SHORT WAVE AND TELEVISION

June

WORLD'S LARGEST SHORT WAVE CIRCULATION

THE RADIO EXPERIMENTER'S MAGAZINE

HUGO GERNSBACK
Editor

John L. Reinartz
Discusses
"Radio—Then and Now"
in this issue

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25¢
IN U. S. AND CANADA

RCA ALL THE WAY

RCA Radio News

RCA Manufacturing Company, Inc. • Camden, New Jersey
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EVERYTHING IN RADIO—MICROPHONE TO LOUDSPEAKER

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Not only is it light and portable—but it provides excellent tone. In a beautifully carved cabinet it will enhance the appearance of any room. And it costs only $9.50 list.

Take it with you on service calls. Demonstrate its great usefulness to your customers. It will prove a fine aid to extra profits. Comes complete with 6-inch P.M. speaker, universal matching transformer and switch.

New Radio Program Provides Free Radio Instruction...Free Prizes

RCA, in cooperation with your local RCA tube or parts distributor, is sponsoring a new, weekly radio broadcast on 50 stations from coast to coast, solely for the benefit of radio service men. This fine new program teaches radio technicalities. Keeps you up-to-the-minute on latest radio developments. Shows the way to more service jobs. Tells how to make sales.

Not only does this program teach—but it offers a chance to win valuable prizes as well. Your local RCA parts distributor will give you full details on request. Ask him today. Tune in for the next broadcast.

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The RCA Radiotron Spring "Check-Up" Plan consisting of a 10-point radio check-up service costing $1.50 exclusive of parts, is of interest to 73% of the homes in your community, for that many have a radio.

Check-ups are part of American life. People are used to automobile and dental check-ups. Hence they can see the wisdom of a radio check-up. And the RCA Check-Up means giving weak, worn-out radios new life and vigor—restoring to them "new set" tone and performance!

Service men will find, as others have, that the check-up promotes sales of service and parts, new sets and other appliances that they stock. Moreover, they visit sick radios on the basis of "service"—not "sales". And that's a valuable point in their favor. In addition, they get paid for the service they render and, at the same time, are afforded an opportunity to help their customers select other merchandise they may need.

Service Men Get Selling Help from RCA

In order to help you sell this service RCA Radiotron is running full column advertisements in The Saturday Evening Post and Collier's every other week . . . newspaper ads in over 100 cities...and features the check-up with commercials on a full hour radio program every Sunday. And in all cases YOU are mentioned as the man for the consumer to call in! Besides this, Radiotron also offers you several mailing pieces for your own use—mailing pieces that will produce results. Get some. Use them. Back up this Plan. It will pay you well! Also ask your jobber for details of the new auto radio check-up.

Facts Prove RCA All The Way Means Better Radio

Radio holds many thrills in store for listeners every day. But there's no radio thrill that compares with the thrill of owning a set that gives you the benefits of RCA All The Way reception. And only with an RCA Victor radio can you get this reception!

Here are five facts offering strong proof that RCA All The Way means better radio. Read them. Then have your nearest RCA Victor dealer give you an actual demonstration of radio that's RCA All The Way—from the microphone in the studio to the receiving set in your home.

1 Through the National Broadcasting Company, one of the RCA family, RCA creates and broadcasts the majority of network programs.

2 The actual broadcasting of many programs is done with RCA equipment. More than half the broadcast power on the air is RCA installed.

3 From practical experience in radio communication with 47 foreign countries and ships on all seas, RCA knows how to build superb short wave broadcasting and receiving equipment.

4 RCA is the only company that does everything in radio—from original research to broadcasting.

5 RCA is the only company that makes everything in radio—from microphone to receiving sets.

RCA Victor 1937 radios (Model 6K-1 shown here, $52.95) range in price from $20.00 up. Including such outstanding RCA Victor features as Magic Brain, Magic Eye, MagicVoice, Metal Tubes and many others, they are today, more than ever, radio's greatest values!

New Tube Manual!

The RC-13 Manual on RCA Radio Tubes gives service men complete information on all receiving tube types including Metal and G-Series tubes. Get your copy from your RCA tube distributor.

IN THIS ISSUE: PROMINENT SHORT-WAVE AND TELEVISION AUTHORS

Reinartz • Roberts • Johnstone • Gernsback • Cisin • Shuart • Hooton • Miller

SHORT WAVE AND TELEVISION

HUGO GERNSBACK
Editor

H. WINFIELD SECOR
Managing Editor

GEORGE W. SHUART, W2AMN
Associate Editor

Combined With

Official SHORT WAVE LISTENER

Contents for June, 1937

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How to Build a Practical S-W Diathermy Machine

D.C. Output of Rectifiers

How To Get the Best Results from Your S-W Receiver, H. W. Secor

Identifying "Foreign" Stations By Their Musical Signals, by Joe Miller

Photos and Letters from "Hams" and "Fans"

Coming—A Simple "All-Band" Transmitter, by W2FHP

Certified Circuits

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

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

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

OUR COVER

● Aviation radio has received a great deal of attention in the public press recently. It is very important in all cases that radio contact be maintained constantly between ground stations and planes; also that contact be maintained between dispatchers. The newest directive loop antenna, with a range of hundreds of miles for phone or code, is illustrated on our front cover this month, and described in detail on page 70.

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HUGO GERNSBACK, EDITOR H. WINFIELD SECOR, MANAGING EDITOR

Radio—Then and Now

By John L. Reinartz

Consultant on Tube Application for Radio Amateurs, RCA Radiotron Division

● WHEN Marconi electrified the world with his splendid achievement of bringing the Old and the New World together by *wireless* in 1901, there were born what we know today as *amateurs* (Hams) who were to follow in his footsteps and outdo even Marconi's feat. By 1908 these amateurs had multiplied to the extent that business houses found it profitable to manufacture and sell parts to these amateurs. Many *old-timers* will remember the E. I. Co. catalog as well as the one supplied by Mesco. A perusal of these old-time catalogs will bring a smile to any present-day amateur, but back in the old days they represented the "store-house" from which the amateur could obtain the latest and most authoritative information on just what radio was. Incidentally, he spent all his hard-earned money for such apparatus as he could afford to buy. Who does not remember the ½ inch spark coil secondary for two dollars, the core and primary to be made up by the purchaser? I still have such a coil, purchased from the E. I. Co. Then later, Brandes earphones replaced the coherer and decoherer. Detectors ranged all the way from the pyrite and galena crystals to electrolytics and the audion. Spark transmitters were the rule and the amount of power used was determined only by the capacity of the pocket-book, wavelengths were just as *elastic* until the law of 1912 limited amateurs to a wavelength of 200 meters and a power of 1000 watts. Then there came a period of *status quo* lasting up to the time of our entry into the World War. Before this time there had been few occasions when the amateur could point to public service. However when war was declared, a call for radio operators met with an enthusiastic response and the amateurs' service to their country in time of need is one of the "high spots" in the history of amateur radio.

John L. Reinartz, one of the best known radio amateurs in the world. The receiving circuit bearing his name has been used by thousands of amateurs and was the first satisfactory C-W receiver. In 1923 the first two-way amateur contact across the Atlantic was established when Schnell, 1MO, and John Reinartz, 1XAM, held a QSO for several hours with 8AB, Deloy, in France. The wavelength was about 110 meters. He is at present engaged as a consultant on radio amateur tube applications.

When the rights of the amateur were restored to them after the war in 1919, the technical progress of radio had advanced in great strides and the vacuum tube had come into its own. Spark transmitters gradually went the way of all obsolete material and tube transmission became the rule. A few amateurs had been experimenting with radiophone and they brought about a new phase of radio. Several broadcasting stations started to transmit music and entertainment and the amateurs began to invite their friends in to hear this *broadcasting*. A great craze for *receiving* equipment developed and nearly all amateurs started to build receivers for the broadcast listener. It became a scramble of circuits until finally they settled down to two basic types, the radio-frequency amplifier type and the superheterodyne type. Many amateurs were drawn into commercial channels and are today some of the leaders in that field. For a while the amateur got away from his hobby but came back to it with a vengeance when in 1923 he started to investigate the then *unused* shorter wavelengths below 200 meters. He found that greater distances were possible in spite of the earlier prediction of physicists that 200 meters was the lower limit of effective radio transmissions. First the amateur went below 100 meters and found it a wonderful territory for greater distances than he had ever before covered, then on down until his dream of contacting the antipodes was fulfilled. First he spanned the Atlantic, then the American continent; finally the greatest distance possible, from one antipode to the other. Amateur interest soared and commercial interest followed. What had been unused territory before became a *hotly contested* section of the radio spectrum. The amateur had to give way and be content with short sections in what had been before an unlimited range. Commercial companies started to scrap their *high-power long-wave* stations and began to build high-frequency (short-wave) stations of comparatively *low* power, capable of more effective communication than were the old *long-wave* stations. Today, commercial communication is effected in greater part on those *short waves* which were demonstrated by the amateurs to be surprisingly useful.

Again there was a lull in amateur activity until he began to take stock of those frequencies still left to him and he decided that perhaps the frequencies above those used by the commercial companies might still be good for something. Therefore the amateur started to look into the 5 and 10 meter bands, including 2½ meters for good measure. He found ten meters capable of *round-the-world* contacts and 5 meters splendid for short distance work because of the unbelievably small power requirements. Equipment for transmission required but a single receiving type tube to effect contact with a receiver using but one tube. While usual contacts were along *line-of-sight* distances, occasional contacts were made over greater distances, lending that enchantment necessary to keep the amateur interested. Again commercial companies followed suit and we now have short-wave police radio and pick-up stations used for contacts with studios of the large broadcasting companies. Even now, work is going forward on 3 meters and 6 meters (*Continued on page* 95)

Sixth of a Series of "Guest" Editorials

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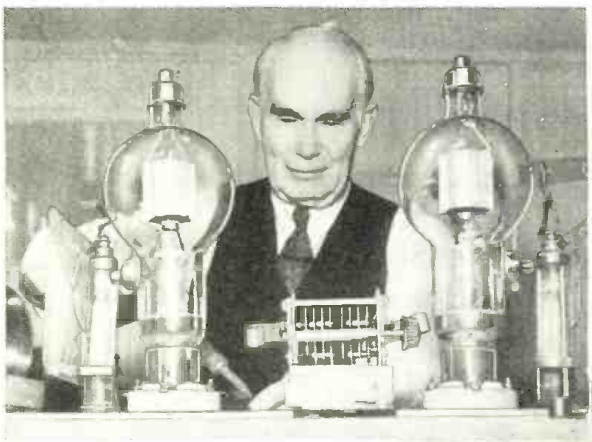
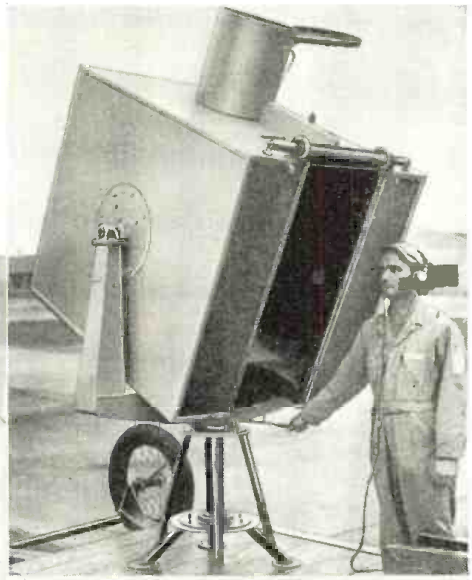
Short Wave Snapshots

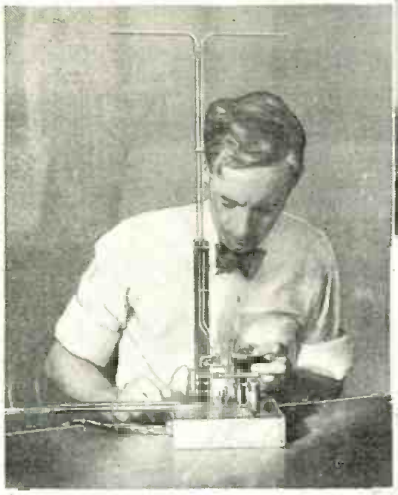
Latest Advances in S-W Diathermy . . . Airplane Bombing . . . Television . . . Ultra Short Waves . . . Portable Army sets.



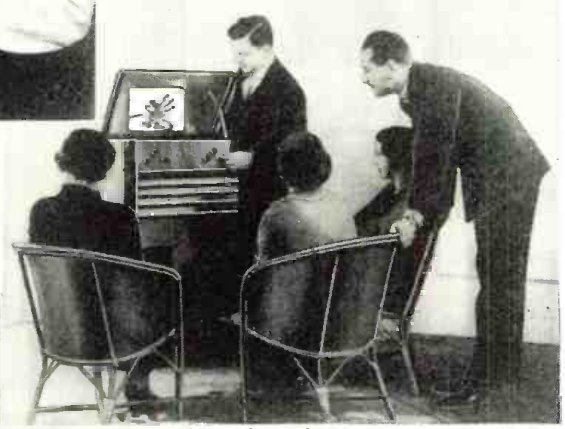
Dr. Lee de Forest has turned his lifetime of experience to the building of radio therapy instruments. He has designed a machine known as the "Dynatherm," which, by means of short waves, induces artificial fever, helpful in curing various ailments. Dr. de Forest is shown in his Los Angeles laboratory.

→ Radio signal substitute for aerial bombs—the odd looking device at the right is used by Uncle Sam's aerial bombing experts for target practice. The position of the plane, when it sends a short-wave signal instead of dropping a bomb, is recorded by the large camera obscura. This system saves the cost of bombs, and serves the same purpose. Wavelengths between 42 and 96 meters are used.



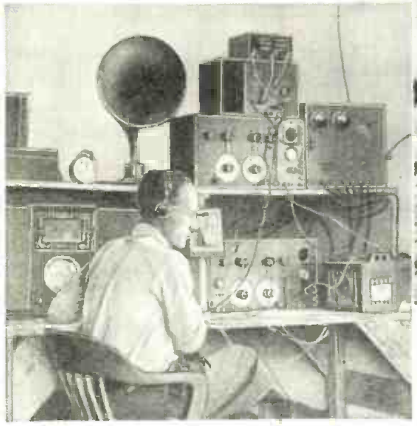


→ Right—The Baird T-5 Television receiver is said to be the best European set and operates on A.C. or D.C. Incoming sound and vision signals are fed into the receiver through a low-impedance feeder cable. Vision channel band-width 2 megacycles; Control knobs—center one is for tuning; the other 5 for adjustment of image sharpness, for varying the contrast, for controlling the screen light intensity, also sound and vision controls to adjust the overall gain of the set.



↑ Above—One-half meter transmitter. An ultra short-wave transmitter recently built by one of the engineers of the Bell Telephone Laboratories. It utilizes the new 316A high-frequency tube. 400 volts D.C. is applied to the plate. At 600 mc. the power output is 4 watts. The limit of oscillation for this tube is 750 mc.

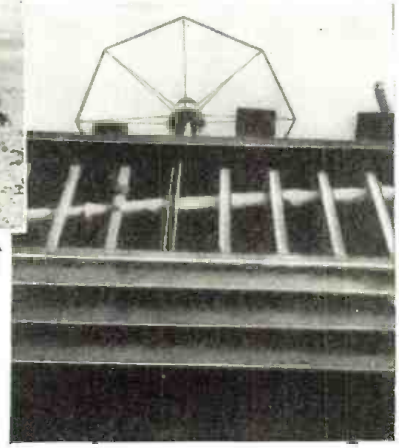
Pancake Television Antenna used in Berlin. Photo below shows the top of Berlin's television tower 453 feet in height, with an image antenna of unusual design. The antenna was designed for a wavelength of 6.7 meters, and it is claimed that the great range of the Berlin television station is due to this odd-looking radiator. ↓



↑ Located 100 miles north of the Arctic Circle, he provides the link between Wiseman's isolated handful of prospectors and Eskimo families and the outside world. The village of Wiseman is roadless and train-less, relying on river travel, airplane and dog-team for transportation. Besides being radio operator, young Rayburn is school teacher, doctor and dentist.

"Farthest North" radio amateur—George Rayburn of Wiseman, Alaska, seen at the controls of his home-made transmitting and receiving sets.

Above—a radio set on "mule-back." ↑ A British signaller using a "portable" which can be used while the mule is moving. This picture shows a scene on India's Northwest frontier, during operations in the Khaisora Valley against hostile tribesmen who opposed the British Government's efforts to secure the safety of a kidnapped Hindu girl. The operations were successfully conducted, but sniping of troops continued as a matter of routine.



Practical Cathode-Ray TELEVISION In France

By P. Hémardinquer

With the recent announcement that a new French television transmitter rated at 30,000 watts, will shortly go on the air—interest in French television receivers has greatly increased. The present article describes the latest cathode-ray television receivers of the type used in France.

Fig. 2—The small model Emyradio television receiver (without sound reception).

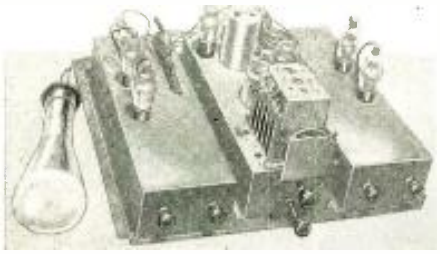


Fig. 3—The interior of the Emyradio television receiver—small model.

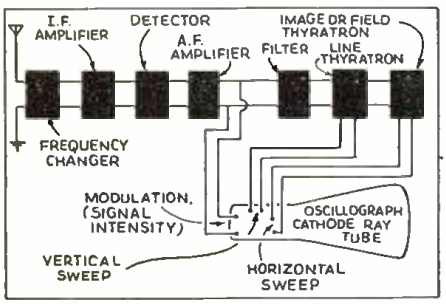


Fig. 1—Breakdown (block diagram) of the Emyradio television receiver.

● THE receivers constructed by M. R. Barthelemy, one of the pioneers of television in France, permit in some cases the reception of images and in other cases the reception of both images and their accompanying sounds for transmissions of the French system.

The receiver proper is a simple superheterodyne using an octode tube for the frequency changer, special high-frequency pentodes for the intermediate frequency amplifier, a double-diode triode for detection and a pentode of the power type for audio-frequency amplification. The band covered extends from 6 to 9 meters, and the band passed by the I.F. amplifier is approximately 1,000 kilocycles. (Fig. 1).

The coils are space-wound and supported on forms of very high insulating quality; the coupling between the detector and the A.F. amplifier is of the resistance-capacity type.

The tuning dial is about 3½ inches in diameter and is graduated in arbitrary divisions of 0 to 100. Also on the front panel are the sensitivity control, the control of the intensity of the cathode ray tube luminescence, the frequency control of the sweep circuits and the power-supply switch.

Lens Magnifies Image

The cathode-ray oscillograph tube has a diameter of 3¾ inches and produces a greenish tinted image. The sensitive surface of the tube is magnified to a size of 7 inches *by means of a simple convex lens placed in front of the tube* in the simplified model.

The oscillograph tube functions with a filament voltage of 4 V. and a current of 1.5 amperes. The voltage applied to the first anode is 800 to 1,400 V. and on the second it is 230 to 400 V. (Fig. 1, 2 and 3.)

The sensitivity of the electrostatic deflecting plates differs—for the first pair it is between .0164 and .0094 inch per volt, while for the second pair it is between .0176 and .01 inch per volt.

The high voltage necessary for the power-supply is obtained from two rectifiers (Kenotrons) with a particularly fine filter circuit. The sweeps, horizontal and vertical, are controlled by two thyratron tubes.

The synchronization is completely automatic both in frequency and in phase (line and field) and is obtained at intervals of a half-second, without intervention of the operator. In the system of M. Barthelemy synchronization is obtained by a single intense signal of short duration, which locks the thyratron in line and suppresses the signal corresponding to the end of the last line. The inventor has inserted devices which compensate for the lack of linearity of the simple sweep circuits used, which are caused by the difference in the charging rate of a condenser at the beginning and end of the charging curve.

The *Radio L.L. receiver* is regulated especially for the reception of the transmissions of the French system. The actual receiver and the sweep equipment is enclosed in a small piece of furniture with a protruding part on top in which a lens is mounted which both corrects and enlarges the images.

The receiver covers the wavelengths between 6 and 12 meters. It consists of a frequency changer using an octode tube, three stages of intermediate frequency amplification, a double diode detector, a tube for decoupling, two stages of audio amplification, and finally one tube for rectifying the high voltage of the "B" supply (Fig. 4).

The band pass is of the order of 1,500 kilocycles with a maximum attenuation of 6 db. and the audio frequency section carries frequencies of 25 to 1,000,000 cycles with a maximum attenuation of 6 db.

The synchronizing system consists of the usual thyratrons, but the thyratrons are supplemented by two amplifying tubes feeding the horizontal plates, for correcting the non-linearity of the charge curve. The field or image thyratron is also followed by two amplifying tubes which feed the vertical plates.

By this method an absolutely linear sweep is obtained, which produces images clear *right to the borders of the tube*. The "B" power for the amplifying tubes is obtained from a full-wave rectifier tube, while the high voltage for the thyratron is obtained from a half-wave rectifier.

The receiver (*Continued on page 92*)

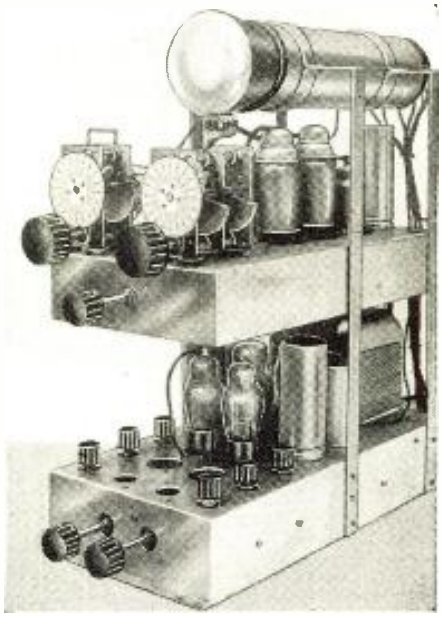


Fig. 6—The amateur or home-made "Visiodyne Baby" receiver designed by M. Chauviere.

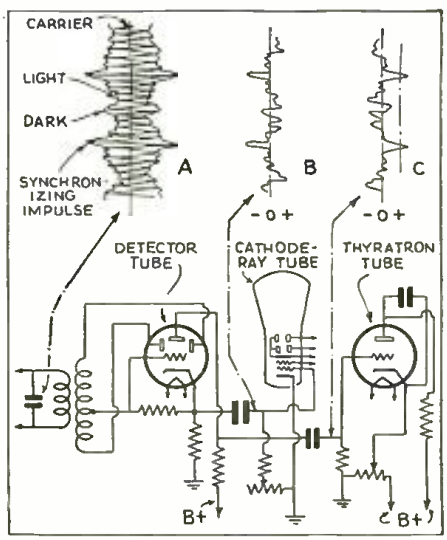


Fig. 7—Circuit details of the Chauviere receiver, showing the current formation in the different stages.

New Loop Aerial *Ensures Contact* With Planes

By Henry W. Roberts

The newest sensation in aviation radio—a directive loop-antenna, which makes it possible to concentrate a wave so as to reach an airplane or land station at practically any distance. Mr. Roberts is an expert on radio direction finders, besides being an airplane pilot.

New "Directive Loop" aerial recently built at Glendale, Calif., by American Airlines. It will enable the dispatcher to "contact" land stations or airplanes at great distances, if necessary. Photo courtesy American Airlines.

● TO reduce radio traffic congestion by eliminating numerous relay stations along their 3000-mile coast-to-coast route, American Airlines recently installed at their Glendale, California, terminal a *directional transmitting antenna*, capable of spanning the continent with code and having a 500-mile range for voice communication.

Trained on a point midway between Fort Worth, Texas, and New York, the new 20 ft. loop antenna directs its maximum radiation substantially along the air line's route, providing greater range for the given power and avoiding interference with communications elsewhere. 800 watts are available for code messages, and better than 400 watts for voice communication with aircraft in flight.

A novel feature of the installation is the *coaxial* feeder line from the transmitter to the antenna. The wire is centrally supported by isolantite beads within a copper duct, from which the air was exhausted and replaced by nitrogen gas under pressure. This provides an excellent insulation, since the nitrogen gas, unlike air, is not affected electrically by variations in temperature and moisture content.

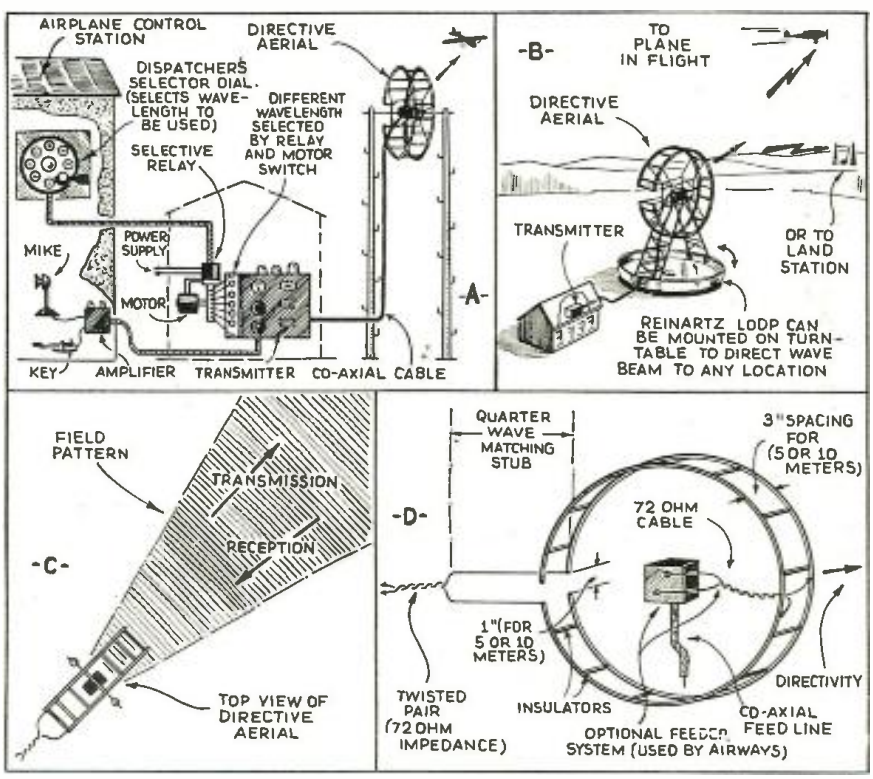
An unusual method of keying and press-to-talk control is used. A fixed oscillator generates a 4100-cycle signal, which activates tubes in the transmitter control unit. These tubes control a relay which turns on the high voltage when the 'phone channels are used; or allows the application of screen voltage to the doubler and intermediate stages when keying. Many relays are eliminated in this manner, and facsimile speeds are possible with this feature. A 400-cycle filter is used with a sharp cut-out below 400 cycles, to prevent modulation of the station carrier on this audio frequency. The frequency range covers ten values, running from 3,000 kc. to 9,000 kc. (33 to 100 meters).

The frequency changing is rapidly accomplished by means of a remotely controlled motor-driven multiple-switching unit. This unit, controlled by a *telephone-dial* system, drives a single insulated shaft mounted vertically in the center of the transmitter, and tunable air-dielectric condensers replace the conventional fixed units in the higher power stages. Frequencies may be varied, with all voltages applied, without damaging the equipment. —*H.W.R.*

Reinartz Beam Antenna Also Useful for Amateurs

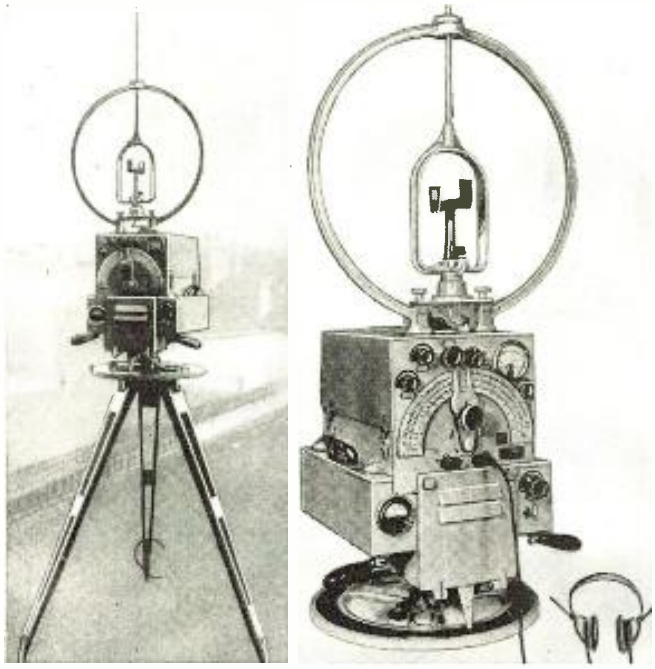
This novel beam antenna, which is being used by the American Airlines for communication with ground stations along their air routes and also for contacting planes whenever desired, is the invention of John L. Reinartz, our "Guest" editorial writer this month.

The antenna as shown on our front cover illustration and in the accompanying photos is rigidly mounted on poles, but for amateur requirements this concentrated design of aerial, which really comprises two half-wave antennas rolled into a more (*Continued on page* 95)



A general idea of the method of using the Reinartz directive loop aerial for transmitting is given above. Also how it may be placed on a rotating platform to direct the beam to any desired point. Different feeder systems are shown.

New Surveying Instrument Has Many Uses

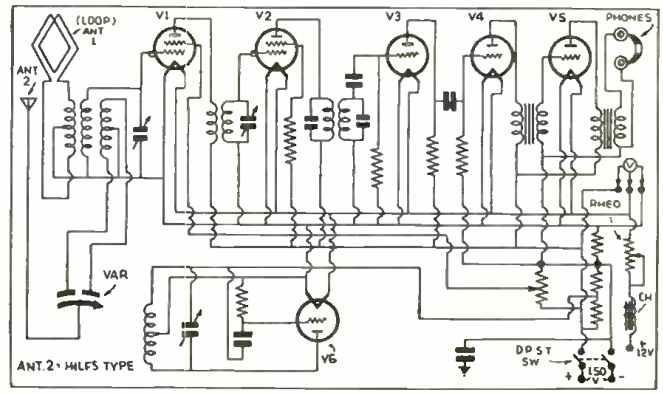


The photos above show the new short-wave surveying instrument used by the German army. It is a thoroughly portable device and has a very high accuracy.

● THE photos show one of the new German "Nahefeld-Peiler" as used by the German Army, i.e., in the form of a portable station. The cast aluminum box atop the tripod contains a very sensitive 6-tube ultra-short wave receiver, which operates in connection with a cast aluminum ring (loop antenna) and an auxiliary antenna consisting of an aluminum rod, penetrating the loop antenna. In addition to the radio devices a diopter is installed into the loop antenna for optical survey. The new device which has been designed by the Telefunken Co., for use by the German Army is of great value for land surveying under most difficult conditions. Batteries for operating it are all self-contained in the cabinet.

The diagram shows the circuit applied in the new German short wave "Nahefeld-Peiler."

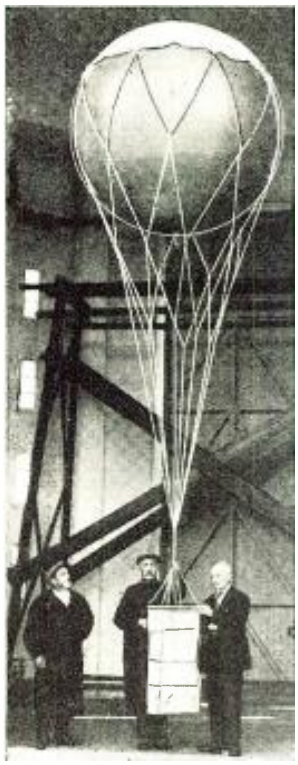
The loop antenna (Rahmenantenne) consists of a single ring made of cast aluminum. The diameter of the ring is about 19 inches. We see further an auxiliary antenna (hilfs antenne) which operates with a differential condenser in the tank circuit of the R.F. tube. This antenna is used for side-determinations. A tube is applied as a local oscillator, followed by a single I.F. stage. A second detector and the two A.F. stages are (*Continued on page* 112)



Wiring diagram of the receiver used on the new German short-wave surveying instrument. The wavelength range covered is 15 to 100-meters.

Short Waves + Balloons = Weather News

Latest French system of determining meteorological conditions in the upper atmosphere

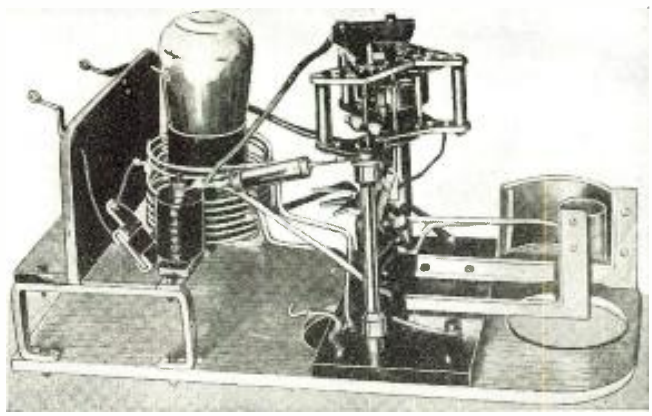


Above—Appearance of one of the new French radio weather balloons.

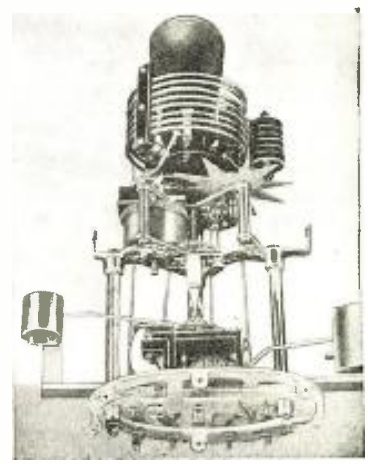
● ABOUT a half century ago, the learned meteorologist, Teisserenc de Bort, began the exploration of the air by means of sound balloons. This method, universally adopted since then by meteorological observatories, consists of throwing into the air a rubber hydrogen-inflated sphere covered by a parachute and equipped with a rattan basket carrying the recording instruments, it reaches a fixed altitude, according to its size. A balloon of 80 cm. (32 inches) in diameter reaches a ceiling of about 12,000 meters, while a balloon of 125 cm. (50 inches) in diameter can attain 18,000 meters. Having reached the greatest altitude their dimensions will permit, these balloons gradually descend, suspended by the parachutes.

The commander, R. Bureau, technical under-director of the National Meterological Dept., has developed the *Radiosondage*. That skillful technician put in a light basket a radio sending-unit, which, connected with recording instruments, permits him to receive all the necessary data on the state of the atmosphere, and to transmit these to those interested in collecting these observations. This method is now used in France, Germany, Russia and the United States.

(*Continued on page* 112)



Close-up of the short-wave transmitter carried in the balloon as it ascends to extremely high altitudes. A small battery operates the set.



View of another type short-wave transmitter carried aloft by weather balloon.

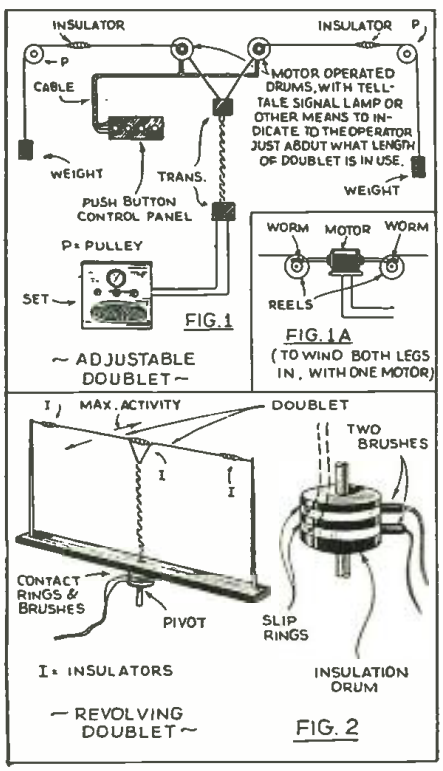
Practical Antenna Hints

By Henry Johnstone

Several novel ideas are herewith presented which the short-wave "Fan" and "Ham" will find of value. Variable doublets for tuning to the exact wavelength are discussed among other things.

● ANY one who has made much of a study of short waves knows that to receive a distant station with the maximum strength of signal, that a doublet aerial should be adjusted exactly to the frequency of the wave which is to be received. Quite some time ago an article in an English journal described a winch for hauling in the extra wire of an inverted "V" antenna, and while this idea has probably not been adopted in this country, due to the reason that this type of antenna is not so much in favor here as abroad, another application of the motor for winding up any unused wire is shown in Fig. 1. Here a motor winch reels in the two wires of a doublet so as to adjust the length of the arms to the desired frequency.

Each arm of the doublet in practice is adjusted to one-quarter of the wavelength of the incoming signal or the two halves are made equivalent to the half wavelength. One of the simplest ways of applying the motor-driven winches to an adjustable wavelength doublet, is to use balance weights as shown in Fig. 1. Either solid or stranded wire can be used and as the wire is reeled in, it may be wound on metal drums of either threaded or smooth contour. The motors and winches may be housed in small waterproof boxes or protected in some other way such as under the eave of a house, etc.



Doublet may be tuned to different frequencies by motor-winch, which is shown in Fig. 1. A push-button control may easily be arranged. Fig. 2 shows "revolving" doublet.

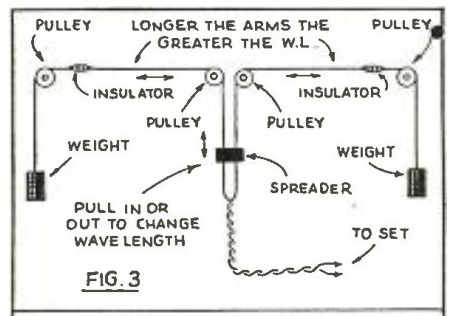
One Motor Winds Up Both "Arms" of Doublet

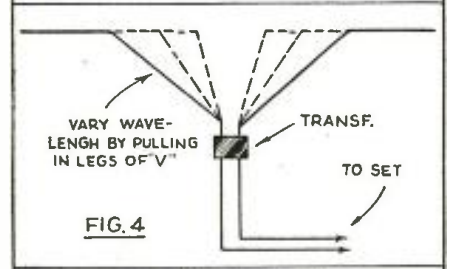
The ingenious experimenter will be able to easily work out any one of several electrical circuits for controlling the motors. One scheme would be to control the motors with a simple switch and arrange to check the lengths of the arms of the antenna visually, by having fixed or stationary indicators rigged up either on the drums or at the very ends of the antenna, so that the positions of the insulators as they were reeled in would indicate the wavelength for which the antenna was set, in any given case. However, the simplest and best arrangement of the winding scheme would be, of course, to use one motor for otherwise it would be almost impossible to keep the winding lengths even. The single motor may be geared to the two winches or drums through a bakelite rod or otherwise, the insulating rod being suggested for use especially where a "V" type antenna is used.

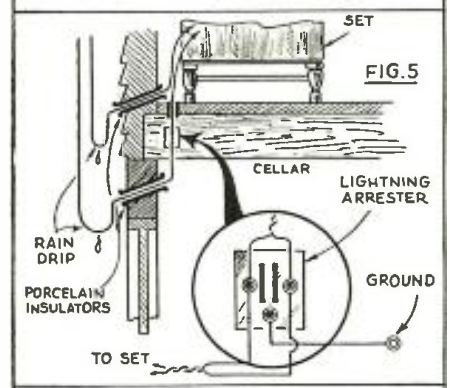
Still another idea for the electrical control would be to have several push-buttons mounted on a small panel near the receiver, so that by preadjustment and calibration, the winch motor would haul in just enough of the antenna wires for the pre-set wavelength. For instance, if the 30-meter button was pressed, the motor—by pre-calibration—would wind in just enough wire on both legs of the antenna to give the proper length of wire and would then stop. The cut-off may be arranged with a traveling nut or switch dog moving along a screw or threaded shaft attached to the motor-winch mechanism, the contacts at the various positions along which the switch dog moves being made *alive* or *dead* by a relay controlled by the respective buttons on the control panel.

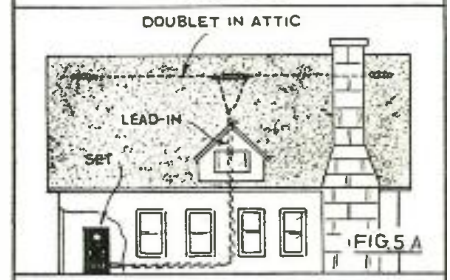
A Revolving Doublet

In Fig. 2 we find another interesting angle with regard to improving the efficiency of the short-wave doublet antenna. This principle has been used by quite a number of "Hams" especially on the ultra-high frequencies. The revolving doublet is based on the principle that to receive a distant station the arms of the doublet should be presented *broad-side* to the distant transmitter. In other words, the maximum activity of the receiving doublet is at right-angles to the axes of the wires composing its two legs or arms. The design of a revolving doublet can be worked out in one of several different ways, and while a rope or other means may be used to rotate the doublet, mounted on a piece of small timber or a board, the electrical (*Continued on page* 96)









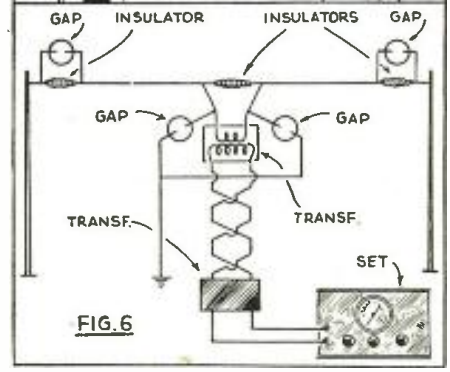


Fig. 3—Adjustable doublet; 4—variable "V" doublet; 5—lead-in detail; 5-A—doublet installed in attic; 6—lightning arrester hook-up.


9580 Kcs.
31.31 Meters

"C"
For Corporation

DAVENTRY, ENGLAND.

Dear Radio Friend:

Your report of reception of GSC on [illegible] has been carefully checked and found correct. Please accept this card as your verification. Many thanks for your report.

THE BRITISH BROADCASTING CORP.

Checked by: [illegible]

Verified by: [signature]

Here's "hot" news for the "Veri" card collectors! A verification card from the BBC! We are indebted to Mr. L. E. Cavileer of Haddon Heights, N.J., for sending us this card and the "welcome news" that Daventry now verifies!

How To GET That "VERI"!

By M. Harvey Gernsback
Editor of Our "World Short-Wave Station List"

So many requests have been made to the editors asking how to apply for verification cards to "foreign" short-wave stations, that we asked Mr. Gernsback to write this article. The instructions are clear and simple to follow, and if you have not already become a DX "Veri" collector, you undoubtedly will once you have seen some of the very attractive verification cards sent by "foreign" stations.

● "HOW can I be sure to get a veri card from that *foreign* station?"—hundreds of short-wave "fans" ask this question each month. Before going into that question we have a piece of news that should be of interest to all "veri" collectors. *Daventry now verifies!* Up above in the corner we have reproduced the card for GSC, one of the numerous frequencies used by Daventry.

To get back to our main topic, however, there are several important points to remember when sending a request to a short-wave broadcasting station for a verification of reception.

First of all the letter must be *clearly written*. The best and surest way is to *type* it. If a typewriter is not available, *print* the letter, unless you possess a very legible handwriting. Stations receive hundreds of letters every day and it is too much to expect them to wade through a carelessly scrawled letter. Never write letters with a pencil! *Always use pen and ink.* Be especially careful with letters sent to stations in countries where English is not generally used. Most stations have people on their staff who can read English, provided it is written clearly. The writer's name and address should be clearly printed also.

The second point is to give sufficient data on what program you heard, the *exact time* at which you heard it, and the exact or approximate frequency the station was operating on (if the station didn't announce its operating frequency, estimate it). Many listeners write letters saying *"I heard your station yesterday morning, please verify."* Of course no station will verify a report of this type. It is not detailed enough!

When writing also include information on how the station was received, whether loud or weak, fading or steady, distorted or clear and whether any other station was interfering with reception. If there was interference, mention the interfering station by name. Also mention whether the station is heard as well, or better than any other station located near to it.

After all, the station is doing you a favor by verifying your report, so it is only fair to give the station operators this information, as it is useful to them.

Always inclose an *INTERNATIONAL REPLY COUPON* with your request. These coupons can be purchased at virtually any post-office in the United States for 9 cents. The station can cash this coupon to cover the cost of answering your letter. Many stations refuse to verify unless such a coupon is enclosed, since they cannot afford the expense. There are certain countries where these coupons are unredeemable. The local postmaster can tell which countries these are on request. Never enclose U.S. postage stamps when sending letters to *foreign* stations, since they can not be used by them.

Attach 9c International Reply Coupon

Date .....

Name of Station
Correct Address

Exact time program was heard. State frequency.

Brief description of station heard.

Whether man or woman, singing or speaking, band or concert, violin or piano solo, etc.

Remarks as to how good program was received, whether static interfered, degree of fading—if any, etc.

Request that they check report with their "log" and send verification card. Also state that you enclose "International Reply Coupon."

Sender's name
Address

General outline of data to be submitted in your letter applying for a verification card to a "foreign" station—and don't forget that "International Reply Coupon," which you can obtain from your local post office for the small sum of nine cents. It costs the foreign stations a considerable sum to send out these "Veri" cards, therefore send that nine-cent coupon to help them defray the mailing cost.

Most commercial telephone stations, as differentiated from broadcast stations, will not verify reception reports unless the report is for a period when the station was testing. This applies particularly to United States telephone stations. The only U.S. phone stations which will verify are those of the A.T. & T. Co., at Dixon, Cal., which are used for Trans-Pacific phone service. They will verify reports covering periods when tests were being conducted. All others generally answer requests by a letter quoting the Federal "secrecy of communications" law and stating that verification is impossible. The great majority of foreign telephone stations are not so "fussy" and *will verify accurate reports.*

There are a number of stations both broadcast and otherwise, which never verify even when reports are complete and a reply coupon enclosed. Their reasons for this attitude are unknown. In this country W8XK at Pittsburg no longer verifies. Some *foreign* stations do not verify unless the request is written in their native language, because they have no one to translate English reports.

To guide verification seekers we reproduce here a model letter requesting verification. In addition there is appended a letter written in Spanish requesting verification.

August 25th, 1932

Radio Station VK2ME,
Amalgamated Wireless Of Australasia Ltd.,
47 York St.,
Sydney, Australia.

Gentlemen:

This morning at 6:18 a.m. (Eastern Standard Time) I had the pleasure of picking up VK2ME broadcasting on 31.28 meters (9590 kc.). I am listing the items heard:

6:18 a.m. Orchestra playing "Home, Sweet Home."
6:20 a.m. Announcement of last number and next number.
6:21 a.m. Soprano solo by Mary Jones, "In the Gloaming."
6:24 a.m. Announcement "This is VK2ME, Sydney, Australia, broadcasting on 31.28 meters. The time in Sydney is now 9.24 p.m. in the evening. You will now hear the song of the Kookaburra, Australia's 'laughing jackass' bird."
6:25 a.m. Kookaburra bird.
6:25½ p.m. Announcement: "The next number will

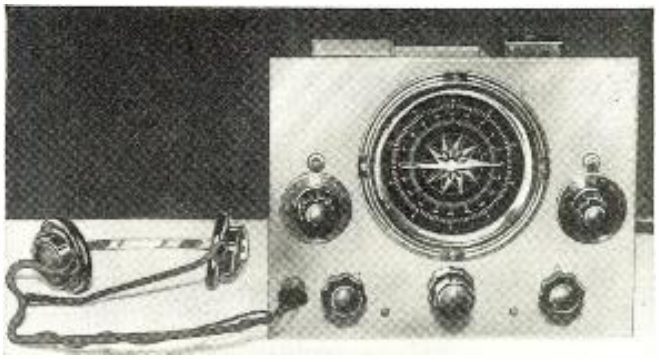
(*Continued on page* 103)


A typical "foreign" short-wave broadcast station—VK2ME, Australia.

Short-Wave Beginner

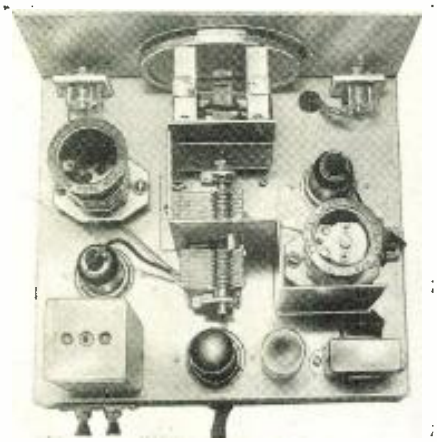
Regenerative SUPER-3

By E. L. Garrett



Front view of the "Regenerative Super-3" with Trimm feather-weight phones used in test.

This new "regenerative super-het" circuit works particularly well and three tubes perform four functions. This set works phones or speaker and uses 6.3 volt metal tubes. A separate plate-supply is required. It has band-spread and many other features.



Top view of the "Super-3", which yielded surprisingly fine results—both as to selectivity and range.

● IT has often been said that "You can't beat the old regenerative detector, and one R.F. stage combination for sensitivity." Whether strictly true or not, there were (and still are!) many thousands of sets with this line up in service. Only a couple of years ago, before the so-called superhet "boom," this was the accepted and standard receiver; and just as much DX was heard on such a "rig" as is heard on the present-day multi-tube superhets. As always, however, there is a drawback to the simple rig—it simply is not selective enough for present day operation. Now many beginners (and old-timers too, though they won't admit) would like to build a superhet, but even the name scares them and brings up thoughts of many tubes, complicated alignment procedure and of course considerable expense. So it was decided to see just how simple a superhet could be made and still be worthy of the name.

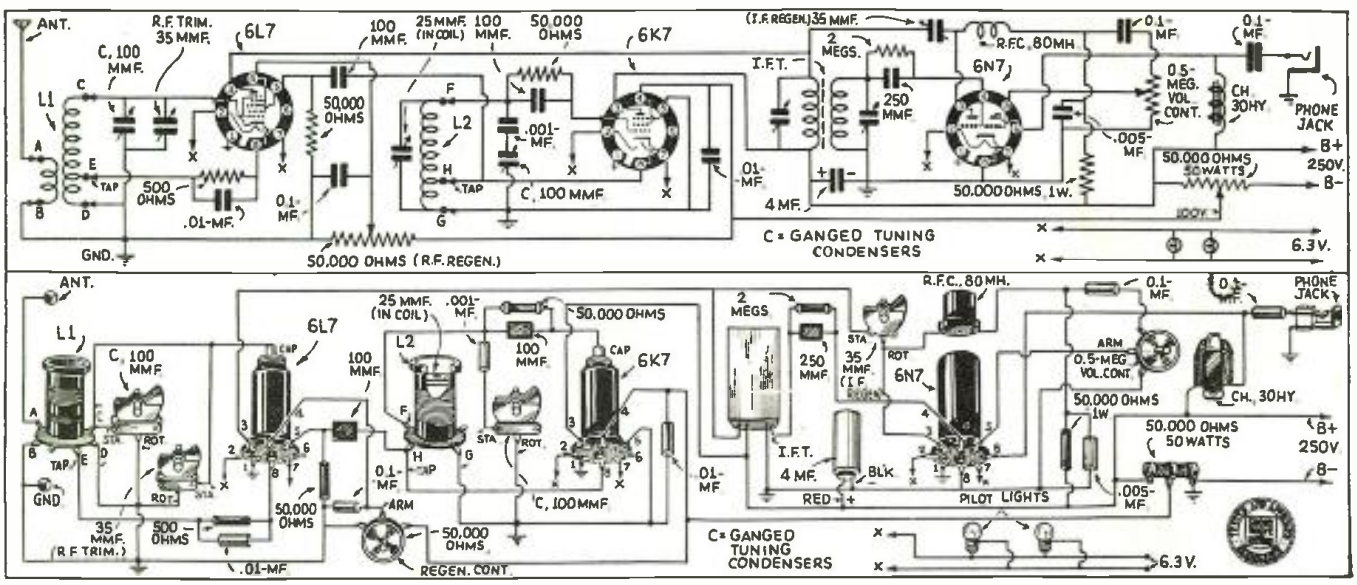
Cost of 3-Tube Set Reasonable

The little set illustrated here is the result, and from the cost standpoint, it will be seen that it is very little more than a good three-tube T.R.F. receiver. The operation, however, is entirely different. Due to the use of double regeneration, and an iron-core I.F. transformer, the sharpness of tuning is surprising. Regeneration in the second detector further sharpens the tuning and increases signal strength. This system makes possible the elimination of the usual I.F. stage, yet the results are very nearly the same as they would be if it were included. This is not at all a freak idea. It has been used for many *ham* receivers, and was used by one of the country's largest commercial set makers in some of their midget A.C.-D.C. receivers. It means an extra control, but this is offset by the fact that the control also *serves as a "beat oscillator"* by allowing the second detector to oscillate.

1 Tube Acts As 2nd Det. and A.F. Stage

The 6N7 tube is used as a combined second detector and A.F. output stage, an audio volume control being provided to assure comfortable volume when using head phones for reception. The output circuit is arranged so that no D.C. flows in the headphones or speaker. Thus any type phones may be safely used.

The construction is quite simple. The vernier dial and tuning condenser are first mounted and lined up so that the dial turns smoothly and without slip. Then all other parts are mounted. Note that none of the parts are mounted on the panel alone. That is, the panel may be removed without detaching any wires. The small variable condensers are mounted by brackets on the chassis. Note that the 50 mmf. regeneration control variable (*Continued on page* 107)



Wiring diagrams in both schematic and picture forms for the "Super-3."

Front view of the "Vacation Portable" with lid open.

The VACATION PORTABLE

By H. G. Cisin, M.E.

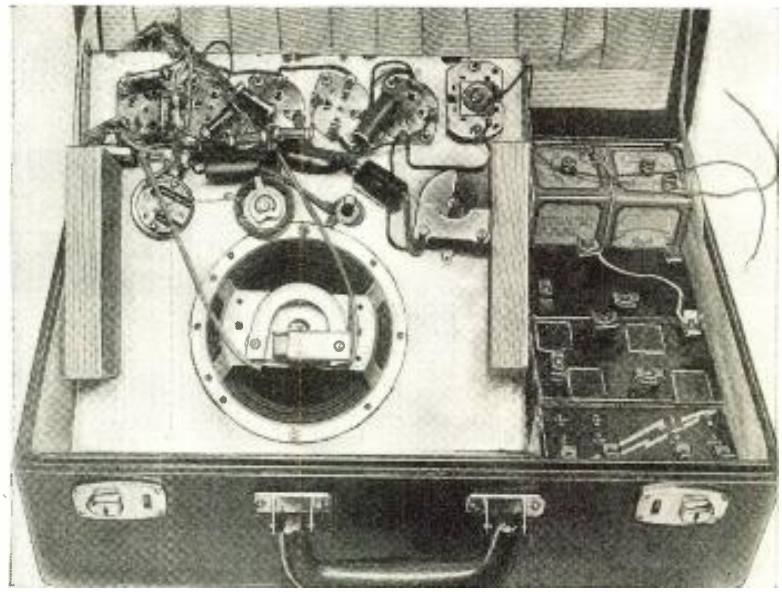
This all-around battery-operated "portable" covers the short-wave and broadcast bands, thanks to the use of plug-in coils. A regenerative detector and three stages of audio are used to give loudspeaker operation, or phones may be used also.

● NOWADAYS radio is recognized as an indispensible aid in the complete enjoyment of vacation time. From year to year the portable radio has increased in popularity until at present no excursion in the great outdoors is considered complete without the accompaniment of radio entertainment. The early portables were crude and bulky. Present-day sets of this type, however, are compact, light and powerful, due to improvements in circuit design, tubes and batteries.

The Vacation Portable takes advantage of the newest developments in portable design. Instead of being restricted to the reception of local broadcasting only, it is arranged for all-wave reception so that it can be used to bring in foreign stations, police calls and other desirable short-wave programs, in addition to the standard broadcasting.

In a portable receiver, where the antenna is often likely to be inefficient, it is necessary to provide an extra sensitive receiver. Through years of experience, it has been found that the regenerative detector is, without a doubt, one of the most sensitive devices for obtaining long-range reception under conditions where the number of tubes is necessarily limited.

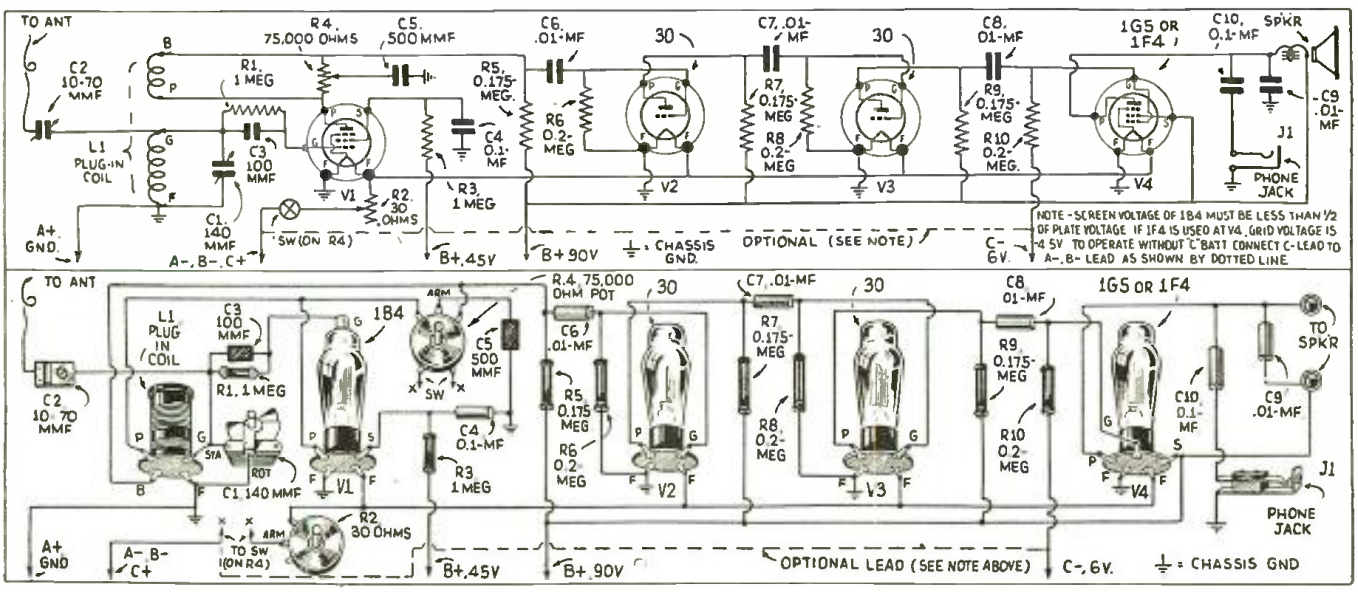
The Vacation Portable uses the latest type 1B4 screen-grid tube as a regenerative detector. This tube has electrical characteristics somewhat similar to the older type 32 tube. However, its sensitivity is higher and in its physical design a smaller bulb is employed, permitting a saving of space.



A view of the chassis of the "Vacation Portable"—the cost of the parts is very nominal compared to the pleasure afforded with such a set.

Three Audio Stages Used

Having provided a means of picking up weak distant stations, the next step is to furnish an amplifier powerful enough to increase the audio output of the (*Continued on page* 104)



Here's how to wire up the relatively few parts required in building the "Vacation Portable" receiver described by Mr. Cisin.

A 2-Tuber the S-W "Fan" has been waiting for. It operates on batteries. Simple switch enables operator to change instantly from one band to another. Range 16 to 550 meters.

←
Photo at left shows neat appearance of the band-switching, 2-volt receiver here described by Mr. Hooton. The set is particularly efficient when used with a sensitive pair of headphones, such as the Brush crystal type shown in the picture.

A 16 to 550 Meter, Band-Switching

2-VOLT RECEIVER

By Harry D. Hooton, W8KPX

● THE little two-tube *short* and *long-wave* receiver described here has been designed to meet the need of a good, yet simple set of the band-switching type using 2-volt tubes. Covering a range from 16 to 550 meters, in six positions of the coil switch, *without skips*, this set effectively eliminates one of the most annoying features of the average simple short-wave receiver—the necessity of continually changing plug-in coils each time the listener desires to receive on another band.

As the schematic diagram, Fig. 1, shows, the circuit is conventional in every detail, consisting of a *regenerative detector*, using a 1B4/951, and a *single resistance-coupled stage* of *audio frequency* amplification, using either a 950 or a 1F4 as output pentode. These tubes are all of rather recent release and are somewhat similar to the older 32 and 33 types except that the 1B4 is smaller in physical size and the other two have a much lower drain on both the "A" and "B" batteries. The regeneration is controlled by varying the voltage applied to the screen-grid of the 1B4 tube by means of the usual 50,000 ohm potentiometer, this control being the one at the right of the tuning dial. The antenna is coupled to the grid circuit of the detector through the usual 35 mmf. trimmer condenser connected to the fixed plates of the tuning condenser.

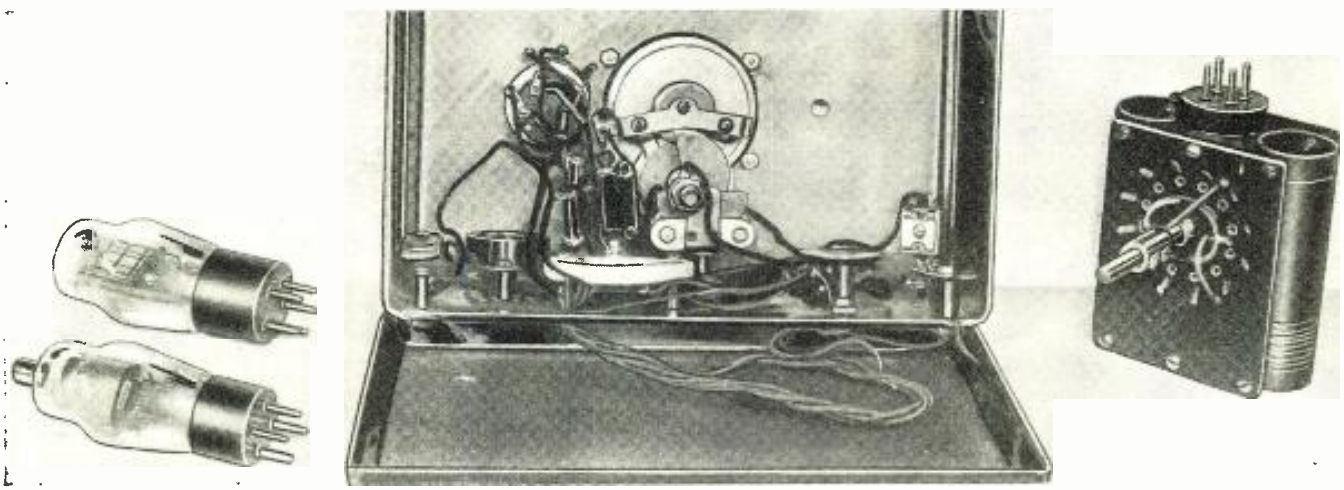
Switching Coil Covers 16 to 550 Meters

The coil and switch system used in this receiver covers the range, as stated above, from 16 to 550 meters. This range by bands is as follows: Position "1" (coil switch), 16-32 meters; position "2," 30-60 meters; position "3," 55-115 meters; position "4," 105-185 meters; position "5," 175-330 meters; position "6," 270-550 meters. The entire coil and switch unit is *completely wired* at the factory, only four connections being brought out to a standard 4-prong tube base. When used with a standard 4-prong socket, the switch-coil unit may be removed, if desired, and standard plug-in coils substituted for it. This is convenient if the listener desires to receive on a frequency outside the 16-550 meter range and also simplifies the wiring of the set.

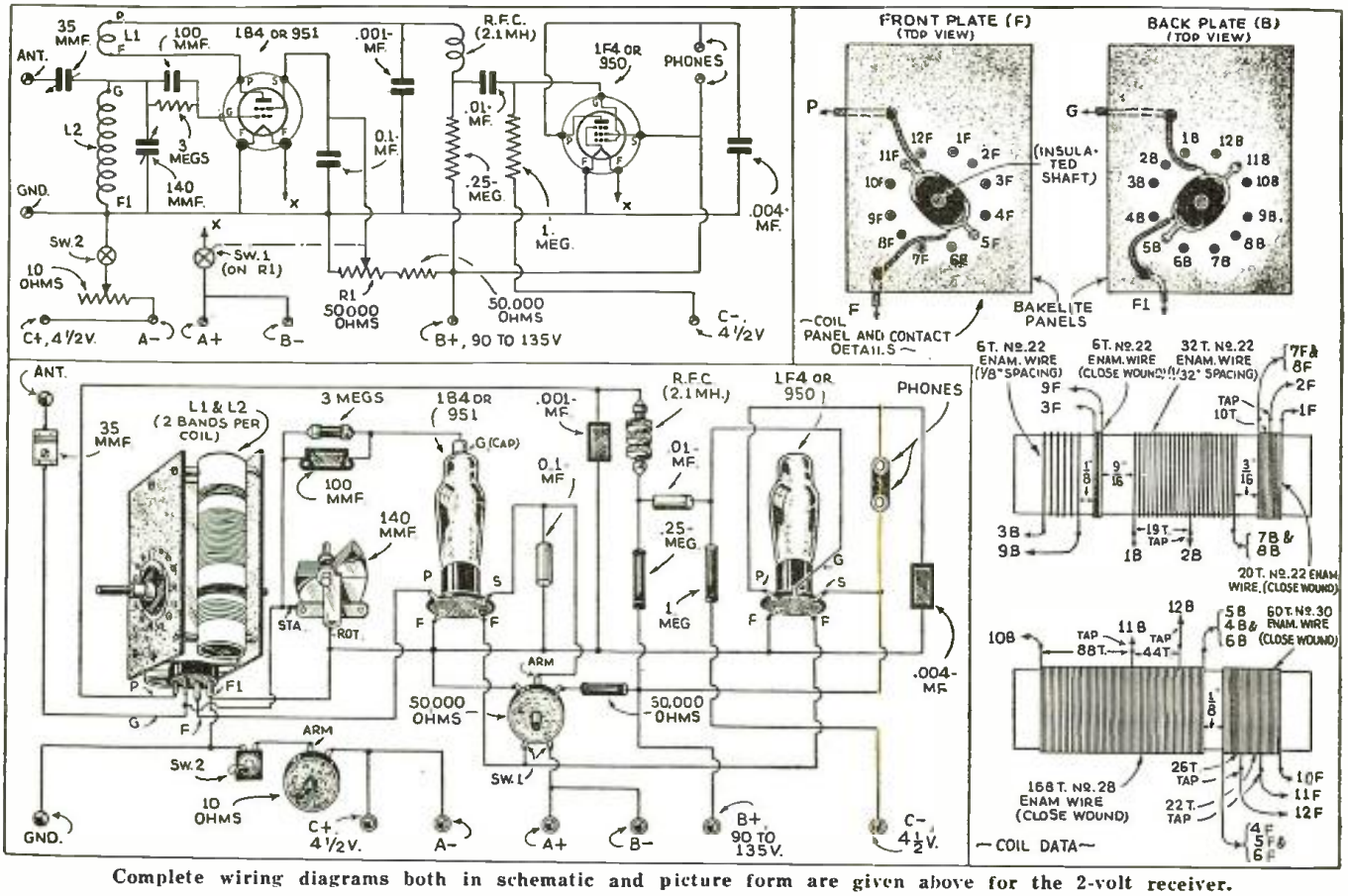
The construction of the set is not at all difficult or complicated in any way. However, the instructions given here should be followed carefully in order to facilitate the job of wiring. First, remove the screws that hold the bottom and rear of the metal cabinet in place and drill the various holes in the bottom plate as shown in Fig. 2. Mount the tube and coil sockets, the tuning condenser and the antenna-ground and tip-jack binding post strips on their ¾ inch brass bushings and, using either the flexible or solid push-back hook-up wire, make the connections between these parts before replacing the plate in the cabinet. The leads from the screen-grid, the negative filament, etc., are left long and are then cut to their proper length and soldered into the circuit after the bottom plate is back in its place. The dial is merely mounted on the shaft of the tuning condenser, no additional support being required.

Test for "Shorts" With Phones and a "C" Battery

After all of the parts have been mounted and the circuit is completely wired, place the coil and the two tubes in their respective sockets and connect the "A" battery (two 1½-volt dry cells in series connection) to its leads. Now, by means of a pair of headphones and a 4½-volt "C" battery, test from each "B" plus and "C" minus lead to the negative filament in order to determine whether a short-circuit exists. *A short-circuit will cause a loud click to be heard in the headphones every time the con-*



Above—an interesting view of the 2-volt band-switching receiver designed and constructed by Harry D. Hooton. At the left we see the tubes used in the set, a glimpse of the "innards" at the center, and at the right the coil-switching unit.



Complete wiring diagrams both in schematic and picture form are given above for the 2-volt receiver.

nection is made and broken; if no short-circuit exists, a loud click may be heard the first time and very weak ones or none at all thereafter.

If everything appears to be correct, the "B" and "C" batteries may be connected as shown in Fig. 1. Place the *range-switch* on the 16-32 meter band or position "one" and turn the potentiometer knob to the right to close the "A" and "B" battery switch. Adjust the 10 ohm rheostat in series with the negative "A" lead until the filaments of the two tubes glow at a *dull cherry-red color.* The antenna and ground and the phones are now connected to the binding post and tip-jack strips at the rear of the cabinet and the knob of the potentiometer is turned to the right until the familiar rushing sound of regeneration is heard.

With an *insulated screwdriver* or similar tool, tighten or loosen the screw in the small 35 mmf. antenna-series until oscillation over the entire 16-32 meter range is obtained. Turn to the 30-60 and the 55-115 meter bands and repeat the process. As the trimmer is not readily accessible for frequent adjustments, it will be necessary to strike a "happy medium" which will be fairly satisfactory for all of the bands covered by the receiver. A better arrangement would be to place the trimmer on the outside of the cabinet or use a standard 35 mmf. tuning condenser, mounted in such a way that it may be reached for the more precise adjustments required for best results.

As mentioned above, either the 950 or the 1F4 tube may be used as *output,* the socket connections being the same. The 1F4, however, has a much higher amplification factor, which means low "C" bias (4½-volts), and is therefore the best where portability is desired. Best results are obtained from the 1F4 when high-impedance headphones, such as the Brush type "A" crystal units, are used.

Either standard or midget "B" batteries may be used with this receiver as the drain is not excessive. With 135 volts of "B" power the combined plate and screen currents are only about 9 milliamperes; reducing the voltage to 90 drops the current to less than 6 milliamperes, which is economically handled by the midget blocks. Best results will be obtained, especially on the standard 200-550 meter broadcast band, with a fairly short antenna 35 to 50 feet in length. Antennas longer than this reduce the selectivity excessively in this region.

If the above instructions are carefully followed, no difficulty should be experienced. However, if additional information or data is required, the author will be glad to correspond with readers who enclose a *self-addressed and stamped envelope* for reply. Letters should be addressed to the author in care of *Short Wave & Television.*

List of Parts, Switch-Coil Receiver

HAMMARLUND MFG. CO.

One Midget tuning condenser, 140 mmf., type MC-140-M
One Equalizing or trimmer condenser, 35 mmf., type MEX
One Midget R.F. choke, 2.1 millihenries, type CH-X

AEROVOX CORPORATION

One Mica condenser, 0.0001 mf., type 1468
One Mica condenser, 0.001 mf., type 1460
One Mica condenser, 0.004 mf. type 1450
One Paper condenser, 0.1 mf., type 484 (400 volts)
One Paper condenser, 0.01 mf., type 484 (400 volts)

(*Continued on page* 97)

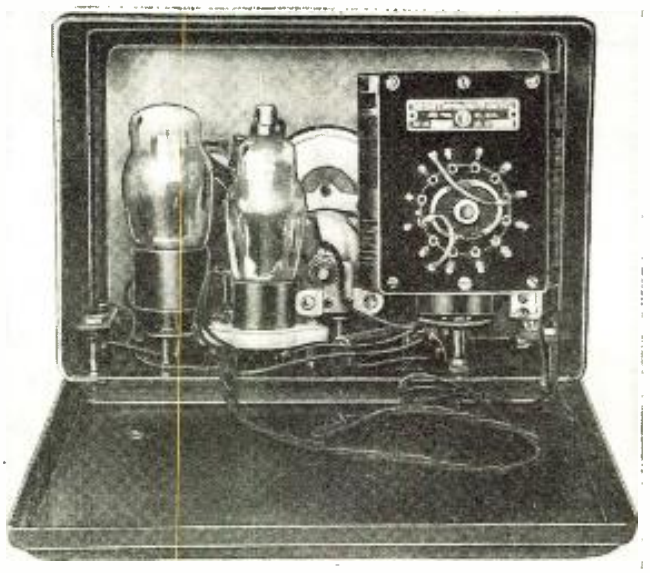
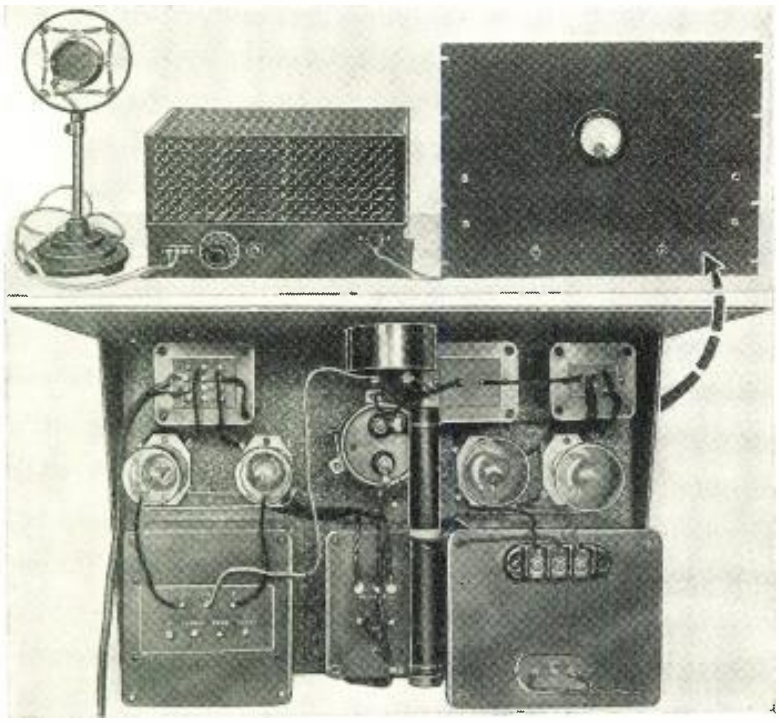


Photo above shows a rear view of the 2-volt receiver, which covers 16 to 550 meters with a handy band-switch.

AN Efficient



Complete view of modulator and speech equipment, together with an "inside shot" of the high-power stage and its power-supply.

This medium-power modulator was designed as a companion unit to the 200-watt transmitter described in the March 1937 issue. It makes use of the new 35-T tubes and the 866 Jr's., and is capable of producing excellent tone quality, as actual tests "on the air" have proved. It is an ideal unit for the Amateur and will modulate any transmitter with a power input up to approximately 400-watts.

● IN previous articles we have described transmitters ranging from 100 to 300 and 400 watts input, and all of these transmitters are capable of *phone* operation. The *modulator* described in this article is a fitting addition to any one of the previously described transmitters. As a matter of fact, it was built as a companion unit to the 200 watt transmitter described in the March 1937 issue, page 682.

The modulator consists of two units; one is a combination *speech amplifier* and *driver*, consisting of three 56's and two 2A5's connected in push-pull class A. The class B power stage employs two Eimac 35-T's, with from 1,000 to 1,100 volts on the plates and is capable of an output of around 125 watts. Since only approximately 25% of audio power is needed for a given input to the modulated R.F. amplifier, this modulator will modulate nearly 500 watts of input. Therefore there is sufficient reserve power for the transmitter described in the March 1937 issue, and care must be taken not to overmodulate.

Referring to the diagram, we find that we start out with a crystal microphone and three stages of triode amplification. Resistance coupling is used to permit good quality, and if the values given in the diagram are followed carefully, there will be no danger of instability or feedback. The plate circuit of each of the amplifier tubes contains a resistor, condenser and filter. The third triode is transformer coupled to the 2A5's. Transformer coupling is used in this position to simplify construction and design. The 2A5's in push-pull serve as a driver stage for the 35-T's. The 2A5's with from 250 to 300 volts on the plates are entirely adequate for driving the final class B stage. Slightly better quality would be possible with a pair of 2A3's or 45's in class A. However, the combination shown in the diagram provides excellent quality, that is, as good as can be found on the amateur bands, and we must agree that there are many fine phone stations now in operation. The output transformer of the 2A5's is a universal affair, designed to match the 2A5's into various loads from 500 ohms downward. Therefore, the input transformer on the class B stage is designed to couple a low-impedance line to the 35-T's. The 500 ohm line was chosen and provides the best all-around results. The turn ratio of the input transformer should be 2.8 to 1 step up from the 500 ohm line.

In a good many cases the driving stage and even the voice amplifier stages are included in the same unit with the high-power class B stage. While this can be done successfully, it is much more advisable to follow the arrangement here described, which permits the modulator stage to be

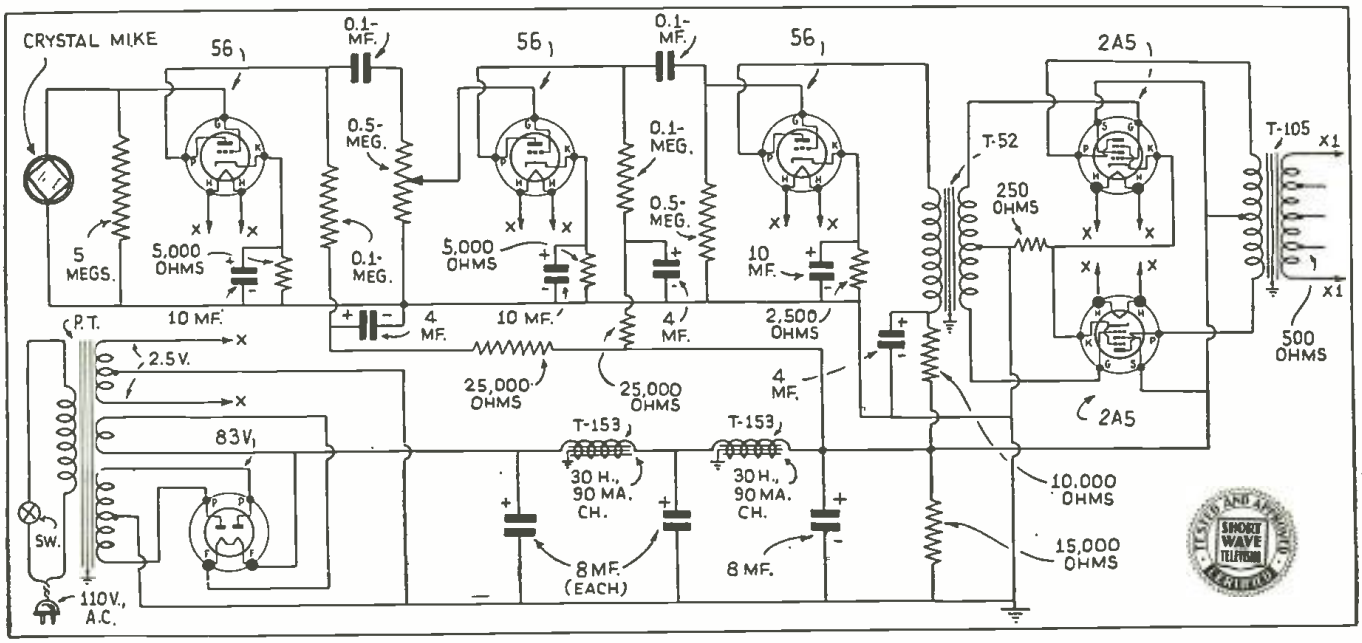


Diagram of the speech amplifier and driver.

125-Watt Modulator Using 35T's

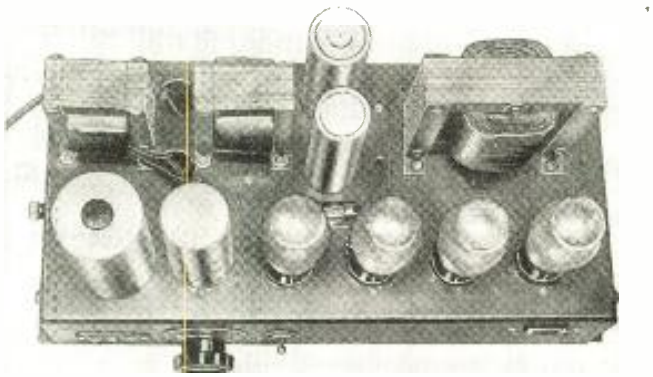
by George W. Shuart, W2AMN

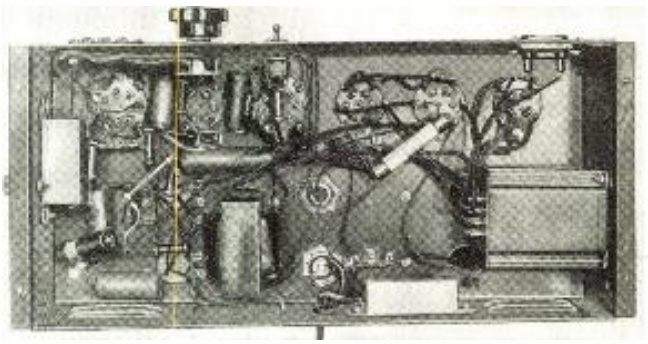
mounted in the rack with the rest of the transmitter and the speech amplifier and driver on the operating desk, well out of the field of the transmitter. In this respect there is less likelihood of it picking up R.F. and, at the same time, the amplifier is located close to the microphone where the gain control is readily accessible.

The power-supply, the speech amplifier and driver stage are all included on the same chassis. Reference to the photograph will show the general construction of this unit. Any fairly high-gain audio amplifier with an output of approximately 7 to 8 watts will serve to drive the 35-T's, and if such an amplifier is readily available completely constructed, matters are greatly simplified. There are a number of 6 to 8 watt high-gain amplifiers now being sold by various radio supply houses which can be purchased just as cheaply as they can be constructed, and any of these which have a 500 ohm output winding will work satisfactorily with the class B stage.

Referring to the photograph of the *final-amplifier* stage, we find that here too, the power supply is mounted on the same chassis with the amplifier. This power-supply makes use of a transformer which has a high and low primary tap, providing an output of 1,100 volts on one tap, and some 1,400 on the other. Either may be used with the audio transformers listed in the parts list. However, some juggling of the load impedance on the 35-T class B stage will be necessary when the higher voltage is employed. In other words, the 6,000 ohm output tap may have to be used with a load impedance as high as 8,000 ohms in order to reflect the proper load into the 35-T's. However, we recommend adhering to the 1,000 to 1,100 volt supply for best all-around results, unless the input of the modulator amplifier is in excess of 500 watts and cannot be completely modulated with the low voltage applied to the modulator tubes. With the plate voltage indicated in the diagram, the plate meter on modulation peaks will show about 180 to 190 milliamperes; higher values than this should not be permitted.

The output transformer employed with these tubes was designed to be used with the type 800 tubes. Since the load impedance of the 35-T's with the voltage specified in this article is slightly less than the value for the 800's, the load impedance represented by the final amplifier input should be slightly less than the values indicated on the output taps of the transformer. For instance, the 6,000 ohm tap should be used for a load of slightly over 5,500 ohms for a perfect match. However, such a slight deviation will not impair the quality at voice frequencies, and for all general purposes the tap may be connected into loads similar to the listing on the transformers.





Top and bottom views of the "speech amplifier" and "driver" unit.

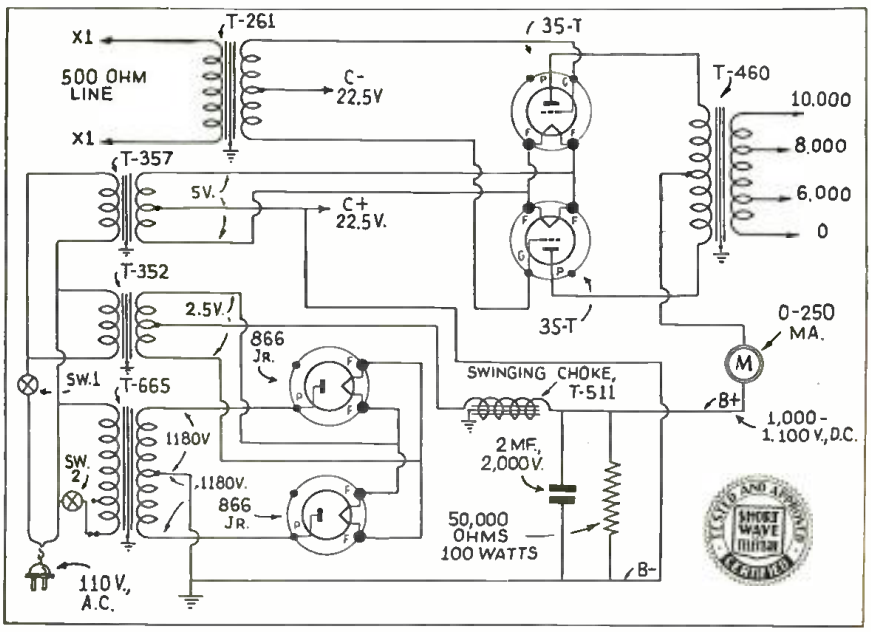


Diagram of the Class-B stage and its "power-supply."

Parts List for Modulator

Speech Amplifier and Driver.

I. R. C.
1—5 meg. resistor—½-watt.
2—5,000 ohm resistors—1 watt.
2—100,000 ohm resistors 1-watt.
2—25,000 ohm resistors 1-watt.
1—.5 meg. resistor ½-watt.
1—2,500 ohm resistor 1-watt.
1—10,000 ohm resistor 1-watt.
1—250 ohm resistor 2-watts.
1—.5 meg. potentiometer.
1—50,000 ohm 50-watt resistor.

SPRAGUE
2—.1 mf. condensers.
3—10 mf. electrolytic condensers.
3—4 mf. electrolytic condensers.
3—8 mf. electrolytic condensers (wet 500 volts).

KENYON
1—push-pull input transformer, T-52.
1—push-pull output to low impedance line, T-105.
2—30 henry 90 ma. filter chokes, T-153.
1—power transformer 250 to 300 V., D.C., output, 90 to 100 ma.

MISCELLANEOUS
3—5 prong wafer sockets.
2—6 prong wafer sockets.
1—4 prong wafer socket.

ASTATIC
1—D-104 crystal microphone.

RAYTHEON
3—Type 56 tubes.
2—2A5 tubes.
1—83 V. tube.

PAR-METAL
1—Amplifier foundation unit chassis and cover. Class B power stage.

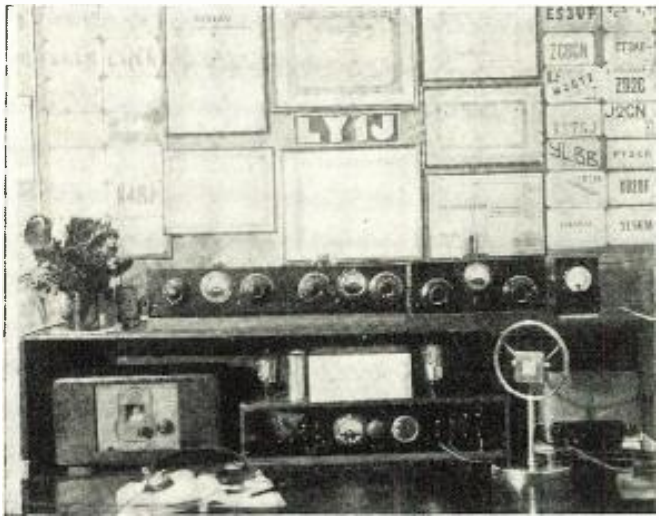
(*Continued on page* 106)

LET'S "Listen In"

With Joe Miller

Our Short-Wave "DX" Editor

Winner of 30th "S.-W. Scout" Trophy



LY1J—Lithuania's star amateur has a very effective layout.

● IN this month's article we will take up the subject of the DXer's reports sent to *amateur* stations.

We have received letters from a number of prominent *amateurs* in distant countries, who operate on phone, complaining about the large amount of reports received that do not comply with the ordinary requirements of courtesy between amateur and DXer.

One letter, from the famous DX amateur VU7FY, seems to state the facts most plainly, although ZS2X of South Africa also has a few pertinent things to say.

Here are the plaints as our fellow DXers, the amateurs, see them: Many listeners seem to think amateurs are so glad to get a report that they will answer, even if the report is sent on a postal card, and, of course, *with no return postage!*

Most amateurs, or "hams," as they call themselves, rarely have much "capital" to spend on answering mail, preferring to use whatever cash available to improve their "rig"—and who can blame them? In their place, we'd do the same, we are sure!

Then again, these DX hams get so many reports, that to answer all, counting postage, this item would run into quite a sum! SU1CH at Cairo was reported to have received some 7,000 reports! The large amount of reports nullifies any hope that our reports will be of much use, the large number reporting showing well enough how the ham's signals are "pushing across."

Lastly, as VU7FY in India states, there are those who write to amateurs reporting signals which they evidently did *not* hear! VU7FY sent us four of these reports, all from U.S., all but one being written on *ordinary postals*, and one being nothing more than an *index card*, with postage on one side and report on the other! Is it any wonder that we DXers who do comply with the rules, do not hear from the *hams*, when they receive quite a number of reports such as these? One would think that the amateur would feel disgusted enough to throw out all reports, as may often be the case, judging from the numerous unanswered *ham reports* of late!

At the time VU7FY was reported by these four DXers, he was in daily QSO with W4DBC. As 7FY used only 10 watts phone, he rarely put through a good signal here, so usually the QSO was W4DBC phone, 7FY C.W. Yet DXers hearing 4DBC calling and working 7FY wrote reports to 7FY claiming to have heard 7FY on phone, reports ranging from a modest QSA4, R3-4 all the way up to QSA5, R7-8!! All this supposed to be on phone, when 7FY was at the time using C.W.!

Concluding this discussion, we can only ask this of our readers—If all of you want the *amateur* to think more kindly of us, why not do the right thing? The "Golden Rule" applies here, as well. To all amateurs, send only good, *positive* reports, written in clear, concise language, with an international reply coupon enclosed with each and every report! This last is important. If one wants a veri card, should not one at least pay for the postage on same? This is the least we can do, and we should never slip on this important duty.

On to a better understanding 'tween the *ham* and the DXer!

Regarding VAC certificate, we have had an unavoidable delay in printing, and will have them ready soon. They are tentatively planned to be on blue paper with silver printing. Sounds good! Details on how to qualify for these handsome documents will follow shortly. Thank you all for your patience.

It seems, according to Joe, that some of our DX "Fans" have failed to send postage when asking for veris from owners of "Ham" stations. Many interesting DX "contacts" are quoted this month, including a number of unusual "Hams."

Not much new in DX this month, more or less of the same ol' DX, with more and more attention being paid to the amateurs, what with their annual DX phone contest during March. Our monthly report follows:

Manchukuo

TDE, 10,065 kc., Hsingking, is being heard practically daily with a fine "sig" and often, regularly at 4 a.m. Suns.

TDE has a pronounced Asiatic "flutter," and, being the only such signal in the vicinity, should be quite easy to "log."

Manchukuo counting as a new country, distinct from China, we advise all to try for them now. Signal well heard from 1-7 a.m. and lately heard using side-band secrecy Xmissions, when one must tune to side of carrier to hear a voice, as in Algerian (8.96-12.12 mc.) Xmissions. QRA (address) given in last issue.

Also, again heard, JDY puts in a FB signal, no less, on 9.925 mc. This Dairen, Manchuria, (or is it Manchukuo?) station still continues to phone JVN between 2:30-3:30 a.m. Ashley Walcott has already received JDY veri, written on stationery of JQAK. We do not have the QRA of this station, so have sent our report to Tokio.

India

VUB, 9.57 mc., Bombay, has been reported by Bob Gaiser, at the unusual time of 10:30 a.m.-12 noon. Bob says VUB "peaks" at 11 a.m. This on Weds. And Bob has already received a QSL from VUB of his reception! VY FB DX, OM, and keep it up! This "tip" will be too late for us to try now, but we will be on the lookout next Fall, and hope to "snag 'em"!

Charlie Miller reports veri of VWY, 8.98 mc., Poona, FB, OM! This would place VWY on 2 low freqs., as a letter direct from station states VWY is on 9.037 mc. This station often heard near 2:30 a.m.

(*Continued on page* 108)

CT1AK—This uproariously comical QSL is sure to get the laughs, Hi!

CORRECTED AND REVISED Monthly

World S-W Station List

Complete List of Broadcast, and Telephone Stations

All the stations in this list use telephone transmission of some kind. Note: Station calls printed in BOLD FACE are broadcast stations; others are telephone stations.

Please write to us about any new stations or other important data that you learn through announcements over the air or correspondence with the stations.

S.W. BROADCAST BAND

Mc.	Call	
31.600	W2XDV	**NEW YORK CITY,** 9.494 m., Addr. Col. Broad. System, 485 Madison Ave. Daily 5-10 pm.; Sat. and Sun. 12.30-5, 6-9 pm.
31.600	W4XCA	**MEMPHIS, TENN.,** 9.494 m., Addr. Memphis Commercial Appeal. Relays WMC.
31.600	W8XAI	**ROCHESTER, N. Y.,** 9.494 m., Addr. Stromberg Carlson Co. Relays WHAM 7.30-12.05 am.
31.600	W8XWJ	**DETROIT, MICH.,** 9.494 m., Addr. Evening News Ass'n. Relays WWJ 6-12.30 am.. Sun. 8 am-12 m.
31.600	W9XPD	**ST. LOUIS, MO.,** 9.494 m., Addr. Pulitzer Pub. Co. Relays KSD.
26.100	GSK	**DAVENTRY, ENG.,** 11.49 m., Addr. B. B. C., London. Operates irregularly 5.45-8.55 am., 9.55 am.-12 n.
25.950	W6XKG	**LOS ANGELES, CAL.,** 11.56 m., Addr. B. S. McGlashan, Wash. Blvd. at Oak St. Relays KGFJ 24 hours daily.
21.550	GST	**DAVENTRY, ENG.,** 13.92 m., Addr. (See 26.100 mc.) Irregular at present.
21.540	W8XK	**PITTSBURGH, PA.,** 13.93 m., Addr. Grant Bldg. Relays KDKA 7-9 am.
21.530	GSJ	**DAVENTRY, ENG.,** 13.93 m., Addr. (See 26.100 mc.) Irregular at present.
21.520	W2XE	**NEW YORK CITY,** 13.94 m., Addr. Col. Broad. Syst.. 485 Madison Ave. Relays WABC 6.30-11 am.
21.470	GSH	**DAVENTRY, ENG.,** 13.97 m. (See 26.100 mc.), 5.45-8.55 am., 9.15 am.-12 m.

S.W. BROADCAST BAND

21.420	WKK	**LAWRENCEVILLE, N. J.,** 14.01 m., Addr. Amer. Tel. & Tel. Co. Calls S. Amer. 7 am.-7 pm.
21.080	PSA	**RIO DE JANEIRO, BRAZ.,** 14.23 m. Calls WKK daytime.
21.060	WKA	**LAWRENCEVILLE, N. J.,** 14.25 m. Addr. (See 21.420 mc.) Calls England morning and afternoon.
21.020	LSN6	**BUENOS AIRES, ARG.,** 14.27 m., Addr. Cia. Internacional de Radio. Works N. Y. C. 7 am.-7 pm.
20.860	EHY-EDM	**MADRID, SPAIN,** 14.38 m., Addr. Cia. Tel. Nacional de Espana. Works S. Amer. mornings.
20.700	LSY	**BUENOS AIRES, ARG.,** 14.49 m., Addr. Transradio Internatl. Tests irregularly
20.380	GAA	**RUGBY, ENG.,** 14.72 m. Calls Arg., Brazil mornings.
20.040	OPL	**LEOPOLDVILLE, BELGIAN CONGO,** 14.97 m. Works ORG mornings.
20.020	DHO	**NAUEN, GERMANY,** 14.99 m., Addr. Reichspostzentralamt. Works S. Am. mornings.
19.900	LSG	**BUENOS AIRES, ARG.,** 15.08 m., Addr. (See 20.700 mc.) Tests irregularly.
19.820	WKN	**LAWRENCEVILLE, N. J.,** 15.14 m., Addr. A. T. & T. Co. Calls England daytime.
19.680	CEC	**SANTIAGO, CHILE,** 15.24 m., Addr. Cia. Internacional de Radio. Calls Col. and Arg. daytime.
19.650	LSN5	**BUENOS AIRES, ARG.,** 15.27 m., Addr. (See 21.020 mc.) Calls Europe daytime
19.620	VQG4	**NAIROBI, KENYA,** 15.28 m., Addr. Cable and Wireless,Ltd. Calls London 7.30-8 am.
19.600	LSF	**BUENOS AIRES, ARG.,** 15.31 m., Addr. (See 20.700 mc.) Tests irregularly.
19.480	GAD	**RUGBY, ENG.,** 15.4 m. Calls VQG4 7.30-8 am.
19.355	FTM	**ST. ASSISE, FRANCE,** 15.5 m. Calls S. America mornings.
19.345	PMA	**BANDOENG, JAVA,** 15.51 m. Works Holland 5.30-11 am.
19.260	PPU	**RIO DE JANEIRO, BRAZ.,** 15.58 m., Addr. Cia. Radiotel. Brasileira. Works France mornings.
19.220	WKF	**LAWRENCEVILLE, N. J.,** 15.6 m., Addr. A. T. & T. Co. Calls England daytime.
19.200	ORG	**RUYSSELEDE, BELGIUM,** 15.62 m. Calls OPL mornings.
19.160	GAP	**RUGBY, ENG.,** 15.66 m. Calls Australia 1-8 am.
19.020	HS8PJ	**BANGKOK, SIAM,** 15.77 m. Mondays 8-10 am.
18.970	GAQ	**RUGBY, ENG.,** 15.81 m. Calls S. Africa mornings.
18.890	ZSS	**KLIPHEUVEL, S. AFRICA,** 15.88 m., Addr. Overseas Comm. of S. Africa, Ltd. Calls GAQ 9-10 am.
18.830	PLE	**BANDOENG, JAVA,** 15.93 m. Calls Holland early am.
18.680	OCI	**LIMA, PERU,** 16.06 m. Tests with Bogota, Col.
18.620	GAU	**RUGBY, ENG.,** 16.11 m. Calls N. Y. daytime.
18.480	HBH	**GENEVA, SWITZERLAND,** 16.23 m., Addr. Radio Nations. Tests irregularly.
18.345	FZS	**SAIGON, INDO-CHINA,** 16.35 m. Works Paris early morning.
18.340	WLA	**LAWRENCEVILLE, N. J.,** 16.36 m., Addr. A. T. & T. Co. Calls England daytime.
18.310	GAS	**RUGBY, ENG.,** 16.38 m. Calls N. Y. daytime.
18.299	YVR	**MARACAY, VENEZ.,** 16.39 m. Works Germany mornings.
18.250	FTO	**ST. ASSISE, FRANCE,** 16.43 m. Works S. America daytime.
18.200	GAW	**RUGBY, ENG.,** 16.48 m. Works N. Y.C. daytime.
18.135	PMC	**BANDOENG, JAVA,** 16.54 m. Works Holland mornings.
18.115.	LSY3	**BUENOS AIRES, ARG.,** 16.56 m., Addr. (See 20.700 mc.) Tests irregularly.
18.040	GAB	**RUGBY, ENG.,** 16.83 m. Works Canada morning and afternoon.
17.810	PCV	**KOOTWIJK, HOLLAND,** 16.84 m. Works Java 6-8 am.

S.W. BROADCAST BAND

17,790	GSG	**DAVENTRY, ENG.,** 16.86 m., Addr. B. B. C., London. 5.45-8.55 am., 9 am.-12 n.. 4-6 pm.
17.785	JZL	**TOKIO, JAPAN,** 16.87 m. Tests irregularly.
17,780	W3XAL	**BOUND BROOK, N. J.,** 16.87 m., Addr. Natl Broadcasting Co. 9 am.-5 pm.
17.775	PHI	**HUIZEN, HOLLAND,** 16.88 m., Addr. (See PHI, 11.730 mc.) Daily except Wednesday. 8-9.30 am.: Sun. 7-10 am.
17.760	DJE	**BERLIN, GERMANY,** 16.89 m., Addr. Broadcasting House. 12.05-5.15 am.; 5.55-11 am.
17,760	W2XE	**NEW YORK, N. Y.,** 16.89 m., Addr. Col. Broad. System, 485 Madison Ave. 11 am.-12 n.
17.775	ZBW5	**HONGKONG, CHINA,** 16.9 m., Addr. P. O. Box 200. 4-10 am. irregular.

S.W. BROADCAST BAND

17.741	HSP	**BANGKOK, SIAM,** 16.91 m. Works Germany 4-7 am.
17.650	XGM	**SHANGHAI, CHINA,** 17 m. Works London 7-9 am.
17.520	DFB	**NAUEN, GERMANY,** 17.12 m. Works S. America, near 9.15 am.
17.480	VWY2	**KIRKEE, INDIA,** 17.16 m. Works London 7.30-8.15 am.
17.120	WOO	**OCEAN GATE, N. J.,** 17.52 m., Addr. A. T. & T. Co. Works ships irregularly.
17.080	GBC	**RUGBY, ENG.,** 17.56 m. Works ships irregularly.
16.835	ITK	**MOGADISCIO, ITAL. SOMALILAND,** 18.32 m. Calls IAC around 9.30 am.
16.270	WLK	**LAWRENCEVILLE, N. J.,** 18.44 m., Addr. A. T. & T. Co. Works S. Amer. daytime.
16.270	WOG	**OCEAN GATE, N. J.,** 18.44 m.. Addr. A. T. & T. Co. Works England Late afternoon.
16.240	KTO	**MANILA, P. I.,** 18.47 m., Addr. RCA Comm. Works Japan and U. S. 5-9 pm. irregularly.
16.233	FZR3	**SAIGON, INDO-CHINA,** 18.48 m. Calls Paris early morning.
16.030	KKP	**KAHUKU, HAWAII,** 18.71 m., Addr. RCA Comm. Works Dixon 3-10 pm.
15.880	FTK	**ST. ASSISE, FRANCE,** 18.9 m. Works Saigon 8-11 am.
15.265	CEC	**SANTIAGO, CHILE,** 18.91 m. Calls Peru daytime irregular.
15.810	LSL	**BUENOS AIRES, ARG.,** 18.98 m., Addr. (See 21.020 mc.) Works London mornings and Paris afternoons.
15.660	JVE	**NAZAKI, JAPAN,** 19.16 m. Works Java 3-5 am.
15.620	JVF	**NAZAKI, JAPAN,** 19.2 m. Works Cal. near 5 am. and 8 pm.
15.450	IUG	**ADDIS ABABA, ETHIOPIA,** 19.41 m. Works Rome 9.15-10.30 am.
15.440	XEBM	**MAZATLAN, SIN., MEX.,** 19.43 m., Addr. Flores 103 Alto. "El Pregonero del Pacifico." Irregularly 7 am.-10 pm.
15.415	KWO	**DIXON, CAL.,** 19.46 m., Addr. A. T. & T. Co. Works Hawaii 2-7 pm.
15.370	HAS3	**BUDAPEST, HUNGARY,** 19.52 m..Addr. Radiolabor, Gyali Ut 22. Sun 9-10 am.
15.360	DZG	**ZEESEN, GERMANY,** 19.53 m., Addr. Reichspostzentralamt. Tests irregularly.
15.355	KWU	**DIXON, CALIF.,** 19.53 m.. Addr. A. T. & T. Co. Phones Pacific Isles and Japan.

S.W. BROADCAST BAND

15.340	DJR	**BERLIN, GERMANY,** 19.56 m., Addr. Broadcasting House. 8-9 am.
15.330	W2XAD	**SCHENECTADY, N. Y.,** 19.56 m., Addr. General Electric Co. Relays WGY 10 am. to 6 pm.
15.310	GSP	**DAVENTRY, ENG.,** 19.6 m., Addr. (See 26.100 mc.) Irregular 6.20-8.30 pm.
15.290	LRU	**BUENOS AIRES, ARG.,** 19.62 m., Addr. El Mundo. Daily 7 am.-6.30 pm.
15.280	DJQ	**BERLIN, GERMANY,** 19.63 m., Addr. Broadcasting House. 6-8, 8.15-11 am., 4.50-10.45 pm.
15.270	W2XE	**NEW YORK CITY,** 19.65 m., Addr. (See 21.520 mc.) 12 N-6 pm.
15.260	GSI	**DAVENTRY, ENG.,** 19.66 m., Addr. (See 26.100 mc.) 12.20-3.45 pm.

(Continued on page 83)

(All Schedules Eastern Standard Time)

TELEVISION COURSE

Problems of High-Fidelity Reception. Lesson 5

By George H. Eckhardt,
Author, "Electronic Television"

What the amateur must know in order to receive Television Images, with a discussion of the Farnsworth television receiver circuit.

● THE amateur is naturally impatient to get started on a television set. News comes from abroad, especially England, of the success of television receiver sets made by amateurs from parts easily purchased abroad. Wiring diagrams, and more or less detailed information on these foreign sets arrive from time to time, and advertisements of television parts are quite common in foreign radio magazines. The question arises, can these foreign parts and wiring diagrams be adapted for use in America, where stations are already sending out television programs of 441 line "high-fidelity" definition.

Two of the foremost television research engineers in this country assured the writer that, in their opinion, it would be extremely difficult to adapt these English wiring diagrams and parts to make a set that would receive the experimental programs being sent out by R.C.A., Philco, and the Farnsworth Co. in this country. It was pointed out that the adaptation and changes were by no means impossible, but that they would be difficult unless a man had behind him the facilities of an electronic research laboratory, and a long experience in television research.

It would seem best, therefore, for the American amateur to start from "scratch," and build up his set and his knowledge always with the American standards of high definition in view. Above all else the American amateur will want a set that will receive all of the high definition television programs, —R.C.A., Philco, and Farnsworth.

Therefore the American amateur should get started right, above all else, getting thoroughly grounded in the fundamentals of electronic television, and thus being certain that his set, upon which he will have spent money and time, will work.

Some schematic diagrams have appeared in publications, and these give more or less information. Taking the Farnsworth Schematic diagram, which has appeared from time to time, and which carried more information than most of these diagrams, the writer has taken the liberty to use this as the diagram upon which the following articles will be based.

It would be impossible in a space less than a small book to go through the entire diagram giving values and pointing out places where the amateur is most liable to meet difficulties. The writer has, therefore, roughly divided the diagram into parts, marked with the letters A, B, C, etc., and each of these parts will be taken up in detail, thus making it possible for the amateur finally to assemble a television receiver that will be well worth his efforts. For the present the *sound* part of the television receiver will be disregarded.

If one were to contemplate building this set, or many of the others, from the information given, he might be able to procure a suitable cathode ray tube, and he might be able to procure the tubes used in the set, knowing the proper value and purpose of each one of them, and yet he might be far from being able to construct a set that would work.

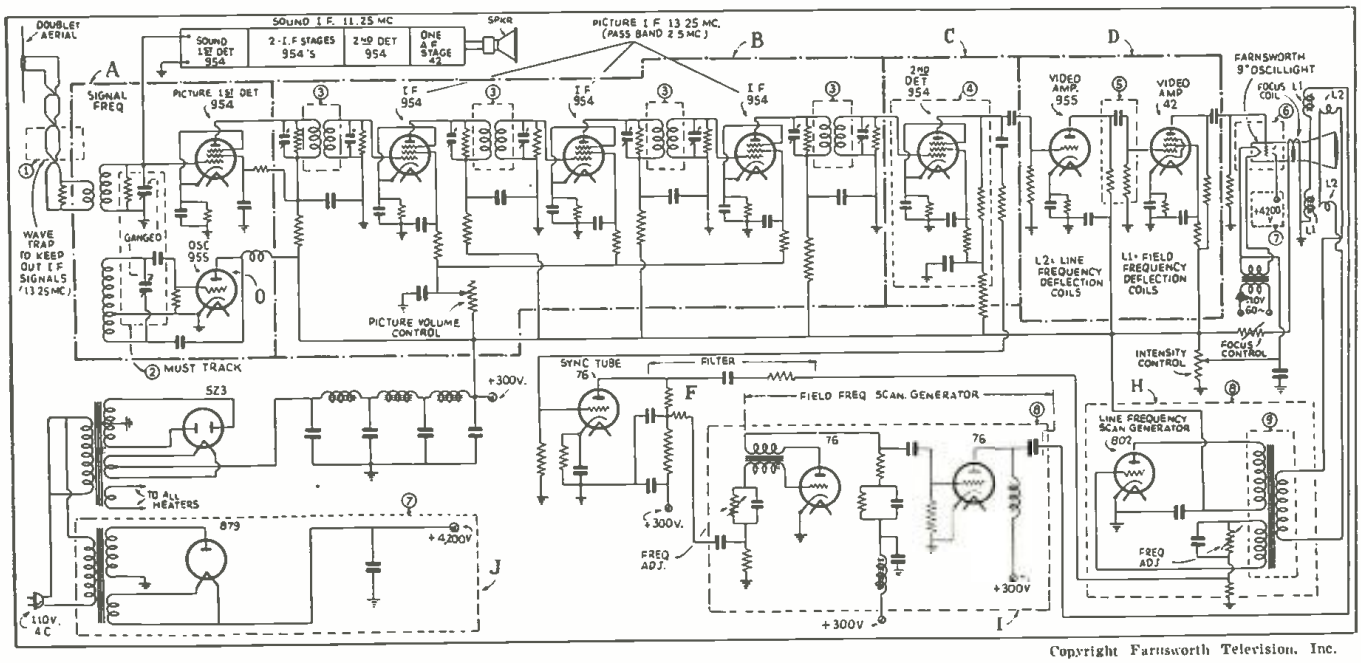
Therefore, taking this Farnsworth Receiver as an example, it might be well to go over the diagram, and outline each place where the amateur would need additional and detailed information.

It might *also* be well to here state that none of the parts necessary for a television set are exceedingly expensive, the cathode ray tube being the one single most expensive item. It is simply a matter of getting detailed information on these parts, or being able to purchase them.

The following list of eight items will give the amateur a very good idea of what additional information he must have before building his set. Every effort will be made to supply him this necessary information in subsequent articles, or to advise him where parts may be obtained.

Specific Problems—1, Shielding

There must be *proper shielding* from outside interference at the intermediate amplifier, and a *wave-trap* for intermediate frequency must be put in the antenna circuit. (*Continued on page* 104)



Fundamental schematic diagram of the complete Farnsworth Television Receiver, with scanning oscillators, "Sound" receiver, synchronizing impulse filter, etc.

Note: The Schematic Diagram of the Farnsworth Receiver, which is copyrighted by Farnsworth Television, Inc., is used with that company's permission. The indications in dotted line enclosures are by the writer, and are not part of the original diagram.

Mc.	Call	
15.252	RIM	**TACHKENT, U.S.S.R.,** 19.67 m. Works RKI near 7 am.
15.250	W1XAL	**BOSTON, MASS.,** 19.67 m., Addr. University Club. Sundays 11 am-12.30 pm. Irregular other days.
15.245	TPA2	**PARIS, FRANCE,** 19.68 m., Addr. 98 bis. Blvd. Haussmann. "Radio Colonial." 6-11.05 am.
15.230	HS8PJ	**BANGKOK, SIAM,** 19.32 m. Irregularly Mon. 8-10 am.
15.230	OLR5A	**PRAGUE, CZECHOSLOVAKIA.** Irregular.
15.220	PCJ	**HUIZEN, HOLLAND,** 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.
15.210	W8XK	**PITTSBURGH, PA.,** 19.72 m., Addr. (See 21.540 mc.) 9 am.-7 pm.
15.200	DJB	**BERLIN, GERMANY,** 19.74 m., Addr. (See 15.280 mc.) 12.05-5.15 am., 5.55-11 am., 4.50-11 pm. Also Sun. 11.10 am. to 12.25 pm.
15.190	ZBW4	**HONGKONG, CHINA,** 19.75 m., Addr. P. O. Box 200. 11.30 pm. to 1.15 am, 4-10 am.
15.180	GSO	**DAVENTRY, ENG.,** 19.76 m., Addr. (See 26.100 mc.) 1-3.15 am.
15.180	RW96	**MOSCOW, U.S.S.R.,** 19.76 m., Sun 2-3 pm.
15.160	JZK	**TOKIO, JAPAN,** 19.79 m., 2.30-3.30 pm., 4-5 pm., 12 m.-1 am.
15.150	YDC	**BANOOENG, JAVA,** 19.8 m., Addr. N. I. R. O. M. 6-7.30 pm.. 10.30 pm.-2 am., Sat. 7.30 pm.-2 am., 5.30-10.30 am.
15.140	GSF	**DAVENTRY, ENG.,** 19.82 m., Addr. (See 26.100 mc.) 9.15 am.-12 n., 4-6 pm., 6.20-8.30 pm., 9-11 pm.
15.120	HVJ	**VATICAN CITY,** 19.83 m., 10.30-10.45 am., except Sun., Sat. 10-10.45 am.
15.110	DJL	**BERLIN, GERMANY,** 19.85 m., Addr. (See 15.280 mc.) 12 m-2, 8-9 am., 11.35 am. to 4.30 pm. Sun. also 6-8 am.
		S.W. BROADCAST BAND
15.090	RKI	**MOSCOW, U.S.S.R.,** 19.88 m. Works Tashkent near 7 am.
15.055	WNC	**HIALEH, FLORIDA,** 19.92 m., Addr. A. T. & T. Co. Calls Central America daytime.
14.980	KAY	**MANILA, P. I.,** 20.03 m., Addr. RCA Comm. Works Pacific Islands.
14.970	LZA	**SOPHIA, BULGARIA,** 20.04 m., Addr, Radio Garata. Sun. 12.30-8 am., 10 am. to 4.30 pm. Daily 5-6.30 am., 12 n.-2.45 pm.
14.960	PSF	**RIO DE JANEIRO, BRAZIL,** 20.43 m.. Works with Buenos Aires daytime.
14.950	HJB	**BOGOTA, COL.,** 20.07 m. Calls WNC daytime.
14.940	HH	**CIUDAD, TRUJILLO, D. R.,** 20.08 m., Phones WNC daytime.
14.940	HJA3	**BARRANQUILLA, COL.,** 20.08 m. Works WNC daytime.
14.845	OCJ2	**LIMA, PERU,** 20.21 m. Works South American stations daytime.
14.790	ROU	**OMSK, SIBERIA, U.S.S.R.,** 20.28 m. Works Moscow irregularly 7-9 am.
14.730	IQA	**ROME, ITALY,** 20.37 m. Tests irregularly.
14.653	GBL	**RUGBY, ENG.,** 20.47 m. Works JVH 1-7 am.
14.640	TYF	**PARIS, FRANCE,** 20.49 m. Works Saigon and Cairo 3-7 am., 12 m.-2.30 pm.
14.600	JVH	**NAZAKI, JAPAN,** 20.55 m. Broadcasts irregularly 5-11.30 pm. Works Europe 4-8 am.
14.590	WMN	**LAWRENCEVILLE, N. J.,** 20.56 m., Addr. A. T. & T. Co. Works England morning and afternoon.
14.535	HBJ	**GENEVA, SWITZERLAND,** 20.64 m., Addr. Radio Nations. Broadcasts Sat. 5.30-6.15 pm., 7.15-8.30 pm.
14.530	LSN	**BUENOS AIRES, ARG.,** 20.65 m., Addr. (See 20.020 mc.) Works N. Y. C. afternoons.
14.500	——	**ASMARA, ERITREA, AFRICA,** 20.69 m. Works Rome and Addis Ababa 6.30-7.30 am.
15.500	LSM2	**BUENOS AIRES, ARG.,** 20.69 m., Addr. (See 21.020 mc.) Works RIO and Europe daytime.
14.485	TIR	**CARTAGO, COSTA RICA,** 20.71 m. Works Central America and U. S.A. daytime.
14.485	YSL	**SAN SALVADOR, SALVADOR,** 20.71 m. Irregular.
14.485	HPF	**PANAMA CITY, PANAMA,** 20.71 m. Works WNC daytime.
14.485	TGF	**GUATEMALA CITY, GUATEMALA,** 20.71 m. Works WNC daytime.
14.485	YNA	**NICARAGUA, MANAGUA,** 20.71 m. Works WNC daytime.
14.485	HRL5	**NACAOME, HONDURAS,** 20.71 m. Works WNC daytime.
14.485	HRF	**TEGUCIGALPA, HONDURAS,** 20.71 m. Works WNC daytime.
14.470	WMF	**LAWRENCEVILLE, N. J.,** 20.73 m., Addr. A. T. & T. Co. Works England daytime.
14.460	DZH	**ZEESEN, GERMANY,** 20.75 m., Addr. (See 15.360 mc.) Irregular.
14.440	GBW	**RUGBY, ENG.,** 20.78 m. Works U. S. A. afternoons.
14.200	EA9AH	**TETUAN, SPANISH MOROCCO,** 21.13 m. Daily except Sun. 2.15-5, 7 and 9 pm.
13.990	GBA	**RUGBY, ENG.,** 21.44 m., Works Buenos Aires late afternoon.
13.820	SUZ	**ABOU ZABAL, EGYPT,** 21.71 m. Works with Europe 11 am. to 2 pm.
13.690	KKZ	**BOLINAS, CALIF.,** 21.91 m., Addr. RCA Communications. Irregular.
13.635	SPW	**WARSAW, POLAND,** 22 m., Mon., Wed. Fri., 12.30-1.30 pm.
13.585	GBB	**RUGBY, ENG.,** 22.08 m. Works Egypt and Canada afternoon.
13.415	GCJ	**RUGBY, ENG.,** 22.36 m. Works Japan and China early morning.
13.410	YSJ	**SAN SALVADOR, SALVADOR,** 22.37 m. Works WNC daytime.
13.390	WMA	**LAWRENCEVILLE, N. J.,** 22.4 m., Addr. A. T. & T. Co. Works England morning and afternoon.
13.380	IDU	**ASMARA, ERITREA, AFRICA,** 22.42 m. Works Rome daytime.
13.345	YVQ	**MARACAY, VENEZUELA,** 22.48 m. Works WNC daytime.
13.285	CGA3	**DRUMMONDVILLE, QUE., CAN.,** 22.58 m. Works London and ships afternoons.
13.330	IRJ	**ROME, ITALY,** 22.69 m. Works Tokio 5-9 am. irregularly.
13.075	VPD	**SUVA, FIJI ISLANDS,** 22.94 m. Irregularly.
12.840	WOO	**OCEAN GATE, N. J.,** 23.36 m., Addr. A. T. & T. Co. Works with ships irregularly.
12.825	CNR	**RABAT, MOROCCO,** 23.39 m., Addr. Director General Telc. & Teleg. Stations. Works with Paris irregularly.
12.800	IAC	**PISA, ITALY,** 23.45 m. Works Italian ships mornings.
12.780	GBC	**RUGBY, ENG.,** 23.47. Works ships irregularly.
12.485	HIN	**CIUDAD TRUJILLO, D. R.,** 24 m. "Broadcasting National." 12 n.-2 pm. 6-11 pm. approx.
12.325	DAF	**NORDDEICH, GERMANY,** 24.34 m. Works German ships daytime.
12.300	——	**SANTIAGO, CHILE,** 24.39 m., Addr. Louis Desmaras, Casilla, 761. 11 am.-1 pm., 4-8 pm., Sun. 4-10 pm.
12.290	GBU	**RUGBY, ENG.,** 24.41 m. Works N. Y. C. evenings.
12.250	TYB	**PARIS, FRANCE,** 24.49 m. Irregular.
12.235	TFJ	**REYKJAVIK, ICELAND,** 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.
12.215	TYA	**PARIS, FRANCE,** 24.56 m. Works French ships in morning and afternoon.
12.150	GBS	**RUGBY, ENG.,** 24.69 m. Works N. Y. C. evenings.
12.130	DZE	**ZEESEN, GERMANY,** 24.73 m., Addr. (See 15.360 mc.) Tests irregular.
12.120	——	**ALGIERS, ALGERIA,** 24.75 m. Calls Paris 12 m.-6.30 am.
12.060	PDV	**KOOTWIJK, HOLLAND,** 24.88 m. Tests irregularly.
12.000	RNE	**MOSCOW, U.S.S.R.,** 25 m. Daily 3-6 pm., Sat., Sun., Tues., Thurs., 10.15-10.45 pm., also Sun. 6-11 am., Mon 6-7 am. and 8.30-9 pm. Wed. 6-7 am., Thurs. 8.30-9 pm.
11.991	FZS2	**SAIGON, INDO-CHINA,** 25.02 m. Phones Paris mornings.
11.960	HI2S	**PUERTO PLATA, D. R.,** 25.08 m., Addr. La Voz de Hispaniola. Relays HIX 5-6.30 am.
11.955	IUC	**ADDIS ABABA, ETHIOPIA,** 25.09 m. Works IAC around 12 midnight.
11.950	KKQ	**BOLINAS, CALIF.,** 25.1 m. Tests irregularly evenings.
11.940	FTA	**STE. ASSISE, FRANCE,** 25.13 m. Works Morocco mornings and Argentina late afternoon.
		S.W. BROADCAST BAND
11.900	XEWI	**MEXICO CITY, MEXICO,** 25.21 m. Monday, Wed. and Fri. 3-4 pm., 9 pm.-12 m. Tues. to Thurs., 7.30 pm.-12 m. Sat. 9 pm. to 12 m. Sunday 12.30-2 pm.
11.895	HP5I	**AGUADULCE, PANAMA,** 25.22 m., Addr. La Voz del Interior. 7.30-9.30 pm.
11.880	TPA3	**PARIS, FRANCE,** 25.23 m., Addr. (See 15.245 mc.) 4-5 am., 10.15 am.-5 pm.
11.875	OLR4C	**PRAGUE, CZECHOSLOVAKIA,** 25.24 m. Daily 8.55 am. to 12 n., 2.25-4.30 pm. Sun. 2-7.30 am. Thurs. and Sat., 5-7.30 am. Mon. and Thurs., 7.55-11 pm.
11.870	W8XK	**PITTSBURGH, PA.,** 25.26 m., Addr. (See 21.540 mc.) 7-10.30 pm.
11.860	YDB	**SOERABAJA, JAVA,** 25.29 m., Addr. N. I. R. O. M. Sat. 7.30 pm. to 2.30 am., daily 10.30 pm. to 2 am.
11.860	GSE	**DAVENTRY, ENG.,** 25.29 m., Addr. (See 26.100 mc.) Irregular.
11.855	DJP	**BERLIN, GERMANY,** 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am. to 4 pm.
11.840	CSW	**LISBON, PORT.,** 25.35 m. Nat'l Broad. Stat. 11.30 am.-1.30 pm.
11.830	W9XAA	**CHICAGO, ILL.,** 25.36m., Addr. Chicago Federation of Labor. Irregular.
11.830	W2XE	**NEW YORK CITY,** 25.36 m., Addr. Col. Broad. System, 485 Madison Av., N.Y.C., relays WABC 6-9 pm.
11.820	XEBR	**HERMOSILLA, SON., MEX.,** 25.38 m., Addr. Box 68. Relays XEBH. 2-4 pm
11.820	GSN	**DAVENTRY, ENG.,** 25.38 m., Addr. (See 26.100 mc.). Irregular.
11.810	2RO	**ROME, ITALY,** 25.4 m., Addr. E.I.R.R., Via Montello 5. Daily 6.43-10.30 am, 11.30 am.-5.30 pm. Sun. 6.43-9 am., 11.30 am.-5.30 pm.
11.803	JZJ	**TOKIO, JAPAN,** 25.42 m., Addr. Broadcasting Co. of Japan. Overseas Division. 12 m.-1 am, 9-10 am, 2.30-3.30 pm., 4-5 pm.
11.800	OER2	**VIENNA, AUSTRIA,** 25.42 m. Daily 10 am.-5 pm. Sat. until 5.30 pm.
11.795	DJO	**BERLIN, GERMANY,** 25.43 m., Addr. (See 15.280 mc.). Irregular.
11.795	OAX5B	**ICA, PERU,** 25.43 m., Addr. Radio Universal. 11 am.-12 n, 4-11.15 pm.
11.790	W1XAL	**BOSTON, MASS.,** 25.45 m., Addr. (See 15.250 mc.) Daily 3.30-5.45 pm. Irregular at other times.
11.770	DJD	**BERLIN, GERMANY,** 25.49 m., Addr, (See 15.280 mc.) 11.35 am.-4.30 pm., 4.50-11 pm.
11.760	OLR4B	**PRAGUE, CZECHOSLOVAKIA,** 25.51 m., Addr. (See 11.875 mc.) Irregular.
11.750	GSD	**DAVENTRY, ENG.,** 25.53 m., Addr. B. B. C., London. 12.20-6 pm., 6.20-8.30, 9-11 pm.
11.730	——	**SAIGON, INDO CHINA,** 25.57 m., Addr. Radio Philco. Irregular 5.30-9.30 am.
11.730	PHI	**HUIZEN, HOLLAND,** 25.57 m., Addr. N. Y. Philips' Radio. Irregular.

(*Continued on page* 85)

(All Schedules Eastern Standard Time)

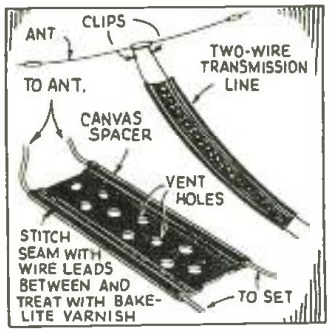
$5.00 FOR BEST SHORT-WAVE KINK

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

$5.00 PRIZE

PORTABLE TRANSMITTERS

For portable transmitters that require a two-wire transmission line of a definite impedance this arrangement proves quite



efficient. The two wires are spaced according to formulae. A piece of cotton cloth about an inch wider than the space between wires is used as the medium of separation. One half inch of cloth is bent over each wire and sewn into place on a sewing machine. The whole assembly is treated with No. 74 bakelite varnish which is an excellent high-frequency insulation. This transmission line may be rolled up when not used. Other material may be used such as light-weight canvas or leatherette. Holes cut in the cloth serve to lessen wind resistance.—H. F. Beaver.

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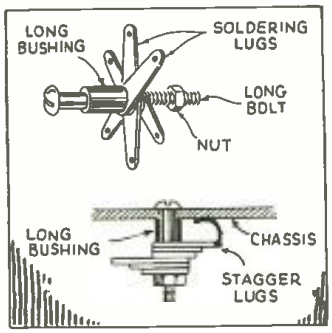
THE COMMON GROUND

When a number of leads are to be grounded, a neater job is made by using a common post consisting of soldering lugs



mounted in staggered positions on a screw which is grounded to the chassis. The wires are then easily removable. If an insulated post is desired, the screw may be mounted in a rubber grommet or in a piece of fiber—Edward Wooten.

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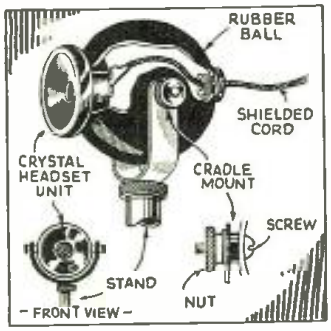
ATTENTION "HAMS"!

Here's my idea for getting that Xtal "mike" you've always wanted! Besides,



when on CW (usually one uses phones for CW and speaker for phone work) you've got a pair of earphones you can't beat! One unit removed and mounted as shown makes not only a ball type "mike" for your phone rig, but gives Xtal clear "T" reports. Direct to grid economy, plus the flexibility o. such an investment, is bound to satisfy any "Ham."—Fred C. Hoffman, W9VVU.

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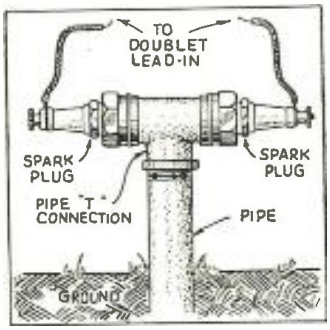
DOUBLET LIGHTNING ARRESTOR

Many "Fans" have attempted to construct their own "doublet" antenna lightning arrestors and have not been successful. Therefore I am passing along my idea which has worked out very nicely. It consists of two discarded spark-plugs, which should be thoroughly cleaned, eliminating all traces of carbon and corrosion. These are then placed into the two ends of a "T" connection which in turn is screwed into the ground pipe. In my particular case a ground pipe 5 ft. long proved to be sufficient. However, the length of this pipe will depend upon the type of earth it is embedded in, and in some cases a pipe as long as 10 feet may be required.—Steve Gorzkowski.



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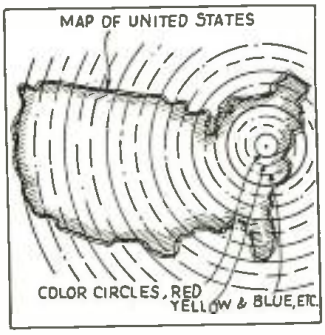
ADDING COLOR TO MAP

I am a regular reader of Short Wave & Television and have read Kenneth Tyler's kink for improving a map. Why not use several colors, which will save considerable line counting. In the accompanying diagram I have illustrated my idea.—Alfred Wolfer.



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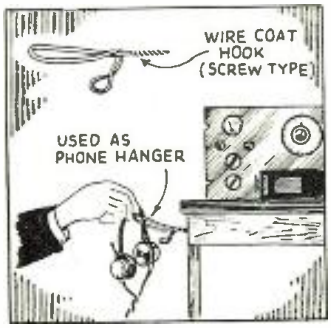
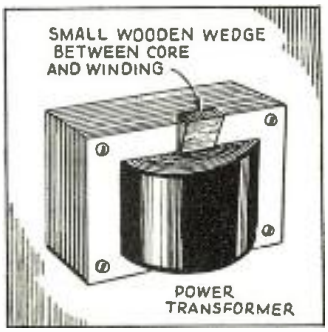
PAGE THE COAT HOOK!

Once more the old wire coat hook goes to work for the radio "Fan." I have used it as a mounting place for the earphones, in order to keep them off the operating desk or table. This ordinary coat hook is screwed into the side of the desk in some position where it will not be brushed against. The illustration shows how this is done.—D. A. Watkins.





STOPPING TRANSFORMER HUM

I believe many short-wave "Fans" will be interested in knowing that it is possible to quiet a "noisy" transformer or choke; the method is very simple, especially in instances where the transformer is not sealed in some sort of compound. A wedge is made of a small piece of wood and is placed between the core and the winding of the transformer. This should be hammered tightly into the space until all signs of hum have been eliminated. This hum, incidentally is core vibration. Other hums cannot be eliminated in this manner. —Harold Bruce Jr.,

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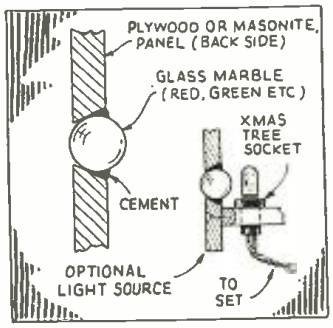
JEWEL LIGHT SUBSTITUTE

Use ordinary colored glass marbles in place of the jewel; panel must be of some material other than metal.

A hole about ¼ inch in dia. is drilled in the panel, then enlarged with a reamer to accommodate the marble. The reamer leaves the hole slightly conical in shape, allowing the marble to fit in on only one side. The marble is then fastened with ordinary household or "chlum" cement. Any source of light can be used. Sockets from Xmas tree strings make convenient mountings. Marbles of one solid color make the best "jewels," although those of a mottled structure are not displeasing in appearance. —James F. Rauney, W8QJ.



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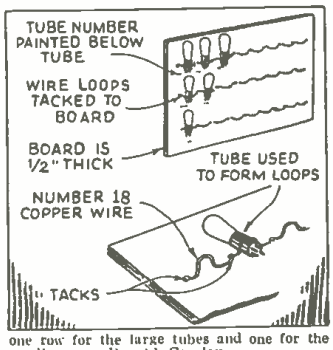
TUBE RACK

This tube rack is easy to make and very useful. My rack is thirty inches square and can accommodate fifty tubes. In making the wire loops, I used only one piece of No. eighteen wire for each row. To do this, first tack the wire at one edge of the board near the top. Then place a tube under the wire and bend the wire around the base of the tube. Leave some slack in the wire so that the loop is slightly larger than the tube base. Now, while holding the wire loop in place, remove the tube and tack the wire to the board. If you use an old tube, you don't have to remove it while tacking the wire. The next loop is formed in the same way. Don't forget that some tubes have large bases and some small, so make



one row for the large tubes and one for the small ones.—Donald Greeley.

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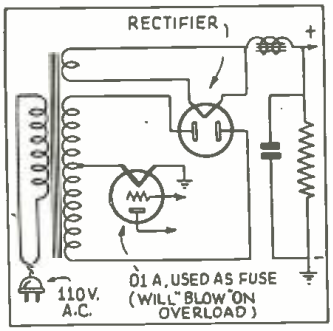
PREVENT BLOW-UPS!

Here is a kink that I have used with great success in building low-power power supplies. In case of an accidental "short," unless a protective device is used, the power-supply will most likely "blow up." A stunt that I have found to be useful is to connect an 01-A tube filament between the center tap of the transformer and the ground. The drawing clearly shows this. —R. Woodward, W6LUX.



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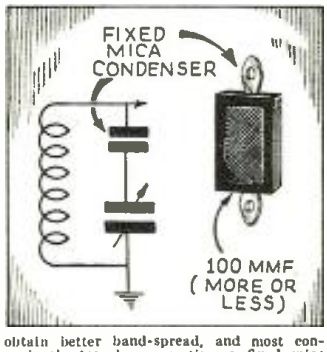
BETTER BAND-SPREAD

Instead of purchasing a special band-spread condenser, or removing some plates, which often ruins a condenser, one can

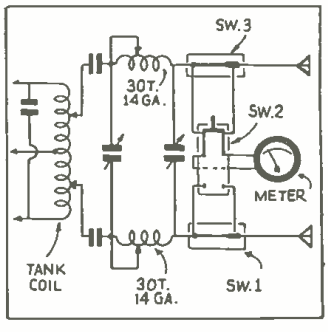


obtain better band-spread, and most conveniently too, by connecting a fixed mica condenser in series, usually about 100 mmf., with the stator. Thus any variable condenser may be employed, even a 365 mmf. unit.—Engelbert Bartosch.

▼ ▼ ▼

R. F. METER SWITCH

For those who cannot afford to have on hand two meters for measuring current in the feeder system of the antenna, I offer the following kink. A single pole single-throw switch is employed in each leg of the feeder system, and across each of these switches are leads running to a double-pole, double-throw switch.
—F. R. Harlow.



Mc.	Call	
11.720	CJRX	WINNIPEG, CANADA, 25.6 m., Addr. James Richardson & Sons, Ltd. 4-10 pm.
11.718	CR7RH	LAURENCO MARQUES, PORTUGESE, E. AFRICA, 25.6 m. Daily 12.45-3 pm. Sun. 8-10.30 am.
11.715	TPA4	PARIS, FRANCE, 25.61 m., (See 15.245 mc.) 5.15-7 pm., 9 pm.-12 m.
11.710	SM5SX	STOCKHOLM, SWEDEN, 25.63 m., Addr. Royal University. Sun. 5-7 am. Wed. 4-5 pm.
		S.W. BROADCAST BAND
11.690	KIO	KAHUKU, HAWAII, 25.68 m., Addr. RCA Communications. Irregularly, Mon. 11.30 pm.-12 m, Thurs. 9.30-10 pm.
11.600	COCX	HAVANA, CUBA, 25.86 m. 8 am.-1 am. Relays CMX.
11.595	VRR4	STONY HILL, JAMAICA, B. W. I., 25.87 m. Works WNC daytime.
11.560	VIZ3	FISKVILLE, AUSTRALIA, 25.95 m., Addr. Amalgamated Wireless of Australasia Ltd. Tests irregularly.
11.500	XAM	MERIDA, YUCATAN, 26.09 m. Irregular 1-7.30 pm.
11.500	PMK	BANDOENG, JAVA, 26.09 m. Tests irregularly.
11.413	CJA4	DRUMMONDVILLE, QUE., CAN., 26.28 m. Tests irregularly.
11.405	HBO	GENEVA, SWITZERLAND, 26.30 m., Addr. Radio Nations. Sat. 5.30-6.15, 7.15-8.30 pm.
11.280	HIN	CIUDAD TRUJILLO, D. R., 26 m. Addr. La Voz del Partido Dominicano. Irregular.
11.050	ZLT4	WELLINGTON, NEW ZEALAND, 27.15 m. Works Australia and England early morning.
11.040	CSW	LISBON, PORTUGAL, 27.17 m., Addr. Nat. Broadcasting Sta. 1.30-6 pm.
11.000	PLP	BANDOENG, JAVA, 27.27 m. Relays YDB. 5.30-10.30 or 11 am. Sat. until 11.30 am.
10.970	OCI	LIMA, PERU, 27.35 m. Works Bogota, Col. evenings.
10.840	KWV	DIXON, CALIF., 27.68 m., Addr. A. T. & T. Co. Works with Hawaii evenings.
10.770	GBP	RUGBY, ENGLAND, 27.85 m. Works Australia early morning.
10.740	JVM	NAZAKI, JAPAN, 27.93 m. Works U.S.A. 2-7 am. Broadcasts daily 9-10 am., 2.30-3.30 pm.
10.675	WNB	LAWRENCEVILLE, N. J., 28.1 m., Addr. A. T. & T. Co. Works with Bermuda irregularly.
10.670	CEC	SANTIAGO, CHILE, 28.12 m. Daily 7-7.15 pm.
10.660	JVN	NAZAKI, JAPAN, 28.14 m. Broadcasts daily 2-8 am. Works Europe irregularly at other times.
10.550	WOK	LAWRENCEVILLE, N. J., 28.44 m., Addr. A. T. & T. Co. Works S. A. nights.
10.535	JIB	TAIWAN, FORMOSA, 28.48 m. Works Japan around 6.25 am.
10.520	VLK	SYONEY, AUSTRALIA, 28.51 m., Addr. Amalgamated Wireless of Australasia Ltd. Works England 1-6 am.
10.430	YBG	MEDAN, SUMATRA, 28.76 m. 5.30-6.30 am., 7.30-8.30 pm.
10.420	XGW	SHANGHAI, CHINA, 28.79 m. Works Japan 12 m.-3 am.
10.410	PDK	KOOTWIJK, HOLLAND, 28.8 m. Works Java 7.30-9.40 am.
10.410	KES	BOLINAS, CALIF., 28.8 m., Addr. RCA Communications. Irregular.
10.370	EHZ	TENERIFFE, CANARY ISLANDS, 28.93 m. Relays EAJ43 2-4, 6-7 or 8 pm.
10.350	LSX	BUENOS AIRES, ARG., 28.98 m., Addr. Transradio International. Broadcasts 5-6 pm. Mon. and Fri. Tests irregularly at other times.
10.330	ORK	RUYSSELEDE, BELGIUM, 29.04 m. 1.30-3 pm.
10.300	LSL2	BUENOS AIRES, ARG., 29.13 m., Addr. Cia. Internacional de Radio. Works Europe evenings.

Mc.	Call	
10.290	DZC	ZEESEN, GERMANY, 29.16 m., Addr. (See 15.360 mc.) Irregular.
10.260	PMN	BANDOENG, JAVA, 29.24 m., Relays YDB 5.30-10.30 or 11 am., Sat. to 11.30 am.
10.250	LSK3	BUENOS AIRES, ARG., 29.27 m., Addr. (See 10.310 mc.) Works Europe and U.S.A. afternoons and evenings.
10.230	CED	ANTOFAGASTAN, CHILE, 29.33 m. Tests 7-9.30 pm.
10.220	PSH	RIO DE JANIERO, BRAZIL, 29.35 m. Irregular.
10.170	RIO	BAKOU, U.S.S.R., 29.15 m. Works Moscow 10 pm.-5 am.
10.140	OPM	LEOPOLDVILLE, BELGIAN CONGO, 29.59 m. Works Belgium around 3 am. and from 1-4 pm.
10.080	RIO	TIFLIS, U.S.S.R., 29.76 m. Works Moscow early morning.
10.070	EDM-EHY	MADRID, SPAIN, 29.79 m. Works S. A. evenings.
10.065	JZB-TDB	SHINKYO, MANCHUKUO, 29.81 m. Works Tokio 6.30-7 am.
10.055	ZFB	HAMILTON, BERMUDA, 29.84 m. Works N. Y. C. irregular.
10.055	SUV	ABOU ZABAL, EGYPT, 29.84 m. Works Europe 1-6 pm.
10.042	DZB	ZEESEN, GERMANY, 29.87 m., Addr. Reichspostzenstralamt. Irregular.
9.990	KAZ	MANILA, P. I., 30.03 m., Addr. RCA Communications. Works Java early morning.
9.950	GCU	RUGBY, ENGLAND, 30.15 m. Works N. Y. C. night time.
9.930	HKB	BOGOTA, COL., 30.21 m. Works Rio evenings.
9.930	CSW	LISBON, PORTUGAL, 30.31 m., Addr. Nat. Broad. Station. 6-9 pm.
9.890	LSX	BUENOS AIRES, ARG., 30.33 m., Addr. (See 10.300 mc.) Works N. Y. C. evenings.
9.870	WOX	LAWRENCEVILLE, N. J., 30.4 m., Addr. A. T. & T. Co. Works England nights.
9.860	EAQ	MADRID, SPAIN, 30.43 m., Addr. Post Office Box 951. Daily 5.15-7.30 pm., Sat. also 12 n.-2 pm.
9.830	IRM	ROME, ITALY, 30.52 m. Works Egypt afternoons.
9.800	LSI	BUENOS AIRES, ARG., 30.61 m., Addr. (See 10.350 mc.) Tests irregularly.
9.790	GCW	RUGBY, ENGLAND, 30.64 m. Works N. Y. C. evenings.
9.760	VLJ-VLZ2	SYDNEY, AUSTRALIA, 30.74 m., Addr. Amalgamated Wireless of Australasia Ltd. Works Java and New Zealand early morning.
9.750	WOF	LAWRENCEVILLE, N. J., 30.77 m., Addr. A. T. & T. Co. Works London, night time.
9.740	COCQ	HAVANA, CUBA, 30.78 m. 6.50 am. 1 am.
9.710	GCA	RUGBY, ENGLAND, 30.89 m. Works S. A. evenings.
9.675	DZA	ZEESEN, GERMANY, 31.01 m., Addr. (See 10.042 mc.) Irregular.
9.670	TI4NRH	HEREDIA, COSTA RICA, 31.02 m., Addr. Amando C. Marin. Apartado 40. 8.30-10 pm., 11.30 pm.-12 m.
9.660	LRX	BUENOS AIRES, ARG., 31.06 m., Addr. El Mundo. 7-11.30 pm.
9.650	CT1AA	LISBON, PORTUGAL, 31.09 m., Addr. Radio Colonial. Tues., Thurs. and Sat. 3-6 pm.
9.650	YDB	SOERABAJA, JAVA, 31.09 m., Addr. N. I. R. O. M. Daily except Sat. 6-7.30 pm., 5.30 to 10.30 or 11 pm. Sat. 5.30-11.30 am.
9.650	DGU	NAUEN, GERMANY, 31.09 m., Addr. (See 20.020 mc.) Works Egypt afternoons.
9.645	HH3W	PORT-AU-PRINCE, HAITI, 31.1 m., Addr. P. O. Box A117. 1-2, 7-8 pm.
9.645	YNLF	MANAGUA, NICARAGUA, 31.1 m. 8-9 am., 12.30-2.30, 6.30-10 pm.
9.635	2RO	ROME, ITALY, 31.13 m., Addr. (See 11.810 mc.) Daily 12.40-5.30 pm. Mon., Wed. and Fri. 6-7.30 pm. Tues., Thurs. and Sat. 6-7.45 pm.

Mc.	Call	
9.630	HJ2ABD	BUCARAMANGA, COL., 31.14 m. 11.30 am.-12.30 pm., 5.30-6.30, 7.30-10.30 pm.
9.620	HJ1ABP	CARTAGANA, COL., 31.19 m., Addr. P. O. Box 37. 11 am.-1 pm., 5-11 pm. Sun. 10 am.-1 pm., 3-6 pm.
9.615	HP5J	PANAMA CITY, PANAMA, 31.22 m. Addr. Apartado 867. 12 n. to 1.30 pm., 6-10.30 pm.
		S.W. BROADCAST BAND
9.600	RAN	MOSCOW, U.S.S.R., 31.25 m. Daily 7-9 pm.
9.600	CB960	SANTIAGO, CHILE, 31.25 m. Heard after 9.30 pm.
9.595	HBL	GENEVA, SWITZERLAND, 31.27 m., Addr. Radio Nations. Irregular.
9.590	PCJ	HUIZEN, HOLLAND, 31.28 m., Addr. (See 15.220 mc.) Sun. 2-3, 7-8 pm. Tues. 1.30-3 pm. Wed. 7-10 pm.
9.590	VK6ME	PERTH, W. AUSTRALIA, 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd. Testing 5.30-6.30 am
9.590	VK2ME	SYDNEY, AUSTRALIA, 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd., 47 York St. Sun. 1-3, 5-9 am. 10.30 am.-12.30 pm.
9.590	W3XAU	PHILADELPHIA, PA., 31.28 m. Relays WCAU 11 am. to 7 pm.
9.580	GSC	DAVENTRY, ENGLAND, 31.32 m., Addr. B. B. C., London. 9-11 pm.
9.580	VK3LR	MELBOURNE, AUSTRALIA, 31.32 m., Addr. 61 Little Collins St. 3.15-8.30 am. except Sunday. Also Friday 10 pm. to 2 am.
9.575	HJ2ABC	CUCUTA, COL., 31.34 m. 8 pm. to 12 m.
9.570	W1XK	SPRINGFIELD, MASS., 31.35 m., Addr. Westinghouse Electric & Mfg. Co. Relays WBZ 6 am. to 12 m. Sun. 7 am. to 12 m.
9.565	VUB	BOMBAY, INDIA, 31.36 m., Addr. Indian State Broadcasting Corp. 11.30 am.-12.30 pm. Tues, Thurs., Fri. irregularly.
9.560	DJA	BERLIN, GERMANY, 31.38 m., Addr. Broadcasting House. 12.05-5.15 am., 4.50-10.45 pm.
9.555	HJ1ABB	BARRANQUILLA, COL., 31.39 m., Addr. P. O. Box 715. 11.30 am. to 1 pm., 4.30-6 pm.
9.550	OLR3A	PRAGUE, CZECHOSLOVAKIA, 31.41 m. See 11.875 mc. for schedule.
9.540	DJN	BERLIN, GERMANY, 31.45 m., Addr. (See 9.560 mc.) 12.05-5.15 am., 4.50-10.45 pm.
9.540	VPD2	SUVA, FIJI ISLANDS, 31.45 m., Addr. Amalgamated Wireless of Australasia, Ltd. 5.30-7 am.
9.535	JZI	TOKIO, JAPAN, 31.46 m., Addr. (See 11.800, JZJ) 9-10 am.
9.530	W2XAF	SCHENECTADY, N. Y., 31.48 m., Addr. General Electric Co. 4 pm.-12 m.
9.525	ZBW3	HONGKONG, CHINA, 31.49 m., Addr. P. O. Box 200. Irregular 11.30 pm. to 1.15 am., 4-10 am.
9.525	LKJ1	JELOY, NORWAY, 31.29 m. 5-8 am.
9.520	HJ4ABH	ARMENIA, COLOMBIA, 31.51 m. 8-11 am., 6-10 pm.
9.510	VK3ME	MELBOURNE, AUSTRALIA, 31.55 m., Addr. Amalgamated Wireless of Australasia, 167 Queen St. Daily except Sun. 4-7 am.
9.510	GSB	DAVENTRY, ENGLAND, 31.55 m., Addr. (See 9.580 mc.—GSC) 1-3.15 am., 12.20-6 pm., 6.20-8.30 pm.
9.505	HJ1ABE	CARTAGENA, COLOMBIA, 31.57 m., Addr. P. O. Box 31. 5-10.30 pm.
9.500	HJU	BUENAVENTURA, COLOMBIA, 31.58 m., Addr. National Railways. Mon., Wed. and Fri. 8-11 pm.
9.500	PRF5	RIO DE JANIERO, BRAZ., 31.58 m. Irregularly 4.45 to 5.45 pm.
9.500	EAQ2	MADRID, SPAIN, 31.58 m., Addr. (See 9.860 mc.) Exc. Mon. 2.30-3, 6.30-7, 7.30-9.30 pm., Mon. 7.30-9.30 pm.
		S.W. BROADCAST BAND

(Continued on page 87)

(All Schedules Eastern Standard Time)

Practical Cathode-Ray Television In France

(*Continued from page* 69)

and sweep chassis are installed side by side on the vertical walls of the cabinet. The oscillograph tube has a diameter of 3¾ inches; it is mounted vertically and the large end extends into the upper portion of the cabinet.

Mirror and Lens Used in 1 Model

A mirror inclined at an angle of 45° is mounted on the inside of the cover. A lens which enlarges the images to about *double their size* is secured on a panel of wood in such a manner that a wide angle of vision is assured; 10 to 12 spectators can watch the projected images.

This receiver is the work of Messrs. De France and Roger Cahen. In collaboration with the *Radio-Industry Society*, they have designed a series of receivers intended particularly for televised motion pictures (Fig. 5).

Fig. 4—The Radio L.L. television receiver, with vertical cathode-ray tube.

Their particular achievement is in the amplification of audio frequencies, permitting the use of a number of transformers yet with a very wide band pass and without distortion. The images are 9½ inches square and are *white and black*.

Amateur Television Apparatus—One Set Uses But 8 Tubes

We list under this heading those French receivers designed for amateur assembly from a kit of parts.

First is the "Visiodyne Baby" set developed by M. Chauviere which is especially well made (Fig. 6).

It employs an oscillograph tube of 3¾ inches and it uses a total of 8 tubes.

The cathode-ray tube is supplied with a protential of 1,000 volts. The images are viewed through a magnifying glass 6¼ inches in diameter and are enlarged to the size of a *postal card*, which is very good, considering the simple apparatus employed.

The receiver itself consists of 4 tubes; an octode frequency changer, two pentodes of special high-frequency type in the I.F. amplifier and a double-diode triode for the detection and synchronizing signal amplification. (Fig. 7.)

This assembly is completed by two correcting tubes, and a high-voltage rectifier and low-voltage rectifier; the first for the power-supply for the oscillograph tube and the second for the receiver; two thyratrons supply the *line* and *image* sweeps.

The power-supply to the entire set is obtained from a single unique transformer having 9 secondaries; the source of "B" voltage is *common* for the receiver and the time base oscillators.

The frequency-changer stage is stabilized by using a Colpitts circuit in the oscillator, aided by a double-diode triode which serves simultaneously as second detector of the superheterodyne receiver, amplifier for the modulation signal for the C.R. tube and phase reverser for the synchronizing signals which control the thyratrons (Fig. 7).

As you can see in the photo the chassis is made in two levels; the upper stage is formed by the chassis of the receiver and the support of the cathode-ray tube, with the observing lens; the lower stage contains the power transformer, the rectifiers and the thyratrons (Fig. 6).

On the time-base (sweep) chassis, 8 knobs are seen, each knob controlling a potentiometer. Six of these are on the chassis top, as they are not regulated in the course of receiving.

Two of these potentiometers serve to control the concentration or *focussing* of the spot and the *intensity* of this spot. Two others serve to center the image, moving it to left or right, and up or down.

The last four potentiometers control the line and image thyratrons. They regulate the *length* and *width* of the image and permit exact synchronization to be maintained during transmission.

The adjustment of the receiver proper is conducted exactly the same as for any radio telephone set, by sound by connecting a loudspeaker to the A.F. amplifier.

The regulation of framing and synchronization are, in principle, effected one for all; it is necessary only to search by means of the speed of discharge of two condensers, for the images, and to vary the intensity of the illumination by means of a potentiometer. From time to time, the concentration of the spot and the average illumination can be adjusted, also.

Installation of a Television Receiver

A television receiver is installed much the same as a radio receiver, though several precautions should be observed in the choice of an antenna.

Very often, the types of antennas used for radio reception are quite suitable, whether they are indoor or outdoor types. Before erecting special aerials it is well to try available ones. At a little distance from the transmitter it is generally sufficient to use an indoor aerial of about 12 feet in length, insulated with rubber, and supported at the far end with an insulator and at the other, connecting to the receiver; also, a simple vertical wire about 12 to 14 ft. long with a single wire lead-in will often be sufficient. This should be connected to the set through a small ca-

pacity of about 1 or 2 micro-microfarads.

When it is desired to receive transmissions from greater distances, it is best to resort to a *doublet* with two horizontal arms of about 6 ft. in length and a double lead-in with parallel wires, or with wires transposed every few inches as shown in Fig. 8. The lead-in is coupled to the receiver by means of a coil of 1 or two turns of heavy wire and two condensers of about 50 mmf. in series with each lead-in wire.

Another simple type consists of a vertical wire of a length of about 12 ft. and a shielded lead-in, the inner wire connecting to the receiver and the shield and wire connected together through a small fixed condenser; the system is completed by means of a counterpoise. This system is augmented in Germany by placing a loop of iron wire about 9 ft. in diameter around the top end of the shielded lead-in, and connected to it. This is used to reduce the effect of man-made static on reception.

Defects in Reception

The defects encountered in image reception may be divided into those which are external to the apparatus and those which are due to defects in the system.

There are, as we have mentioned, the variations in the focus of the spot at the edges of the image; this is due to the change in focus of the tube between the center and the edges of the image. There are also deformations as those due to changes in the general form of the image (trapezoidal distortion) or lack of symmetry. These defects are due, as we have explained to defects in the sweep system; the only remedy is to use a more perfect sweep circuit. Also, there is the visible return of the spot to its original position (back trace) and this forms streaks in the images which are particularly annoying; this is a fault of the circuit used.

Next there is the case of an image which is too gray and lacking in contrast; the cause is lack of sensitivity in the receiver. It is difficult to correct or vary the contrast; though this may be accomplished by increasing the amplification of the I.F. amplifier or by changing the aerial. Also the bias on the C.R. tube may need adjustment.

By contrast, there is the condition when the contrast is too intense, though this can be controlled by reducing the intensity by means of the regulating potentiometers.

Lack of details may be due to cutting of side-bands, and the only remedy for this condition is to adjust the I.F. amplifier.

Man-made static is seen as bright spots on the screen; this may completely ruin reception by throwing the synchonizing off for an indeterminate length of time. The interference due to telegraph messages is often seen in the form of vertical lines on the images—it can be reduced by better shielding of the set.

Insufficient filtering causes a sinusoidal deformation of the edges of the images; the variations in the voltage causing changes in the sensitivity of the tube.

Defects in the thyratron circuit cause the lines to be unequal in length.

Accentuation of the high frequencies, on the contrary a sort of "plastic" effect or double image—which is usually caused by mis-alignment of the tuned circuits of the receiver. Of the same type is the defect caused by mis-alignment of the local oscillator.

The framing is automatic but if the frequency of the line sweep has not been regulated correctly it is possible to have two images on the screen; this, however, is a rare defect.—*Courtesy La Nature.*

Fig. 5—The De France Television receiver.

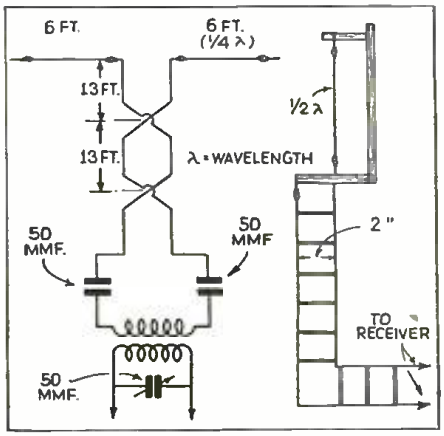


Fig. 8— Types of aerials for ultra-short waves.

Radio—Then and Now

By John L. Reinartz

(*Continued from page* 67)

for television radio.

It is difficult to tell where the amateur will "break out" next. What with his wonderful work during flood and other national emergencies, he has been kept quite busy of late, but you can depend upon it—he will be the "torch-bearer" where radio progress is concerned. He may at times try the patience of the *broadcast* listener next door with his radio activities, yet he fills a very great need in the radio scheme of things and that same next-door neighbor will bless the amateur when he fully understands the real mission of his activity.

New Loop Aerial

(*Continued from page* 70)

compact form, may be arranged so as to be rotated in a complete circle. Thus, if we consider the antenna as a disc resting on its edge, it may be rotated on its vertical axis as shown in one of the accompanying diagrams; in this way it is possible to concentrate the signal in whatever direction of the compass you may wish to contact a station or plane.

This rotary beam antenna devised by Reinartz is said to show particularly high efficiency on the short and ultra short wavelengths. When used for five meter work, both for transmitting and receiving, there is a considerable gain over the usual antenna.

For five meter work, two pieces of copper tubing each 8 ft. in length, are bent into circular shape as shown in the diagram, with a space of 3 inches between the tubes. The ends of the circular members are not completely closed but remain open, with a space of 1 inch between the adjacent ends. Each circular member is about 30.48 inches in diameter. Many methods may be used to connect a 5-meter transmitter to this beam antenna, and one suggestion as shown in the drawing employs a low impedance transmission line, which consists of a twisted pair.

If the antenna is arranged to be turned about its horizontal axis, this will change the polarization, and, in some cases, this may be desired. However it should be made to rotate on its vertical axis for utilizing its directive qualities. It is claimed that the directive gain in a direction away from the open end is approximately 6 to 1. For operation on other frequencies the length of the tubes will be the same as for a single half-wave Hertz antenna. This antenna should work remarkably well on the now *alive* 10 meter band.

All-Wave 13-Tube Receiver Has Tele-Dial

(*Continued from page* 88)

Two 12" speakers are supplied. The power transformer is designed to operate from any A.C. line from 95 to 130 volts, 50-60 cycles without adjustment.

The 13-tube line-up is as follows: R.F. amp., 6K7; 1st det. 6K7; oscillator 6C5; two 6K7's 1st and 2nd I.F. amp.; 2nd det. 6H6; AVC 6C5; 1st A.F. amp. 6C5; tuning indicator 6G5; 2-6L6 power tubes and 2-5Z4 rectifiers.

The r.f. interstage coupling consists of 2 transformers each with its own tuning condenser. This arrangement gives a superior band-pass selectivity characteristic and minimizes the possibility of "images."

This unusual receiver should be an excellent performer on both broadcast and short waves.

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

Don't Miss Next Issue! Lots of "Ham" and "Fan" Features.

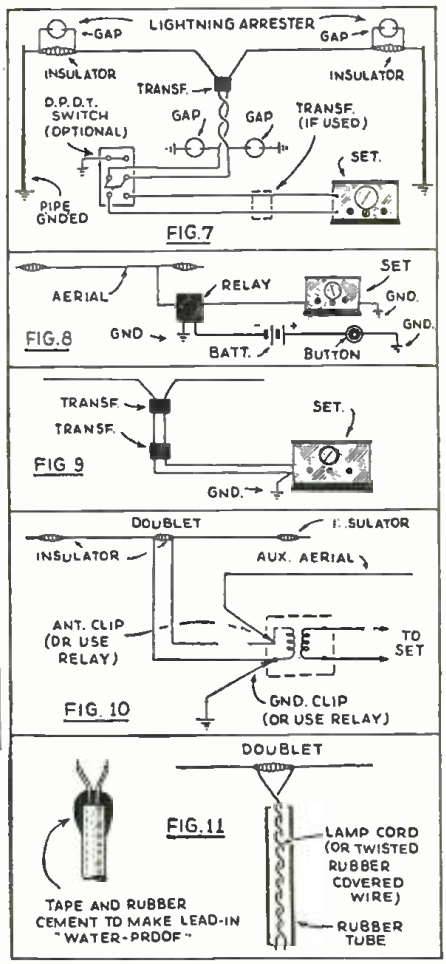


Fig. 7—Lightning "grounding" switch for doublet; 8—relay for "grounding" aerial; 9—"V" doublet connection. Fig. 10—Auxiliary aerial connected to doublet gives greater range in some cases; 11—homemade "waterproof" leadin.

Practical Antenna Hints

(Continued from page 72)

connections may be carried through a piece of flexible twin-conductor cord but the best arrangement is to use two slip rings and brushes.

A Clever Way to Tune the Doublet

In Fig. 3 we have an interesting suggestion made by George Shuart, W2AMN, for adjustable wavelength doublet and here the length of the wire in the lead-in sections adjacent to the doublet are made variable. As the length of the parallel wires is increased or decreased the wavelength to which the antenna responds is also varied in direct proportion.

Another idea which may be employed for adjusting the wavelength response of the doublet, especially those of the "V" type, is to vary the length of the top of the "V" as shown in Fig. 4. As the legs of the "V" are closed up more and more as shown by the dotted lines, the wavelength response of the antenna is decreased.

Lightning Protection

While lightning arresters are required by the National Board of Fire Prevention and are also required by the terms of practically all fire insurance policies, many people have neglected to install lightning arresters of any type when they switched from an ordinary *single-wire* antenna to a *doublet*. Several diagrams are given herewith showing how lightning arresters can be connected to a doublet.

Fig. 5 shows one method of bringing in the two wire leadin from the doublet through porcelain tubes at either the first floor level, or just below it into the cellar of the house. The lightning arresters can be mounted on a beam inside the cellar wall or can be placed on the baseboard at the floor level. Some people prefer to place the lightning arresters on the outside of the building; the connection of the arresters to the twin lead-in cable is indicated in Fig. 5. An interesting installation of a doublet in a good size attic is also shown in Fig. 5A. The doublet installed in an attic as in Fig. 5A will work just as well as if it were installed on poles a few feet above the roof, providing that the roof of the house has wood or slate surface shingles and not tin or other metal roofing, which would act as a shield and probably reduce the receiving efficiency of the doublet very markedly. Where electric light or telephone wires pass close to the top of the roof and near the ridge beam, then it may be desirable to erect the doublet outside on a couple of poles, about 10 feet or so above the roof.

If factory-made "approved" lightning arresters are not used but home-made ones instead (which are permissible where no fire insurance is carried on the building, or where the receiving station may be located in a small shack or outbuilding and well away from the main dwelling) then air-gap type arresters with gaps about one-sixtieth inch long between sharp screw (or needle) points may be connected as shown in Fig. 6.

For full protection of the doublet, and bearing in mind that no one can predict just what paths a lightning discharge will take, it was suggested by H. W. Secor, to connect these lightning arrester gaps across the insulators at the very ends of the doublet, and also across the main lead-in wires *before* they enter the transformer case at the upper end of the twin lead-in section. If this is not done, and providing 100 per cent protection is desired, did you ever stop to think what might happen if an extra heavy static or lightning discharge piled up on the antenna and first lead to find its way through the transformer at the upper end of the leadin and thence to ground! The discharge would pass through the second transformer near the set (if the lightning arrester happened to be connected to the lead-in wires at a point between the second or lower transformers and the set) which has occurred in some instances? Most likely one or both of the antenna coupling trans-

formers would then be burned out and after that the operator would probably never be the wiser but would probably be picking up his distant stations on the lead-in alone, without the benefit of the doublet! Another possibility—he might only be receiving on one "arm" of the doublet, the other having been disconnected by the static or lightning discharge partially burning out the coupling transformer. A loss in reception efficiency and one hard to locate.

Fig. 7 shows how a lightning grounding switch may be connected to a *doublet*; gap arresters are also shown connected across the insulators, these arresters being connected to ground wires in each case.

Fig. 8 shows how a relay may be operated with a push-button and battery from inside the house, so as to *ground* the antenna during a thunderstorm or whenever the operator is away from the set.

Improving Reception With Doublet

Fig. 9 shows the connection of the G.E. "V" doublet and those who have complained of poor reception on certain wave bands when using a doublet may take a tip from this connection, and try a ground wire from the nearest water pipe to one terminal post on the set (to which the doublet twin leadin is connected).

Fig. 10 shows an auxiliary aerial connected to the doublet and also a ground connection. In some cases one experimenter found that the signals from Europe, for example, were greatly enhanced (as much as 100 per cent) by connecting the auxiliary aerial and ground (either with a clip or else by means of a relay) once a station had been "picked up" on his doublet. The auxiliary aerial may be a single wire, 50 to 60 feet long, and should point in a different direction from the plane of the doublet.

Fig. 11 shows a simple method for providing a *waterproof* leadin for the twin conductor, such as lamp-cord or light rubber-covered wire frequently used for doublets. The twisted-pair is placed inside of a rubber tube, which will cost but a few cents a foot, and the top of the "leadin" where the wires enter is covered with rubber tape or else rubber cement.

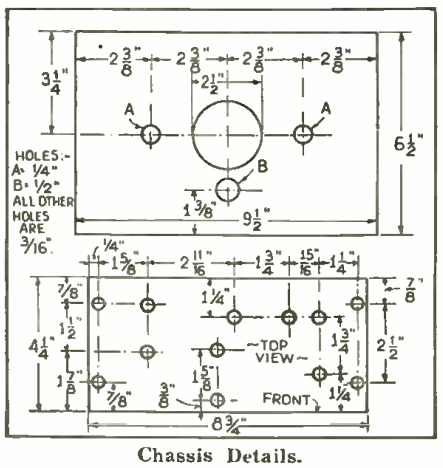
A 16 to 550 Meter, Band-Switching 2-Volt Receiver

(*Continued from page 77*)

One Carbon resistor, 1/4 watt, 3 megohms, type 1096
One Carbon resistor, 1/4 watt, 1 megohm, type 1096
One Carbon resistor, 1 watt, 1/4 megohm (250,000), type 1094

ELECTRAD INC.
One Potentiometer, 50,000 ohms, with d.p.s.t. switch, type 205
One Filament rheostat, 10 ohms, type 204-W

HARDWARE
One Steel cabinet, size 9 1/4 x 6 1/16 x 4 7/8 inches, type 245, pierced
One Airplane dial, 1/4" shaft, 0-100 scale, type 124
Two "Change-o-Name" dial plates, type 541-A
Two Pointer knobs, 1 1/8", type 286



Chassis Details.

ICA
One "Band-switching" coil unit, type 1415
One Ceramic socket, 4-prong, type 2600
One Bakelite socket, 5-prong, type 2485
Two Tip-jacks, insulated, type 1890

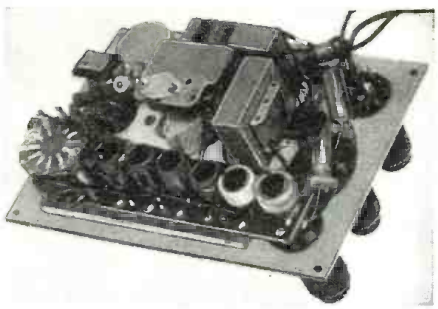
EVEREADY (Batteries)
Two or three type 772 or 762, 45-volt "B" blocks (see text)
One type 761 or type 783 "C" battery (see text)
Two type 7111, 1 1/2-volt "A" batteries (dry cells)

RAYTHEON
One type 950 tube or one type 1F4 tube (see text)
One type 951/1B4 tube

Guide to Short-Wave Reception

● The United States Department of Commerce has recently issued "A Guide to Reception of Short Wave Broadcasting Stations." Copies are available for 25c from the Department of Commerce, Washington, D.C.

The book contains instructions for the proper installation of the radio receiver; characteristics of short-wave radio transmission, with a table of frequencies for the different classifications, such as foreign programs, police calls, as well as amateur and aircraft calls. A chart of the world showing the distances and azimuths from Washington, D.C., to all points on the earth's surface is given. A folding chart giving the "time-zones" of the world is included, as well as a list of the principal short-wave broadcast stations with their location, call letters, frequencies, etc. A list of the international call letters is also appended and a final section gives detailed instructions of just how to tune in the Short-wave stations.



Metal-Tube 6-Band Signal Generator

By Edward M. Shiepe

● A VERY stable signal generator for all waves, AC-DC operation with a separate tube for modulation at 400 cycles, can now be compactly built by the service man and experimenter. It uses three 6C5 metal tubes to perform the functions of oscillator, modulator and rectifier.

The frequency range is from 90 kc. to 31 megacycles on fundamentals, and harmonics will reach 1 meter when required. The six bands are selected by switching, the switch automatically shorting all unused coils to ground, eliminating all instability and "breaks" in the oscillation spectrum.

The construction of the generator is simple, as seen from the photograph, and combines a new method of band-spreading the short waves, with a new idea in stabilizing service oscillators.

The coil assembly is novel, since one can easily and quickly remove any coil without disturbing the others, because each coil is individually wound on a separate form.

Band-spreading is accomplished by the expedient of calibrating the high-frequency band on a 5-inch diameter dial scale, and the longer waves on the smaller diameters.

Stability of an unusual degree is attained by keeping all heating elements from affecting the temperature of the tank circuit and other frequency-determining-parameters. This is done by mounting the metal tubes on the front of the panel, adding to its appearance and permitting the heat of the tubes to dissipate into space. This not only keeps the coils and condensers at room temperature, but cools the tubes so their temperature change affects the circuit as little as possible. This point has been overlooked in many previous designs and is possible now because of the advantages of the new metal tubes. The line-cord carries the voltage-dropping resistor for supplying the 0.3 ampere heaters.

Provision is made for a *wobbler* connection for use with the cathode ray oscillograph. The attentuator really works, as it must for AVC sets, and the output terminals of the generator are isolated from the line by r.f. by-pass condensers. A toggle switch controls the modulation. The complete generator is shielded in a metal cabinet.

The single-gang tuning condenser is fastened to the sub-panel and has a midline shape of plate, giving a maximum capacity less trimmer of .000365 mf.

All coils are wound on bakelite tubing. Since a Hartley circuit is used, the coils are tapped. The coil data follows:

COIL NO.	FREQ. RANGE
1	90— 220 kc.
2	217— 570 kc.
3	560—1500 kc.
4	1.45— 4.0 mc.
5	3.9—11.0 mc.
6	10.5—31.0 mc.

The r.f. choke is wound on ⅜" diameter and is honeycomb wound. Coils No. 1, 2 and 3 are also honeycomb wound to take up less space. Such coils are commercially available.

This article has been prepared from data supplied by courtesy of Delta Radio Company.

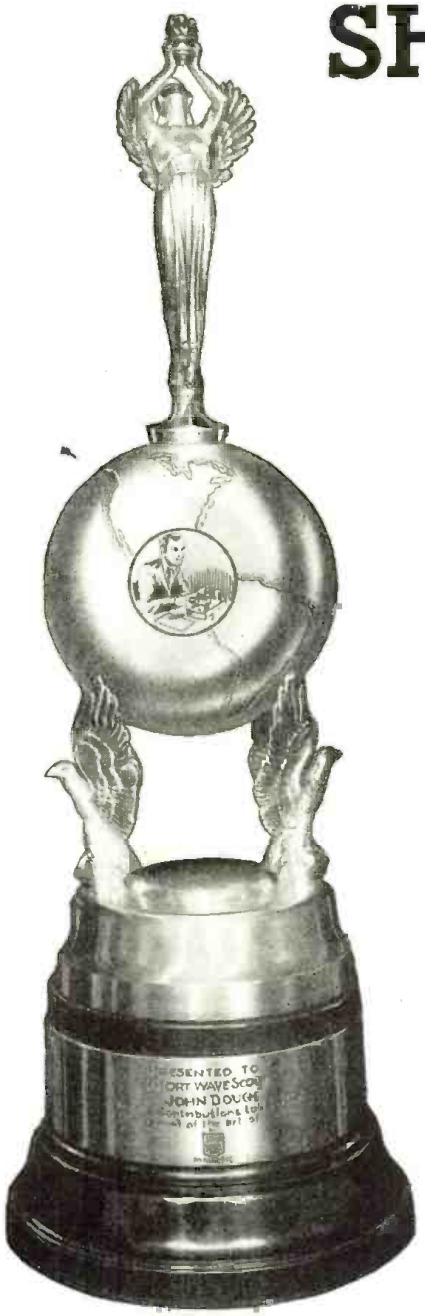
SHORT WAVE SCOUTS

THIRTY-NINTH TROPHY

Presented to
SHORT WAVE SCOUT
ERNEST KNOWLTON
P. O. Box 327, Main Street, Marlboro, N. H.

For his contribution toward the advancement of the art of Radio
by

SHORT WAVE TELEVISION
Magazine



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

It is a most imposing piece of work, and stands from tip to base 22½". The diameter of the base is 7¾". The diameter of the globe is 5¼". The work throughout is first-class, and no money has been spared in its execution. It will enhance any home, and will be admired by everyone who sees it.

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

The purpose of this contest is to advance the art of radio by "logging" as many short-wave phone stations, amateurs excluded, in a period not exceeding 30 days, as possible by any one contestant. The trophy will be awarded to that SHORT WAVE SCOUT who has logged the greatest number of short-wave stations during any 30-day period.

● WE take pleasure in awarding the thirty-ninth Scout Trophy to Ernest Knowlton, of Marlboro, New Hampshire. Mr. Knowlton submitted 79 verification cards, 70 of which were *foreign*.

The receiver employed was an 11-tube 1936 RCA-Victor using the Magic Eye, Magic Brain and metal tubes. The antenna was a RK-40, RCA double-doublet. It seems that Mr. Knowlton's location is not a good one inasmuch as he is located near electrical machinery, which caused considerable interference. Fortunately, to the rear of his shack there was a slight hill, and by mounting the antenna on this hill he was able to eliminate practically all of the noise. The method of bringing the lead-in to the "shack" was quite novel. Mr. Knowlton states that the lead-in was run through 300 ft. of rubber hose; this was buried in the ground. Also he goes on to explain that his ground consists of a copper screen which was placed at the bottom of a well in the cellar. This idea came from an issue of *Short Wave Listener*. All-in-all, he says that the antenna system with the "buried" lead-in, together with the ground wire works out exceptionally well, despite previous difficulties.

79 Stations—70 Foreign

Station	Frequency	Location
United States		
W3XAL	6.100 kc.	Bound Brook, N.J.
W2XAF	9.530 kc.	Schenectady, N.Y.
W2XAD	15.330 kc.	Schenectady, N.Y.
W9XF	6.100 kc.	Chicago, Ill.
W1XAL	6.400 kc.	Boston, Mass.
W3XAU	9.590 kc.	Philadelphia, Pa.
W3XAU	6.060 kc.	Philadelphia, Pa.
W9XAA	6.080 kc.	Chicago, Ill.
W8XAL	6.060 kc.	Cincinnati, Ohio
Foreign Stations—Canada		
VE9DR	6.005 kc.	Montreal, Canada
VE9HX	6.130 kc.	Halifax, N.S., Canada
CJRO	6.150 kc.	Winnipeg, Man., Canada
CJRX	11.720 kc.	Winnipeg, Man., Canada
Europe		
EAQ	9.860 kc.	Madrid, Spain
CT1AA	9.650 kc.	Lisbon, Portugal
2RO3	9.635 kc.	Rome, Italy
2RO4	11.810 kc.	Rome, Italy
HVJ	15.120 kc.	Vatican City, Italy
DZA	9.675 kc.	Zeesen, Germany
DJA	9.560 kc.	Berlin, Germany
DJB	15.200 kc.	Berlin, Germany
DJC	6.020 kc.	Berlin, Germany
DJD	11.770 kc.	Berlin, Germany
DJE	17.760 kc.	Berlin, Germany
DJN	9.540 kc.	Berlin, Germany
TPA3	11.880 kc.	Paris, France
TPA2	15.245 kc.	Paris, France
HBJ	14.535 kc.	Geneva, Switzerland

HBL—9,595 kc.—Geneva, Switzerland
HBP—7,799 kc.—Geneva, Switzerland
HAS3—15,370 kc.—Budapest, Hungary
HAT4—9,125 kc.—Budapest, Hungary
PCJ—15,220 kc.—Eindhoven, Holland
PHI—17,775 kc.—Hilversum, Holland
PHI—11,730 kc.—Hilversum, Holland
ORK—10,330 kc.—Ruysselede, Belgium
RV59—6.000 kc.—Moscow, U.S.S.R.
RK1—15,090 kc.—Moscow, U.S.S.R.
RNE—12.000 kc.—Moscow, U.S.S.R.

Central America

HP5J—9,615 kc.—Panama City, Panama
HP5B—6,030 kc.—Panama City, Panama
XEUW—6,020 kc.—Vera Cruz, Mexico
TG2X—5,940 kc.—Guatemala City, Guatemala
TI8WS—7,550 kc.—Costa Rica
TIRCC—6,550 kc.—San Jose, Costa Rica
TIEP—6,710 kc.—San Jose, Costa Rica
TIPG—6,410 kc.—San Jose, Costa Rica
COCH—9,428 kc.—Havana, Cuba
CO9JQ—8,665 kc.—Camaguey, Cuba
COCD—6,130 kc.—Havana, Cuba
COCO—6,010 kc.—Havana, Cuba
HI3C—6,105 kc.—La Romana, Republica Dominicana
HI1J—5,865 kc.—San Pedro de Macoris, Dominicana Republica
HIZ—6,316 kc.—Cuidad Trujillo, Dominicana Republica
HIH—6,780 kc.—San Pedro de Macoris, Dominicana Republica
HIX—5,980 kc.—Cuidad Trujillo, Dominicana Republica
HIT—6,630 kc.—Cuidad, Trujillo, Dominicana Republica
HH2S—5,915 kc.—Port-au-Prince, Haiti
HH3W—9,595 kc.—Port-au-Prince, Haiti

South America

OAX4G—6,230 kc.—Lima, Peru
HC2RL—6,635 kc.—Guayaquil, Ecuador
HC2JSB—7,854 kc.—Guayaquil, Ecuador
PRADO—6,625 kc.—Riobamba, Ecuador
YVQ—6,672 kc.—Maracay, Venezuela
YVI2RM—6,300 kc.—Maracay, Venezuela
YV6RV—6,520 kc.—Valencia, Venezuela
YV3RC—6,150 kc.—Caracas, Venezuela
YV2RC—5,800 kc.—Caracas, Venezuela
YV8RB—5,880 kc.—Barquisimeto, Venezuela
HJ4ABE—5,930 kc.—Medellin, Colombia
HJU—9,510 kc.—Buenaventura, Colombia
HJ1ABP—9,600 kc.—Cartagena, Columbia
HJ1ABE—9,500 kc.—Cartagena, Columbia
HJ3ABH—6,012 kc.—Bogota, Colombia
HJ5ABC—6,150 kc.—Cali Valle, Republic of Colombia
VK2ME—9,590 kc.—Sydney, Australia
VK3ME—9,510 kc.—Melbourne, Australia
VK3LR—9,580 kc.—Victoria, Australia
PLP—11,000 kc.—Bandoeng, Java

New "Continent" Scout Trophy Contest

● MANY of our readers have suggested that we offer a new type of contest for the Short-Wave Scout Silver Trophy. We have therefore decided to begin a new series of contests and you can start "listening in," and writing for veris at once.

This new series of contest will be confined to reception from stations on one continent at a time. The first of these contests will be for the greatest number of verified stations heard in *Asia*. You may "listen in" from now until Aug. 25th, but you will have to allow time for veris to reach you.

The same general rules as given previously apply. That is, a notarized affidavit must be sent with the veri cards and, of course, all of the veris will have to be for the continent assigned for each particular contest. The *Asia* "listening in" contest will close Aug. 25th, and the trophy award will be announced in the November number which goes on the newsstands October 1st.

A—By midnight August 25th, all entries for the Asia contest must therefore be in the hands of the Editors, together with veris and the notarized oath that the contestant personally listened to all of the stations listed.

B—For the next four issues, the July, August, September and October numbers, trophies will be awarded on the basis of the old rules, which require that 50% of the stations heard and verified be foreign, and also that the listening time may be any 30-day period. In either contest, and in the event of a tie between two or more contestants, each listing the same number of stations, the judges will award a similar trophy to each contestant so tying.

C—Bear in mind that the veri cards should be absolute verifications, and not simply an acknowledgement that you notified a station that you heard them. Several stations do not verify, but simply send an acknowledgment card. Note that in either contest that only experimental phone or broadcast stations should be entered in your list. No *amateur* transmitters or *commercial code* stations can be entered. For the July, August, Sept. and Oct. contests, which follow our regular rules, the entries must be in the Editors' hands by midnight of the 25th day of the month for the next succeeding issue. The contest for the July issue will close in New York City, May 24th, etc.

D—Please note once more, that only letters or cards which *specifically* verify reception of a given station on a given wavelength and on a given date will be accepted! Don't forget to send International Postal Reply Coupon, costing 9 cents at your P.O. with requests for foreign veris.

E—Any type of short or all-wave receiver may be used by the listener. Please specify type and make of set, how many tubes, type of aerial and its dimensions in a brief statement accompanying the veri cards. All veri cards will be returned prepaid after judging each contest. The judges in each contest will be the Editors of *Short Wave & Television* and the opinions of the judges will be final.

F—When sending in entries, type your list, or write in ink, and give the total number of stations both Foreign and Domestic. Send veri cards with your letter and oath certificate all in one package. Use a single line for each station and list them in a regular order, such as: frequency, schedule, (All time should be reduced to E.S.T., which is five hours behind Greenwich Meridian Time.) Name of station, city, country; musical identification signal if any.

Notice To Trophy Contestants

● The closing date for the Asia contest announced in the May issue, has been advanced from June 25th to August 25th, in order to provide sufficient time for the veris to reach the contestants from Asiatic stations. Note: We are also including in the Asia group, short-wave stations in the Philippines and the East Indies.

The group for which entries must be in the Editor's hands by Septemher 25th are, Australia, Africa and Oceania.

The group in which entries must he in our hands by October 25th, includes the veris from European short-wave stations, including Iceland.

For entries to he in the Editor's hands by November 25th, North America (including Central America, West Indies, Canada and Mexico) veris are to be in hy that time.

For entries to be in our hands by December 24th, South American stations are the objective.

A Boost From England

(*Continued from page* 86)

and my association with American tubes and radio components.

My own receiver is a four-tube affair, using two type 24A's, one type 2A5, and one 80 tube in an untuned R.F.-Det.-A. F. circuit. During the summer I have had consistent trans-Atlantic reception. The best regularly received stations are: W2XAD, W2XAF, W8XK, W2XE, W1CJE, W1DNL, W3DQ.

I think *Short-Wave & Television* is the best radio magazine obtainable, and I enjoy best the articles by W2AMN and the description of "ham" stations.

Edward John Buchan,
"Cliff House",
3 Shorefield Gardens
Westcliff-on-Sea,
Essex, England.

S-W Station List

(*Continued from page* 89)

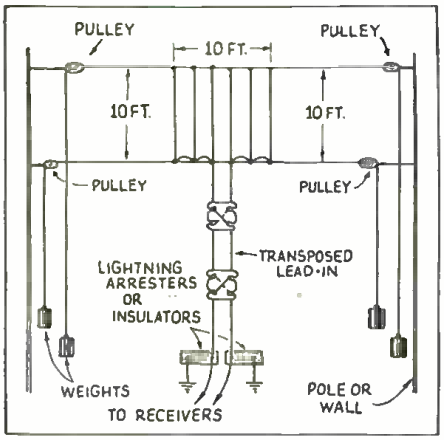
4.600	HC2ET	**GUAYAQUIL, ECUADOR,** 65.22 m., Addr. Apartado 249. Wed. and Sat. 9.15-11 pm.	4.107	HCJB	**QUITO, ECUADOR,** 73 m. Daily 7.30-8.45 am. Daily except Mon. 11.30 am.-2.30 pm.. 5-7 pm., 7-10 pm.
4.272	WOO	**OCEAN GATE, N. J.,** 70.22 m., Addr. A. T.& T. Co. Works ships irregularly.	4.098	WND	**HIALEAH, FLORIDA,** 73.21 m., Addr. A. T. & T. Co. Works Bahamas Irregular.
4.250	RV15	**KHABAROVSK, SIBERIA, U.S.S.R.,** 70.42 m. 1-10 am.			

World-Wide S-W Review

Edited by C. W. Palmer

A Noise-Reducing Aerial

● THE aerial shown in the accompanying sketch is taken from a late issue of The *Australasian Radio World (Sydney)*. It is described as a good aerial for thickly populated localities and noisy areas where man-made static is bad.



Here's a clever noise-reducing type of aerial and one that should have a very good signal pick-up.

The aerial can be swung between two poles, trees or walls and if the lower end of the grid of wires is kept 15 ft. or more above the ground, the action is undisturbed.

If necessary, the length and number of wires can be increased to suit the space available. Also, as the insulators at top and bottom of the "grid" are slipped on the rope or wire before putting the aerial in place, it is advisable to add an extra insulator or two to enable the number of wires to be increased if required.

The transposition blocks should be spaced not less than 2 ft. apart. Should rope be used to support the "grid aerial," it is advisable to use weights as shown. The principal qualities of the system are that it provides an excellent signal-to-noise ratio, far better than that given by the ordinary "L" aerial.

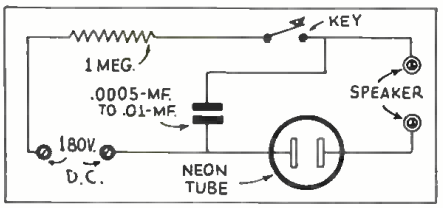
Neon Code Practice Oscillator

● A CODE practice set which provides a loud signal, yet is simple in make-up is shown in the circuit here, which is taken from the *Australasian Radio World (Sydney)*.

This little unit will provide signals loud enough to be used with a magnetic speaker if desired. The parts needed are few in number and very reasonably priced.

The condenser in the unit varied the tone which for ordinary purposes will be about .001 to .002 mf. If the supply voltage is less than 180, the value of the 1 meg. resistor should be lowered.

If the neon tube used has a current-limiting resistor in its base, this resistor must be removed before the tube can be used as an oscillator.



A simple circuit for a "code-practice" oscillator using a neon tube.

Book Review

RECREATIONS IN MATHEMATICS, by H. E. Licks. Cloth covers; size 5¼ by 7½ inches. 156 pages; illustrated; copious appendix. Published by D. Van Nostrand Co., New York, N. Y.

As the author states in the preface "The object of this book is to afford recreation for an idle evening and to excite the interests of young students, in sound mathematical inquiries. The topics discussed have, therefore been selected with a view toward interesting students and mathematical amateurs, rather than experts and professors." Every student of science will enjoy this book—some of the subjects discussed are: Roman Numeration; Early Arithmetic in England; Arithmetic Amusements, etc.

Some interesting problems in *algebra* are explained, including some algebraic fallacies; the cattle problem of Archimedes, etc. Then we come to a chapter on some interesting angles of geometry. Very interesting are other problems in trigonometry, analytic geometry, etc., not forgetting the Calculus, Astronomy and the Calendar.—H.W.S.

* * *

MODERN STORAGE BATTERY PRACTICE, by A. D. Althouse, B.S., and Carl H. Turnquist. Flexible covers of cloth; size, 5¼ by 7¾ inches; 272 pages. Illustrated. Published by Goodheart-Willcox Co., Chicago, Ill.

This battery hand-book will prove useful to anyone at all interested in the standard lead-acid battery. The book is profusely illustrated with half-tones and line drawings and describes all of the tools necessary in the care and repair of storage battery and how to use them. The apparatus, as well as the application of lead welding, is described at length. The elements of electricity with regard to battery charging circuits, etc., is clearly explained with the necessary diagrams. The procedure in making hydrometer tests on storage batteries, as well as the other standard tests are discussed by the authors. One chapter deals with the dismantling and inspection of a typical storage battery, including the testing of individual plates, separators, etc. This is followed by a chapter on rebuilding the storage battery and the replacement of worn-out parts. Other sections deal with battery troubles, their causes and remedies; the automobile battery and its care, and how to arrange a battery repair shop. A thorough index is provided.

* * *

A FUGUE IN CYCLES AND BELS, by John Mills. Cloth covers; size 5½ by 8¼ inches; 270 pages; illustrated. Published by D. Van Nostrand Co., New York, N.Y.

The science of sound is so indissolubly tied up with music, that this latest book by John Mills finds a real welcome. Some of the interesting subjects embraced in this fugue are: Pythagoras to Bell; Amplifiers and Engineers; Translation and Transmission of Musical Sound; What is Meant by Loudness—as the scientist considers it; Overloading and Distortion; The Power of Music, scientifically considered.

Other topics discussed most interestingly by the author are—Recording Sound; The Scientific Aspects of "Noise"; Auditorium Acoustics; Teaching Aids—with a final chapter on the meaning of decibels and cycles, the measurement of voice and the pitch and intensity of various musical instruments.

SHORT WAVE LEAGUE

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D. E. Replogle
Hollis Baird
E. T. Somerset
Baron Manfred von Ardenne
Hugo Gernsback

Executive Secretary

WHEN TO LISTEN IN

By M. Harvey Gernsback

(All Schedules Eastern Standard Time)

SPAIN

● EAQ at Madrid now broadcasts on an additional frequency using the call EAQ2. The frequency used is approximately 9.495 mc. although the announced frequency is 9.480 mc. This is the same station that we have been listing as EAH. The schedule is daily at 2:30 p.m., 6:30 p.m. and from 7:30-9:30 p.m. On Mon. the station is on only from 7:30-9:30 p.m. Programs include news in English for the 1st 15 minutes, followed by music and frequently in the 7:30 p.m. transmission by a talk on the Civil War by a prominent American or Englishman who is in Madrid at the moment. The station is operated by the Loyalists. At present the station exceeds all others in volume and steadiness. In contrast the old EAQ still suffers from very weak and distorted modulation. Address of both stations is P. O. Box 951.

VENEZUELA

A new Venezuelan is YV1RL at Maracaibo on 5.930 m.c. For details see the station list.

HIN

HIN at Ciudad Trujillo, Dom. Rep., on 6.243 mc. is now heard on 12.486 mc. simultaneously. Schedule seems to be the same as published for HIN 6.243 mc. We have not determined whether this is a harmonic or a new transmitter. It is heard very well at present.

MYSTERY STATIONS

We have an unknown station this month; its frequency is about 11.670 mc. from 7:30-8:15 p.m. most evenings. From 7:30-7:45 a 3 tone interval signal is repeated over and over. This is followed at 7:45 p.m. by an announcement in what is presumably Portuguese. Musical entertainment follows this, interspersed with announcements. At 8 p.m. a clock strikes 4 and then the program continues until 8:15 when it abruptly terminates and the station goes off the air. The station apparently is a phone station relaying an excerpt from the program of some broadcast station. The only phrase which has been identified is "Radio Bras" which is repeated frequently. We suspect that it is PPQ in Rio de Janeiro testing, although the 4 strokes of the clock do not coincide with Rio time, which is 2 hours ahead of E.S.T.

HUNGARY

The Budapest short-wave station: the new schedule is as follows: Sun. 9-10 a.m. on 15.370 mc. (HAS3), Sun. and Wed. 7-8 p.m. on 9.125 mc. (HAT4) and Sat. 6-7 p.m. on 9.125 mc.

ENGLAND

By the time listeners are reading this column the new high-powered transmitters and the new aerial system at Daventry will probably be in regular use. There are 3 new transmitters, each with a power of about 50 kw., as compared to the old power of 10-15 kw., each. These 3 will be used in addition to the old units.

NEW STATIONS

Some of the newly listed stations this month are: XEPW, 6.110 mc., Mexico; XEUZ, 6.120 mc., Mexico; HI2S, 11.960 mc., Domin. Rep. For details see the station list.

Here's Your Button

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

The requirements for joining the League are explained in a booklet, copies of which will be mailed upon request. The button measures ¾ inch in diameter and is inlaid in enamel—3 colors—red, white, and blue.

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

Short Wave League

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

John F. Müller

a member of this League.

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

H. Winfield Secor
Asst Secretary

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

(see page 111)

How To Get That "Veri"!

(*Continued from page 73*)

be an orchestral piece 'Old Man River,' played by Harry Roy and his orchestra." 6:26 a.m. "Old Man River."

Reception was very good, with only slight fading and no static. Signals were quite loud; quality was very good. I also listen to VK3ME at Melbourne, Australia, frequently; but they are not heard as well as VK2ME. Will you please check my report with your "log" and verify my reception, if possible?

I am enclosing an International Reply Coupon.

Yours sincerely,
John Doe,
25 Mack St.,
N. Y. City, N.Y.

Sample Letter Requesting "Veri"

(English)

Chief Engineer,
Short Wave Broadcast Station,
City and Country.
Dear Sir:

On.....(put date here) at..... (Eastern Standard Time), I tuned in your short-wave station, call....., operating on .....kc., ...meters.

Reception was good, weak, (R—). The station faded, did not fade. Reception was by means of the..... .....tube receiver.

Will you please check my log with your records, and if it is correct, please send me a verification card. I am enclosing an International postal reply coupon.

Yours very truly,
(Print name and address clearly.)

(Spanish)

Ingeniero en Jefe,
Estación de Onda Corta.
Ciudad y Pais.
Muy Sr. mio:

En.....(Fecha) a la hora..... (E.S.T.) sintonizé su Estación de Onda Corta, letras.....operando con..... ciclos.....metros.

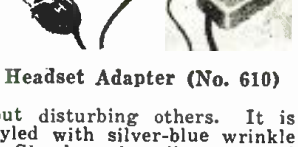
La recepción fué buena, débil, (R—) desvaneció, no se desvaneció. Mi aparato receptor es de.....válvulas.

Haga el favor de comprobar mi reporte con los suyos y si es correcto envieme su tarjeta de verificación para cuyo objeto incluyo un Cupon Internacional de respuesta.

S. S. S.
(Print your name and address clearly.)

Trimm Head-Phone Attachment Kits

● HEADSET attachment kit for the radio set with universal switching—headset or speaker; and headset and speaker. Ideal for short-wave listeners, the "hard-of-hearing," and for bedside radio, providing clear reception without disturbing others. It is beautifully styled with silver-blue wrinkle finish adapter. Simple to install—connected to voice-coil circuit, thus permitting it to be installed on any radio set.



Headset Adapter (No. 610)

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

$25.00 FOR GOOD 1-TUBE SET

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

What the editors want is a *new* circuit, designed around one of the latest type tubes having a multiplicity of grids.

RADIO INSTRUCTION

Television Course

(*Continued from page* 82)

The purpose of this is to keep outside signals (13.25 m.c.) out of the intermediate amplifier. This is accomplished by (a) proper shielding and (b) some form of wave-trap in the antenna lead.

This shielding and the proper wave-trap are most important and there is little information now available to the amateur on this important point.

"Tracking" of Osc. and Det.

Oscillator and Tuner (if a superheterodyne is used) must be adjusted to *track* so that a single dial may be used. (It may be mentioned that a superheterodyne is indicated in all diagrams to date.)

The importance of this adjustment can easily be seen from the following. Suppose that we are receiving at 60 m.c., then at "O" we must have 73.25 m.c. to give us 13.25 m.c. Now then suppose we wish to tune in another station at 70 m.c., then "O" should be at 83.25 m.c. to give us 13.25 m.c. again. But if the Oscillator and Tuner do *not* track perfectly "O" may be at, say 84.50 m.c., which would give us 14.50 m.c. (wrong value).

I.F. Transformers

The *intermediate transformers* must pass a band of 2.5 m.c., otherwise we will not get the full details of the pictures. These transformers cannot be bought as yet, and full details upon them are not available to the amateurs.

If a *second detector* is used there is still controversy among engineers whether the bias-type detector or a dio-detector should be used to obtain the *best quality* pictures. Both work, it may be mentioned. The bias-type will produce more harmonics, while the dio-type requires a higher voltage. The English use the dio-type.

There must be definitely proportioned coupling units in the resistance coupled stages in the video (picture) amplifier.

The cathode ray tubes now available, and on the market, are not sufficiently uniform in requirements as to signal so that they would be interchangeable. Thus a set built for the use of a certain tube, of a certain make, would have to always use that particular tube, and a tube of another make could not be substituted.

It may be well to here mention that if a tube is fitted with plates for *electrostatic* deflection, that tube cannot be used with *magnetic* deflection, since the presence of the plates causes eddy-currents.

The power supply for the cathode ray tube requires special attention. An extremely small current at high voltage is required and condensers and other filter components suitable to handle this high potential must be provided.

Saw-tooth waves of suitable frequencies and characteristics for either electro-static or electro-magnetic deflection must be provided.

A special transformer is used here.

The Vacation Portable

(*Continued from page* 75)

detector to a point where comfortable loudspeaker volume will be obtained. To accomplish this, it was found necessary to employ three resistance-coupled audio frequency stages. Low-gain amplification was obtained by cutting down the ratio of the grid and plate resistors in each resistance stage. This was found to be preferable from the standpoint of stability, to the employment of only two audio stages with high gain.

In the first and second audio stages, standard 30 type tubes are used. In the output stage a recently developed power output pentode is employed. This may be the 1F4, or the even newer 1G5. The 1F4 tube has a high power sensitivity and will deliver considerable power output. These characteristics along with the low filament and plate current consumption, provide means for an economical as well as highly efficient output system. The 1F4 tube uses only 0.12 ampere filament current which, in fact, is equivalent to adding only two more 30 tubes. It can readily be seen that this four tube set will be extremely easy on the batteries. In the list of operating conditions describing the characteristics of this tube, the operating plate voltage is given as 135 volts and the grid voltage as minus 4½ volts. Under these conditions, the power output with a 3.5 r-m-s volts signal, is 0.340 watt. These characteristics, of course, are ideal theoretical ones. However, under actual experimentation, it was found that the set would work just as well with a plate voltage of 90 volts or even lower and a correspondingly reduced grid voltage. In fact, returning the grid to the negative filament seems to furnish the necessary bias without requiring the "C" battery. It is recommended, however, that the set-builder do a little experimenting on his own account under varying conditions. In this way, he will obtain a practical working knowledge of the actual characteristics of the 1F4 and if he finds that the "C" battery can be dispensed with, this permits the use of a smaller and more compact carrying case.

The characteristic of the new 1G5 tube which can be used interchangeably with the 1F4, show that this tube is designed to operate with a plate voltage of only 90 volts maximum and with a grid voltage of minus 6 volts. In case this tube is used, the use of a "C" battery in mandatory with 90 volts at the plate. This tube will give very nearly the same power output at 90 volts, plate, as the 1F4 gives at 135 volts.

Circuit Is Simple

The schematic diagram shows the extreme simplicity of the circuit design. The regeneration control is of the shunt resistor type, consisting of a 75,000 ohm potentiometer connected directly across the tickler of the plug-in coil.

A single .00014 mf. variable condenser of the midget type is used to tune the longer winding of the plug-in coil; this is the station selector. An antenna trimmer is provided, as usual, in circuits of this type. A filament rheostat is placed in series in the A minus line so that as the "A" batteries become weaker, the voltage may be kept at the specified value of two volts by cutting resistance out of the rheostat. The on-off switch which is built in the potentiometer and controlled with the same knob is also in series in the A minus line. A short-type phone jack is provided as shown at J1, so that earphones may be used for tuning in distant stations with greater precision. The loud-speaker employed is a five-inch magnetic speaker. *(Band-spread may be provided by using one of the new "dual-ratio" dials.—Editor.)*

Constructional Details

The chassis may be made of 1/16" aluminum. A piece of aluminum 9" by 12" is bent as shown in the sketch to form a U-shaped chassis, 10" by 9" by 1" high. After the socket holes are drilled, the antenna trimmer, variable condenser, filament rheostat and phone jack mounting holes are drilled. A single 4" diameter hole may be drilled for the speaker, or a number of ⅜" holes may be drilled within a 4" diameter circle. In the latter case, about 37 holes will be necessary. The aluminum panel may be painted with black crackelac

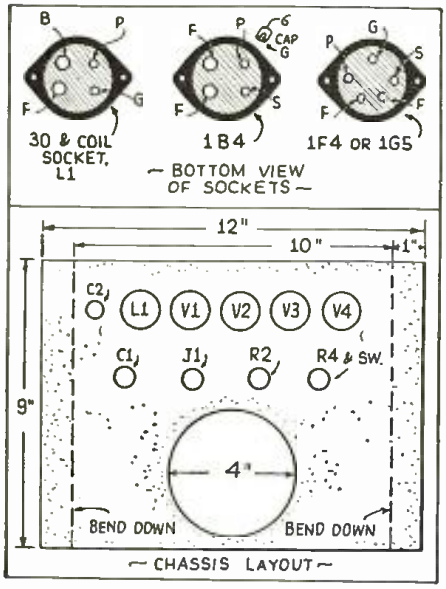
RADIO INSTRUCTION

or Egyptian lacquer in order to give it a black crackle finish. The various parts, including the sockets are fastened to the chassis. Before the speaker is mounted, the grille cloth should be cemented in place by means of duco cement.

In wiring the set, it is simply necessary to follow the schematic diagram. The chassis may be used as the common "A" positive return.

The finished set is mounted in a suitable carrying case similar to the one illustrated. The bottom portion of this case should have inside dimensions of 14½" by 9⅝" by 8¼" deep. Two small blocks of wood are fastened beneath the chassis as shown on the underside view, in order to provide a suitable support. The batteries are placed within the case at the right of the chassis and, as can be seen, are readily accessible. If desired, however, a piece of painted wood may be fitted over them and this will give the set a more finished appearance.

Before the receiver is finally mounted in the case, it should be given a thorough test. Inasmuch as several of the tubes are quite expensive and also since all of the tubes, being two volt tubes, are extremely delicate, great care should be exercised in handling them and in making connections to the set. A short-circuit between the filament and the plate supply will



Details of Chassis.

burn out all four tubes in an instant and this is an unnecessary experience which can be avoided through the exercise of care. The best plan is to connect the "A" batteries alone and see whether the tubes light up, and then connect the "B" batteries. Of course, if a voltmeter is available for testing, all the batteries may be connected before the tubes are inserted and voltage tests may be made at the sockets. Having connected the batteries, and connected the aerial and ground, the first tests are made with the broadcast coil.

When the regenerative control is turned, the typical regenerative *whistles* should be present. If the set fails to whistle, this is a sign that the tickler coil is *reversed*, or that the "A" voltage is too low. However, insufficient plate or grid voltages on the detector tube will also prevent correct regeneration.

A complete list of parts follows.

Parts List

HAMMARLUND

C1—Midget Condenser, 140 mmf. type MC-140-M.
C2—Equalizer antenna trimmer, type MICS-70 (10 to 70 mmf.).

L1—Set of 4 short-wave coils, 17 to 270 meters, 4 prong type SWK-4.
L1—1 broadcast coil, 4 prong 250 to 560 meters, type BCC-4.

CORNELL-DUBILIER
C3—.0001 mf. mica condenser, type 3L.
C4—.1 mf. 400 volt "Cub" tubular condenser, type BA-4P1.
C5—.0005 mf. mica condenser, type 1W.
C6—.01 mf. 400 volt "Cub" tubular condenser, type BA-4S1.
C7—Same as C6.
C8—Same as C6.
C9—Same as C6.
C10—Same as C4.

ELECTRAD
R2—Electrad filament control rheostat, 30 ohm type 270-W.
R4—Electrad 75,000 ohm potentiometer with switch, type 202-S.

I.R.C. RESISTORS
R1—1 meg., ½ watt metallized resistor.
R3—Same as R1.
R5—175,000 ohm ½ watt metallized resistor.
R6—200,000 ohm, ½ watt metallized resistor.
R7—Same as R5.
R8—Same as R6.
R9—Same as R5.
R10—Same as R6.

TUBES—RAYTHEON
V1—1B4 tube.
V2—30 type tube.
V3—30 type tube.
V4—1F4 tube or 1G5 tube.

SOCKETS
4—4 prong wafer type sockets.
1—5 prong wafer type socket.

MISCELLANEOUS
J1—Open-circuit phone jack.
1—5-inch Find-All magnetic speaker.
1—Fahnestock ground connection clip, soldered to chassis.
4—knobs.
2—dial plate—one for station selector, other for regeneration control.
Aluminum chassis—as per sketch.
1—carrying case.

BATTERIES
2—1½ volt "A" dry-cell batteries—compact style.
2—45 volt dry cell "B" batteries—compact type.
1—9 volt "C" battery, smallest type.

An Efficient 125 Watt Modulator

(*Continued from page 79*)

KENYON
1—Input transformer T-261; variable ratio 500 ohms to class B grids.
1—T-460 output transformer with tapped secondary.
1—T-357 filament transformer for 35-T's.
1—T-352 filament transformer for 866's.
1—T-665 plate transformer 1,180 volt output, with primary tap.
1—T-511 swinging choke.

SPRAGUE
1—2 mf. 2,000 volt oil condenser.

I. R. C.
1—50,000 ohm 100-watt resistor.

TRIPLETT
1—0-250-ma. meter, large bakelite case.

MISCELLANEOUS
4—4 prong sockets.

PAR-METAL
1—17 by 3 by 11 inches chassis black crackle finish.
1—19 by 10¾ panel, black crackle finish.

TUBES
2—Eimac 35-T's.
2—866 Jrs.

New Zealand Again!

(*Continued from page 86*)

Amongst the "Hams," W's, VK's, ZL's, X's and VE's can be heard all over the room on the loud-speaker! Commercial stations are almost as numerous as the CW stations; the most frequent heard are WOP, PLE, JVE, VPD, ZLT, VLJ—almost every day.

Appreciate very much the good work S.W. & T. is doing, and don't forget more ultra-short wave data!

Ronald J. Hills,
44 Seatown Rd., Wellington, E-3,
New Zealand.

Short-Wave Beginner Regenerative Super-3

(*Continued from page 74*)

must be insulated from the chassis.

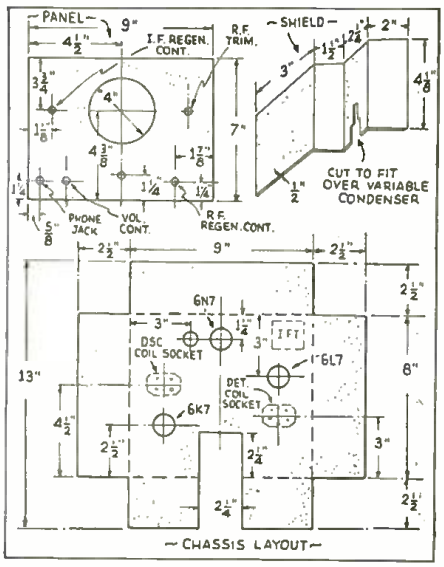
The I.F. transformer has a lead coming out the side which is the grid connection. This lead must be run down through the base, since the grid of the 6N7 (both sections) is on the base.

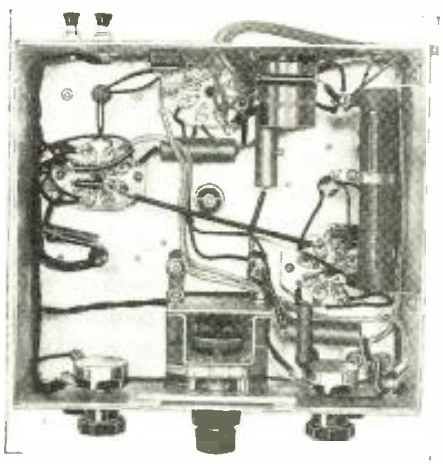
The *voltage divider* is in the form of a bleeder of the wire-wound type. This allows the use of a sliding tap to set the screen voltages to the correct operation values. The proper voltage is around 100V.

Plug-in Coils Give Wide Coverage

The coils cannot be obtained exactly as required in this circuit so the nearest possible coil set was chosen and then altered as shown in the coil table. The oscillator coils have four prongs and come with two windings. On the high frequency coils the secondary winding is of heavy wire, while the other winding, the primary of thin wire, is removed. This leaves two prongs vacant, one of which is used for the cathode tap. The corresponding primary winding on all the other oscillator coils is also removed.

The mixer or first detector coils have six prongs and come with three windings. The high frequency coils have one winding of thin wire interspaced with the heavy secondary winding, and it is this thin wire winding that is removed. This again makes available a prong for the cathode tap. The other thin wire winding is left intact for the antenna connection.





Bottom View of Receiver.

Garrett Receiver-Coil Data

Band	Grid Coil	Antenna Coil	Tap	Osc. Coil Turns Grid	Tickler
10	3¼	3¼	1	3¼	1¼
20	8¾	3¾	1	8¾	3
40	18	6	1	18	5
80	38	12	1	38	10
160	80	17	2	74	20

The grid windings of all factory made coils are used unchanged, except for the largest coil for the oscillator, which has 6 turns removed. All primaries on L1 coils are used unchanged. Spacing between primaries and secondaries is ¼-inch.

Band-Spread Too!

Band-spread is accomplished by the type of dial used, but to enable easy alignment without the necessity for too much coil trimming, a small 25 mmf. trimmer is placed in each oscillator coil. This is set once and then may be left alone. The mixer section of the tuning condenser has a 35 mmf. trimmer across it to enable exact tuning. This is especially necessary when regeneration is used, since the tuning is then much sharper.

When the circuit has been thoroughly checked, the rig is ready for alignment. It is usually possible, especially with the lowest frequency coils, to tune in a loud steady signal. Of course, the audio volume control should be full on, and the R.F. regeneration control well toward maximum. Adjust the I.F. transformer trimmers for best response. These transformers are sent from the factory ready aligned, so very little change is needed in many cases.

Now set the condenser in the oscillator coil so that best response is had with R.F. trimmer at about one-half scale.

The I.F. or second detector *regeneration-control* should always be run just below the oscillation point; for *beat-note* reception it is run just over the oscillation point. The first detector should never be allowed to oscillate.

List of Parts

HAMMARLUND

3—Isolantite octal sockets
1—Isolantite four prong socket
1—Isolantite six prong socket
1—Set 3 winding coils (for 1st detector)
1—Set 2 winding coils (for oscillator)
1—six prong 10 meter coil
1—four prong 10 meter coil
1—double 100 mmf. condenser
1—Iron core I.F.T.
1—35 mmf. high frequency trimmer condenser
1—15 mmf. high frequency trimmer condenser
1—25 mmf. high frequency trimmer condenser
5—25 mmf. air padding condensers
1—80 mh. R.F. choke

RAYTHEON

1—6L7
1—6K7
1—6N7

INTERNATIONAL RESISTANCE COMPANY

1—50 Watt, 50,000 ohm wire wound resistor
1—50,000 ohm variable resistor
1—500,000 ohm variable resistor
1—50,000 ohm one Watt fixed resistor
2—50,000 ohm ½ Watt fixed resistor
1—10 meg ohm ½ Watt fixed resistor
1—500 ohm ½ Watt fixed resistor

AEROVOX

3—.1 mf. 400 Volt tubular condensers
2—.01 mf. 400 Volt tubular condensers
1—.005 mf. mica condenser
1—250 mmf. mica condenser
1—50 mmf. mica condenser
1—100 mmf. mica condenser
1—.001 mf. mica condenser
1—4 mf. electrolytic condenser

TRIMM

1—pr. head-phones.

MISCELLANEOUS

1—9x7x1/16" panel
1—9x8x2½" chassis
Wire, pilot bulbs, and sockets, etc.
1—dual ratio Band-spread dial
2—1¾" dials
2—small knobs
1—five prong plug
1—binding post strip
1—midget jack

Let's "Listen In" With Joe Miller

(*Continued from page* 80)

Afghanistan

YAH, 5.17 mc., approx, at Herat, working YAA, 4.225 mc., Kabul, was verified by Roy Myers, Los Angeles! We believe this is the first veri of this station extant! The veri was sent special delivery, by the Director of Communications at Kabul. Stated in veri is schedule between stations at 7:30 a.m.; little later in summer. Our sincere "congrats" to you, Roy; it's tops!

Southern Rhodesia

ZEB, 6.14777 mc. (to be exact, hi!), at Bulawayo, has been heard on one or two good Sundays, when conditions were right, but poorly; hard to get a good "log." The unusual noise this unusual winter (in N.Y.) has made DX on lower freqs. rather unprofitable this year.

In a letter direct from the Postmaster General, General P.O. at Salisbury, we have received full information regarding the stations down there in So. Rhodesia.

ZEA—325 watts, 5.8823 mc., and located at Salisbury, and

ZEB—325 watts, 6.14777 mc., at Bulawayo, operate on following sked:

Suns.—3:30-5 a.m. E.S.T.
Mons.—1:15-3:15 p.m.
Tues.—11 a.m.-12 noon.
Weds.—1:15-3:15 p.m.
Thurs.—10 a.m.-10:45 a.m. (Children' Hour). Also 11 a.m.-12 noon.
Fri.—1:15-3:15 p.m.

ZEA has been mentioned repeatedly as ZEC. ZEC operates on 440 meters. ZEB reported as the better signal of the two. Best time for ZEB appears to be Suns. 3:30-5 a.m. Signal weak, fading in and out; hard indeed to "log."

Postal address: P.O. Box 792, Salisbury.

Ceylon

VPB, near 6.13 mc., Colombo, is reported daily by Ashley Walcott, Frisco, 7-11 a.m. "Colombo calling" is usual identification.

QRA of VPB: Radio Club of Ceylon, P.O. Box 282, Colombo, Ceylon. This is definitely not an easy catch.

Italian Africans

IUD, 14.5 mc., approx., has been verified by a number of DXers, even though IUD is listed now on 18.27 mc.; this we cannot understand! We reported this station last December, wrote, but no reply. Others, hearing the station at our "shack," wrote, and received veri in a month! IUD should be in Ethiopia, but this station often answered to IAC's call of "Pronto Asmara." More mystery!

Bill Harriman reports an Italian African on 10.00 mc., believed in Addis Ababa, working IAC, Coltano, Italy, 9-10 a.m.

Charlie Miller reports ITK, 16.385 mc., Mogadiscio, Italian Somaliland, at 8 a.m., FB "sig." This is a good bet.

ITR, 14.63 mc., reported by Bob Gaiser at 2 a.m.; we also heard this sig.

Mozambique

CR7BH, on an announced freq. of 11.718 mc., daily *except* Suns. 9:30-11 a.m, Suns., 10 a.m.-12:35 p.m. Ashley Walcott is surprised at the fine signal strength they constantly maintain. 7BH relays programs of CR7AA.

The QRA is P.O. Box 594, Lourenco Marques, Mozambique. Announcements are in Portuguese and English.

Australia

VK9MI, "S.S. Kamimbla," on an announced wave of 49.917 meters, or 6.006 mc., is heard every 3 or 4 days, broadcasting programs to various small Australian stations, usually from 7-7:30 a.m., occasionally from 6:30 a.m. Ashley Walcott and John De Myer report 9MI with a FB signal.

QRA is: McIlwraith and McEacharn, Bridge St., Sydney, Australia.

Dutch East Indies

PLQ, 10.68 mc., Bandoeng, almost daily from 5-6:30 a.m., and 7:30-8:30 a.m. phoning either PNI, 8.77 mc., MaKassar, or YBG, 10.43, Medan, Sumatra. Often, when PLQ is busy with YBG, a new one on 11.60 mc., believed to be PLN, is used to phone PNI, Makassar.

YCP, 9.12 mc., Balikpapan, Borneo, was heard from 5:45-6:20 a.m. phoning PNI. Who wouldn't like to log Borneo?!! Thanks to Ashley Walcott for above data, FB DX OB!

YBZ, 7.68 mc., at Menado, Celebes, also reported at 5:45-6:15 a.m. Also phoning PNI. Ashley received his YBZ veri through the Chief Engineer of the Technical Telegraph Service, Post-Telegraaf-en Telefoondienst, Bandoeng, Java. So although Javan phones are supposed not to verify any more; perhaps here is a loophole through which we may obtain these rare veris!

Asiatics

XOJ, 15.795 mc., Shanghai, phones JVF, 15.62 mc., almost daily from 7 p.m. to as late as 1 a.m. Last heard at 7:15 p.m. Fine signal on both.

XPC, (or is it XTC?) 9.285 mc., also heard phoning at 6:55 a.m., using inverted speech.

VVS, 12.87 mc., at Mingaladon, India, should be looked for from 5-7:00 a.m. Seems to use inverted speech, and their signal fairly good.

ZGE, Kuala Lumpur, Malay States, now on 6.21 mc., reported by Ashley Walcott. Sked. is 6:40-8:40 a.m .Suns., Tues. & Fridays.

FZR, 16.25 mc., Saigon, French Indo-China, heard at 6:34 a.m. phoning FTK, Paris.

JVK, 12:02 mc., Tokyo, phones Suns. 5-6 a.m., thanks to Ashley.

KBB, 8.71 mc., Manila, phones ships often 3:30-3:45 a.m., 5-6:30 a.m. Lately KBB operates 8-8:30 a.m. (daily) phoning a GMBJ. Roy Myers reports GMBJ, Ashley —KBB.

XGW is reported on 10.42 mc., daily except Suns., phoning KWX, 9:30-11:30 a.m. XTK, 9.08 mc., Hangkow, often near 4-7 a.m. daily—9:40-9:45 a.m.—Ashley Walcott.

Oceania

ZLT4, 11.05 mc., Wellington, New Zealand, still heard often with VLK, 10.52 mc., Sydney, last heard 4:30 a.m.

ZMBJ, on the good ship "S.S. Awatea," has been repeatedly heard on Suns. between 3-3:40 a.m., on 22.7 meters or 13.600 mc., this wave approximate. Veri card this month confirms this reception.

Notes

Moscow writes us to say that they will no longer verify reports on any U.S.S.R. stations, except the *Moscow broadcasters.* This thing is spreading! New Zealand, Siam, Java, and now Moscow!

Mr. Chas. C. Norton, President of Universal Radio DX Club, Frisco, has sent us a very friendly letter, and we are glad to hear you are over your illness, OM! A few words here on URDXC.

Publish weekly bulletins, now a new SW division, edited by Martin J. Olthoff, assisted by James B. Wooten. California DXers should attend meetings of URDXC, full particulars from Mr. Norton, at 2018 Green St., San Francisco, Cal. Also, listen to KGGC, Suns., 12:45-1 a.m. E.S.T. to their DX TIP programs. Ashley Walcott, our faithful DXer, is a URDXC member. Best of luck to you all!

Special thanks to Bob Green, a FB OM, opr. of SUIKG, Ramleh, Egypt, for his help on getting SU8MA to QSL here.

Also to ZUIT, ZS2X, ZT6AL, ZS6AJ, all of whom wrote splendid letters. Also to ZEIJW, whom we appoint our representative in Southern Rhodesia; many thanks, Ted. OB!

Thanks also to Otto at VU7FY, and to Sangiem Powtongsook, HS8PJ, HS1PJ-1RJ,

Engineer, for your kind letters. Also acknowledging Mr. Harold W. Tidman's very FB and interesting letter. "Tiddy," as he is known throughout New Zealand, is official Report Station ZL156. "Tiddy" finds one fault with "S.W.&T.," it being that it is published only once per month, and wants us to pass it on to HQ! Hi!

Thanks to all "S.W.&T." readers, as well as the above OM's, for all your letters, and always glad to hear from the "gang."

If any of you boys write in for data, be sure to send a stamped, self-addressed envelope, as so much mail is received that an answer cannot otherwise be sent. Address all letters direct to 2559 E. 28th St., Brooklyn, N.Y.

Mr. Ollie A. Landgraf, 97 Park St., Chilton, Wis., would like to exchange QSL cards with all DXers.

* * * **Ham Stardust** * * *

The amateurs claimed most of our attention this month, some very FB DX being heard.

Africa

EL1A-14,300 k.c., P.O. Box 73, Monrovia Liberia, now on 20 meters, heard by many between 1-2 a.m.

SU1AS-14,115 k.c., Egypt, heard 7:10 p.m.

CN8AI-14,060 k.c., Fr. Morocco, 4:30 p.m. by Bob Gaiser.

OQ5AA, operated by Dr. George Westcott, Tondo, via Irebu Tribu, Belgian Congo, old ON4CGW, reported by many, on 14,065 k.c.

SU1CH, 14,305 k.c., Egypt, heard afternoons by many, around 4-7 p.m. usually.

ZU6E, 14,088 kc., 11 p.m., South Africa, and EA8AE, 14,100 k.c., 8 p.m., Canaries, reported by Charlie Miller.

SU1RO, Egypt, 14,264 k.c., heard at 6:20 p.m. by Dave Styles, and XYL Lou. Hi Lou! Hi Dave!

SU1KG, 14,040 k.c., often heard with FB sig. using 24 watts. Bob usually heard from 4-8 p.m.

FT4AG, 14,100 k.c., Tunis, 5 p.m., by Irv. Goodeve. FB!

On 40 m. phone, Roy Myers reports CR7AW, 7.2 mc., early a.m.'s! Some DX, Mozambique, Roy, FB!

Asia

PK3ST heard at 6:30-7:30 a.m. by Charlie Miller, Joe Hellman, Eddie Schmeichel, already QSL'd from last September by Y.T. A nice QSL, this from Java. On 14,300 k.c.

PK3WI QSL'd to Dave Styles, FB!

VS6AB reported by Bill Harriman, Cal., and "Tiddy." New Zealand, by latter often QSOing KA1BH, Philippines. VS6AB at Hong Kong.

Ashley Walcott sends this load of "hams" heard from Java.

PK1ZZ, 14,290 k.c., PK1BX, 14,260 k.c. ("Boston, X-ray"), PK2VD, 14,270, ("Victoria, Denmark"), PK6AJ, 14,100, ("Alabama, Japan")!

John De Myer, Michigan, also cleaned up on PK's! PK6CI, 14,080 k.c., PK3ST and PK4AU, 14,350 k.c., all at 7-7:30 a.m.

John also logged KA1JZ and KA1RC, both at 6 a.m., in L.F. end American band! KA's are, as we all know, in the Philippines.

Roy Myers, Los Angeles, reports on 40 meter phone, MX2A, Manchukuo, and XU6AZ, China! Get after 'em, boys, hi! Some very FB DX, Roy! Roy has 17 VAC now, a "high" for Pacific Coast!

VU2JN, Calcutta, 14,070 k.c., 7 a.m., by Bob Gaiser.

Other DX

Watch for VK6MW, 14,320 k.c., the only VK6 on phone. VK7JB, 14,000-14,100 k.c., on most a.m.'s, 6-8 a.m., best Tasmanian on the air, using 150 watts. VY FB signal, Buck!

VQ1AB, 14,255 k.c., Fanning Islands, 1000 miles south of Hawaii, last heard 6:10 p.m., by J. O. Faris, Jr.

SV1KE, 14,080-260 k.c., Greece, last reported 8 and 10 p.m., Charlie Miller, Kentucky. Charlie has 23 VAC FB! Ted Battema also reports SV1KE 9-11 p.m.

John De Myer reports SV1NK, 14,080 k.c. at 4:30 p.m.

SM5SV, 14,330 k.c., Sweden, also by John, at 5 p.m., FB "sig."

K4ENY, 14,155 k.c., St. Thomas, Virgin Islands, operated by Lieut. Wm. A. Smith, VO Squadron 9-M, is giving all the boys a chance at a new and easy-to-get country. Try any day from 4-6 p.m., often at 7-7:30 a.m. for this FB signal. Many report Bill.

KHAQQ, Amelia Earhart's plane, was scheduled with W6NNR to keep in constant amateur communication with stations all along her route.

Other DX heard is: OE3AH, 14,300 k.c., Austria, 5:20 p.m., FB, said "America Honolulu."

I1TKM, 14,400 k.c., 4:30 p.m., Italy. FB signal despite low power.

OZ3U, 14,500 k.c., Denmark, heard 1:50-2 a.m. R5-9+, strong fading. This on a Sunday. Said "O Zed 3 United."

HB9A, 14,125 k.c., Switzerland, heard FB at 3 a.m.

HB9AB, 14,120 k.c., heard very FB at 1:30 a.m. Said "America Boston."

VP2BC-DC, at Leeward Island, BWI, 14,050 k.c., heard at 1 a.m.

CP1AA, Bolivia, 1:00 a.m. on 14,000 k.c. "CP1 double A, the voice of the Andes."

Plenty of Europeans heard now from 1-5:00 a.m. on 20 meters. Australians (VK's) heard also during that time, also, best 6-7:30 a.m.

South Americans push through best in evenings, 6 p.m.-12 mid.

K7FST, 14,260 k.c., Alaska, 10:30 p.m., heard by Charlie Miller. Sends FB "QSL," gold letters outlined in green. Also, Charlie, and J. O. Faris, Pierre Portmann report CX1CC, 14,410, or 13,985 k.c. located in Uruguay.

Fred Satterthwaite, 544 Colonial Court, Toledo, Ohio, offers a set of metalette call letters to any phone amateur who sends him a list of "DX" worked on phone recently, with frequencies.

Guess that's all this month, so "happy hunting" to all, and may your mail box swell with veries!

VY73 to all,
JOE MILLER,
YE "DX ed."

A very interesting veri card, the original in flashing silver and black, received by Joe Miller from station ZS2X.

COMPAGNIE GÉNÉRALE DE TÉLÉGRAPHIE SANS FIL

CENTRE RADIOÉLECTRIQUE DE SAIGON

Saigon, le 12 Juillet 1936

Mr. Joseph E. Miller
8469 Bay
88 Street
BROOKLYN (N.Y.)

Dear Sir,

We take pleasure in verifying your report of reception of our station FZS 18388 kcs on February 22nd working telephony with Paris.

We were very glad to know that you heard our station under such excellent conditions.

Thanking you for your report, we remain,

Yours Very Truly,

F. BEAUQUIS

A personal letter of verification from station FZS, Saigon, and greatly prized by Joe Miller.

"Super-Pro" Rolls 'em in—and How!

● THIS very excellent receiver was tested at this "listening post" this month, and superlatives are certainly in order to describe its unusually fine performance under conditions met here.

Friends who have flocked here to see and hear this latest Hammarlund receiver went away with their mind settled as to what this receiver could really do!

Our test showed too many good points to go into full detail here, but several outstanding features demand mention.

Calibration—so perfect that but rarely do we find a station not exactly on the dot—and this on all bands! Sensitivity, very high; enough for any signal coming through at all, to be heard.

Selectivity, what with variable band width, allowing a continuous variation from 3 kc. selectivity for "Ham" bands, etc., to 16 kc. for an excellent high-fidelity signal, is all one could possibly ask for. Consider also that with crystal added to band-width control, one can get really astonishing selectivity.

The AVC control works very well indeed. AVC "takes hold" even on weak signals. A variable sensitivity control is also incorporated, and each of 14 controls is neatly and conveniently brought out to the front panel. What with all these controls, the Super-Pro is really very simple to operate, and any DXer can certainly "go places" with this masterpiece of the Hammarlund craftsmen.

In our brief tuning period, to date, we tried for some of the better DX catches, setting the dial on the exact frequency of each station, turned up the volume and—believe it or not—*they were there!* DX included RV15, PMY, XGOX, PMH, ITK, IUG, YDB, SU1AS, SU1SG, FT4AG, XPC, YPK, VK7YL, SM5SY, and many others. Vy, 73. Joe Miller.

New S-W Surveying Instrument

(*Continued from page* 71)

used also. The receiver operates an output meter; three divisions of this meter are equal to an input voltage of 5 microvolts per meter.

The waverange covered by the receiver is from 15 to 100 meters.

Below the box we see an azimuth circle which permits exact readings of the loop position. The instrument should also prove useful for determining the exact positions of airplanes, etc.

Short Waves + Balloons = Weather

(*Continued from page* 71)

A clock-like movement causes a toothed wheel to move, and permit the moving recording point to estimate the angle at which it turns. This constitutes a kind of chronometer, independent of time and giving the angle looked for in the oscillatory periods because these ten teeth pass between the blades of a minute condenser placed in the plate circuit of the tube of the sending-unit. The passage of each tooth is expressed by a modulation, and the transmission ceases when the observer comes in contact with one of the needles or one of the prongs of the fork. An oscillograph, which is assembled on the ground, records the balloon's signals. In this last set-up, the modulations become the movements of the recording pen on a band of paper which automatically rolls around. On a jagged curve thus traced, a straight line replaces the oscillations each time there is a contact between the observer and one of the indexes. So, in order to ascertain the temperature and the pressure, we read the number of teeth-like marks included between two dash strokes.

● Index to Advertisers ●

(While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.)

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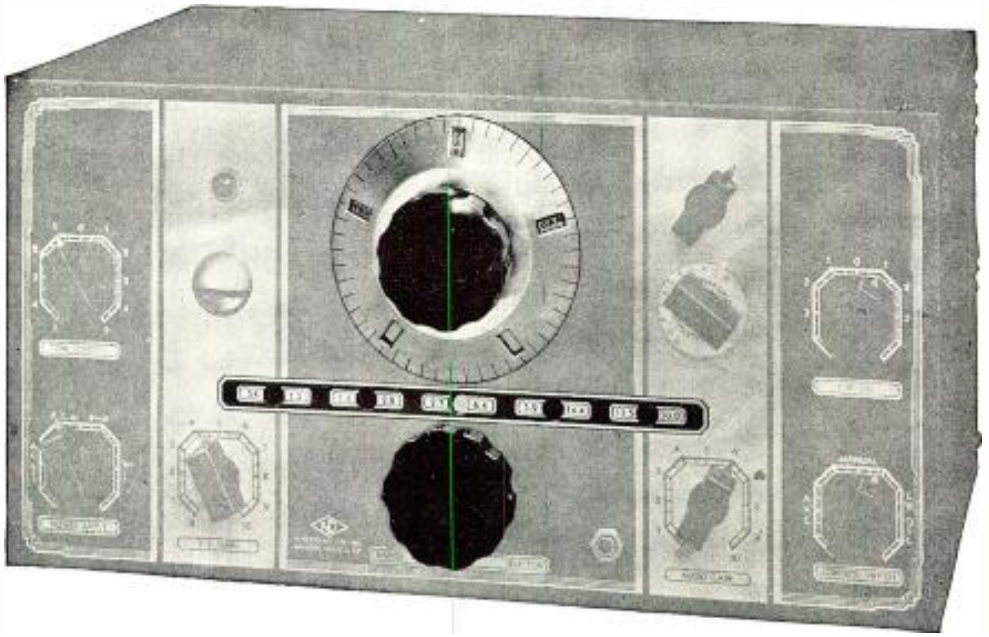
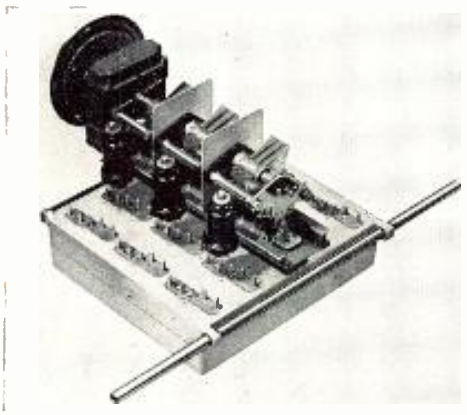


PRECISION THAT STAYS PRECISE

The permanence of calibration for which National Receivers are famous is combined with the convenience of knob-controlled range changing in the NC-100



THE MOVABLE-COIL TUNING UNIT
Accurate positioning of coils insures that calibration will not be affected by changes in stray inductance.

Receiver. The unique Movable-Coil Tuning Unit has such obvious advantages in electrical efficiency—such as short leads and isolation of idle coils—that it is often thought of in that connection alone. But this remarkable unit also makes possible a permanent accuracy in tuning and logging that is invaluable in DX work.

When a twist of the range-changing knob slides the heavy cast aluminum coil shield down its smooth running track, positive detents lock the new set of coils into exact position, close to the tuning condenser and tubes. There are no flimsy switch arms and flexible leads here! Instead, fifteen rigidly-mounted double-side-wipe contacts make permanently dependable connections to tubes and tuning condenser. And the precision tuning condenser is fully worthy of the responsibilities placed upon it. Its preloaded gear drive of 20 to 1 ratio is a revelation in smoothness. Its Micrometer Dial is direct reading to one part in five hundred, and has an effective scale length of twelve feet.

To justify such precision construction, electrical parts must be of the same high quality. There are no compromises on this score in the NC-100! Throughout the entire receiver—both RF and IF stages—air dielectric condensers are used wherever their permanence of adjustment and low losses can improve performance. HF coils are rigidly mounted on low-loss R-39 supports, each in its own shielded compartment. Important connections are made with heavy bus wire. Tuning condenser stators have four point mounting on bars of low-loss Isolantite.

The circuit also has received its share of attention. For example, separate tubes, electron-coupled, are used for high frequency oscillator and first detector. A bias-type power detector and a separate tube for amplified and delayed AVC relieve the second IF stage of the undesirable loading caused by diode rectifiers. From first RF stage to push-pull output, no pains have been spared to make the NC-100 as outstanding in reliability as it is in performance. Whether you tune to 540 KC or to 30 MC, you will find its tuning as smooth as its logging is accurate.

Whether you are about to buy a receiver or not, you will want to know more about the NC-100. Drop in at your dealers. He will be proud to explain its many features to you. Or, if more convenient, write for a copy of the descriptive folder describing the NC-100. It is free for the asking and no coupon is needed. Just send a postcard, saying you are a *Short Wave & Television* reader and want a copy of the NC-100 folder. But be sure to write your name and address plainly!

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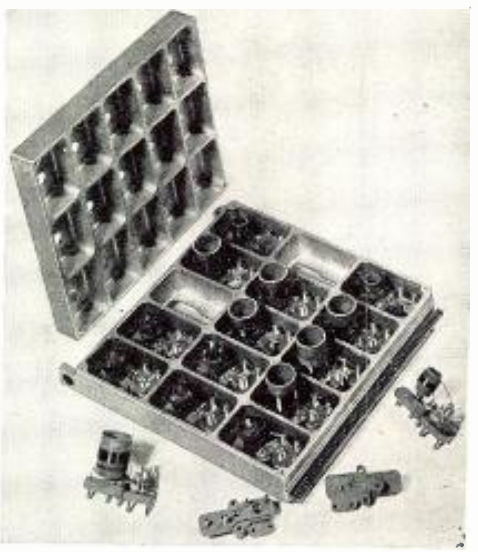
MALDEN, MASS., U. S. A.



THE COMPLETE COIL ASSEMBLY
Permanence of circuit characteristics is assured by the rigid cast aluminum shield and by air dielectric trimmer condensers with R-39 insulation.

NATIONAL NC-100 TWELVE TUBE SUPERHETERODYNE

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J. E. Smith, President
National Radio Institute
The man who has directed the home study training of more men for the Radio Industry than any other man in America.

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Radio broadcasting stations employ engineers, operators, station managers and pay up to $5,000 a year. Spare time Radio set servicing pays as much as $200 to $500 a year—full time jobs with Radio jobbers, manufacturers and dealers. $30, $50, $75 a week. Many Radio Experts own and operate their own full time or part time Radio sales and service businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to $6,000 a year. Radio operators on ships get good pay and see the world besides. Automobile, police, aviation, commercial Radio, and loud speaker systems are newer fields offering good opportunities now and for the future. Television promises to open many good jobs soon. Men I have trained are holding good jobs in these branches of Radio. Read their statements. Mail the coupon.

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

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

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

Practically every neighborhood needs a good spare time serviceman. The day you enroll I start sending you Extra Money Job Sheets. They show you how to do Radio repair jobs that you can cash in on quickly. Throughout your training I send you plans that made good spare time money—$200 to $500 a year—for hundreds of fellows. My training is famous as "the Course that pays for itself."

I Give You Practical Experience

My Course is not all book training. I send you special Radio equipment and show you how to conduct experiments and build circuits which illustrate important principles used in modern Radio receivers, broadcast stations and loud speaker installations. I show you how to build testing apparatus for use in spare time work from this equipment. You work out the things you read in the lesson books. Read about this 50-50 method of training—how it makes learning at home interesting, quick, fascinating, practical. Mail coupon.

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

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

J. E. SMITH, President, Dept. 7FB3
National Radio Institute, Washington, D. C.

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National Radio Institute, Washington, D. C.

Dear Mr. Smith: Without obligating me, send the sample lesson and your book which tells about the spare time and full time opportunities in Radio and explains your 50-50 method of training men at home in spare time to become Radio Experts. (Please write plainly.)

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