminate the interference. Manufacturers are now building automobiles, ice boxes, fans, etc., that do *not* cause interference. Make all the manufacturers abide by this.

(2) Have a city ordinance drawn up and passed that will have a department supplied with the equipment to find these noises, notify and warn the owner of the disturbing motor, etc., and then check up, later, to see if the interference is stopped. If not, hand out a ticket!

Why should automobiles and trucks be allowed to run on our streets and invade our homes with interference! They can be silenced and should be!

We make a further suggestion. All short-wave listeners who agree with the

(*Turn to page* 310)

ALLIED SELLS FOR LESS!

This Great Catalog proves it 10,000 times*

When you order from your new 1936 ALLIED Catalog you will **be** getting **bigger values than ever before.** That's saying a lot—when you consider that we've had a great reputation for selling the best radio equipment for less money ever since the early days of radio. We say that you can't buy identical brand and quality **anywhere** for less—if you can—**we'll refund the difference in a jiffy.** Send for the new 1936 ALLIED CATALOG right now. Page by page, it will prove to you that we sell for less.

How ALLIED **saves** you **money:** We don't have to bear a terrific overhead in maintaining branches, and we pass our savings along to you. **We ship from one great center where we have assembled radio's biggest stock.** We are 100% Radio Specialists—our buyers have a genius for getting value-scoops. We buy in vast quantities—get lower prices—and pass them on to you—so that **you** can buy for less. **That's** how we save you money!

Why ALLIED **serves** you **better:** We are located in the very nerve center of America's transportation system. That's why we ship your order fast. Under **one** big roof—on 45,000 square feet of modern floor space—we have gathered the choicest and most complete radio stock in the country. Your **whole** order is shipped from **one** location **without delay. An alert, really peppy radio organization sees each order through. That's** why we serve you better.

ALLIED puts meaning into PERSONAL SERVICE: We are not an organization carrying on a cold impersonal chain business. **We're a big friendly close-working group** with a real interest in your needs and your problems. We invite and like the thousands of inquiries you send in each month. We'll answer you always in an intelligent, valuable and personal way that you'll like. As a customer, you are always an individual at ALLIED—not just an order number.

Send for your copy of the new 1936 ALLIED Catalog right now. Buy for less and be better served. We have bigger stocks than ever before—more people to serve you—thousands of feet more space—more live high grade lines, more Personal Service—**more Values than ever before.**

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• • •

FALL SERVICE SALES

• • •

TUBE SALVAGE

WATCH OUT FOR HIM!
He knows how to insure good radio reception.

Conducted by Zeh Bouck, *Service Editor*

TAKING ADVANTAGE OF THE MANUFACTURERS' SERVICES

EVERY advantage should be taken by the serviceman of the merchandising assistance offered by many of the parts, tubes and set manufacturers. These sales aids are in the forms of logotypes (trademarks for printing on stationery, business cards and in advertisements), attractive letterheads, mats (from which your local printer can reproduce advertisements containing expensive art work at a nominal cost), business cards, window and counter displays, signs, stickers, sales campaign ideas, form letters, special equipment, booklets with service hints, circulars and envelope stuffers with your own imprint. Prominent among the companies offering such co-operation are Philco (The Radio Manufacturers' Service), R.C.A., Sylvania, Tobe Deutschmann, National Union, Raytheon and others.

THE advantages offered by manufacturers' services for servicemen are several in number. They are inspirational to the serviceman and often indicate the road to sound and progressive business methods. The material is offered to the serviceman at a cost far beneath that at which he could have prepared it himself. In some instances there are no charges or obligations whatsoever and in many cases accredited representation is all that is required to avail oneself of these merchandising aids. The serviceman is immediately identified with a widely-known product and thereby gains in prestige at the same time cashing in one the national advertising of the manufacturer.

So important is this co-operation on the part of the manufacturer that serious consideration should be given to such facilities by the serviceman and small dealer in choosing a line.

THE FALL PICK-UP

The radio season is upon us and the serviceman with an eye for business will reap the usual profits in dusting off cabinets, checking antennas and grounds, realigning, tube testing, etc., preparatory for the next four months of relatively concentrated radio listening. It is a good time to send out a card such as that shown in Figure 1!

FIGURE 1

Dear Friend

We like to keep in touch with our customers. Your name appears on our files, and entitles you to the following service

During the week of *October 8th to 15th* inclusive, at your convenience, we will be pleased to call at your home and check up your radio and tubes without charge. During this week only, this card will be accepted as full payment for a regular $1.00 service call.

This card is mailed only to former customers, and is not transferable.

To avail yourself of this service, PHONE 369 now and arrange for appointment. Thank you

149 State Street RADIO SERVICE SHOP Auburn, N. Y.
THOS. H. BROGAN, Propr

THE DAY'S WORK

While, in actual construction, automobile power-supply units may differ considerably, the adjustments, at least, are similar and the general observations and principles outlined below apply to installations other than the make specifically mentioned.

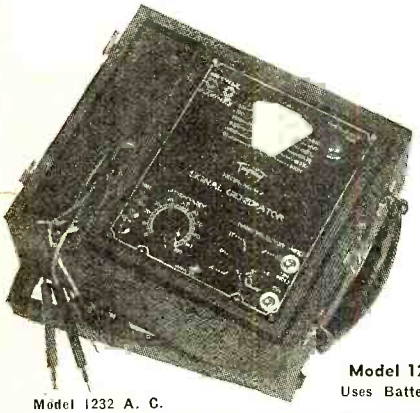
Vibrator Adjustment on the Majestic 66

"After long operation, the vibrator contacts may become sufficiently worn that they will require readjustment. Adjustment is a very delicate procedure and under no circumstances should it be attempted without meters in the circuit. 'Blind' adjustment of the contacts according to 'feel,' etc., invariably results in excessive battery drain, overheating, accelerated wear and burning of contacts, improper plate voltages and noise interference with programs. A primary d.c. ammeter (0-5 or 0-10 amps, low resistance) is the most important indicator used during adjustment and should be connected in series between the pigtail terminal on the vibrator and the battery wire connected to this terminal. An 0-300 d.c. voltmeter, 1000 ohms per volt, should be connected between ground and the B side (red lead) of the audio output

(*Turn to page* 311)

Power Output

TESTS ALL TYPES TUBES METAL AND GLASS-METAL

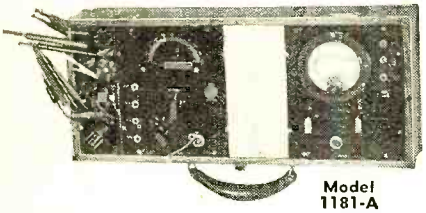


Model 1232 A. C.

Model 1231
Uses Batteries

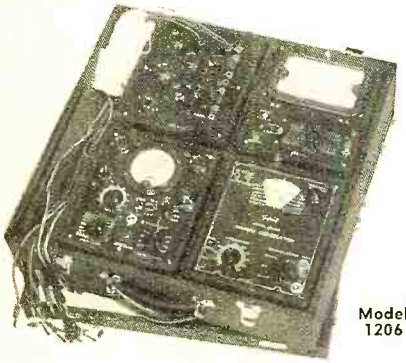
ALL WAVE DIRECT READING SIGNAL GENERATOR. All frequencies fundamentals, stabilized 100—30,000 KC. Jacks for 400 cycle audio note. Very accurate yet easy to operate. Model 1231 complete with batteries and two No. 30 tubes. Dealer net..... **$26.67**

Model 1232 same except use 110-60 cycle A. C. Dealer Net..... $26.67



Model 1181-A

FREE POINT TEST SET Model 1181-A combines three essential units: No. 1125 Volt Ohm-Milliammeter, 1151 All Wave Oscillator, 1166-A Free Point Auxiliary Set Tester—units can be purchased separately, if desired. Dealer net price..... **$38.00**



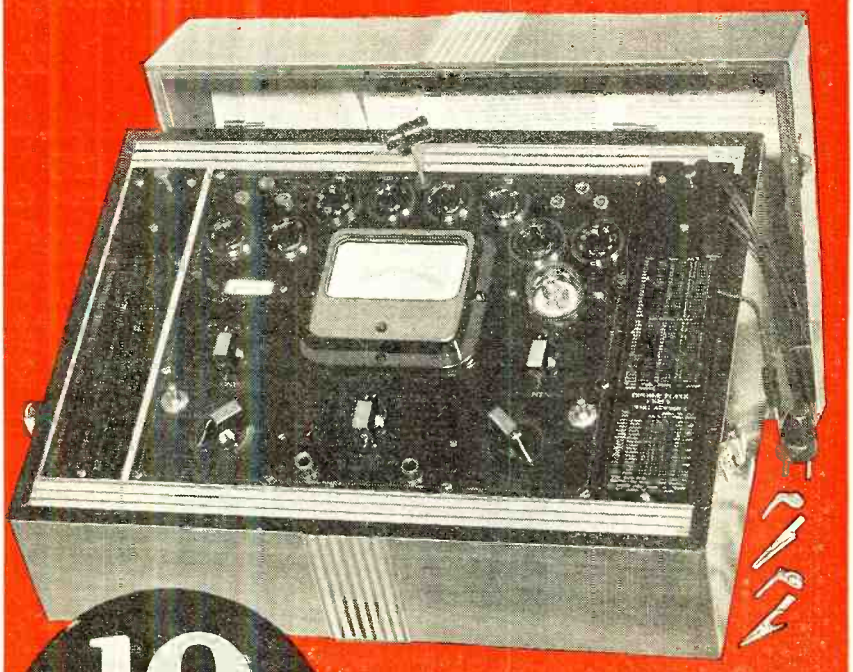
Model 1206

MASTER UNIT COMPLETE Model 1206. A complete, up-to-date laboratory contains Nos. 1200 Volt-Ohm-Milliammeter, 1210 A Tube Tester, 1220-A Free Point Tester, 1231 or 1232 All-Wave Signal Generator and No. 1204 Case. All items can also be purchased separately and complete unit built up over period of time. Dealer net price. **$82.67**

TRIPLETT MANUFACTURES

Triplett manufactures a complete line of electrical instruments for radio, electrical and general industrial purposes—both standard and custom built. Write for Catalogue.

NEW TUBE TESTER



10 INSTRUMENTS IN ONE

PRECISION WITHOUT EXTRAVAGANCE

Model 1501
$46.67
DEALER NET

8. A. C. Voltmeter
9. Decibel Meter
10. Impedance Meter

Model 1501 is furnished for portable use in a handsome, modernistic, walnut case. The cover is removable, making a beautiful counter tester, with sloping panel.

THE NEW MULTI PURPOSE TUBE TESTER MODEL 1501 Radio service dealers have always wanted a tube tester that would test tubes under conditions approximating their use in a radio set. Here it is! Model 1501 combines in one unit ten instruments that are needed by radio servicemen in their daily work. Here are the ten instruments:

1. Test all type tubes (New Power Output Test)
2. Neon short test
3. Separate Diode Tests
4. Neon Paper Condenser Tests
5. Electrolytic Condenser Leakage
6. D. C. Voltmeter and Milliammeter
7. Ohmmeter

TESTS ALL TYPES—old style, new style, both metal and glass-metal—specially constructed against obsolescence.

Bring on your trick tubes that get by other testers—try them in TRIPLETT'S new Power Output Tester—see for yourself how this instrument can save you time in hunting for troubles and help you to sell more tubes. Each tube is measured by output test, that is, the tube is fully loaded and does not have an opportunity to reheal for an instantaneous test. It will definitely help you sell more tubes by finding more bad and weak ones.

Model 1500 is a power output tube tester with neon short test and shadowgraph line voltage indicator—Same case as Model 1501. Dealer net price..... **$36.67**

THE TRIPLETT ELECTRICAL INSTRUMENT CO.
BLUFFTON, OHIO

TRIPLETT
Precision
ELECTRICAL INSTRUMENTS

Servicemen's PRIZE CONTEST

Announcement of Awards

Zeh Bouck
Service Editor

FIRST PRIZE
Advertising in a Tourist Camp

"If you are not getting enough auto radio business, cash in on this idea! There is a tourist camp a block away from my shop and I tacked up one of the accompanying cards (Figure 1) in each of the 21 cabins. The photographer received $8.00 for the 21 cards. There was no charge for the display, because the card

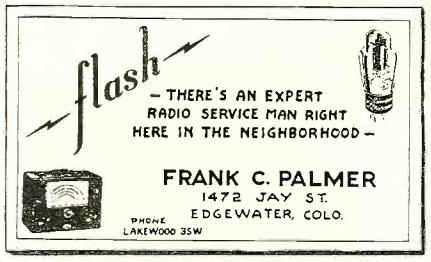
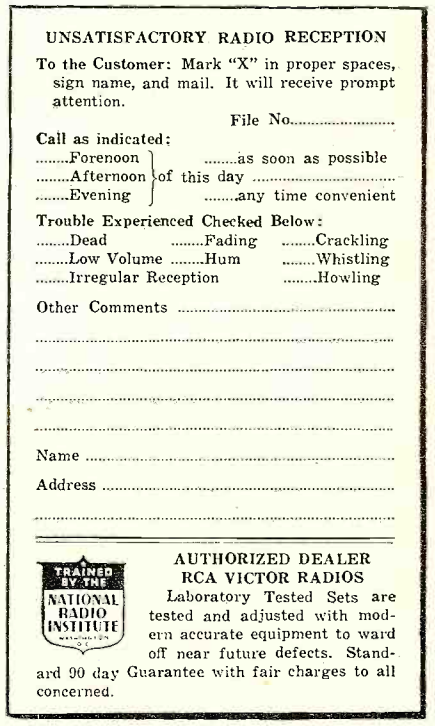


FIGURE 1

also carries an advertisement for the lunchroom and beer garden operated by the owner of the tourist camp. Tourists having auto radios like to be able to tune in on their home stations. A set that is all right on a local station may not be good for distance—a fact that has brought me considerable business servicing receivers that did not require attention so long as their owners remained at home. Tourists seldom stay more than one night in a cabin, so with my 21 cards I can contact twenty-one potential customers every day." —Frank C. Palmer. (*An excellent idea and of prize-winning caliber. However, it might be worth while, in a similar poster, to emphasize that the serviceman specializes in auto radios, and adopt a pertinent slogan such as, "Your favorite home station is on the air. Can you get it?"*)

SECOND PRIZE
Making Salesmen of Your Customers!

"I started my service work in the middle of the so-called depression, and my main problem was how to advertise and let people know I was open for business. As I live 2½ miles from the village, I knew my competitors there would get the work in the immediate vicinity. The fact that there were no telephone lines out my way made matters slightly worse, even though many phones had been removed throughout the farming district. I finally decided on soliciting business in a house-to-house canvass, and was quite successful. Where immediate work was not forthcoming, I left the enclosed self-addressed and stamped card (Figure 2). I made a record of the


UNSATISFACTORY RADIO RECEPTION

To the Customer: Mark "X" in proper spaces, sign name, and mail. It will receive prompt attention.

File No.....

Call as indicated:

.....Forenoon } .....as soon as possible
.....Afternoon } of this day .....
.....Evening } .....any time convenient

Trouble Experienced Checked Below:

.....Dead .....Fading .....Crackling
.....Low Volume .....Hum .....Whistling
.....Irregular Reception .....Howling

Other Comments .....

Name .....

Address .....

TRAINED BY THE NATIONAL RADIO INSTITUTE

AUTHORIZED DEALER
RCA VICTOR RADIOS

Laboratory Tested Sets are tested and adjusted with modern accurate equipment to ward off near future defects. Standard 90 day Guarantee with fair charges to all concerned.

FIGURE 2

type receiver, number and kind of tubes, etc., identifying this record with a file number, which was also written in on the card illustrated. The prospect could mail me the card in case of trouble. Also—and this is the novel point—the card could be given to any friend whose radio was out of order. By means of the file number I could determine to whom the card had originally been issued, and this party was promised a 10% discount on their own service jobs for each customer sent to me this way. These cards have been piling in. I am now a full-time repair man, a member of the Radio Manufacturers Service, and am gaining clients right along!"—Albert Faber.

THIRD PRIZE
Sales and Follow-Up Letters

A. S. Mather declares that "Australia is a great country—the finest in the world—" and that the two form letters quoted below, which were printed for him by his battery manufacturer at a nominal cost, have helped to make it so as far as his business is concerned:

Dear Sir:

Many thanks for the opportunity of

THIS MONTH'S WINNERS!

FIRST PRIZE—To Frank C. Palmer, Palmer's Radio Shop, Edgewater, Colorado—$10.00 for co-operation—appreciation of the fact that non-competing merchants can be of mutual assistance!

SECOND PRIZE—To Albert Faber, R. R. 3, Hudsonville, Mich.—$5.00 for rural radio success and building up new business through old customers!

THIRD PRIZE—To A. S. Mather, "Radio and Electrical Dealer," 14 William Street, Singleton, Australia—$4.00 for taking advantage of a valuable manufacturer's service and two successful form letters!

FOURTH PRIZE—To R. A. White, R. A. White Electrical Service, Box 98, Three Hills, Alberta, Canada—$3.00 for successful experiments in selling radio insurance.

FIFTH PRIZE—To C. H. Rauschenberg, "Amplifying Service," Greenville, Pa.—$2.00 for novelty—a job which almost any serviceman could put over twice a year with a little sales promotion!

Congratulations and thanks—from RADIO NEWS *and its servicemen readers!*

doing business with you recently. I trust that you have found both my price and workmanship satisfactory. I have the most up-to-date service equipment in town and I would appreciate a recommendation to your friends. If you could tell me of a prospective purchaser of a radio set I would treat it as confidential and would esteem it a favour. I am distributor for the famous ERG batteries and can supply you with a battery to meet your every requirement. They carry every possible guarantee and are the very latest development in battery construction. Stocks are kept of all sizes of electric light bulbs, and will be delivered to your door. Any electric appliance can be obtained within 24 hours. Battery charging and new B batteries are another feature of my 100% service. You can be assured that your battery will be charged slowly and efficiently and that all B batteries are new and capable of giving their maximum performance. You can always be assured of the best and latest radio and electrical service.

Yours faithfully,
A. S. Mather.

Dear Sir:

Are you getting the best results from your radio set? I can bring the operation of your old set back to its original performance, or give you a liberal allowance on a new radio set featuring all the latest improvements. Is your aerial efficient? Does the installation of your set comply with the fire underwriters' and municipal regulations? Insurance is void if your set is not correctly installed. I will be pleased to check up on your installation and quote for any job that is necessary. I shall not charge anything for the installation of a set. Recently I have been appointed agent for the famous ERG batteries and am in a position to supply these quality products and render battery service to you under very favourable terms.

Yours faithfully,
A. S. Mather.

(*Turn to page 320*)

GLEN GRAY

RIGHT:
LUM AND ABNER

BERNICE
CLAIRE

GRACE MOORE

By
Samuel Kaufman

Backstage in Broadcasting

THE Camel Caravan, CBS's crack semi-weekly hit, has returned to the air on a Tuesday and Thursday schedule. The chief change is the addition of Deane Janis as vocal star. The Walter O'Keefe, Glen Gray Orchestra and Ted Husing combination remains intact. Miss Janis, who fills the spot occupied by Annette Hanshaw last season, won popularity in vaudeville and was starred in several Chicago night clubs. She appeared on the air with Hal Kemp's Orchestra and was signed for the Camel series shortly after coming to New York.

BERNICE CLAIRE, radio, screen and stage songstress, was signed as feminine star of the "Melodiana" and "Lavender and Old Lace" programs of CBS upon her return from England, where she recently made a talking picture. On the "Melodiana" series, presented Sundays, she is co-featured with Oliver Smith, tenor, and Abe Lyman's orchestra. On the "Lavender and Old Lace" Tuesday presentations Miss Claire is heard with Frank Munn, tenor, and Gus Haenschen's orchestra.

HELEN HAYES, one of America's most popular stage and screen actresses, after many occasional radio appearances, has signed for an entire series of dramatic programs. The feature, sponsored by General Foods over NBC each Tuesday, is in the form of a serial drama with Miss Hayes playing the same character on every program. Miss Hayes is a native of Washington, D. C. She made her stage début in "The Babes in the Wood" at the age of six. Her stage appearances included such hits as "What Every Woman Knows," "Coquette" and "Mary of Scotland." Her talkies included "Arrowsmith," "The Sin of Madelon Claudet" and "A Farewell to Arms."

HELEN HAYES

THE team of Lum and Abner, created four years ago by Chester Lauck and Norris Goff, is now featured on a daily (except Saturday and Sunday) NBC spot under the sponsorship of Horlick's Malted Milk. The team first came to the air as a vacation substitute for another feature. The pair clicked so well that the sponsor immediately arranged a personal-appearance tour, after which another NBC spot was obtained. Lauck and Goff are natives of the Ozarks and are familiar with the backwoods locale of their broadcasts.

FRANK CRUMIT, who scored a long-running hit with his wife, Julia Sanderson, on the Sunday CBS Bond Bread program, was recruited as summer master of ceremonies of the NBC Wednesday "Town Hall Tonight" program. The veteran musical comedy star registered so well in a guest rôle that the sponsors decided to keep him the whole length of Fred Allen's Hollywood vacation. Uncle Jim Harkins, Allen's first substitute, left the program in Crumit's hands when he took an amateur vaudeville unit on tour. Thus, through the summer weeks, Crumit had the rare opportunity of starring on both networks simultaneously.

FRANK CRUMIT
AND JULIA SANDERSON

GRACE MOORE, noted operatic and screen soprano, has returned to the air as star of the Vick NBC program presented Mondays. Miss Moore came back to the air immediately following the great success of the talkie, "Love Me Forever." A Tennessee church choir was the starting point in Miss Moore's career. She found fame in Broadway musical shows before her début with the Metropolitan Opera Company. She appeared on the previous season's Vick programs, too.

JOHN F. Royal, NBC vice-president in charge of programs, recently returned from an extensive European tour, during which he made arrangements for a great interchange of programs between NBC and the various broadcasting groups of Europe. Included in his plans are tenta-

WALTER O'KEEFE

DEANE JANIS

tive arrangements for broadcasts from the African zone where war seemed imminent between Ethiopia and Italy at the time of this writing. Royal admitted that NBC would try to bring broadcasts direct from the battlefield—if there should be one. He also made plans for programs of ancient history lessons to be broadcast from such spots as the Colosseum, the Acropolis, the Appian Way and other historic spots. Pick-ups from Iceland, Greenland and more frequent British programs were among his arrangements. He said that every foreign country wants a North and South American audience and he predicted that within the next 18 months there will be the greatest international program competition in the history of entertainment. "By that time," he added, "all the European countries will be equipped for short-wave sending and receiving and, with the further improvement of long- and short-wave receiving sets, every radio listener will have the world in his living room."

TO NBC goes credit for one of the year's greatest talent scoops—a broadcast by Ignace Jan Paderewski, world-famed Polish pianist. The broadcast, scheduled for October 12 between 10:30 a.m. and 12 noon, Eastern Standard Time, will originate in his home at Riond Bosson, Morges, Switzerland. Paderewski will play an all-Chopin program. The pianist, 74 years old, has no public concerts scheduled this year, and this fact greatly enhances the program value of his broadcast. The broadcast was arranged by the Societe Romande de Radiodiffusion.

JOHN F. ROYAL

RADIO PHYSICS COURSE

ALFRED A. GHIRARDI

Lesson 46. Condenser Reactance

IT is evident from our study of the action of a condenser in an alternating-current circuit, that the greater the capacitance of a condenser, the more electrons will be transferred around through the external circuit from one set of plates toward the other during each charge and discharge, and consequently the larger will be the current in the external circuit. In other words, the greater the capacitance the less the opposition or *capacitive reactance* to flow of electrons or current. Also the more rapidly the applied e.m.f. changes, the greater is the total flow of electrons around through the circuit in one second. In other words, the greater the frequency, the stronger the current and therefore the less the reactance. In all of these respects, capacitive reactance acts in a manner just opposite to that of inductive reactance. It is important to remember the opposite effects of inductive reactance and capacitive reactance.

If we let Xc represent the capacitive reactance in ohms, C the capacitance in farads, and f the frequency in cycles per second, then

$$Xc = \frac{1}{2\pi f C}$$

Calculation of capacitive reactance may be illustrated by the following problem: What is the reactance offered by a 2 mf. condenser when connected in a circuit to which a 60-cycle e.m.f. is applied? What is the reactance if the frequency of the e.m.f. is 500,000 cycles?

At 60 cycles:

$$Xc = \frac{1}{2\pi f C} = \frac{1}{2 \times 3.1416 \times 60 \times .000002} = 1{,}327 \text{ ohms}$$

At 500,000 cycles:

$$Xc = \frac{1}{2 \times 3.1416 \times 500{,}000 \times .000002} = 0.16 \text{ ohms}$$

It should be remembered when working problems involving capacitive reactance, that C in formula (17) must be expressed in farads. Thus in the foregoing problem, 2 mfd. = .000002 farads. The microfarad is so commonly used to express capacitances in practical work that one often forgets to change microfarads to farads when using this formula.

It is evident from the above example that a given condenser offers much less reactance or opposition to the flow of currents of high frequency than to currents of low frequency. This is to be expected, of course, since at the high frequencies the plates are being more frequently charged and discharged, resulting in a greater total flow of electrons around the circuit each second and hence a greater current. This means it has less reactance. This is particularly important in filters used in telephone and radio circuits where condensers are used to by-pass currents of high frequencies due to the low reactance offered, and choke back currents of low frequencies due to the higher reactance offered. Specific cases of the uses of condensers for these purposes will be studied later at the proper places. As the calculation of capacitive reactance is rather tedious due to the large numbers involved, the following table of capacitive reactances is published below for convenience by courtesy of the editors of the Aerovox Research Worker in which it first appeared.

REACTANCES OF CONDENSERS OF STANDARD CAPACITANCES AT COMMONLY USED FREQUENCIES

CAP. IN MFDS	FREQUENCY IN CYCLES PER SECOND						
	Broadcast Radio Frequencies		Audio Frequencies		Power Supply Frequencies		
	500,000	1,500,000	50	10.000	25*	60	120
	CAPACITIVE REACTANCE IN OHMS						
.00005	6,369.4	2,123.1	63,694,267	318,471	127,388,534	53,078,503	26,539,252
.0001	3,184.7	1,061.6	31,847,133	159,235	63,694,267	26,539,252	13,269,626
.00025	1,273.8	424.6	12,738,853	63,694	25,477,706	10,615,600	5,307,850
.0005	636.9	212.3	6,369,426	31,847	12,738,853	5,307,850	2,653,925
.001	318.5	106.2	3,184,713	15,924	6,369,427	2,653,925	1,326,963
.005	63.7	21.2	636,943	3,185	1,273,885	530,785	265,393
.01	31.8	10.6	318,471	1,592	636,943	265,393	132,696
.015	21.2	7.1	212,314	1,061	424,629	176,929	88,464
.02	15.9	5.3	159,235	796	318,471	132,697	66,348
.05	6.4	2.1	63,694	318	127,389	53,078	26,539
.1	3.2	1.1	31,847	159	63,694	26,539	13,270
.25	1.28	.42	12,739	64	25,478	10,616	5,308
.5	.64	.21	6,369	32	12,739	5,308	2,654
1.0	.32	.11	3,184	15.9	6,369	2,654	1,327
2.0	.16	.05	1,592	7.9	3,184	1,327	663
4.0	.08	.03	769	3.9	1,592	664	332
6.0	.05	.02	531	2.6	1,062	442	221
8.0	.04	.01	398	2.0	796	332	166
10.0	.03	.01	318	1.6	637	265	133
15.0	.02	.01	212	1.1	425	177	88

* Full wave rectification of 25-cycle current is equivalent to 50-cycle column under "Audio Frequencies." Half wave rectification of 25-cycle should never be used because of hum.

Note on the use of above table: Examination of the previous formula shows that the reactance of a condenser is inversely proportional to the frequency and the capacitance. Doubling the capacitance of the condenser gives one-half the reactance. If these two factors are remembered it is an easy matter to calculate, mentally, the reactance of almost any capacitance not given in the table, and at almost any frequency.

For example, a 20 mfd. condenser has one-half the reactance of a 10 mfd. condenser at say 50 cycles. Since the reactance of a 10 mfd. condenser at 50 cycles is found from the above table to be 318 ohms, it follows that the reactance of a 20 mfd. condenser at the same frequency would be 318 ÷ 2 or 159 ohms.

Likewise the reactance of a 2 mfd. condenser at 10,000 cycles is 7.9. Therefore the reactance at 100 cycles (not on the table) would be 7.9 × 100 or 790 ohms.

New Stations in France

PARIS, FRANCE—The new French short-wave broadcasting station at Villebon-sur-Yvette is nearing completion and will be put into service soon. This station is considerably more powerful than the Pontoise station which it will replace.

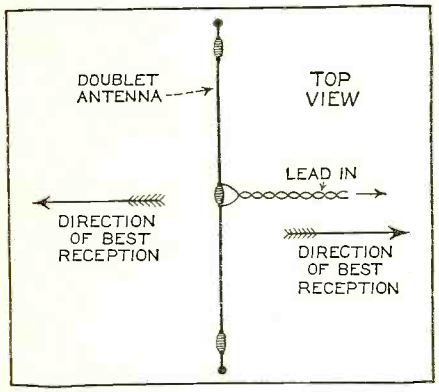
Hints for Beginners

(*Continued from page 273*)

The patient listener who is willing to spend a little time experimenting with the aerial's position is likely to be rewarded with real results. The lead-in, if properly constructed, picks up practically nothing of its own accord, and serves only to transmit to the receiver what the antenna plucks out of the atmosphere.

An important point to remember is that the distance between the aerial and the local noise area is what counts, and that this distance may be horizontal just as well as vertical. Many a listener has been pleasantly surprised to find that a rather low antenna strung fifty, seventy-five or even two hundred feet in back of the house is extremely quiet, whereas a similar antenna strung on the highest practicable poles above the house is noisy.

Incidentally, much better signals are often obtained with both feeder wires connected to the aerial binding post than with the recommended



coupling device. This is due to the fact that the lead-in may be quite long in comparison with the horizontal "doublet" on the roof. When the two feeder wires are shorted together, they act as an ordinary lead-in and become a part of the aerial proper, picking up considerably more energy than the small doublet. This means louder signals, but also more noise if the lead-in happens to pass through a noise zone.

A doublet antenna receives best in the directions at right angles to its length. This effect is most marked when the antenna is out in the open, but is subject to considerable variation if large buildings or other structures are nearby.

The second popular question dealt with band spreading. It was astonishing to see how many people had the idea that band spreading increases the selectivity of a receiver. Band spreading, whether accomplished electrically with small variable condensers or mechanically with high-ratio dials, merely makes tuning over any particular portion of the scale easier and more convenient. It obviates the need for the "Jimmy Valentine touch" on the more critical frequencies and has nothing whatsoever to do with selectivity, which is a function of the number of tuned circuits in the receiver. As a matter of fact, band spreading applied to a set with poor selectivity has the effect of making the tuning *appear* broader than before.

The choice between "electrical" and "mechanical" band spreading depends on the design of the particular receiver. One system probably is as good as the other. In specialized amateur communication receivers, which are required to cover limited frequency ranges, the condenser method seems to be more popular. In general purpose all-wave receivers using wave-changing switches, dual-ratio dials have taken the lead, although at least one manufacturer is using an ingenious double-section three-gang condenser with one of the sections comprising very small units for band spreading anywhere on the dial.

The double ratio dials have usually a 5:1 or 6:1 drive for quick tuning, and 50:1 or 80:1 for band spreading. Some short-wave fans compound several ordinary "vernier" dials to obtain tremendous reduction ratios; that is, they mount one dial on the control shaft of another dial, the latter being attached to the tuning condenser.

The third popular query concerned the relative merits of built-in vs. separate a.c. power packs for short-wave receivers. The best answer to this is found in the large and increasing number of receivers that contain their own power supplies. The set builder who is trying an experimental design would probably do well to use a separate pack at the start, and to combine it with the receiver proper after all the bugs have been removed from the latter. So far as commercial sets are concerned, the old bogey about hum seems to have disappeared.

The only real trouble created by the incorporation of the power supply onto the receiver chassis is that of heating. Unless adequate ventilation is provided, the i.f. stages of a superheterodyne are likely to slide off tune, resistors will change in value and the life of fixed condensers will be shortened considerably.

The DX Corner

(Short Waves)

(*Continued from page 292*)

p.m. E.S.T. Sundays and irregularly (McCormick, Mallet-Veale).

OPM, Leopoldville, Belgian Congo, Africa, 10135 kc. is reported putting in a nice signal here in America during the hours noted on the time table (Alan Smith, Miller, Johnson, Mallet-Veale, Donald Smith, Winand).

IRG, Massawa, Eritrea, Africa, reported heard irregularly on 20.3 meters at 6 a.m. E.S.T. and sometimes broadcasts opera (Donald Smith).

Anyone hearing **FB8VX** on either the 7 or 14 megacycle band please write report to Prince Vinh-San, 67 rue Ste. Anne, St. Denis, Ile de la Réunion. The Prince uses his transmitter between 16 and 22 G.M.T. Here is a chance for a very rare verification (T. P. Jordan).

VK3LR, Lyndhurst, Australia, 9580 kc. sometimes has sports broadcasts on Saturday and Monday nights at 12 midnight and sometimes 1 a.m. E.S.T. (Bundlie, Craft, Coover, Fabius, Reilly, Evans, Haws, Gallagher, J. E. Moore).

VIZ3, Rockbank, Australia, 11490 kc. is reported heard talking to CJA4, Drummondville, Canada, on 11413 kc. from about 10 p.m. to 3 a.m. E.S.T. (Sholin, Gallagher, J. E. Moore).

ZLO, Wellington, New Zealand reported heard on 12.1 megacycles Sundays 1:45-3 a.m. E.S.T. (Allen, Radio Fellowship, Andrews).

W1OFV, are the call letters of the Schooner "Kinkajou," on a new expedition to the South Pacific. Listening Posts please keep an eye out for this station. Give call letters, frequency, etc.

W1XAL, Boston, Mass., reported heard on 15500 kc. 10:30 a.m. E.S.T. and 11790 kc. 2:55 p.m. (Hamilton).

W4XB, Miami, Florida, 6040 kc. has been heard on the air again irregularly relaying programs of W1OD (Betances. Valentine, Sholin).

A new short-wave DX program dedicated to **Radio News** will be read on Saturday afternoons at 3 p.m. E.S.T. by Mrs. Martelle Minter and will be known as the WQBC (1360 kc.) DX Tip Period.

TFJ, Reykjavik, Iceland, now on air on 24.5 meters, 12235 kc. irregularly at 9 a.m., at 11 a.m., at 5 p.m., and at 9 p.m. E.S.T. (Sholin). Other wavelengths of this station are TFK, 9060 kc., TFL, 13960 kc., TFI, 5060 kc., also heard on approximately 10350 kc. (Borst).

TIPG, San Jose de Costa Rica, 6385 kc. reported on the air now irregularly 10-11 p.m. E.S.T. (Winand, Johnson, Gallagher). L.P.O. Marshall says frequency is 6450 kc.

TIRCC, San Jose de Costa Rica. The true frequency of this station is 6550 kc. but it is reported heard on about 23 meters. This is an harmonic (Chambers, Miller).

COCD, Havana, Cuba, 6130 kc. is now on the air with its program ending at midnight E.S.T. (Valentine, Barnes, DeLaet, Betances, Marshall, Kemp, Styles (Gunn, Winand, J. E. Moore, Pilgrim).

HP5H, Colon, Panama, 49.3 meters, 6070 kc., 300 watts, reported heard by Sholin. Schedule not known. Can anyone verify it?

TIBA, Guatemala City, Guatemala,

OFFICIAL OBSERVER FOR OHIO

"Greetings," from C. D. Hall, of Chillicothe, to brother observers throughout the world

14485 kc. reported heard Sundays 5:30-7 p.m. E.S.T. (Ortiz).

HRF, Tegucigalpa, Honduras, 14490 kc. reported heard 7:15-8 p.m. E.S.T. (Ortiz).

TI5HH, San Ramon, Nicaragua, 5:52 megacycles reported heard 8:23-9:45 p.m. E.S.T. Can anyone verify schedule? (Alan Smith).

HJ3ABI, Bogota, Columbia, 6045 kc., reported heard 9:30 to 10 p.m., E.S.T. (Reilly).

HJ4ABC, Pereira, Colombia, 6089 kc., reported heard with 300-watts power (Betances, Horwath).

HJ4ABD, Medellin, Colombia, 6057 kc., reported heard, except Sundays, 6 to 7 p.m., E.S.T. (Betances).

The old controversy about the two Manizales stations seems to be closing as per the next two paragraphs.

HJ4ABL, Manizales, Colombia. This is reported conclusively, as 6065 kc., (Lawton, Pilgrim, A. E. Emerson, N. C. Smith, Betances).

HJ4ABB, Manizales, Colombia, is set up, certainly, on 49.9 meters 6100 kc., and they are also on from 11 to 12 p.m., E.S.T. Sundays. (Gallagher, Pilgrim, Lightbourne, Young, A. E. Emerson, Betances; the Editor thinks "fini").

HJA3, Barranquilla, Colombia, reported heard on 14.94 megacycles. (Gavin).

HJ5ABE, Cali, Colombia, who has been reported on 14,000 kc., and 14,100 kc., is now reported to be on 14110 kc., 21.4 meters, with 50 watts from 12 noon to 2:15 p.m., E.S.T. This report was furnished by the Department of Commerce as the only frequency this station has and that it's not an harmonic of a lower frequency. That this station *is* heard on about 14,100 kc. is attested by Forbes, de-Laet, Alan Smith, Schumacher, Kenyon, Bower, Atkinson. Dr. Twomey kindly sent in the Department of Commerce report. (At the Westchester Listening Post this frequency has been logged on a calibrated dial at 14110 kc., approximately.)

YV5RMO, Maracaibo, Venezuela, 5.2+ meters, 5850 kc. is reported to be the correct frequency for this station which was reported heard from 6-10 p.m. E.S.T. (N. C. Smith, Barnes, Nosworthy, Chambers).

YV10RSC, San Cristobal, Venezuela, 52.4+ meters, 5740 kc. reported heard 10:15 p.m.-1 a.m. E.S.T. (Betances, Sholin).

YVQ, Maracay, Venezuela, 44.9 meters, 6672 kc. reported heard Saturdays, 8-9 p.m. E.S.T. (Fritsch, Williamson, Marshall, Alan Smith, Barnes, Styles, Betances, Miller, Chambers).

PRF5, Rio de Janeiro, Brazil, 9501

kc. has a special program on Sundays from 7-10 p.m. E.S.T. (Westchester).

CEC, Santiago, Chile, 28.1+ meters, 10670 kc. is now on the air from 8:30-9:30 p.m. on Thursdays and Sundays. (Craft, Pilgrim, J. E. Moore, Gallagher, Winand, Akins, Alan Smith, Miller, Myers, Chambers).

OAX4G, Lima, Peru, is the new call of old OAX4B on 6230 kc. heard Wednesdays 7-11 p.m. E.S.T. (Myers).

CBCX, Toronto, Canada, 6090 Kc.

These are the new call letters of old station VE9GW of Bowmanville, Canada. The station has been moved to Toronto and will be on the air, daily, from October 1st from 6 p.m. to midnight and on Sundays from 12 noon to 12 midnight E.S.T. (Shane.)

YV2RC Club Broadcasts

During the month of October, Station YV2RC, Caracas, Venezuela, will transmit the following special programs dedicated to RADIO NEWS readers and affiliated radio clubs. They will be transmitted on this station's 1 kw. short-wave transmitter from 01:30 to 02:00 G.M.T. the following day to those noted below:

1. October 1st—Chicago Short Wave Club, Chicago, Illinois.
2. October 8th—The Radio Section of the San Francisco Examiner.
3. October 15th—Anglo-American Radio and Television Society.
4. October 22nd—International Short Wave Club.
5. October 29th—Short Wave League.

We hereby invite all clubs and radio stations putting on special broadcasts to also include in their sponsorship RADIO NEWS and its readers. For all such broadcasts RADIO NEWS will also cooperate in giving full publicity to its hundreds of thousands of fans throughout the world who will listen in and thereby swell the success of each broadcast.

Readers Who Are Awarded "Honorable Mention" for Their Work in Connection with This Month's Short-Wave Report

Douglas S. Catchim, Gilbert W. Dixon, Wm. Schumacher, Theodor B. Stark, Jack F. Altstadt, Eddie C. Zarn, Jim T. Geoghegan, John Jacobs, G. W. Twomey, Tatudarshi Bansal, Oliver Amlie, Arthur B. Coover, A. F. Y. Alpers, Johnny Torres, A. J. Paul, Darrell Barnes, Walter F. Johnson, James B. Robbins, Louis T. Haws, S. G. de Mardo, Thaddeus Grabek, Fred M. Craft, C. R. Devaraj, Arthur Evans, John Eagan, Edgar J. Anzola, Charles R. Steegmuller, Henry B. Shields, H. J. Dent, O. Hersowitz, James H. Mayers, L. C. Healey, Frank Andrews, P. E. Byrns, C. McCormick, R. Stevens, Robert J. Flynn, H. Mallet-Veale, J. W. Partner, Floyd L. Finley, William Bundlie, James E. Moore, Jr., A. Fabius, George Munz, Stan Elcheshen, T. A. Adams, H. Kemp, Herman M. Valentine, N. C. Smith, G. L. Harris, F. W. Gunn, Harry E. Kentzel, G. A. Crossley, C. H. Skates, Hank G. Wedel, Manuel E. Betances, L. C. Styles, Fred A. Pilgrim, Alan E. Smith, A. J. Webb, G. C. Gallagher, E. L. Myers, Harold W. Bower, Ken L. Sargent, Walter L. Chambers, Walter W. Winand, George C. Sholin, Rene Arick, J. F. Fritsch, Jr., Kenneth W. Cassel, A. C. Lyell, Dwight Williamson, Charles B. Marshall, Jr., W. H. Boatman, J. M. Hynek, Charles Krier, Donald Smith, Thomas P. Jordan, F. Reilly, E. B. Notson, George C. Akins, Edward DeLaet, W. E. Frost, H. H. Parker, Frank Nosworthy, Manuel Ortiz, M. Keith Libby, J. T. Atkinson, Gerald N. Peyer, Joseph H. Miller, J. E. Gibson, Arthur Hamilton.

Society of Wireless Pioneers

Mr. A. Fabius, former Holland amateur and Short Wave Listening Post Observer for RADIO NEWS, has been placed in charge of all Society activities in Hawaii and will establish a chapter in Honolulu, shortly. Brother Frank Carpenter, W9MBO has recently left Minneapolis for Chicago in company of Bob Bowman, W9MZN. Brother D. R. D. Wadio of Bombay, India, is now on a world jaunt and plans to visit the United States. We hope that all members will make him welcome en route. Brother A. G. Cutts of Sheffield, England, has recently been appointed as Director of Publicity. He sends in the following call letters for Americans to listen for, on 40 meters c.w.: G2AAF, G6LF, G6PO, G6YX, G5ML, G2RX, OA2AD, ON4PA, ON4CMM, PAOPZ, PAOPW. "In an endeavor to assist as much as possible in furthering the interest of the Short Wave Pioneers, the Editor of RADIO NEWS AND SHORT WAVE RADIO has offered us space in their magazine monthly. Remember that the Society stands well to the front in its objective of banding together pioneers from every quarter of the globe. RADIO NEWS is obtainable in every quarter of the globe and there can be no excuse for not being well posted with news as well as other items of interest to short-wave listeners. This position must not be endangered in any way, and therefore, let us all pull together to accomplish our ends. Keep up the pioneer spirit and show your Vice President, who gets together these News Notes and your Directors you all mean big business. Send your news items directly to him."

Henry B. Shields,
Associate British and European Director of Affairs.

Radio Fellowship

This is the name of the new club recently organized in Los Angeles as a chapter of the I.D.A. Mr. M. H. Ryder is Chairman of this organization and is also the Editor of the Listening Post Bulletin that this club circulates among its members.

Globe Circlers' DX Club

A recent letter from Irwin Beitman, an official of the Globe Circlers' DX Club requests affiliation of this club with the DX Corner. We are glad to welcome this fine club, whose President is William H. Wheatley, among our growing member organizations.

Monongahela Radio Club

A request for enrollment of the Monongahela Radio Club as an associate of the DX Corner has been received from L. C. Healey, Secretary. The President of this Club is Willis Hodgson, operator of station W8IX; the Vice-President is Frank Pedrosky, station W8NUS, and the Treasurer, Leland Hagerty, station W8MTT. Welcome to the fold, fellows, from all of us!

Radio Short-Wave and Television Experimental Association

Another new associate organization of the Short-Wave DX Corner, as named above, is hereby welcomed to our ranks. Mr. James H. Manjers is Secretary.

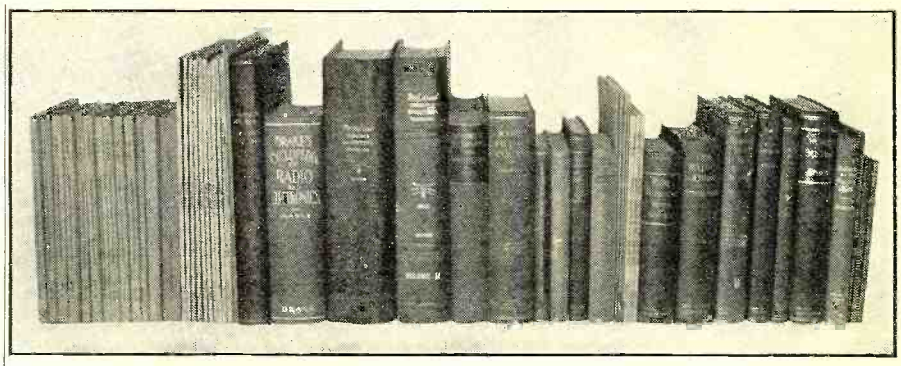
The Short-Wave Club of New York

This club, with a membership of one hundred attending meetings held the second and fourth Thursdays of every month at the Hotel Edison, 228 West 47th Street, has recently become associated with the DX Corner. Their meetings include the following features: tips of new stations heard, the display of members' verification cards, timely hints on short-wave DX, with speakers of prominence. The President of the organization is Mr. Harry C. Lange, now visiting Moscow. The club has been in existence two years.

International 6,000-12,500-Mile Club

Announcement is made of the amateur contacts with foreign countries for arrang-

(*Turn to page* 311)



THE TECHNICAL REVIEW

CONDUCTED BY ROBERT HERTZBERG

Modern Radio Servicing, by A. A. Ghirardi; Radio & Technical Publishing Co., 1935. The subtitle says "A Revision and Enlargement of the 'Radio Servicing Course.'" It is practically an entirely new book since it has been rewritten completely and enlarged to 1300 pages. This certainly makes it the most ambitious attempt to put service problems on paper. Every good service man should be thoroughly familiar with his service instruments. So, Part I is devoted to this subject. It begins with the discussion of how milliammeters work and continues with voltmeters, multimeters, ohmmeters, tube testers, oscillators, analyzers, output meters, vacuum tube voltmeters, etc. of all these instruments, the underlying theory is first explained, then there are directions on how to make your own and there are descriptions of the most important commercial apparatus. This part alone takes over 400 pages. Now comes the real service work. Entering the customer's home and asking a few useful questions is an art in itself. Part II deals with ordinary service problems. The author discusses, at length, trouble-shooting by means of analyzers, the point to point resistance method, aligning, etc., in a clear and understandable manner. A specially interesting chapter is the one on peculiarities of a.v.c. and q.a.v.c. circuits. It is a discussion of nearly all systems under the sun and the troubles that develop in them. The part on aligning is very complete and contains such up-to-date methods as the use of the cathode-ray tube.

Part III deals with specialized servicing problems. Automobile radio, all-wave receivers, reduction of interference, high-fidelity are among the subjects in this part of the book. Each chapter ends with a list of questions whereby the reader can test his knowledge of the chapter in question. The book is intended for those who wish to study service work and have already a general knowledge of radio. Although book-knowledge alone will not make an experienced serviceman, the careful study of this textbook is warmly recommended to servicemen and would-be servicemen.

Radio Field Service Data, by A. A. Ghirardi and B. M. Freed; Radio & Technical Publishing Co., 1935. A compilation of useful data, which supplements "Modern Radio Servicing." It consists of the following: a list of intermediate frequencies of 2790 receivers; a list of typical troubles occurring in 750 models of the most popular radio receivers; data on auto ignition interference remedies, miscellaneous tables, such as tube charts, grid-bias resistor chart; RMA color codes, wire table, etc. This is an excellent volume to have on hand for ready reference.

Service Hints, volume 2. Published by Hygrade Sylvania Corporation. Servicemen will find this little booklet of great help. It contains much useful information, contributed in the most part by servicemen as a result of their own practical experience in the field.

Review of Articles Appearing in the August, 1935, Issue of the Proceedings of the Institute of Radio Engineers

Super-Regeneration in an Ultra-Short Wave Receiver, by H. Apaka. The action of super-regeneration in an ultra short wave receiver is investigated theoretically and experimentally under the following four headings: 1. Theory of quenching action. 2. Experiments on quenching action. 3. Effect of signal waves. 4. Amplification by super-regeneration.

Electrical Measurements and Ultra High Frequencies, by Ronald King. The growing use of the ultra-high frequencies, for communication and other purposes, makes the matter of accurate measurement of great interest to all radio engineers. This paper describes a number of methods that can be used for practical measurements.

A Broadcast Antenna for Low Angle Radiation, by James W. Lavus. The present trend in broadcast engineering is to build transmitting antennas with reduced radiation at high angles and elevation. This increases the coverage of transmitters within which no appreciable amount of "short range fading" takes place. A novel antenna of this kind is described in this paper. It consists of a verticle radiator combined with a horizontal shield located near its top.

Anode Bend Detection, by M. J. O. Strutt. The theory of anode bend detection, and describes the result of some experimental work conducted with a view to checking these theories.

Review of Contemporary Literature

Plate Modulation of Pentodes, by George Grammer. QST, September, 1935. The ease with which pentode type power tubes can be modulated by means of the suppressor grid has more or less masked the fact that these tubes can be plate-modulated as well. This article outlines operating conditions and tells what the modulator requirements are for successful operation.

A New Stroboscope for Speed Measurement, The General Radio Experimentor, August, 1935. The ability of the stroboscope to slow down or stop motion has found many applications in industry, and one of these, the measurement of speed, has justified the design of a small unit especially adapted to it. This new instrument, the General Radio Strobotac, is fully described in this article.

The Barkhausen Oscillator, by S. W. Llewellyn. Bell Laboratories Record, August, 1935. The theory of the Barkhausen oscillator is clearly described in this article, and several practical applications of the idea are illustrated. Amateurs interested in ultra short wave work should

find this material very interesting and instructive.

Detection at Large Inputs, by W. F. Cope. The Wireless Engineer, London, August, 1935. The advantages of operating a detector tube with a large input are described. The design of suitable circuit arrangement to provide this large input is discussed, and several solutions are given.

Miscellaneous Application of Vacuum Tubes, by S. H. Shephard, Jr. Proceedings of the Radio Club of America, June, 1935. This paper shows a few of the numerous applications wherein ordinary vacuum tubes can be used in comparatively simple circuits to accomplish things that have heretofore required special tubes, expensive apparatus, and comparatively complicated circuits. The ideas range from light ratio indicators to roadside speed indicators.

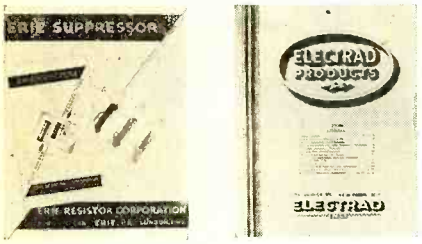
Ultra-High-Frequency Antenna Termination, by W. C. Tinus. Electronics, August, 1935. This article deals especially with the use of concentric lines contained within solid metal tubes, a type of construction that is becoming increasingly popular for ultra high frequency transmitters.

Resonant Circuit Response and Impedance Calculations, by H. T. Budenbom; Radio Engineering, August, 1935. A series of short-cut methods for the computation of the amplitude and phase response characteristics of one- and two-mesh circuits; the extension of the method to three- and four-mesh networks is carried out formally. The article is extremely complicated from a mathematical standpoint, but will be of interest and value to practicing engineers.

Technical Booklets Available

Two New Folders

The Erie Resistor Corporation is now publishing two bulletins of interest to dealers and servicemen. The first bulletin describes a new line of insulated and non-insulated types of carbon fixed resistors. The second deals with the use of suppressors in radio-equipped motor cars for the elimination of ignition interference. Copies of these bulletins are available, free of charge, from RADIO NEWS, 461 Eighth Avenue, New York City.



1936 Resistor Catalog

The complete line of Electrad volume controls, new Vitreous enameled power rheostats, voltage dividers, and fixed resistors for various radio and industrial electrical applications is fully described in this new catalog, which has just come off the press. Every serviceman, amateur and experimenter will want a copy for reference purposes. To obtain one, free of charge, simply write to RADIO NEWS, 461 Eighth Avenue, New York City.

Folder on a New Resistance Bridge

A bulletin has just been issued by the Muter Company describing their new Wheatstone type resistance bridge. This should prove interesting to all users of testing equipment. A copy of the

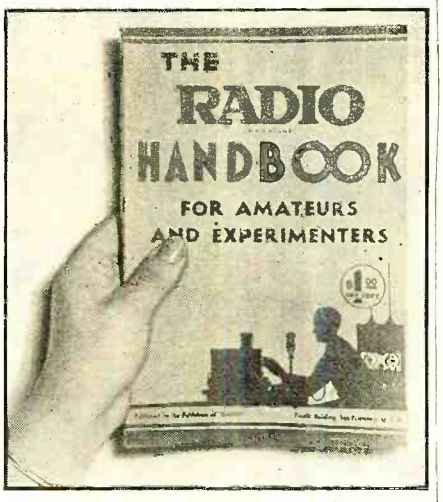
bulletin is available to our readers free of charge. Address requests to RADIO NEWS, 461 Eighth Avenue, New York City.

Free Code Charts

A colored picture post-card, containing both the Morse and Continental codes, is being offered free of charge by Dodge's Telegraph and Radio Institute. This card is very useful to the amateur operator and the prospective student learning the code. Copies can be obtained, free of charge, from RADIO NEWS, 461 Eighth Avenue, New York City.

Attention! Amateurs and Experimenters

The new "Radio Handbook" is probably one of the outstanding radio books of the year. Containing 296 pages, it is chock full of valuable, practical data on short-wave receivers, transceivers, transmitters and antennas of every imaginable type. Included with the text are diagrams, values of parts and coil data and there are innumerable illustrations. Fundamentals of radio are given and every phase of amateur activity from learning the code to operating a one kilowatt outfit is told very thoroughly and capably.



There is a chapter on power transformer design, a table on static characteristics of transmitting tubes and to show how up-to-date the book is, characteristics are given on the new metal receiving tubes. Every amateur, prospective amateur or experimenter should have a copy of this book for his radio library. The price of the book is one dollar ($1.00), and any reader desiring a copy can obtain same by forwarding his remittance to RADIO NEWS, 461 Eighth Avenue, New York City.

Radio News Booklet Offers Repeated

For the benefit of our new readers, we are repeating below a list of valuable technical booklets and manufacturers' catalog offers, which were described in detail in the June, July, August, September and October, 1935, issues. The majority of these booklets are still available to our readers free of cost. Simply ask for them by their code designations and send your requests to RADIO NEWS, 461 Eighth Avenue, New York, N. Y. The list follows:

J1—Information on the Cornish Wire Company "Noise-Master" Antenna Kit. Free.

J2—Booklet describing the technical features of the Hallicrafters' "Super-Skyrider" short-wave superheterodyne. Free.

J3—New 1935 catalog of the Hammarlund Manufacturing Co. Free.

J5—Booklet on tube testing prepared by Supreme Instruments Corp. Free.

J6—"Practical Mechanics of Radio Service," issued by F. L. Sprayberry. Free.

J7—New 1935 parts catalog of Alden Products Co. Free.

J8—Practical ham antenna design folder and leaflet on a new auto-radio under car antenna system, published by Arthur H. Lynch, Inc. Free.

J9—Information on new radio courses given by the Capitol Radio Engineering Institute. Free.

J10—"Radio Noises and Their Cure." A 75-page book. Price 50 cents.

Jy2—New parts catalog of Birnbach Radio Company. Free.

Jy4—"Increasing the Serviceman's Income," folder issued by Philco Radio & Television Corp. Free.

Jy5—Transformer Bulletin of American Transformer Corp. Free.

A1—Information on new Browning "35" receiver, issued by Tobe Deutschmann Corp. Free.

A2—New parts catalog of Wholesale Radio Service Company, Inc. Free.

A3—Data on a multi-testing instrument, published by Supreme Instruments Corp. Free.

A4—Condenser catalog prepared by Cornell-Dubilier Corp. Free.

A5—Instructive and interesting information on condensers published by the Sprague Products Company. Free.

S1—Analyzer booklet, published by Supreme Instruments Corp. Free.

S2—Transformer bulletins, issued by Kenyon Transformer Co. Free.

S3—Bulletin of sound equipment, issued by Sound Systems, Inc. Free.

S4—Amateur equipment catalog of Wholesale Radio Service Co., Inc. Free.

O1—Dial Bulletins, issued by Crowe Name Plate & Mfg. Co. Free.

O2—Carbon Resistor folder, published by Ohio Carbon Co. Free.

O3—Muter Catalog of "Candohm" wire-wound resistors. Free.

O4—Cardwell condenser catalog. Free.

O5—"Radio" Handbook. Price $1.00.

The Ham Shack

(*Continued from page 271*)

former). The tuning circuit should consist of a coil shunted with a condenser designed to cover the operating band. The diode should be connected in series with the milliammeter and both units across the tuned circuit. Such a device when tuned to resonance will read current when placed almost at any point in the shack, but preferably as far from the transmitter and as near the antenna as possible. The needle will wiggle when modulation exceeds 100 per cent or indicate carrier shift, but will remain stationary when the transmitter's "modulation capability" is not exceeded. Here again it is wise to reduce modulation well below the point where the meter stops moving.

If reasonable care is taken in the adjustment of the transmitter they may adequately serve as means to "insure the transmitter is not modulated in excess of its modulation capability."

Other Regulation Changes

In addition to the forementioned substitute regulation, the Federal Communications Commission widened the 10 meter 'phone band to 1,000 kilocycles, thereby making it the second widest band for telephone transmission. The new rule allocates the frequencies between 28,000 to 29,000 kilocycles to radiotelephony. The commission in announcing the change said: "The effect of the change is to assign one-half of this amateur band for amateur telephone use in addition to amateur radiotelephony."

At the same time that this change in allocation was announced it was stipulated that Rule 382 is changed to read 30,000 instead of 14,400. Therefore, Rule 382 now reads: "Licenses of amateur stations using frequencies below 30,000 shall use adequately filtered direct current power supply for the transmitting equipment, to minimize frequency modulation and to prevent the emission of broad signals." In effect this change bars modulated self-excited oscillators on the 10 meter band.

Another change in the new regulations authorizes the use of the 10 meter band for mobile use. In announcing this change the commission said: "There is considerable amateur interest in being permitted to engage in portable-mobile operation in the 28,000-30,000 band on the same basis as is permitted under present regulations on frequencies above 56,000 kc. These frequencies share with the higher frequencies the characteristic of being a region not commonly employed by the commercial classes of service where interference would not be at all likely to ensue. Amateurs have found the performance of frequencies in the 28,000-30,000 kc. band extremely variable and it is believed that if this band were made available for portable-mobile operation, a great deal more would be learned of the characteristics of this band."

An Inexpensive High-Voltage Power Supply

Cost of high voltage power supplies has tended to retard the universal use of the higher voltage lower current types of tubes which are extremely desirable for the higher frequencies. The idea of using two low voltage transformers and a double rectifier in series has been used by some amateurs, but such units have a double primary and it is seldom that two different transformers deliver identically the same voltage. The Thordarson Electric Manufacturing Company recently announced a new model transformer which offers a flexible combination of outputs that are ideal for supplying transmitters using the RK-20, 203A, 800, 825 and similar types of tubes. This power unit will furnish 1,120 and 500 volts of direct current out of the filter at 150 milliamperes total current; two separate 500 volt 150 m.a. supplies, or, by paralleling the two, 500 volts at 300 m.a. The circuit eliminates the use of a bridge rectifier which normally is used for such a voltage with low voltage transformers and at the same time permits the use of inexpensive type 83 rectifiers. Two schematic diagrams making use of this transformer (T-7584) are shown elsewhere in this department.

Calls Heard

By Anthony J. Misunas, W9TDW, 319 Grand Ave., Rockford, Ill., on 20 meter C.W.: K6DDN, ON4AU, VK2OC, VK2YW, G2NH, G2DV, F8EB, X1DC, X1AY, K5AN, VK2CW and PA0XF.

On 20 meter 'phone: G5ML, G6XR, EA4AO, CO2HY, K6KKP, X1HH, XIW, HI7G, CO6OM, CO2LL, CO2WW, CO1A, VO1I, HI2K.

By J. D. Brewer, W8DCG, 3077 Woodbine Place, Columbus, Ohio, on 40 meter C.W.: CM2AS, CM2FA, CM2GE, CM2IP, CM2JB, CM2OR, CM6RC, CM7CX, D2DH, EA7AO, G2NM, HC1FS, HS1PJ, J5CK, K3ZR (ship QRA wanted by W8DCG) K4BRN, K5AA, K5AC, K5AG, K5AJ, K6AHX, K6CIG, K6GAS, K6HG, K6IBW, K6JFV, K6JUY, K6KDV, K6KTF, K6KUX, K6LEH, K6LEJ, K6LEX, K6LPW, K7ZZK, KA9WX, LU1AB, LU2DP, LU5CZ, NX2Z, PA0QQ, SU1AQ, U3UT, VE2GX, VE2GH, VE3BA, VE3NG, VE3QE, VE4FW, VE4KA, VE4NZ, VE5LG, VK1OJ, VK2DA, VK2DR, VK2DJ, VK2EL, VK2EO, VK2DR, VK2FD, VK2FY, VK2GG, VK2GR, VK2HG, VK2PE, VK2RP, VK2QK, VK2TH, VK2TI, VK2XJ, VK3BW, VK3DP, VK3GC, VK3GU, VK3HT, VK3JK, VK3KR, VK3OW, VK3PB, VK3UH, VK3WW, VK4EI, VK4EL, VK4ER, VK4KA, VK4RP, VK4ZL, VK5EP, VP2NT, VP4TC, W6ACZ, W6AOR, W6BKZ, W6BTM, W6BXB, W6CUZ, W6DRQ, W6DPN, W6FQW, W6FYK, W6GRE, W6IED, W6JRY, W6JYY, W6KTH, W6KTQ, W6NUS, W6KWA, W6LLQ, W6LYM, W7AFL, W7APD, W7APF, W7AT, W7CBL, W7DDU, W7DND, W7DVY, W7ESI, W7EST, W7JL, X1B, B1BT, S1D, X1DY, X1H, X1HH, X1R, X2J, X2M, X3AT, X3C, X3U, X3Y, XU2GW, XU2RT, XU8RR, ZL1AR, ZL1DV, ZL1HY, ZL2CY, ZL4BQ, ZL4FO, ZL5BQ.

Bq Charles Miller, 309 View Pl., Covington, Ky., on 20 meter 'phone: G2DV, G2OI, G2MP, G2MP, G2MV, G2HN, G5BJ, G5BY, G5BD, G5JT, G5ML, G5NI, G5YV, G5YY, G6GF, G6DL, G6XQ, G6XR, G6QS, G6PY, G5SY, G2TD, G5VL, LA1G, VP3BG, VP5IS, VP6TR, VP6MO, VP6YB, EA4AO, EA4BM, HI7G, HI8X, K4SA, K6BAZ, K6DDN, K6KKP, HP1A, TI2RC, TI2FG, TI3AV, TI3WD, LU1DA, LU4BC, LU6AP, LU9PA, HC1FG, VO1I, OA4B, ON4AC, ON4AU, ON4ZA, CT1BY, VP9R, F8GR, F8DR, PA0IDW, HB9AQ, VK2EP, HH5PA, X1F, X1G, X1K, X2AH, X2C. On 20 meter C.W.: OK1FF, OK1LN, OK2AK, OK3ID, ES7C, SM7YN, HAF3H, FM4AA, FM8BG, VQ4CRL, VQ4CRP, ON4CSL, EI8B, I1IQ, SP1AR.

By Sam J. Emerson, 1097 Galewood Dr., N.E., Cleveland, Ohio; on 20 meter 'phone: G5NI, VE4LA, K6CMC, VE3DF, LU6AP, VP6TR, CO2SE, HI2K, K4SA, CO8RQ, VE2FG, G5MIL, CO2AN, LU9PA, VE5JK, X1G, CO2RA, VE4FI, X2AH, VP6YB, PY2AK, CO2AJ, EA4AO, VE3TD, X1AI, CO5RY, VE4HQ, CO2SV, VE2CA, VP5AT, CO8YB, VE2BG, TI3AV, PH1A, TI2RC, CO7HF, TI2AV, VE4BF and W1OXFP.

Serviceman's Diary

(*Continued from page 260*)

most likely to be affected by pounding of the r.f. coil shield on the under side of the chassis. Located a small .04 metal encased condenser tucked away in the most inaccessible part of the compartment. Replaced same and the job was done. Delivered the set and called it a day.

Television

(*Continued from page 265*)

About 200 watts input is required for the entire television receiver.

At our demonstration, 240 lines were used, but Farnsworth intends to increase this to 360 lines and, in turn, to "something in the order of 400 lines." The scanning circuits are operated with hard tubes, no thyratrons being used. A.C. heaters are employed in both cathode-ray tubes. We were told that the tubes are manufactured "for far less" than ordinary cathode-ray oscillograph valves. Also, the engineers declared, none of the experimental tubes have been worn out, and some of them have been in use for two to three years.

Images were presented at 24 frames per second. At an early date, we were told, 48 frames per second will be used. However, this was said to actually mean an interlacing of "two 24's."

Eleven tubes are used in the present Farnsworth receiver. These include one picture-amplifier, one pulse-isolator (or separator), one tube for interlacing, one for high-frequency scanning, two for low-frequency scanning, three in the radio receiver and two as rectifiers.

Farnsworth confirmed his firm's recent tie-in with the Baird group of England and the Fernseh interests of Germany. At the time of our visit, he declared that the European firms were adapting some of his methods, a member of the Baird organization, Captain A. G. D. West, being in the U. S. A. Farnsworth also said that one of his own representatives, R. E. Rutherford, was in Berlin at the Fernseh laboratories.

The inventor expects to get his television receiver down to about $200 list price, the low figure being dependent on mass production. At any rate, he declared, the cost should be somewhere between $150 and $500. It might include broadcast receiving apparatus, he said, but his own policy is against it. "That's up to the manufacturers," he commented. The Farnsworth firm is organized for research and development and will not do its own manufacturing. Instead, it will license various manufacturers. At the time of this writing, non-exclusive licenses have been issued to Philco Radio & Television Corporation, for receivers, and to Heintz and Kaufman, for transmitters. At an earlier date, Farnsworth designed an experimental television transmitter for Philco.

A 10-Tube Super

(*Continued from page 273*)

the panel. But it is not needed for shielding purposes.

The authors and a number of prominent engineers worked long and hard on this receiver, and are proud of it, as well as of doing the job sufficiently well so any amateur or experimenter can build it and have a really fine high-frequency receiver using standard parts. And the makers of these parts thought well enough of it to spend some money telling you about it, so it must be pretty good, aside from the fact that it costs less to build than a lot of ordinary garden variety jobs.

The receiver employs only standard high quality parts of dependable makers. You can build this receiver or you can buy it as a laboratory built, tested and RCA licensed complete receiver. Substitutions of parts are not recommended—high-frequency receiver specifications simply must not be played with for even resistors and tubes are critical, and other equally good parts will often vary enough to upset performance seriously.

Parts List

2—Aladdin 465 kc. Polyiron core i.f. coil assemblies
1—"Chitran" 2067 power transformer, 110 ma., 325 v. sec.
1—"Chitran" 2856D filter choke
1—Crowe 4½-inch two-speed band-spread airplane dial with calibrated scale
1—Crowe control panel
16—Hammarlund APC25 air trimmers type D, 25 mmfd.
5—Hammarlund APC100 air trimmers, type D, 100 mmfd.
1—Hammarlund MICS1000 trimmer, 1000 mmfd.
2—Hammarlund SM15 star midgets, 15 mmfd.
4—Continental 250 ohm, ½-watt resistors
1—Continental 500 ohm, 1-watt resistor
1—Continental 6000 ohm, 1-watt resistor
2—Continental 10,000 ohm, ½-watt resistors
1—Continental 3000 ohm, 2-watt resistor
1—Continental 30,000 ohm, 1-watt resistor
5—Continental 5000 ohm, ½-watt resistors
2—Continental 15,000 ohm, ½-watt-resistors
4—Continental 250,000 ohm, ½-watt resistors
3—Continental 500,000 ohm, ½-watt resistors
1—Ohmite 7500 ohm, "Brown Devil" 10-watt resistor
1—Readrite TM1OS 0-7 ma. meter, arrow left, window down
6—Readrite 1¼-inch black bar pointers
1—Silver 4 gang 200 mmfd. "Low Min." condenser
1—Silver kit of 4 A-B-C coils (2 r.f., 1st det. and osc.) 4 D coils (2 r.f. 1st det. and osc.)
1—Silver 17-F beat oscillator coil
1—Silver 17-G crystal autotransformer and shield
6—Silver shield cans
2—Silver 10 mh. r.f. chokes
8—Silver tube shields
1—Silver A-A-G binding post strip
1—Silver set 12 phenolic sockets with 8 tube shield bases (4-6D6, 1-6C6, 1-42, 1-6B7, 1-5Z3, 2-76, 2 5-pin blank)
1—Silver a.c. cord and plug
1—Silver a.v.c. on-off switch
1—Silver kit of hardware
1—Sprague 475v. 16 mfd. wet condenser
1—Sprague 250v. 18 mfd. self-regulating electrolytic condenser
1—Sprague 300v. 12 mfd. self-regulating electrolytic condenser
7—Sprague TC15, .05 mfd. 600 volt condensers
1—Sprague TC5 ½ mfd. 600 volt condensers
7—Sprague TC11, .01 mfd. 600 volt condensers
1—Sprague HC5, 5 mfd. 25 volt dry electrolytic condensers
5—Sprague TC1, .1 mfd. 600 volt condensers
1—"Radio Silver" polished chromium pierced chassis, gang-condenser shield, 4 partitions and bottom shield
1—Yaxley type N 500,000 ohm volume control
1—Yaxley 0.1 megohm tone control
1—Yaxley type G 10,000 ohm sensitivity control
1—Yaxley 704A junior jack (4 spring, single closed circuit and single filament circuit)
1—Yaxley SPO7488 locating plate, 5-position 9 inch flat shaft
5—Yaxley SPO7488 2-circuit, 5 position plates
8—Yaxley SPO7488 ½ inch spacers
1—Yaxley No. 9 switch
3—Filtermatic 50 mmfd. isolantite-mica fixed condensers
5—Filtermatic 250 mmfd. isolantite-mica fixed condensers
1—Filtermatic .004 mfd. isolantite-mica fixed condensers

List of Accessories

1—Bliley type B C mounted crystal, 465 k.c.
4—Raytheon 6D6 tubes
1—Raytheon 6C6 tube
1—Raytheon 6B7 tube
1—Raytheon 76 tube
1—Raytheon 41 tube
1—Raytheon 42 tube
1—Raytheon 5Z3 tube
1—Jensen C8X speaker with 7000 ohm transformer, field 495 ohms, 110 ma.

Capt. Hall's Page

(*Continued from page 294*)

editors of this magazine (and the writer) on this all-important subject, write in, giving us your support. When we have seen the reaction, we will go further, but while we all sit in various cities of the United States and condemn but *do nothing*, we are neither helping short waves nor accomplishing anything. We also welcome the support of manufacturers of all-wave receivers who are the potential losers as the situation now stands.

And now—what is new on the short waves and when! ZHJ, Penang Wireless Society, Penang, F. M. S., heard from 6:06 to 6:23 a.m., E.S.T. This station is on a new wavelength, 39.3 meters or 7.63 meg., and is reputedly using only 49 watts power.

TFK, Iceland (12.23 meg.), heard daily from 5 to 5:30 a.m. This station calls GBC, Rugby, England. The address is: Icelandic State Broadcasting Service, Box 547, Reykjavik, Iceland.

PMC, Bandoeng, Java (11 meg.), is relaying programs that were formerly broadcast over YDA, which station is now off the air indefinitely. Tune for PMC on Sunday from 5 to 8 a.m., E.S.T.

PLE (18.83 meg.) and PMC (18.13 meg). are two very active Javanese phone stations and are heard between 9 and 11 a.m., E.S.T.

Active amateurs who are interested in logging Aussie and Zedder "hams" should try for ZL2LB, on the low-frequency end of the 7-meg. band. He usually tries to contact "W" amateurs on code. He is the leading DX station in New Zealand, with 100 watts input. VK7KV is a 14-meg. phone station, using 40 watts power; VK4FB is another with 22 watts power; exact frequency is 7204 kc.

Metal-Tube Set

(*Continued from page 285*)

CO2KC, CO2RA, CO2WW, CO2WZ, CO2SG, CO2FE, CO2HY, Cuban-8YB, CO5RY. From England: G6DH, G5YY, G2DM, G6XQ, G2SN, G5NI, G5VL, G5ML, G5MN. From Central America: TI2AV, TI3AV, K5BL, HP1A, HH2W, HH5PA, HI7G. From Mexico: XIQ, XINI, XIG, as well as the following miscellaneous: LAIG, Norway; F8DR, France; HB9J, Switzerland; VK3H, Australia. Canadian hams were received in such large numbers that they could not all be listed here.

These were all on the 20-meter band. On the short-wave broadcasting bands (also at Fairfield) JVM, Japan, was heard very well, as well as all three Australians, RV59, Moscow, practically all the European, South American and North American stations that were on the air during the tests. I paid a week-end visit to this Post, which by the way is located at Mr. Taylor's summer residence at Fairfield, and verified a number of very excellent s.w. catches that were made during these two days and late evenings (or early mornings) as did also Mr. William Halligan, president of Hallicrafters, who was also present to witness the test.

The set was then brought down by car to the Westchester Listening Post and after a week's concentrated listening, the following results were obtained on reception of 20-meter phones: all districts in the United States, of which the best catches were W6FJ, W6BUT (portable), W6CEP, W6AM, W6LOJ, W6LGD, W6FQY, W6CAH, W6ANU, W6EBJ, W7CHT, W7AOF, W7DCE, W7BVL, W7ALP, also the following, outside of the United States. From Cuba: CO2RA, Cuban-8YB, CO2SV, CO2WZ, CO2KC, CO2HY, CO2RS, CO2WW, CO2XF, CO2LL. From Mexico: X2AH, XIG, X1CZ, X1HH, XIQ. From Costa Rica: TI2AV, TI2RC, TI2FG, TI3AV. A few "H" calls heard: HI7G, HP1XE, HP1A, HH5PA, HH2W, HC1FG. From Canada: VE1CA, VE1BR, VE1CF, VE2FO, VE2BA, VE2HK, VE2BE, VE2TA, VE3DF, VE3GS, VE4HD, VE4CW, VE4BF, VE4NI, VE4NJ, VE4GA, VE4GC, VE4HW, VE5HN, VE5EH, VE9CME, VO1I, VO4Y. From the Barbadoes: VP9R, VP5PZ, VP5AC. From England: G5ML, G5QC, G5NI, G5VB, G5DL, G6GO, G6XR, G6DH. From Belgium: ON4FE, ON4AC, as well as the following miscellaneous: OH2NE, PY1CK, PY2AK, VK2EP, K4SA, K6BBF, K6CMC, K6ASA, EA4AO, LU6AP, LA1G, HB9AQ, SU1TN.

Heard on 20 meters c.w. at this Post, the best catches were: LU4DQ, ZB1E, ZD2C, LY1ZB, LY1N, FMHCR, OH1BA, OH1NP, TI2, TAO, VE1CI, SM6WL.

The 40-meter c.w. band also brought in hundreds of code signals, the best of which were: K5AG, LU5CZ, LU6AX, LU1AZ, ZA1E, ZL4AP, G6SR, OF6OB, VK2XJ, U5KP, PAOPZ as well as F3HQ (phone).

Going through the short-wave log of this Post I also find the following reception reports on s.w. broadcasts: on the 16-meter band: GSH, GSG, GSJ, PHI, DJE; on the 19-meter band: HAS3, DJQ, GSI, FYA, PCJ, HVJ, DJB, GSF; on 22 meters I had logged ORP, VP1A; on 25 meters, the following: RV59, CJRX, HJ4ABA, GSD, FYA, DJD, I2RO, GSE. I also had logged JVN and JVM and ORK on their wavelengths from 27 to 29 meters, respectively. Then of course: EAQ, I2RO, CT1AA, VK2ME, HP5J, VK3LR, HBL, GSC, DJA, DJN, VK3ME, GSB, PRF5, COH, were logged on the 30-31 meter band. The best catch on this band was VUY, rebroadcasting VUB. Other stations logged on the short-waves, between this wavelength and the 49-meter band were: ZCK, HCJB, HBP, XECR, HB9B, HIH, TIRCC, YV6RV, HJ5ABD, HJ1ABB; on the 48-51-meter band, the following: HIZ, CJRO, YV3RC, VE9CL, YV1RC, VE9HX, ZTJ, VE9GW, ZHJ, VE9ZS, PRAA, HV5BB, DJC, COC, VE9DN, XEBD, HJ4ABD, YV5RMO. What I consider the best catches of all on these wavelengths were VUY, ZHJ and ZTJ.

I did not do very much logging on the 80 or 160-meter amateur bands as the reception on these bands is more or less localized as to distance. I did receive all of the American short-wave broadcasters as well as signals from practically all of the police-radio transmitters in the country and a few in Canada, but I shall not attempt to log them here.

For a couple of nights during the end of this period the broadcast band opened up somewhat and I was able to tune in stations that I find were located in Nashville, Minneapolis, Akron, Dallas, Troy, N. Y., Chicago, Mooseheart, Kansas City, Windsor, Ontario, Providence, Los Angeles, Council Bluffs, Seattle, Portland, Reynosa, Mexico. These call-letters can be had on request.

In studying this report, I know that interested persons will be able to see that this receiver has high sensitivity and selectivity, adequate to reach out through QRM to pull in even the most distant stations. What may not be so evident to the uninitiated should be reported as follows: The audio response from this receiver is "pitched" to bring out speech-intelligibility, so that where a signal from another receiver might be louder and with more musical tones, but still undecipherable, this receiver has the necessary ranges speech-frequency reproduction that emphasizes and "crisps up" speech with even much weaker signals. Then another feature, that was used practically constantly in our tests where QRM troubles were encountered, was the crystal filter and its adjustment that gave any desired degree of signal selectivity. In spite of any reports to the contrary, the crystal system employed here *is practicable on phone* and enabled me to hold signals from distant amateur transmissions where other local amateurs reported "QRM and nothing doing!"

The high degree of sensitivity in this receiver was, of course, obtained through the use of iron-core, intermediate-frequency transformers used with high-gain metal tubes; see Figure 1. I predict that the next big general improvement in receiver design will be the incorporation of iron-core i.f. transformers (possibly with variable-band-width adjustments). This receiver therefore is the forerunner, among American receivers, of the coming type of receiver in this class.

Now, just a few words about the new calibrated dial and micrometer adjustment as well as the electrical band-spread arrangement; the positions of these dials have been reversed (from the old Skyrider) and give a much more smooth and accurate logging calibration and the band spread may be marked with station calls. Also, there is not a single sign of microphonism in the new job. A few other features that should be mentioned are: a phone jack; a switch for cutting C-bias in the receiver, for monitoring purposes when used at a transmitting station; a switch for cutting crystal "in" and "out"; a sensitivity r.f. control (which can be left on "full" controlling signal strength with the volume control); and a switch for cutting the a.v.c. "on" or "off".

In summing up, then, I find the receiver eminently satisfactory, from a communication standpoint and with acceptable tone quality. The receiver actually is a first-class communication job and is not meant to bring in music at ballroom volume or with exactly accurate reproduction. As stated before, the purpose for which the set is designed is for *accurate communication at a distance* and this end is served excellently in the design. I am happy to recommend this job to our Short-Wave Listening-Post Observers and any amateurs who want a modern up-to-date and thoroughly satisfactory receiver for this special class of service.

The DX Corner (Short Waves)

(*Continued from page* 305)

ing for reception of the special broadcasts of President Oliver Amlie over WCAU-W3XAU during the month of October. These are: W9NFA, who will contact Cuba, Ecuador, Canada, Germany, South Africa; W8KQQ, contacting New Zealand; W2EUZ, contacting Australia; W5EWB, contacting England; W8LVV, contacting Bolivia; W8DPE, contacting the Fiji Islands; VE2IL, contacting Canada, France and Norway; W9DFE, contacting Australia; W3ETE, contacting Spain. WCAU will give out details and dates of the October broadcasts.

Lansdowne Radio Association

The Lansdowne Radio Association has recently written us regarding the very successful Sixteenth Anniversary Ham Fest recently held and thanks RADIO NEWS for cooperation in making the affair a success.

The DX Corner (Broadcast Band)

(*Continued from page* 280)

6-Chome Minamisotoboricho, Nagoya, Japan.
JOGK Kumamoto Broadcasting Station JOGK, Kumamoto, Japan.
JOHK Sendai Broadcasting Station JOHK, Sendai, Hosokyoku, Sendai, Nippon (Japan).
XGOD E. Pon, Eng. XGOD, Telephone Administration, Chekiang Prov. Govt., Hangchow, China.

Submitted by Observer Hunter (Oregon):
CKWX 801 Georgia St. W., Vancouver, B. C.
CKMO 815 Hastings St., W., Vancouver, B. C.
WKAQ P. O. Box 1414, San Juan, Porto Rico.
CMQ 25 No. 445 entre 6 y 8, Vedado-Habana, Cuba.

Submitted by Observer Johnson (Minnesota):
4BC 43 Adelaide St., Brisbane, Queensland, Australia.
XEB Apartado Postal, 7944 Mexico, D. F.
HIX Secretaria de c. de Trabajo y Comunicaciones, Estacion Radiodifusora HIX, Santo Domingo, D.R.
XEJ Box 95, Juarez, Chihuahua, Mexico.
HJ1ABA Elias J. Pellet, Box 715, Barranquilla, Col.
HJ3ABD Colombia Broadcasting, Apartado 509, Bogota, Colombia, S. A.
XFX Secretary of Public Education, Mexico, D.F.

The Service Bench

(*Continued from page* 296)

transformer. An 0-100 d.c. milliammeter should be connected between ground and the grounded end of the B filter choke (which is first removed from ground). With a good A battery, there should be 5.7 volts at the vibrator terminals. With normal tubes which have been heating for at least one minute, the following values should be read when the vibrator is properly adjusted: Input, 5.7 volts, 3.8 to 4.1 amperes; output, 200 volts, 53 milliamps.

"If the voltage measured at the vibrator is higher or lower than 5.7, then the other readings will be correspondingly more or less. Readjustment of the vibrator will be necessary if, for the above input voltage, the output current and voltage are down or if the input current is over 4.1 amperes. The latter condition will be extremely rare unless the vibrator has been tampered with since leaving the factory.

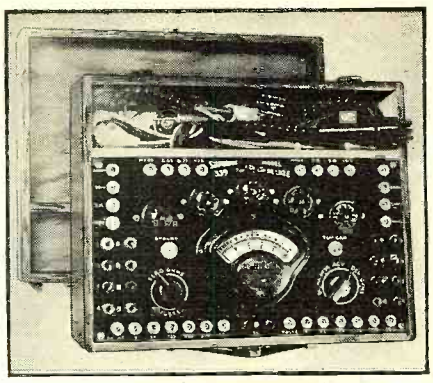
(*Turn to page* 313)

WHAT'S NEW IN RADIO

WILLIAM C. DORF

A Universal Analyzer

Featuring engineering design and quality material and workmanship, the Supreme model 339 De Luxe analyzer was recently produced for the serviceman, dealer and



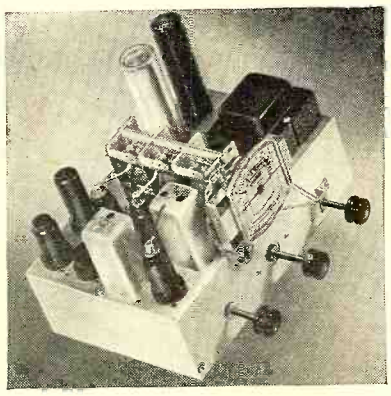
experimenter. It is a combination point-to-point testing instrument providing complete resistance, voltage and current measurements and tube testing facilities direct from a radio socket. It will test all tubes in present day use, including metal type tubes.

Tiny Neon Indicator Light

An announcement was recently received from the Littelfuse Laboratories of their small indicator neon lamps called the "Tattelite." They operate from 90 to 250 volts, a.c. or d.c. and are used as indicating lamps to tell when a meter, motor or other electrical instrument is in use, either directly or in a remote-control circuit. They can also be employed to indicate open circuits. They consume practically no current and measure approximately ¼ inch in diameter by 1¾ inch long.

All-Wave Metal Tube Receiver

The new Howard superheterodyne shown in the photograph below, is a 7-tube set employing metal tubes throughout. It is equipped with automatic volume control, tone control, and a unique airplane type



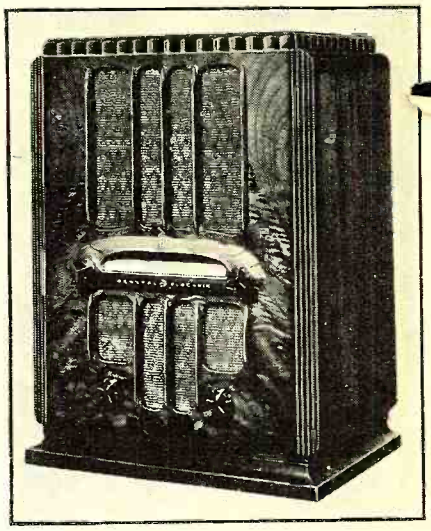
dial. A special heavy 10-inch electrodynamic type speaker is employed with the set. Chassis dimensions are 11 inches by 7⅛ inches by 3½ inches and the shipping weight is 39 pounds.

All-Purpose Tube Tester

The Readrite model 430 tube checker will take care of all the tubes now in use including the new metal tubes. A feature of this checker is the shadow-type a.c. meter for line voltage adjustment, which is located directly above the English reading test meter which indicates "good" and "bad" test values. It is designed to make every inter-element short and leakage test.

Latest Table Model Metal Tube Set

This attractive General Electric 7-tube superheterodyne employs the new metal tubes in all sockets. It is a three band



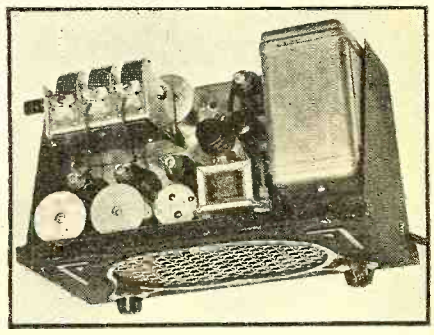
receiver with a frequency range from 540 to 19500 kc. It is equipped with the new sliding-rule tuning scale.

Portable Metal-Tube Checker

The new Dayrad Model 14 tube tester is designed to test all present types of tubes including the new metal and octal "G" type tubes. It is also equipped with a selector-switch for any new tubes that may be introduced. The instrument employs an English reading scale. Short-circuits are indicated on the meter and there is a patented cathode release to indicate heater-to-cathode leakage.

Metal Tube Auto Set

In addition to the regular broadcast band, the new Remler 6-metal tube automobile set also covers the short-wave bands from 2200 to 6800 kc. This innovation and the metal tubes are accompanied by further features including a slide-in chassis, 6-inch size dynamic speaker and the new Remler octal metal-



tube sockets. The tube equipment follows: two 6K7's, one 6A8, one 6H6, one 6J7, and one 6F6.

The Service Bench

(*Continued from page* 311)

"Vibrators which have seen any appreciable amount of service will not retain readjustment unless the points are dressed or replaced with new ones. Experience has shown that it is much cheaper for the average serviceman to replace the vibrator head with a new head which has been adjusted and run in at the factory. Such a head requires no further adjustment once it is attached to the transformer and, providing the tubes in the receiver are in normal condition, will give satisfactory service for 500 hours or more. In dressing the points it will be necessary to remove the armature from the vibrator assembly in order that work may be done on the silver contact surfaces. In removing the armature, loosen only *one pivot* screw in order that the other may remain in position and properly locate the armature when it is put back in the frame. Before removing the armature, take note of the side-play on the pivots, as this same amount of side-play must be obtained when the unit is reassembled. In reassembling, be sure that the pivots do not bind the armature and that the side-play does not exceed .003 to .005 inch.

"A file is practically useless for dressing the contact points, especially for the tungsten on the brass studs. A fine carborundum stone should be used in acquiring a final finish. When the contact is finished, the surface should be as free from pits as possible and should be true so that opposing contact surfaces will come together flatly. When work on the contacts is finished, they should be washed in alcohol (never use ethyl gas), as any carborundum dust left on the contacts will cause rapid failure after adjustment.

"In disassembling the vibrator unit, never disturb the spring tension adjusting screw, as this screw has been set at the factory at that point which will place the spring under a tension of 30 grams. It is very hard to guess at this tension, and if spring guages are not available, the tension adjustment should not be disturbed.

"The contact which is opposite from the tension spring is called the primary contact, that on the same side as the tension screw, the secondary contact. In adjusting the vibrator, set the primary contact all the way out so that it does not make contact with the armature. Connect the battery and after the tubes and rectifier are heated, turn the primary down until the armature begins to clatter against the core, then back it off about a half turn so that the clatter stops. Tighten the lock nut on the primary contact and then turn down the secondary until the ammeter reading begins to make an abrupt rise and at this point adjust to 3.8 to 4.1 amperes. Note that a point will be reached in this adjustment at which the output current and voltage do not increase, even though the input current rises as the contact is turned. The point at which input current is a minimum for a standard output voltage is the point of correct adjustment. Do not attempt to turn any adjusting screw without first loosening the lock nuts and do not leave any adjustment as final without tightening the locknut. When the vibrator is properly adjusted, clearance of the normally opened contact is .010 inch to .015 inch. In attempting to measure this clearance with a feeler gauge one must rely on sight and not feel, because if the gauge is thicker than the clearance of the contact, it will force its way in, due to the flexibility of the spring on which the lower contact is mounted. If the gap is too small, turn the spring tension screw down a half turn. The armature may now clatter against the core, and if it does, turn the primary contact back about one-quarter turn. Recheck adjustment of the secondary contact as described before.

"If, on inspection of the vibrator unit, it is seen that the armature spring is badly discolored, it is an indication that the vibrator has been operated under improper conditions, as follows: Tampered adjustment; incorrect battery polarity; operated at no-load condition; operated at overload; operated at too high a primary voltage."—Morris Chernow.

Tube Salvage

"The serviceman with an eye for economy and the best interests of his customers will not immediately discard all tubes failing to show filament continuity as burned out. While apparently this might seem justified, I have run across quite a number of tubes, particularly 45's, which, while they wouldn't light, had perfectly good filaments. The trouble was in the prongs, and a few moments devoted to resoldering resulted in hundreds of hours additional service from them."—J. Frederick Norlem, Omaha, Nebraska.

Increasing Service Profits

New methods for increasing the business return of the serviceman and a wealth of service material, compiled under a single title, "Tube Talks," is contained in a 48-page book recently published by the Raytheon Production Corporation. This book (see Figure 2) is bound in a new and ingenious method that makes it handy, allows it to open and lie flat without holding as well as giving ample protection on the test bench. The book contains a number of short articles on methods of selling and giving service, but at the same time explains how to make a profit and give satisfaction while doing so.

FIGURE 2

It talks over frankly the serviceman's problems and shows how to solve them. It tells how to make the seasons work for the radio serviceman; suggests a number of new sales opportunities; how to test and sell tubes at a profit. It gives aid in hard-to-get service data and outlines a plan by which Raytheon can help you secure equipment and make yourself better fitted to do the work in hand. It has a complete section on American sets giving the tubes necessary for replacement on all models. This section alone contains 30 pages and in looking over the various sets described we do not find a single one (that we know of) that is missing.

We are sure that every serviceman will want a copy of this new book, as the tube data alone is more than worth the 50 cents asked for it.

QRD? QRD? QRD?

CONDUCTED BY GY

OH me, oh my, and oh us! What a busy place that National office of the A.R.T.A. has become. Very little *talk* going on but plenty of action! Filing, sorting, typing and comparing. Could hardly get a word in edgewise so as to get some "info" for the outside world to gnash its teeth upon. President Haddock was conferring with his various delegates and representatives, formulating policies and stressing the need for immediate action. Mr. Pyle of the West-Coast local was there also, and a right pleasant chappie that sourdough is. Information for perusal by the general public, meaning you and I, was as free as getting a chief's billet on a prime vessel. So we ups and turns our backs on these mill-seamen gathering news from the West Coast. . . .

The recent crash of the Japanese motorship *Koryu Maru* into the *S.S. Calmar* off the Golden Gate gave Ray Hewitt, radio operator of the latter, his first opportunity to send an SOS after 13 years as "Sparks." Photo shows Hewitt at his post.

The President's signing of the Wagner Labor Bill gives operators a great chance, because since radio work deals with immediate work more than intrastate, any deals entered into by radio unions with employers have a better chance of being held unconstitutional than otherwise. Marine and airways are undoubtedly interstate and courts have previously held this to be true in requiring radio station licenses for a Xmtr even for local radiation. Hence, plenty of precedents exist for lawyers to uphold trade agreements. However, here is the catch. Unions in this country have broken contracts, courts have held employers to contracts and at the next session of Congress, legislation is to be introduced making unions legally responsible for their acts, as is the present custom in other countries. At the present time the only successful way to sue a union is to serve papers on all members. Imagine serving all members of A.R.T.A., hi! It would take a deputy sheriff a lifetime, what? Too, a single illegal act might bankrupt a union if held liable.

The series of "quickie" strikes on the great Pacific has worn down the good tempers of all business men. . . . It only goes to prove that the leaders of labor organizations are incapable of leading the masses —the masses being more intelligent, as a group, than the leaders. Those who are supposed to be "in on the know" predict more marine trouble among longshoremen, radio operators and others. . . . Seems like the boys must not only handle the American West Coast but must contribute money and support to the Canadians, but by doing so they injure themselves. Many of the closed-shop agreements are also to be discarded.

Conditions in the Airways are still rotten and if shipping does come up to past par we believe that there will not be any operators left to man this division. One operator stayed with T.W.A. five weeks. . . . Forty-eight-hour weeks are prevalent, wages from $80 to $140 per month, and this latter salary after six honest years of toil! At ground stations, mechanics, janitors and clerks get 3rd-class phone tickets and operate in violation of the law. A new gag for the airlines is to hire clerks with first-class phone and telegraph tickets and make them do radio work. One outfit of this type is the one that fired employees just before their annual vacation time rolled around. Passes for members of the family are given in return for cancelling all vacation rights, yet this same outfit asks Congress for more money. Nice people. . . .

Jobs out in them thar sticks in the Marine field are still above depression level but far below the line of '30-'31. Naturally there are no broadcast jobs. In fact, when NRA went out, some of the boys also went out and salaries were lowered and hours lengthened. Up in the Northwest about ten radio men were given airline jobs. Some of the marine lines are giving examinations to new employees. These exams. consist of 35 w.p.m. sending and receiving, marking off with the left hand, etc. . . . So, me hearties, there are still a few jobs floating around—but a long glass is necessary to find them.

Methinks that it would be a good idea for A.R.T. to pay the expenses of representative radio operators from different sections of the country and have them appear before labor boards and have hear-

ings for better hours and wages. We would suggest men with good education, licensed operators, preferably with varied experience, a good legal knowledge, and a study of labor and economics. It is felt that such representatives could hold their own with any men sent up by employers. Union representation in the past has been mediocre or poorer. A fighter who can think on his feet and use his legal knowledge, plus radio experience, to tangle up the stooges hired by the employers would be worth his weight in gold.

About a dozen airways berths have been opened. These are in the Northwest and Southwest. Only those with past airways experience should apply, since preference is given experience. When sent out into the Pacific, some of the guys stay six months at one place, then are transferred to "civilization." A few dollars extra per month is allowed for foreign expenses. Not bad, but wages on foreign airlines are still *only on par with our regular marine wages!* They ought to be up at least $75 above the present scale. One airline pays operators at certain Pacific posts about $150 per month, whereas steamship lines pay their operators at these same posts $225. Quite a difference. And the airways men have greater responsibility. The continental airlines are still terrible. Some pay dispatchers only $80 per month and the poor guy has to pay his gas and oil to and from work, and since some genius located airports 10 miles from town, this runs into money. For the benefit of our marine and broadcast brothers who want to know what a "dispatcher" is, here's the dope. A dispatcher is a chap who has anything from a 3rd-class ticket to a 1st. teleg. and telephone (depending on company requirements). He works about 50 hours per week, knows some meteorology, and finally, must get along with the pilot and every one in the office. Some dispatchers with 3rd-class tickets would starve to death if they lost their air berths, while others are looking longingly at those $125-$175-per-month sea jobs—so you marine boys better look out.

Several point-to-point stations are under construction in various parts of the West, these serving press, weather and just ordinary point-to-point work. So that in the next six months some good men will get jobs. It's a tough racket, though, brethren.

Some men who have been assigned air berths in the past months are: Del Axe, Charlie Morrison, Jack Smyser, Bill Breuer and others. They are scattered from Los Angeles to Alameda to Wake. Morrison was in an automobile accident, through no fault of his, and is confined to bed with a couple of broken legs. His job is waiting for him and we all hope he mends quickly. Mathison, former delegate for A.R.T.A., is now attempting to hit the Tuna Fleet in San Pedro—seems Volney thinks he'd like to go into the same business that Mackay and R.C.A. are in; i.e., radio equipment business and marine servicing. Somehow or other, we heard that patent laws were bothersome things. Some of the West Coast boys were let off with warnings and having been shown the error of their reasoning, had sense enough to leave it alone. However, Bro. Mathison feels smarter than the average. Perhaps a suggestion is in line. We suggest a look-in at the California code-book where it is stated the Statute of Limitations is 3 years—that leaves 2 years at least to go. How about a nice, quiet book shop, filling station or café.

So-o-o-o, gang, given a little time, things appear to be ironing themselves out. Much of the activity in radio circles is due to minute uprisings by the rank and file, without whom life would become dull and monotonous, so bear awhile with patience, and until then, cheerio, 73, ge. . . GY.

The "Ocean Hopper"

(*Continued from page 267*)

Subsequent tests at the Westchester and the Fairfield Listening Posts confirmed these findings and fully justified the expectations of the designers. Not the least of the demonstrated features was the ease of tuning. The dual ratio airplane dial provides ratios of 25 to 1 and 125 to 1. Using the higher ratio the stations are spread further out on the dial than are broadcast stations on a regular broadcast receiver. At 25 meters, for instance, GSD and DJD are a half-inch apart on the dial, although operating at a frequency difference of only 20 kc. This dial has two knobs and two pointers, the main one traverses a 180° scale to tune the full range of the receiver. The "second" hand traverses a 360° scale and makes 20 revolutions in tuning the full receiver range, thus in effect spreading the full calibration out into a 20-foot scale, and requiring 60 complete revolutions of the "fine tuning" knob. This provides an average separation of ¼ inch on the "second" scale for each 10 kilocycles.

The complete list of parts employed in the construction of this receiver is given at the end of the article. All these parts are available commercially, including the drilled chassis. It will interest readers who constructed the Radio News Short-Wave Converter to know that many of the parts employed in that converter are likewise used in this new receiver.

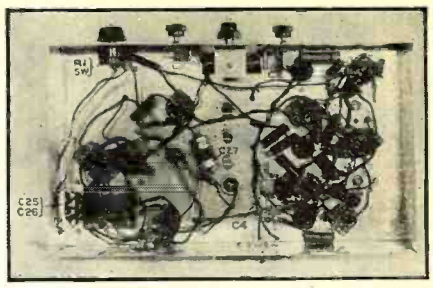
The loudspeaker mentioned in the list of parts is an inexpensive one and is suitable for short-wave requirements. However, if one desires to get higher power handling ability and greater loudspeaker efficiency he can spend more for a better speaker. If another speaker is employed and its field power is to be obtained from the receiver it will be necessary to make some rearrangement of the power supply filter circuit to obtain enough current to meet the requirements of the larger speaker. If a speaker which has its own field supply is used, a 1000-ohm choke should be used in place of the speaker field in the filter system—or a 1000-ohm resistor (25 watts) may be used.

The first step in construction is to mount the sockets and other apparatus as shown in the photographs, turning each socket so that the leads from the r.f. and i.f. coils will be as short as possible. The high-voltage lead from the 5Z4 should be taken off the filament and cathode junction. Make certain that the variable condenser is rigidly mounted. Remove the compression type trimmers from the two front sections of this condenser by breaking off the flexible plates.

In wiring, the terminal ends of the wiping contact forks of the variable condenser rotors should be soldered directly to the chassis. The metal shield of each tube comes connected internally to one of the tube prongs. The corresponding prong on each socket should be grounded with a short, direct lead soldered to the chassis. The high-voltage leads are kept clear of the chassis by insulated double lug supports, which may be mounted under convenient assembly nuts. The 5-prong speaker socket is mounted in the large hole in the rear wall of the chassis. Leads from the front trimmer condensers should be short and cross each other at right angles.

When the construction has been completed the set may be aligned. If an oscillator is not available, adjust the tuning condenser to about 4 on the main dial. A faint background noise should be present with the volume control set at maximum. Adjust the trimmers C2 and C3 until this noise is a maximum. One or both of these trimmers should be nearly at minimum setting when this point is reached if the receiver is properly aligned. If too much trimmer capacity is used, the high frequency range will be limited. This may be corrected by decreasing the oscillator trimmer capacitance C12 and returning until resonance occurs at the proper point. Leaving the trimmer condensers C2 and C3 set, tune in a station on the 49 meter band, near the maximum setting of the tuning condenser, and adjust the padding condenser C4 until reception is at a maximum, tuning the gang condenser C1 around the point while making the adjustment. If the trimmers require too much adjustment for resonance in the middle of the range, carefully increase the i.f. transformer frequency by turning the adjustment screws at top and bottom of each r.f. transformer. Do this step by step, making a small and equal change in each one so that they do not get out of line. If an oscillator is available, it may be connected to C14 and the i.f. transformers aligned to 540 kc. After a little practice at making these adjustments it will be found possible to attain tracking so accurate as to require very little variation of the front panel trimmers as the receiver is tuned throughout its range. When the receiver is correctly lined up the 19-meter stations should come in at approximately 4 on the dial, 20-meter ham phones at 14, 25-meters at 36, 31 meters at 56, and 49 meters around 95.

It will be noted that some of the parts shown in the photographs do not correspond with the diagram and parts list specifications, due to the proper values not being on hand. However, the values given in the article and the parts list are correct.



Blueprints

RADIO NEWS "Ocean Hopper" blueprints of this receiver are available for 50 cents per set and include full-size chassis layout drawings, full-size picture wiring diagram, etc. Order direct from: RADIO NEWS, Blueprint Dept., 461 Eighth Avenue, New York City.

The construction will be greatly simplified if the RADIO NEWS blueprint diagrams are used, as these show the exact connections of all parts. However, the experienced constructor should have no difficulty in building the set from the data given, as there is nothing particularly tricky about it.

Parts List

C1—Trutest tuning condenser, 3-gang, each section 360 mmfd.
C2—Hammarlund "Star" midget variable condenser, 50 mmfd., type SM-50.
C3—Hammarlund "Star" midget variable condenser, 25 mmfd., type SM-25.
C4—Trutest special compression type variable padding condenser, 800-1600 mmfd.
C5, C11, C29—Aerovox tubular condenser, .1 mfd. 400 volt, type 484.
C6, C7, C9, C10, C17, C21—Aerovox tubular condensers, .05 mfd. 200 volt, type 284.
C8—Aerovox tubular condenser, .005 mfd., 400 volt, type 484.
C12—Oscillator trimmer condenser (on C1c).
C13—Trutest special .0015 fixed mica condenser, accurate to plus or minus 5 percent.
C14, C16, C19, C20, C22—Aerovox mica condenser, .0001 mfd. type 1467.
C15—Aerovox electrolytic condenser, dual 8-8 mfd., 450 volt, type GG5.
C18—Aerovox tubular condenser, .05 mfd. 400 volt, type 484.
C23—Aerovox tubular condenser, .01 mfd., 400 volt, type 484.
C24—Aerovox electrolytic condenser, single 8 mfd., type GM5, 450 volt.
C25, C26—Aerovox metal case dual condenser, .1-.1 mfd., 400 volt, type 460X.
C27—Aerovox electrolytic condenser, 10 mfd., 25 volt, type SM 25.
C28, C30—Aerovox tubular condenser, .03 mfd., 400 volt, type 484.
Ch—United 30-henry choke, type CS-41.
L1, L2, L3—Set of special Trutest "Radio News SW Converter" coils.
L4, L5—Hammarlund air-tuned I.F. transformers, type ATT—525.
R1—Electrad volume control, 500,000 ohms with switch—type 203.
R2—Lynch fixed resistor, 300 ohms, ¼ watt.
R3—Lynch fixed resistor, 50,000 ohms, ¼ watt.
R4, R7—Lynch fixed resistor, 500 ohms, ¼ watt.
R5—Lynch fixed resistor, 10,000 ohms, ¼ watt.
R6—Lynch fixed resistor, 20,000 ohms, ¼ watt.
R8, R11, R12—Lynch fixed resistor, .1 megohm, ¼ watt.
R9, R14—Lynch fixed resistor, 1000 ohms, ¼ watt.
R10—Lynch fixed resistor, 2 megohms, ¼ watt.
R13—Lynch fixed resistor, .25 megohms, ¼ watt.
R15—Lynch fixed resistor, 12,000 ohms, 2 watts.
R16—Lynch fixed resistor, 15,000 ohms, 1 watt.
R18—Lynch fixed resistor, 250 ohms, 2 watt.
R19, R20—Lynch fixed resistor, 10,000 ohms, ¼ watt.
R21—Lynch fixed resistor, 30,000 ohms, ¼ watt.
T1—United power transformer, type UH-4, primary 115v, 60 cycles, secondary 400v.-0-400v., 125 M.A., 6.3v.-6.3v.-5v.
T2—United push-pull input transformer, type CS-2P.
Wholesale Radio special high-ratio airplane type dial, type XN, 14221.
9—Continental Octal tube sockets, sub-panel type.
1—Phenolite 5-prong socket.
1—Wholesale Radio 9-inch dynamic speaker, type XW 19120, with 1000 ohm field and push-pull pentode output transformer.
1—5-prong speaker plug for above.
1—Trutest cadmium plated "Ocean Hopper" chassis, completely drilled.
Screws, lockwashers, nuts and push-back wire, assembly lugs, etc.
3—Octal tube grid caps.
9—Raytheon metal tubes.

Talking Light-Beam

(*Continued from page* 269)

of the illuminated surface in the lamp, and the distance over which the light beam is to be projected. The ideal result would be a parallel beam of light emerging from the projection lens. This is always impossible in practice due to the fact that the source is not a geometric point. The longer the focal length of the projection lens the nearer is the approach to a parallel beam. This has the disadvantage, however, of intercepting a smaller percentage of the total light radiated from the source. A short focal length lens has the disadvantage of spreading the beam. On our particular apparatus we found that a double convex lens having an 11-inch focal length, and a diameter of 2½ inches, gave us the best results for our purpose.

When the transmitting equipment has been put together and wired, it can be set up and tested for operation as follows:

1. Turn on the power supply.
2. Adjust the 0-50 milliammeter by means of the 1000-ohm control until it reads 30 mils.
3. Turn on the audio signal and adjust the input attenuator to the point where the milliammeter begins to swing about 2 mils. A greater swing gives greater volume, but introduces considerable distortion.
4. If the audio signal is a complex wave, like speech or music, the neon lamp will have a visible flicker. This is a pretty good indication that it is working.
5. Adjust the projection lens so as to give as nearly a parallel beam as possible. The best way to do this is to darken the room and throw the spot on a white sheet of paper about 20 feet away. The lens should be adjusted until the spot is as near the diameter of the lens as possible.

When the transmitter circuit and projection lens have been properly adjusted as described in items 1 to 5, the equipment is ready to transmit audio-frequency signals to a receiver.

Anyone of a great many types of receiving circuits may be used. The essential units are the following:

1. A receiving lens.
2. A light-sensitive device to convert the light impulses into electric impulses.
3. About 2 stages of high-quality, low noise-level amplification.
4. Any reasonably good quality P.A. amplifier and loudspeaker.

The optical problems for the receiving end of the equipment are not nearly as critical as for the transmitter. Almost any kind of convex lens having a focal length of 6 to 10 inches works out very well. In our work we have used an ordinary reading-glass type of lens having a focal length of about 6 inches.

The light sensitive device may be any type that will respond to the frequency range desired. We have used the Burgess Radiovision Bridge, the Weston Photronic Cell and several other types of standard photo electric cells.

The method of coupling the light sensitive device to the pre-amplifier, and the construction of the pre-amplifier itself, involves some special problems; in another installment next month we will give a full description of the kind of circuit and construction data on the receiver we are using.

Following is a list of the parts that we used in the construction of our transmitter:

List of Parts

1—Power Transformer, United Transformer Co—PA22, (T3);
1—Input Transformer, American Transformer Co—D81B, (T1);
1—Interstage Transformer, United Transformer Co—LS44, (T2);
1—Output choke, United Transformer Co—HUC20, (L1);
1—30 Henry choke, United Transformer Co—NS-40, (L2);
1—Swinging choke, United Transformer Co—PPA-41, (L3);
1—Filter choke, United Transformer Co—PPA-44, (L4);
6—ft shielded pair (for neon lamp), 1000 v.
1—Plug and receptacle (for 7 wire cable);
2—7 conductor cables (see text);
1—Yaxley open-circuit jack;
1—10,000-ohm variable resistor (must carry 30 mils);
2—100,000-ohm, 3 watt, fixed resistors;
1—30,000-ohm, 3 watt, fixed resistors;
1—7mfd, 600-volt condenser (paper);
1—.01 mfd, 600-volt condenser (paper);
2—.1 mfd, 600-volt condenser (paper);
2—.004 mfd, 600-volt condenser (paper);
4—8 mfd, 525-volt electrolytic condenser;
2—type -53 tubes with sockets;
1—type -83 tube with socket;
1—Phone plug;
1—7½-volt C battery;
1—0-50-milliammeter;
1—Neon lamp; 1-watt size with spiral wire on the outside;
1—Small spot-light housing (or equivalent) with lens-focusing arrangement;
1—2½" double convex projection lens with 11" focal length;

1—Chassis 8" x 12" x 3";
1—Chassis 10" x 14" x 2½";
1—16-gauge iron case 8¼" x 8¼" x 12¼" inside dimensions;
1—16 gauge iron case 8¼" x 10½" x 15" inside dimensions;
1—Power switch.

Many of these parts are the kind that every serviceman or experimenter will find around his work shop. Obviously it is not necessary to follow all the details of our design. Perhaps many of our readers will discover improvements.

In addition to having some possibilities from the standpoint of communication, the light-beam telephone has limitless entertainment and spectacular value. With a neon lamp, the beam itself is invisible, when used in daylight. Moreover, the beam can be bent around corners by means of plane mirrors, etc. We have found that it never fails to create great interest, even after repeated demonstrations to the same audience. Perhaps some of our ambitious servicemen can see their way clear to convert this entertainment value into an economic one. *C. A. Johnson, Vernon Sharp, New York University, School of Commerce.*

Radio Weather

(*Continued from page* 269)

by radio at 9:30 a.m. and 9:30 p.m. advertising what trips will complete or cancel and whether delays will occur before the weather clears. Special trip forecasts are sent by radio to pilots and dispatches at the six major terminals. Supplementing the hourly weather reports from various eastern points, the United States Weather Bureau supplies the line's weather bureau from the 250 weather bureau stations as far north as Point Barrow, Alaska and as far east as ships on the Atlantic Ocean.

This use of radio, therefore, as a communication system for aviation weather forecasts works ideally so that pilots may use the information to reach destinations in the fastest time with the greatest comfort to passengers.

A Pre-Amplifier

(*Continued from page* 274)

whatever of misplacing tubes. The same applies for metal-glass or "G" tubes. If glass tubes are used, two 6C6's connected as triodes serve as the voltage amplifiers, and a type 1-V is the half wave rectifier.

The input and output terminations are arranged to accommodate either 200 or 500 ohm lines.

Efficiency and Gain

The use of the 6C5 metal tube triode makes high efficiency possible in this circuit. The use of a transformer for interstage coupling, in place of resistance coupling makes possible a *100% (6 db.)* greater voltage amplication. Additional gain can readily be obtained by the use of an audio choke in place of the resistor for parallel feeding the interstage transformer primary. The overall gain of the amplifier is 55 db.

The harmonics in a class A amplifier come from both transformers and tubes. The harmonic content is small in transformers where the core materials are operated at proper flux densities. The phase shift is also maintained at a low value under these conditions. The amplifier can be operated up to an output of 12 milliwatts (plus 2 db.) without exceeding a negligible value of total harmonics.

Hum Level

The amplifier is complete on a single chassis. It might be thought that the advantage gained in compactness would be completely offset by increased hum. However, proper design and placement of parts has reduced the hum level to an extremely low value.

The hum level in an amplifier can generally be charged to filament supply, plate supply, inductive pickup and electrostatic pickup. The filament hum introduced by modern cathode type tubes is so small that it may be disregarded. The plate supply employs a highly effective 2-stage condenser input filter. Hum due to inductive and electro-static pickup is eliminated by proper transformer shielding and judicious placement of parts. The transformers employed are a United Transformer product, and the type numbers are shown in the schematic diagram.

The complete amplifier is 8⅜" long, 7" wide, and when using the metal tubes, has an overall height of 4⅛ inches. The apparatus, as shown here, does not have a switch nor a volume control, since it is felt that it will usually be controlled from the mixer panel of the main amplifier. If desired, a switch can be placed in the line and a 250,000 ohm volume control potentiometer can be connected across the secondary of the input transformer.

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Radio

RADIO ENGINEERING, broadcasting, aviation and police radio, servicing, marine and Morse telegraphy taught thoroughly. All expenses low. Catalog free. Dodge's Institute, Elm St., Valparaiso, Ind.

Song Poems Wanted

SONG POEMS Wanted. Free examination, 50-50 plan. Song Bureau, Salem, Indiana.

Wind Driven Lights

ELECTRIC LIGHTS—WIND DRIVEN—You build them. Write, Wind Motor Electric, Ridgway, Montana.

Modernization

(*Continued from page 277*)

client's present cabinet for $50.00 plus his old set and speaker. Of course the serviceman had this all figured out in anticipation of exactly what happened. The deal was closed then and there.

The way it worked out on paper is as follows:

Complete kit of parts for the Browning-35	$39.90
Speaker	4.10
Tubes	3.68
Total cost to serviceman	47.68

The serviceman had already arranged to dispose of the Pilot set, as is, to a local gas station for $15.00. Thus his profit was $17.32—or better than $3.00 an hour for five hours work, which included repair on the Pilot job. The average serviceman can assemble a Browning-35 in about 2½ to 3 hours and in this particular case, the substitution took less than two hours.

The mechanics of modernization are illustrated in the accompanying photos captioned "Before" and "After". The cabinet was completely scavenged—the front panel and loudspeaker grille (reliquary of the old Priess days) were removed and a large section of the bottom cut away. A new front panel, drilled in accordance with Figure 3 was fitted, stained dark walnut to conform with the rest of the cabinet, and the escutcheon mounted. A shelf of the correct height was built in the cabinet to hold the chassis, floating on rubber. The bottom was cut away and in its place an inclined baffle was mounted which was about the only way of getting the speaker into the cabinet.

In preparing the plywood panel, sufficient clearance must be provided for in the shaft holes so that the chassis floats. The large hole is easily sawed in the plywood with a key-hole or fret saw and the panel can be stained to match any cabinet, or in contrast. All rough edges are covered by the handsome escutcheon plate shown herewith.

In this particular case, it would have been entirely possible to retain the old power supply, 250 push-pull amplifier and the speaker. The tone quality of the combination supplanted was excellent. However, the owner did not particularly fancy the external speaker which was necessitated by the size of the power supply, amplifier and tuner combination. In many instances it will be possible to utilize either a part or all of the original audio system, in which case the modernization can be effected at a more attractive price to the customer without any reduction in the serviceman's profit. (*The Tobe-Deutschmann Corporation has prepared an interesting booklet on Modernization, which can be secured by writing to the* RADIO NEWS *Technical Review, 461 8th Avenue, New York City. This booklet contains a comprehensive serviceman's sales campaign for modernization, including sales letters, advertisements, publicity, mailing cards, etc.*)

18-Tube Super

(*Continued from page 283*)

local broadcast stations. This was especially true of VK3LR as early as 3:30 a.m. and up to 7:30 a.m., VK2ME and VK3ME were every bit as good as VK3LR at times but a little less consistent. The Jap JVM was a consistent and strong visitor every morning that the receiver was in operation. Another such was the Russian RW59 which several afternoons provided an output audible a block or more away and absolutely clear except for occasional periods of short fading at which times the noise level would rise to appreciable levels.

The stations mentioned convey an excellent idea of the sensitivity and quality of short-wave reception obtained with this set. Add to these, the English, German, French, Italian, Dutch, Portugese, Norwegian, Swiss, Belgian, Spanish, Central American, Canadian and American stations, all of which were logged during the tests, and a good idea of the all around utility and ability of the receiver is obtained.

The Emerson Set

(*Continued from page 284*)

an antenna "trap" cricuit is used to filter out unwanted code signals.

A few of the refinements incorporated in the receiver include an effective automatic volume control; a continuously-variable tone control; and an airplane-type dial, equipped with a friction type vernier drive. The upper outside figures on the dial are colored red, and are for police calls and the regular broadcast programs from 170 to 555 meters; the inside upper series of figures colored green, are for

the police, amateur and airplane ranges from 63 to 180 meters and the blue figures in the lower half of the dial are for the short-wave bands between 19 and 55 meters. For these three different-colored bands there are three corresponding color markings on the wave-band switch knob, and by this method, wave-band selection is simplified.

At this point it is advisable to outline the duties of the various controls: the extreme left-hand control on the front panel is the combined tone control and "on-off" switch. The next knob, lower center is the wave-band switch, marked with the wave-band indicating color dots explained above. The upper center knob is the station selector and the extreme right hand knob is the volume control.

While the set is designed for operation on 60 cycle, 110 to 120 volt a.c. supply, it is also available with a special transformer for operation on 25 to 60 cycle frequency, 125, 150, 230 and 250 volt supply. The rust-proof receiver chassis and a 6-inch dynamic type speaker are enclosed in a walnut-finished cabinet measuring 16 inches high by 11½ inches wide by 7¼ inches deep.

Prize Contest

(*Continued from page* 299)

FOURTH PRIZE
Radio Service Insurance

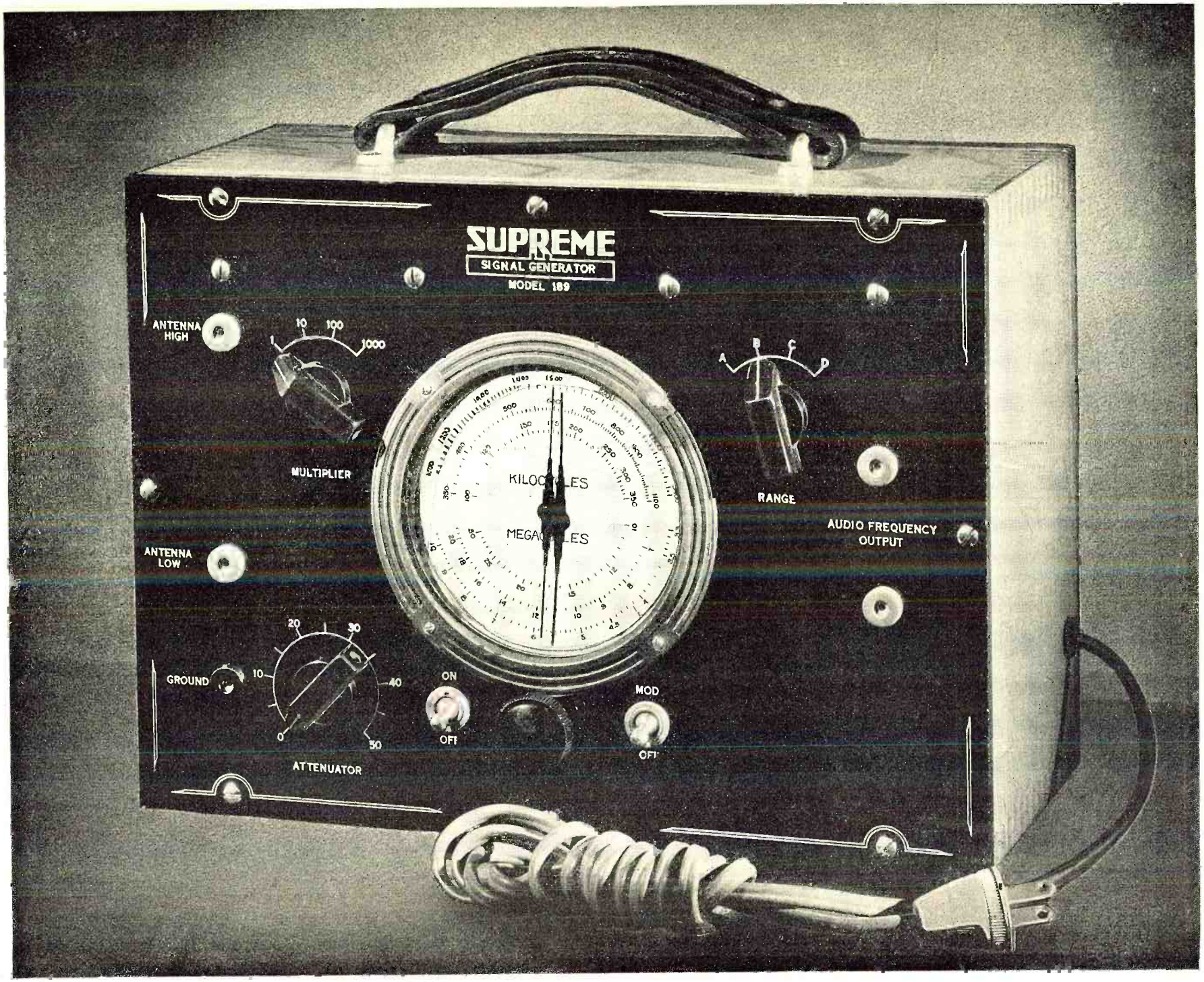
During the last three years I have had considerable success in radio service insurance. The insurance is for a period of one year, and the important points listed on the card issued to my clients are as follows: The insurance covers labor only, all service work, erecting antennas, etc. The insured receiver is given a complete overhaul, with no charge for labor, immediately after the issuance of the insurance. The set is given a complete check-over within ninety days of each service job. The customer is entitled to special prices and allowances on parts, and other electrical work we may do for him. The insurance rates vary with the number of tubes in accordance with the following table:

NO. OF TUBES	TOWN	COUNTRY
3 or less	$3.25	$2.00
4 to 6	3.75	2.75
7 to 9	4.25	3.25
10 to 12	4.75	3.75
13 to 15	5.25	4.25
16 and over	5.75	4.75

"The customer pays cartage charges to and from our shop."—R. A. White.

FIFTH PRIZE
A Novel P. A. Service

"A play, 'Penn High Follies,' presented by home talent in the Penn High School at Greenville, Pa., gives another tip to the alert serviceman looking for extra profits. The second act of this play consisted of imitations of leading radio stars, including Ruby Keeler, Amos 'n' Andy, Bing Crosby, etc. The 'radio' equipment comprised a P.A. system with speakers mounted on either side of the proscenium arch, installed by the writer. I used a home-built amplifier, with one 57, one 56, one 59 driver and two 53's in Class B, driving two 12-inch auditorium dynamics. Pick-up consisted of two crystal and one two-button carbon mikes. This job was a little difficult to handle, as the performers and mikes were all on the stage, with the speakers close by. Volume was held close to the feed-back point at all times, and as all three mikes were alive, the controls had to be delicately adjusted. The up-and-coming serviceman will do well to contact the musical director or principal of the local high school with a view of co-operating in a similar presentation. Most high schools present semi-annual performances. The 'Penn High Follies' played to capacity audiences for three days and was highly profitable—not only to the school, but to—Yours truly, C. H. Rauschenberg."



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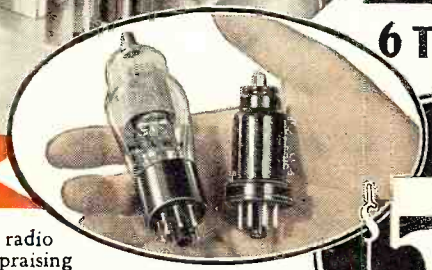

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Now, Push Button Silent Tuning is offered for first time! Simply pushing Silencer Button hushes set between stations . . . suppresses noises. Pressing Station Finder Button automatically indicates proper dial position for bringing in extremely weak stations.

Acousti-Tone V-Spread Design (Patent Pending)

. . . Establishes new radio style overnight! The V-Front Dispersing Vanes were developed by Midwest engineers as a result of a study of directional effect of the Midwest Full Scope High Fidelity Speaker. These Vanes spread the beautiful lacework of the "highs" throughout the entire room in a scientific manner . . . directing the High Fidelity waves uniformly to the ear. Send for new FREE 40-page catalog. It pictures the complete line of beautiful 1936 Acousti-Tone V-Spread consoles . . . and chassis . . . in four colors.

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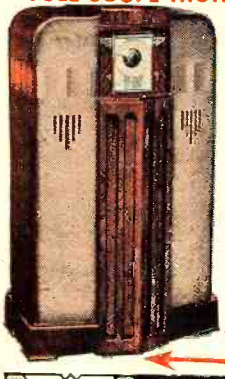

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V-FRONT

EVERYWHERE, radio enthusiasts are praising this amazingly beautiful, bigger, better, more powerful, super selective, 18-tube 6-tuning range radio. They say it is a tremendous improvement over Midwest's 16-tube set, so popular last season. It is sold direct to you from Midwest Laboratories at a positive saving of 30% to 50%. **(This statement has been verified by a Certified Public Accountant who conducted an impartial survey among representative Ohio, Kentucky and Indiana raido retailers.)** Before you buy any radio, write for FREE 40-page 1936 catalog. Never before so much radio for so little money. Why pay more? You are triple-protected with: One Year Guarantee, Foreign Reception Guarantee and Money-Back Guarantees!

This super Midwest will out-perform $200 to $300 sets on a point-for-point comparison. That is why nationally known orchestra leaders like Fred Waring, George Olsen, Jack Denny, Ted Fio Rito, and others use Midwest sets to study types of harmony and rhythmic beats followed by leading American and Foreign orchestras.

80 ADVANCED 1936 FEATURES

Scores of marvelous features, many exclusive, explain Midwest super performance and thrilling world-wide all-wave reception . . . enable Midwest to bring in weak distant foreign stations, with full loud speaker volume, on channels adjacent to locals. Only Midwest offers so many features . . . only Midwest tunes as low as 4½ meters . . . only Midwest gives the sensational new Push-Button Tuning feature, etc. See pages 12 to 21 in FREE catalog for description of the 80 features. Read about advantages of 6 Tuning ranges . . . offered for first time: E, A, L, M, H and U. They make this Super De Luxe 18-tube set the equivalent of six different radios . . . offer tuning ranges not obtainable in other radios at any price!

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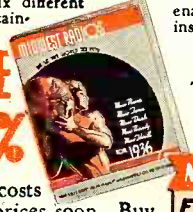

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Thrill to new explorations in sections of radio spectrum that are strangers to you. Every type of broadcast from North and South America, Europe, Asia, Africa and Australia is now yours. Send today for money-saving facts.

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Long Island, N. Y.—After comparing many different makes, I finally decided upon Midwest. It out-performs other radios costing almost twice as much. The crystal-clear tone is so life-like that it sounds as though I am in the studios, actually hearing artists performing. George Olsen

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My new Midwest is finest radio I have had pleasure of hearing. Bass-Treble control is marvelous . . . enables one to hear every instrument in orchestra. Ted Fio Rito

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