

THE
RADIO EXPERIMENTER'S
MAGAZINE

HUGO GERNSBACK
Editor

SHORT WAVE ★ AND TELEVISION

June

WORLD'S
LARGEST
SHORT WAVE
CIRCULATION



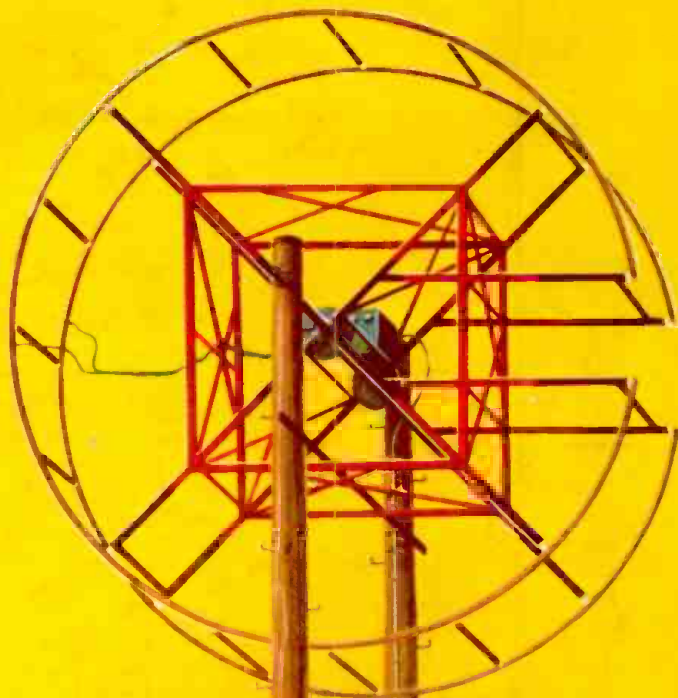
John L. Reinartz

Discusses

"Radio—Then and Now"

in this issue

See Page 70



25¢

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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!

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

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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.

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




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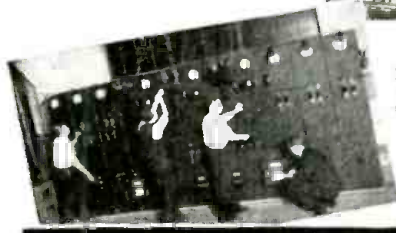
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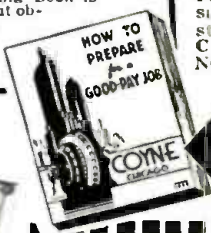
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- How To Get the Best Results from Your S-W Receiver, H. W. Secor
- Identifying "Foreign" Stations By Their Musical Signals, by Joe Miller
- Photos and Letters from "Hams" and "Fans"
- Coming—A Simple "All-Band" Transmitter, by W2FHP

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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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Published by **POPULAR BOOK CORPORATION**

404 N. Wesley Avenue, Mount Morris, Ill.

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

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

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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 $\frac{1}{2}$ 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.

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 $2\frac{1}{2}$ 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 great-

er 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)



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, IMO, and John Reinartz, IXAM, held a QSO for several hours with RAB, Deloy, in France. The wavelength was about 110 meters. He is at present engaged as a consultant on radio amateur tube applications.

Sixth of a Series of "Guest" Editorials

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

This is the June, 1937 Issue—Vol. VIII, No. 2. The Next Issue Comes Out June 1

SHORT WAVE & TELEVISION, Published monthly at Mount Morris, Ill.
EDITORIAL and EXECUTIVE Offices, 99 Hudson St., New York City

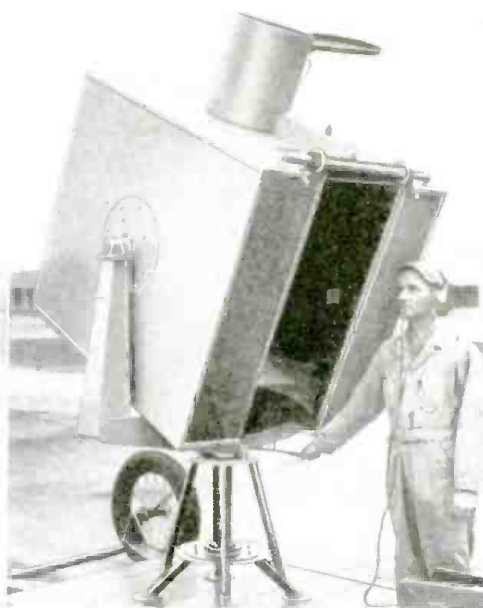
Short Wave Snapshots

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

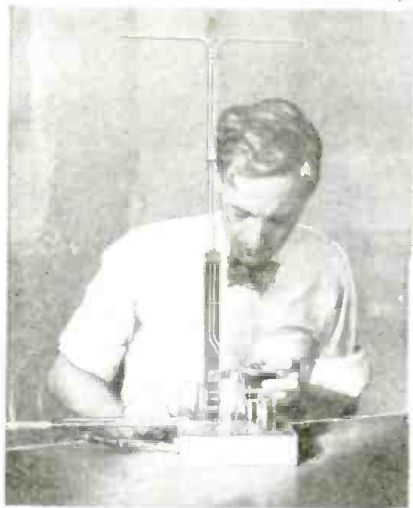


Dr. Lee de Forest has turned his lifetime of experience to the building of radio therapy instruments. He has designed a machine known as the "Dynatherm," which, by means of short waves, induces artificial fever, helpful in curing various ailments. Dr. de Forest is shown in his Los Angeles laboratory.

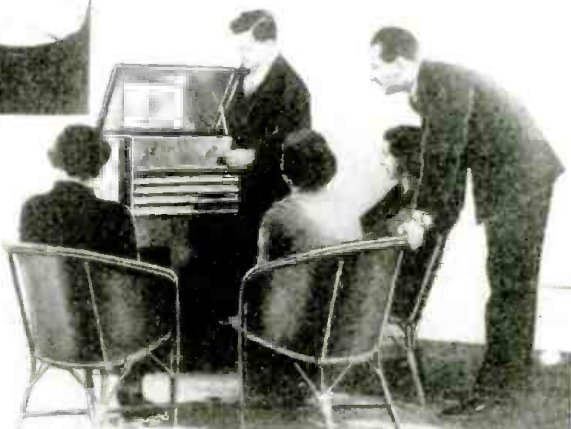
Radio signal substitute for aerial bombs—the odd looking device at the right is used by Uncle Sam's aerial bombing experts for target practice. The position of the plane, when it sends a short-wave signal instead of dropping a bomb, is recorded by the large camera obscura. This system saves the cost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



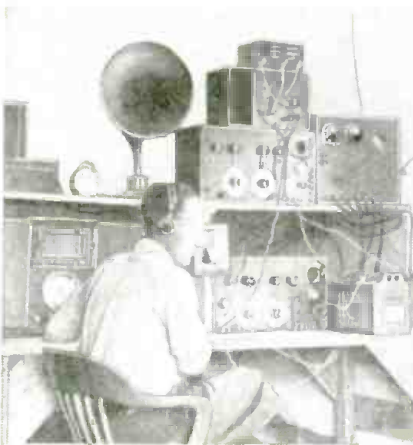
Right—The Baird T-5 Television receiver is said to be the best European set and operates on A.C. or D.C. Incoming sound and vision signals are fed into the receiver through a low-impedance feeder cable. Vision channel band-width 2 megacycles; Control knobs—center one is for tuning; the other 5 for adjustment 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.



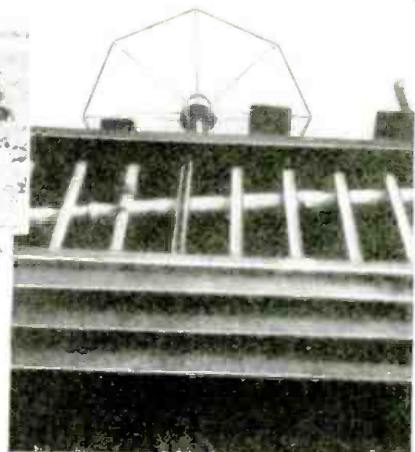
Pancake Television Antenna used in Berlin. Photo below shows the top of Berlin's television tower 453 feet in height, with an image antenna of unusual design. The antenna was designed for a wavelength of 6.7 meters, and it is claimed that the great range of the Berlin television station is due to this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



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.



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 change-

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)

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.

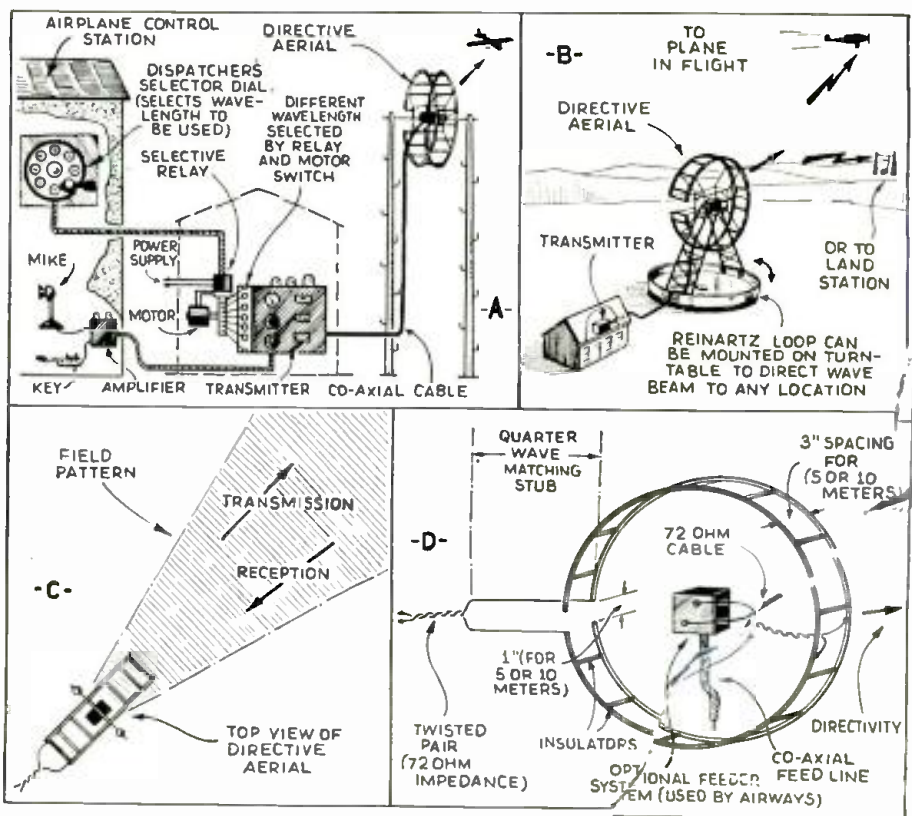
● TO reduce radio traffic congestion by eliminating numerous relay stations along their 3000-mile coast-to-coast route, American Airlines recently installed at their Glendale, California, terminal a directional transmitting antenna, capable of spanning the continent with code and having a 500-mile range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

ing is rapidly accomplished by means of a remotely controlled motor-driven multiple-switching unit. This unit, controlled by a telephone-dial system,



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.

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.

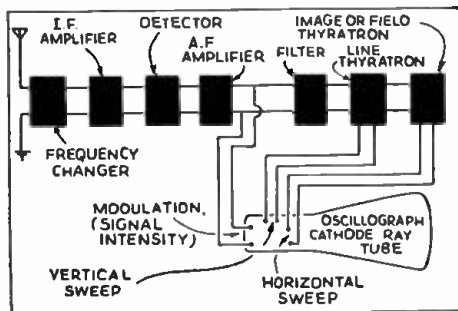


Fig. 1—Breakdown (block diagram) of the Emyradio television receiver.

● 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 material; 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 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 thyatron 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 thyatron 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 thyatron 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 thyatron is obtained from a half-wave rectifier.

The receiver (Continued on page 92)

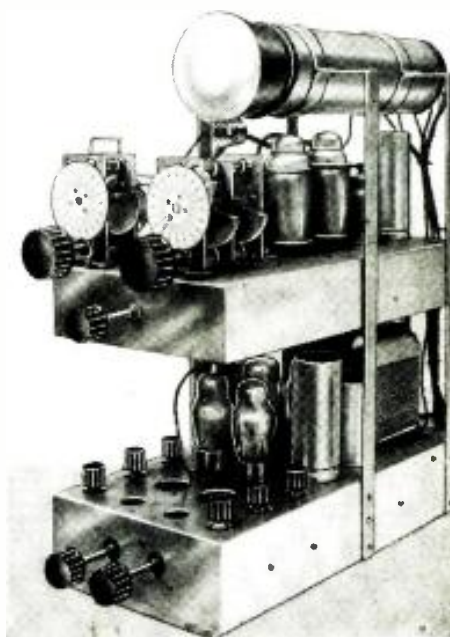


Fig. 6—The amateur or home-made "Visiodyne Baby" receiver designed by M. Chauviere.

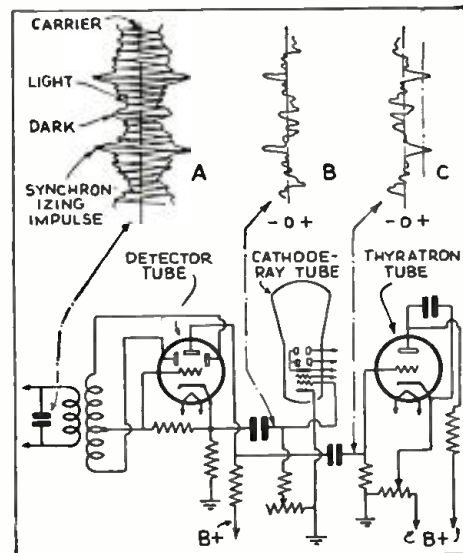


Fig. 7—Circuit details of the Chauviere receiver, showing the current formation in the different stages.

New Surveying Instrument Has Many Uses



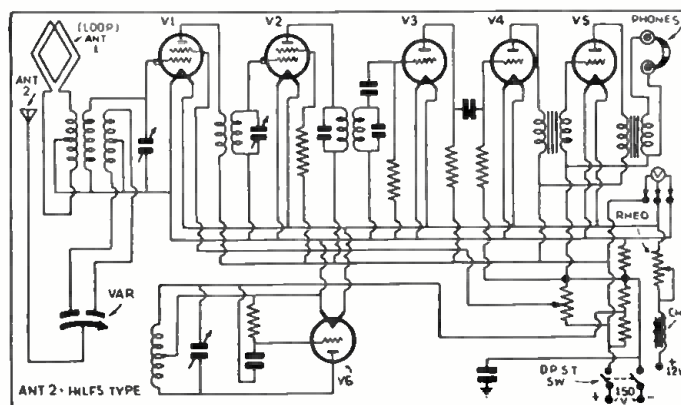
The photos above show the new short-wave surveying instrument used by the German army. It is a thoroughly portable device and has a very high accuracy.

● 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.



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

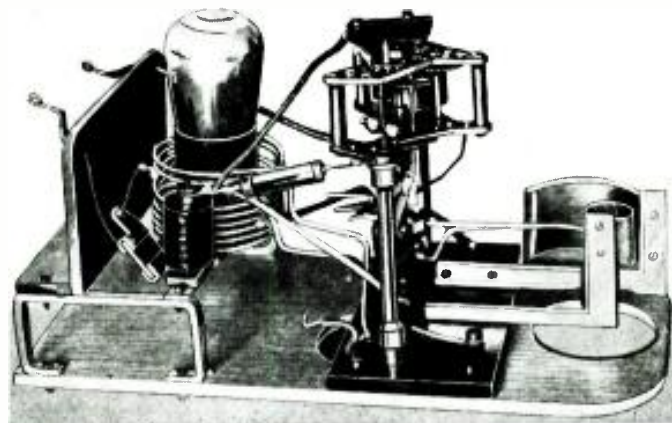
Short Waves + Balloons = Weather News

Latest French system of determining meteorological conditions in the upper atmosphere

● 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

The commander, R. Bureau, technical under-director of the National Meteorological 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.

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.

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.

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)

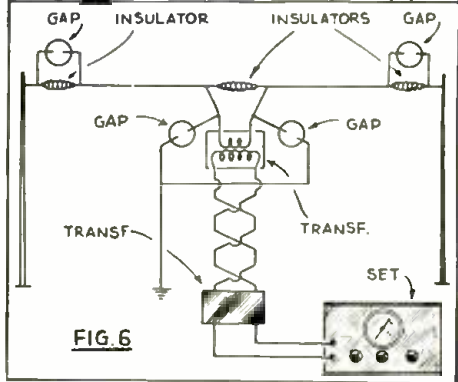
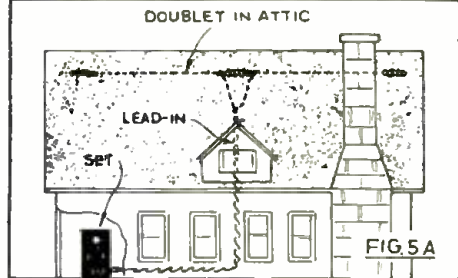
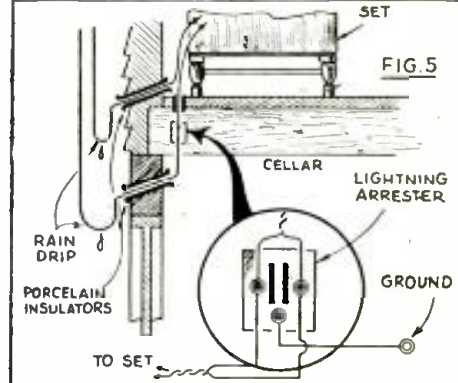
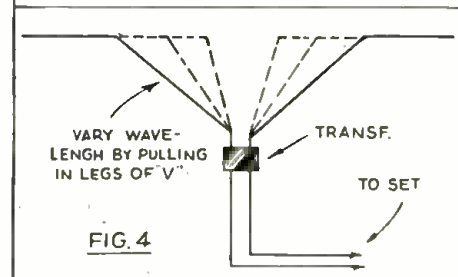
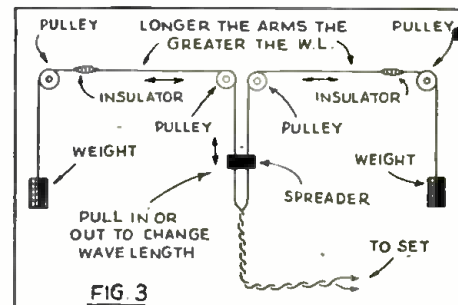
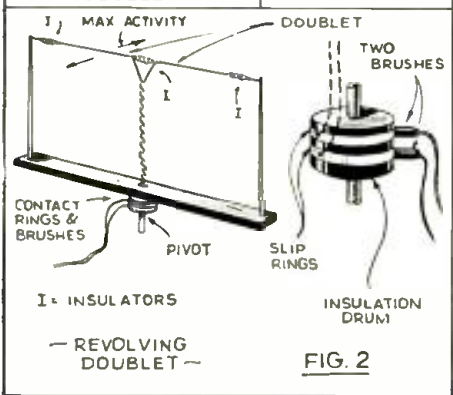
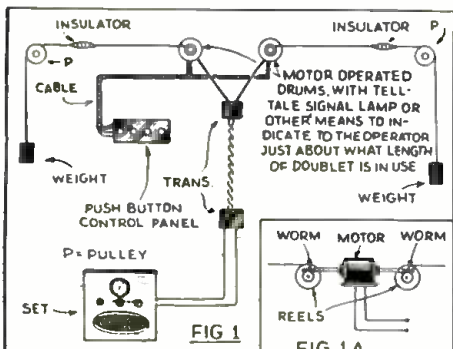


Fig. 3—Adjustable doublet; 4—variable "V" doublet; 5—lead-in detail; 5-A—doublet installed in attic; 6—lightning arrester hook-up.



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.

9580 Kcys.
31.31 Meters

DAVENTRY, ENGLAND

For Corporation

Dear Radio Friend

Your report of reception of GSC 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:

Verified by:

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 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 include 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 unredemable. The local-

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.

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.

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

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.

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

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 hand-spread and many other features.



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

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.

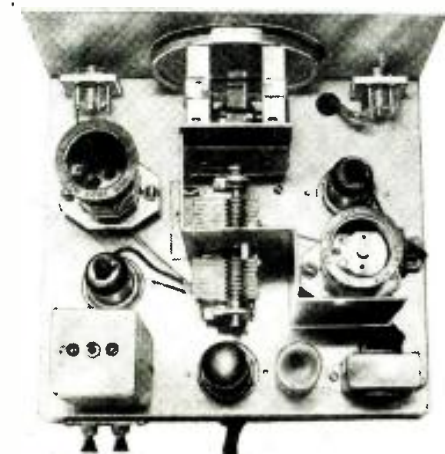
1 Tube Acts As 2nd Det. and A.F. Stage

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)

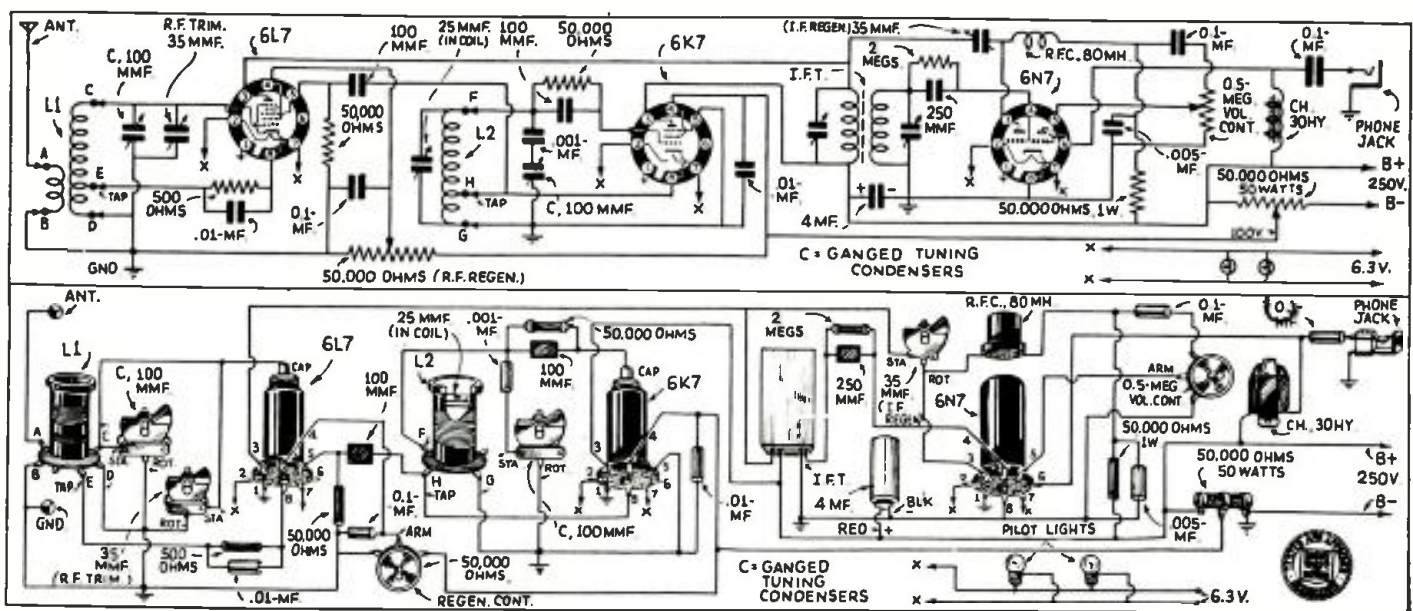


● IT has often been said that "You can't beat the old regenerative detector, and one R.F. stage combination for sensitivity." Whether strictly true or not, there were (and still are!) many thousands of sets with this line up in service. Only a couple of years ago, before the so-called superhet "boom," this was the accepted and standard receiver.



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

er; 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 it)



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.

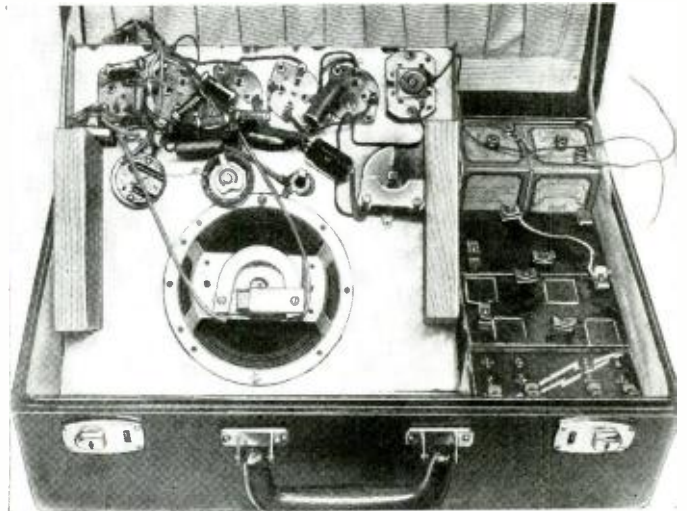
This all-around battery-operated "portable" covers the short-wave and broadcast bands, thanks to the use of plug-in coils. A regenerative detector and three stages of audio are used to give loudspeaker operation, or phones may be used also.

● NOWADAYS radio is recognized as an indispensable 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.

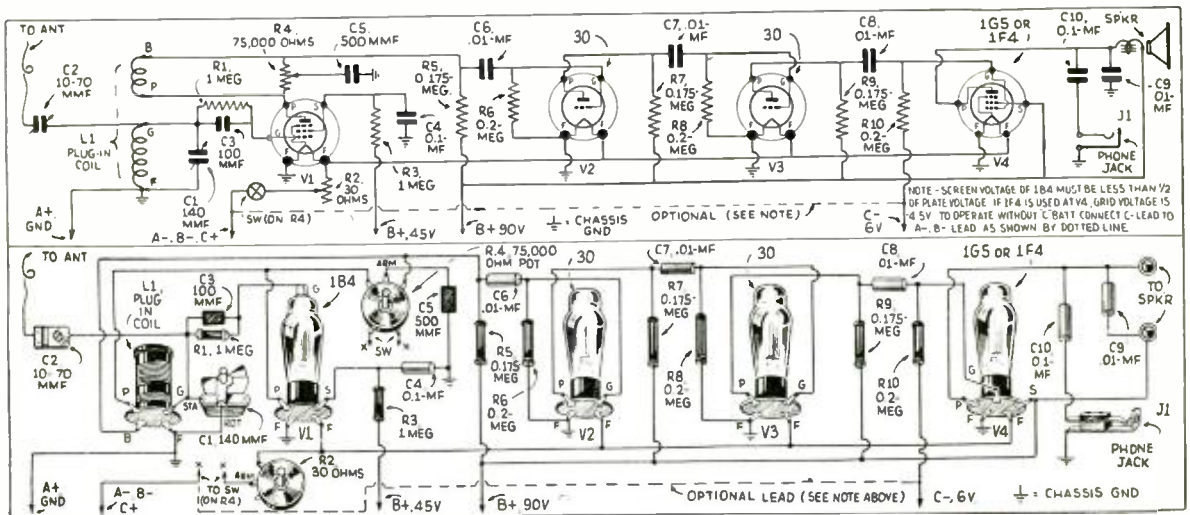
The Vacation Portable uses the latest type 1B4 screen-grid tube as a regenerative detector. This tube has electrical characteristics somewhat similar to the older type 32 tube. However, its sensitivity is higher and in its physical design a smaller bulb is employed, permitting a saving of space.



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-Tube 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

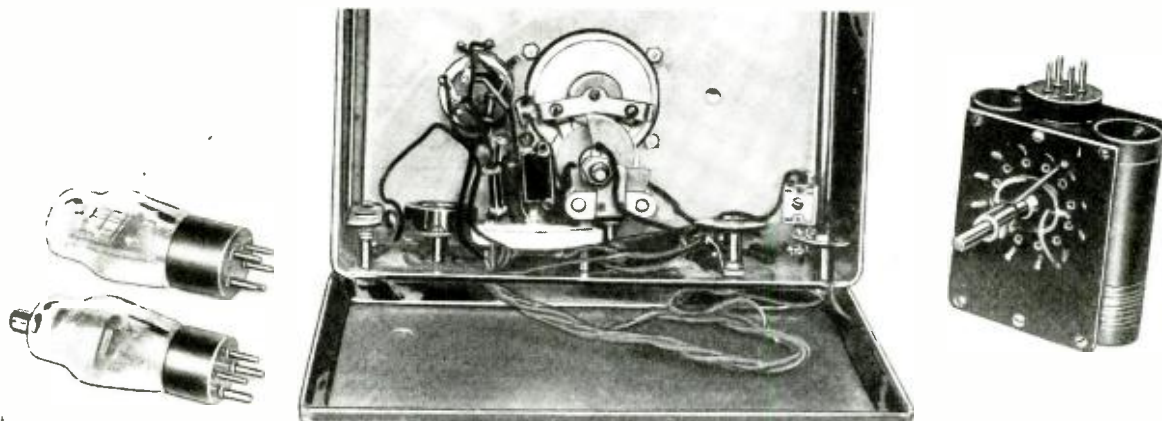
The coil and switch system used in this receiver covers the range, as stated above, from 16 to 550 meters. This range by bands is as follows: Position "1" (coil switch), 16-32 meters; position "2," 30-60 meters; position "3," 55-115 meters; position "4," 105-185 meters; position "5," 175-330 meters; 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

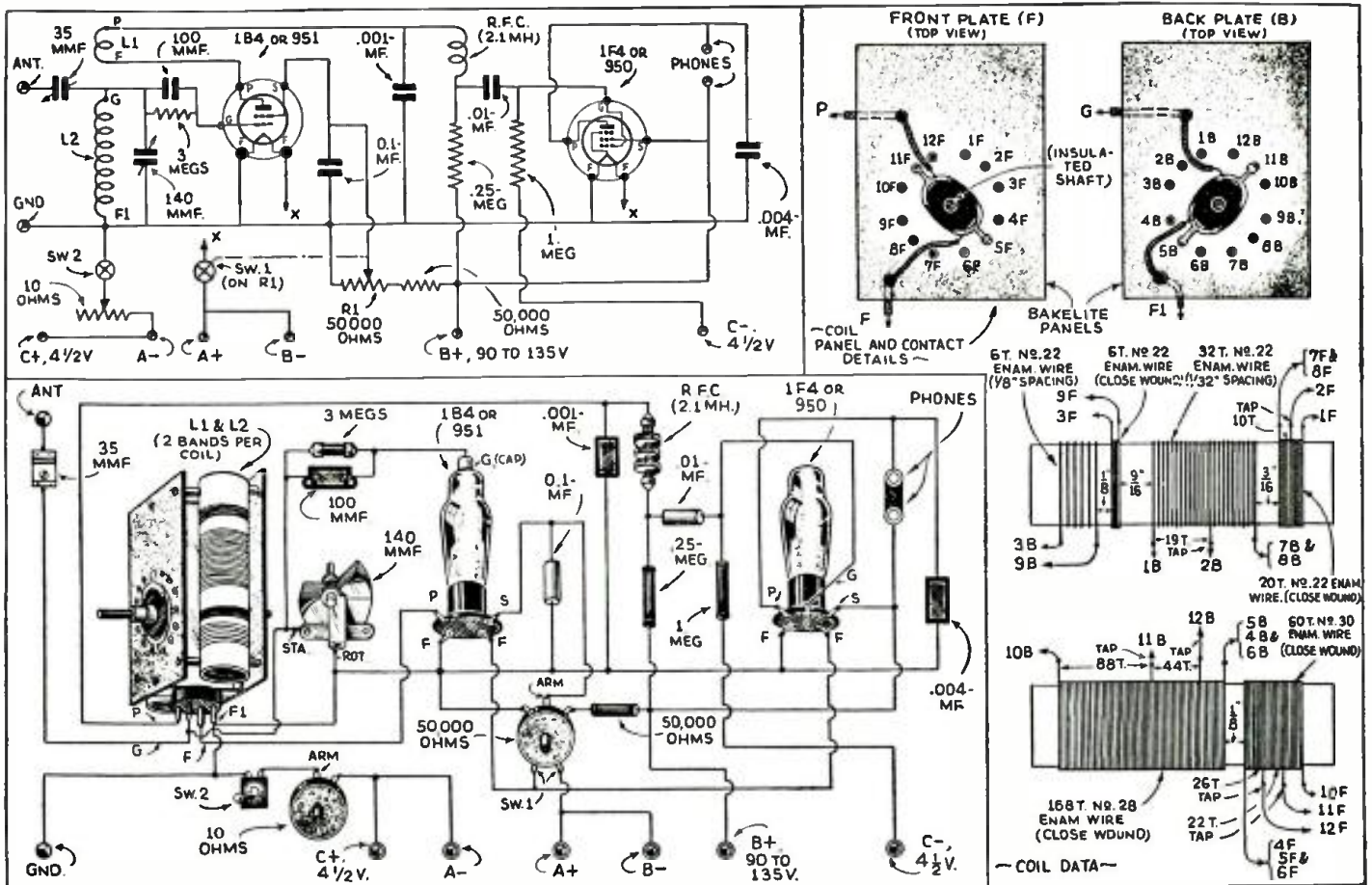
and drill the various holes in the bottom plate as shown in Fig. 2. Mount the tube and coil sockets, the tuning condenser and the antenna-ground and tip-jack binding post strips on their $\frac{3}{4}$ inch brass bushings and, using either the flexible or solid push-back hook-up wire, make the connections 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 (4 1/2-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, 0.001 mf., type 1463
 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.

125-Watt Modulator Using 35T's

by George W. Shuart, W2AMN

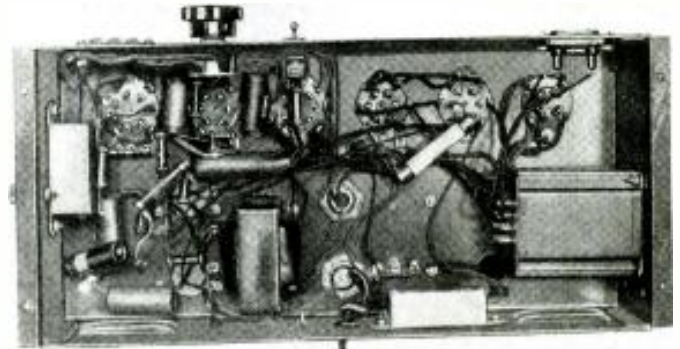
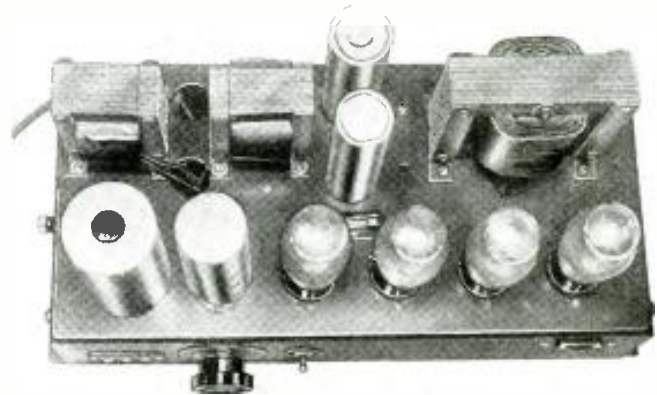


mounted in the rack with the rest of the transmitter and the speech amplifier and driver on the operating desk, well out of the field of the transmitter. In this respect there is less likelihood of it picking up R.F. and, at the same time, the amplifier is located close to the microphone where the gain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



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

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.

Parts List for Modulator

Speech Amplifier and Driver.

I. R. C.

- 1-5 meg. resistor— $\frac{1}{2}$ -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 $\frac{1}{2}$ -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)

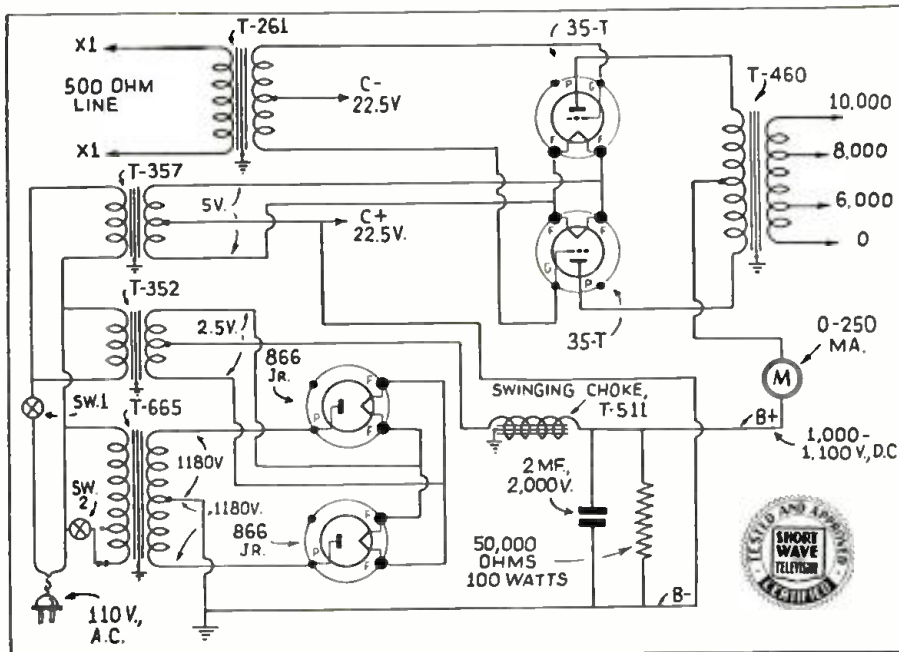


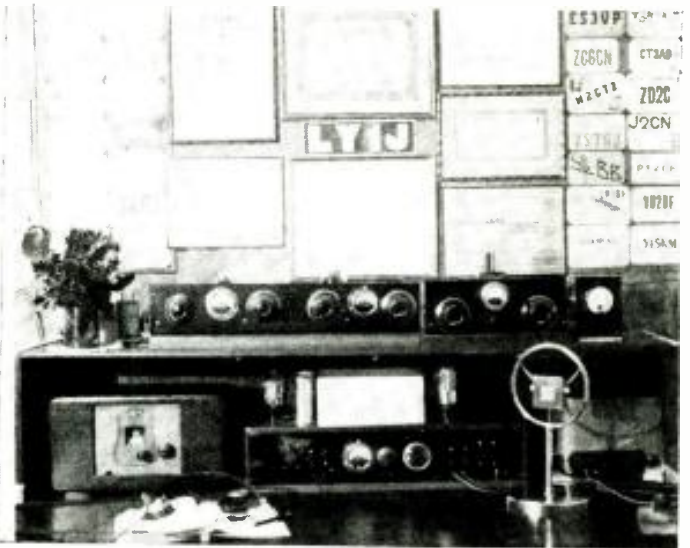
Diagram of the Class-B stage and its "power-supply."

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 complaints 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

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."

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.

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 VVY, 8.98 mc., Poona, FB, OM! This would place VVY on 2 low freqs., as a letter direct from station states VVY 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!

TELEVISION COURSE

Problems of High-Fidelity Reception. Lesson 5

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

● 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

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

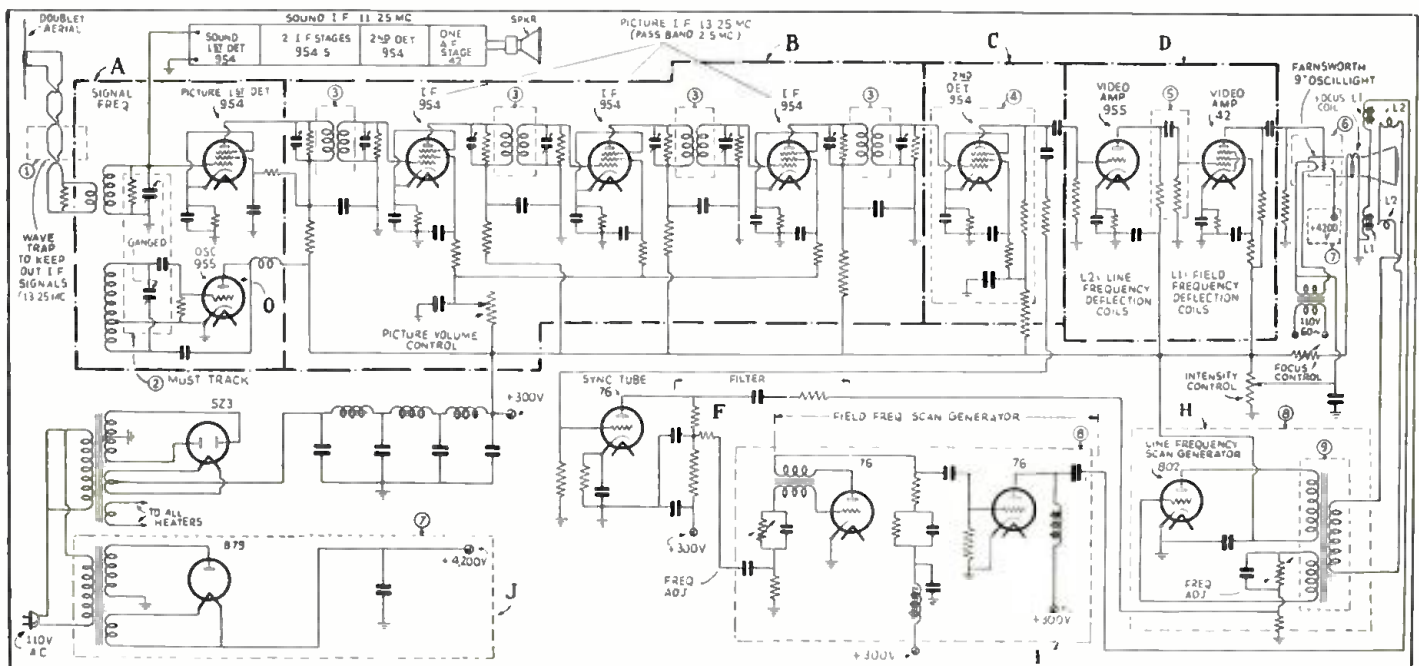
should get started right, above all else, getting thoroughly grounded in the fundamentals of electronic television, and thus being certain that his set, upon which he will have spent money and time, will work.

Some schematic diagrams have ap-

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



Copyright Farnsworth Television, Inc.

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

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

peared 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

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)

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		Mc.	Call		Mc.	Call	
15.252	RIM	TACHKENT, U.S.S.R., 19.67 m. Works RKL near 7 am.	15.500	LSM2	BUENOS AIRES, ARG., 20.69 m. Addr. (See 21.020 mc.) Works RIO and Europe daytime.	12.060	PDV	KOOTWIJK, HOLLAND, 24.88 m. Tests irregularly.
15.250	W1XAL	BOSTON, MASS., 19.67 m., Addr. University Club. Sundays 11 am-12.30 pm. Irregular other days.	14.485	TIR	CARTAGO, COSTA RICA, 20.71 m. Works Central America and U. S.A. daytime.	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.
15.245	TPA2	PARIS, FRANCE, 19.68 m., Addr. 98 bis. Blvd. Haussmann. "Radio Colonial." 6-11.05 am.	14.485	YSL	SAN SALVADOR, SALVADOR, 20.71 m. Irregular.	11.991	FZS2	SAIGON, INDO-CHINA, 25.02 m. Phones Paris mornings.
15.230	HS8PJ	BANGKOK, SIAM, 19.32 m. Irregularly Mon. 8-10 am.	14.485	HPF	PANAMA CITY, PANAMA, 20.71 m. Works WNC daytime.	11.960	HI2S	PUERTO PLATA, D. R., 25.08 m., Addr. La Voz de Hispaniola. Relays HIX 5-6.30 am.
15.230	OLR5A	PRAGUE, CZECHOSLOVAKIA. Irregular.	14.485	TGF	GUATEMALA CITY, GUATEMALA, 20.71 m. Works WNC daytime.	11.955	IUC	ADDIS ABABA, ETHIOPIA, 25.09 m. Works IAC around 12 midnight.
16.220	PCJ	HUIZEN, HOLLAND, 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.	14.485	HRL5	NICARAGUA, MANAGUA, 20.71 m. Works WNC daytime.	11.950	KKQ	BOLINAS, CALIF., 25.1 m. Tests irregularly evenings.
16.210	WBXK	PITTSBURGH, PA., 19.72 m., Addr. (See 21.540 mc.) 9 am-7 pm.	14.485	HRF	NACAOME, HONDURAS, 20.71 m. Works WNC daytime.	11.940	FTA	STE. ASSISE, FRANCE, 25.13 m. Works Morocco mornings and Argentina late afternoon.
16.200	DJB	BERLIN, GERMANY, 19.74 m., Addr. (See 15.280 mc.) 12.05-5.15 am., 5.55-11 am., 4.50-11 pm. Also Sun. 11.10 am. to 12.25 pm.	14.470	WMF	TEGUCIGALPA, HONDURAS, 20.71 m. Works WNC daytime.			
15.190	ZBW4	HONGKONG, CHINA, 19.75 m., Addr. P. O. Box 200. 11.30 pm. to 1.15 am., 4-10 am.	14.460	DZHI	LAWRENCEVILLE, N. J., 20.73 m., Addr. A. T. & T. Co. Works England daytime.			
15.180	GSO	DAVENTRY, ENG., 19.76 m., Addr. (See 26.100 mc.) 1-3.15 am.	14.440	GBW	ZEESEN, GERMANY, 20.75 m., Addr. (See 15.360 mc.) Irregular.	11.900	XEWI	MEXICO CITY, MEXICO, 25.21 m. Monday, Wed. and Fri. 3-4 pm., 9 pm.-12 m. Tues. to Thurs., 7.30 pm.-12 m. Sat. 9 pm. to 12 m. Sunday 12.30-2 pm.
15.180	RW96	MOSCOW, U.S.S.R., 19.76 m., Sun 2-3 pm.	14.200	EASAH	RUGBY, ENG., 20.78 m. Works U. S. A. afternoons.	11.895	HP5I	AGUADULCE, PANAMA, 25.22 m., Addr. La Voz del Interior. 7.30-9.30 pm.
15.160	JZK	TOKIO, JAPAN, 19.79 m., 2.30-3.30 pm., 4-5 pm., 12 m.-1 am.	13.990	GBA	TETUAN, SPANISH MOROCCO, 21.13 m. Daily except Sun. 2.15-5, 7 and 9 pm.	11.880	TPA3	PARIS, FRANCE, 25.23 m., Addr. (See 15.245 mc.) 4-5 am., 10.15 am.-5 pm.
15.150	YDC	BANDOENG, JAVA, 19.8 m., Addr. N. I. R. O. M. 6-7.30 pm., 10.30 pm.-2 am., Sat. 7.30 pm.-2 am., 5.30-10.30 am.	13.820	SUZ	RUGBY, ENG., 21.44 m., Works Buenos Aires late afternoon.	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.
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.	13.690	KKZ	ABOU ZABAL, EGYPT, 21.71 m. Works with Europe 11 am. to 2 pm.	11.870	WBXK	PITTSBURGH, PA., 25.26 m., Addr. (See 21.540 mc.) 7-10.30 pm.
15.120	HVJ	VATICAN CITY, 19.83 m., 10.30-10.45 am., except Sun., Sat. 10-10.45 am.	13.635	SPW	BOLINAS, CALIF., 21.91 m., Addr. RCA Communications. Irregular.	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.
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.	13.585	GBB	WARSAW, POLAND, 22 m., Mon., Wed. Fri., 12.30-1.30 pm.	11.860	GSE	DAVENTRY, ENG., 25.29 m., Addr. (See 26.100 mc.) Irregular.
			13.415	GCJ	RUGBY, ENG., 22.08 m. Works Egypt and Canada afternoon.	11.855	DJP	BERLIN, GERMANY, 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am. to 4 pm.
			13.410	YSJ	RUGBY, ENG., 22.36 m. Works Japan and China early morning.	11.840	CSW	LISBON, PORT., 25.35 m. Nat'l Broad. Stat. 11.30 am.-1.30 pm.
			13.390	WMA	SAN SALVADOR, SALVADOR, 22.37 m. Works WNC daytime.	11.830	W9XAA	CHICAGO, ILL., 25.36m., Addr. Chicago Federation of Labor. Irregular.
			13.380	IDU	LAWRENCEVILLE, N. J., 22.4 m., Addr. A. T. & T. Co. Works England morning and afternoon.	11.830	W2XE	NEW YORK CITY, 25.36 m., Addr. Col. Broad. System, 485 Madison Av., N.Y.C., relays WABC 6-9 pm.
			13.345	YVQ	ASMARA, ERITREA, AFRICA, 22.42 m. Works Rome daytime.	11.820	XEBR	HERMOSILLA, SON., MEX., 25.38 m., Addr. Box 68. Relays XEBH. 2-4 pm
			13.285	CGA3	MARACAY, VENEZUELA, 22.48 m. Works WNC daytime.	11.820	GSN	DAVENTRY, ENG., 25.38 m., Addr. (See 26.100 mc.) Irregular.
			13.330	IRJ	DRUMMONDVILLE, QUE., CAN., 22.58 m. Works London and ships afternoons.	11.810	ZRO	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.
			13.075	VPD	ROME, ITALY, 22.69 m. Works Tokio 5-9 am. irregularly.	11.800	JZJ	TOKIO, JAPAN, 25.42 m., Addr. Broadcasting Co. of Japan, Overseas Division. 12 m.-1 am, 9-10 am, 2.20-3.30 pm., 4-5 pm.
			12.840	WOO	SUVA, FIJI ISLANDS, 22.94 m. Irregularly.	11.800	OER2	VIENNA, AUSTRIA, 25.42 m. Daily 10 am.-5 pm. Sat. until 5.30 pm.
			12.825	CNR	OCEAN GATE, N. J., 23.36 m., Addr. A. T. & T. Co. Works with ships irregularly.	11.795	DJO	BERLIN, GERMANY, 25.43 m., Addr. (See 15.280 mc.) Irregular.
			12.800	IAC	RABAT, MOROCCO, 23.39 m., Addr. Director General Tele. & Teleg. Stations. Works with Paris irregularly.	11.790	OAX5B	ICA, PERU, 25.43 m., Addr. Radio Universal. 11 am.-12 n, 4-11.15 pm.
			12.780	GBC	PISA, ITALY, 23.45 m. Works Italian ships mornings.	11.790	W1XAL	BOSTON, MASS., 25.45 m., Addr. (See 15.250 mc.) Daily 3.30-5.45 pm. Irregular at other times.
			12.485	HIN	RUGBY, ENG., 23.47. Works ships irregularly.	11.770	DJD	BERLIN, GERMANY, 25.49 m., Addr. (See 15.280 mc.) 11.35 am.-4.30 pm., 4.50-11 pm.
			12.325	DAF	CIUDAD TRUJILLO, D. R., 24 m. "Broadcasting National." 12 n.-2 pm. 6-11 pm. approx.	11.760	OLR4B	PRAGUE, CZECHOSLOVAKIA, 25.51 m., Addr. (See 11.875 mc.) Irregular.
			12.300	---	NORDDEICH, GERMANY, 24.34 m. Works German ships daytime.	11.750	GSD	DAVENTRY, ENG., 25.53 m., Addr. B. B. C., London. 12.20-6 pm., 6.20-8.30, 9-11 pm.
			12.290	GBU	SANTIAGO, CHILE, 24.39 m., Addr. Louis Desmaras, Casilla, 761, 11 am.-1 pm., 4-8 pm., Sun. 4-10 pm.	11.730	---	SAIGON, INDO CHINA, 25.57 m., Addr. Radio Philco. Irregular 5.30-9.30 am.
			12.260	TYB	RUGBY, ENG., 24.41 m. Works N. Y. C. evenings.	11.730	PHI	HUIZEN, HOLLAND, 25.57 m., Addr. N. Y. Philips' Radio. Irregular.
			12.235	TFJ	PARIS, FRANCE, 24.49 m. Irregular.			
			12.215	TYA	REYKJAVIK, ICELAND, 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.			
			12.150	GBS	PARIS, FRANCE, 24.56 m. Works French ships in morning and afternoon.			
			12.130	DZE	RUGBY, ENG., 24.69 m. Works N. Y. C. evenings.			
			12.120	---	ZEESEN, GERMANY, 24.73 m., Addr. (See 15.360 mc.) Tests irregular.			
					ALGIERS, ALGERIA, 24.75 m. Calls Paris 12 m.-6.30 am.			

↓ S.W. BROADCAST BAND ↓

↑ S.W. BROADCAST BAND ↑

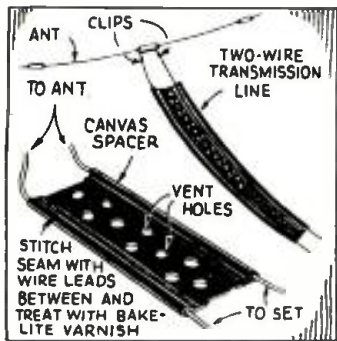
(Continued on page 85)

(All Schedules Eastern Standard Time)

\$5.00 PRIZE

PORTABLE TRANSMITTERS

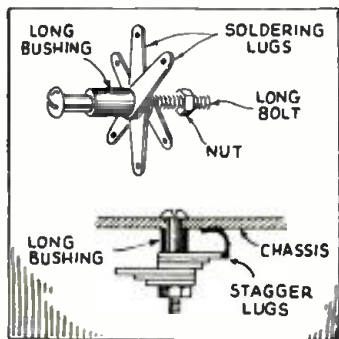
For portable transmitters that require a two-wire transmission line of a definite impedance this arrangement proves quite



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.

THE COMMON GROUND

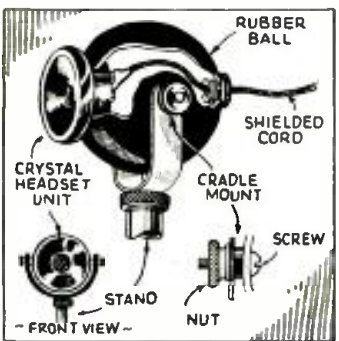
When a number of leads are to be grounded, a neater job is made by using a common post consisting of soldering lugs



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.

ATTENTION "HAMS"!

Here's my idea for getting that Ntal "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 Ntal clear "mike" reports. Direct to grid economy, plus the flexibility of such an investment, is bound to satisfy any "Ham."—Fred C. Hoffman, W8VVI.

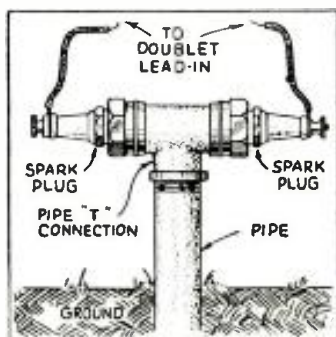
DOUBLET LIGHTNING ARRESTOR

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

\$5.00 FOR BEST SHORT-WAVE KINK

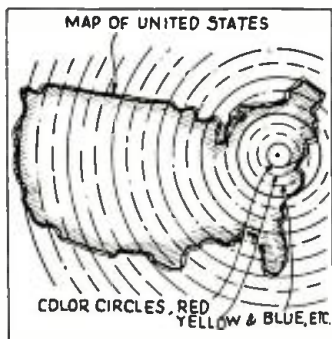
The Editor will award a five dollar prize each month for the best short-wave kink submitted by our readers. All other kinks accepted and published will be awarded eight months' subscription to SHORT WAVE & TELEVISION. Look over these "kinks"; they will give you some idea of what the editors are looking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

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 3 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.



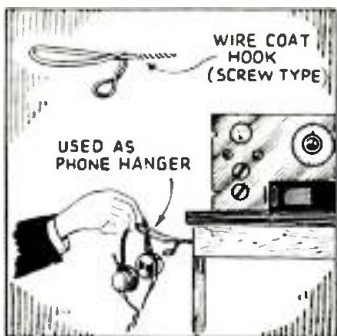
ADDING COLOR TO MAP

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.—Alred Wolfer.

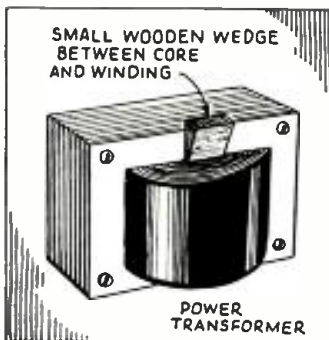


PAGE THE COAT HOOK!

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.



SMALL WOODEN WEDGE BETWEEN CORE AND WINDING

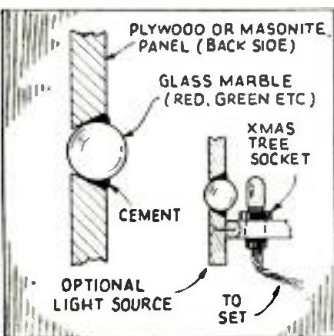


STOPPING TRANSFORMER HUM

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.

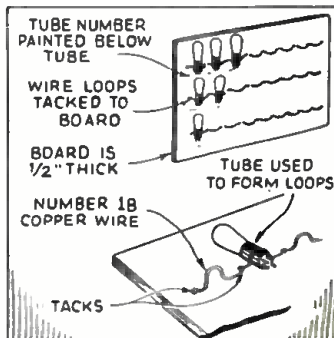
JEWEL LIGHT SUBSTITUTE

Use ordinary colored glass marbles in place of the jewel; panel must be of some material other than metal. A hole about 1/4 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 "china" 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. Ranney, W8QJ.



TUBE RACK

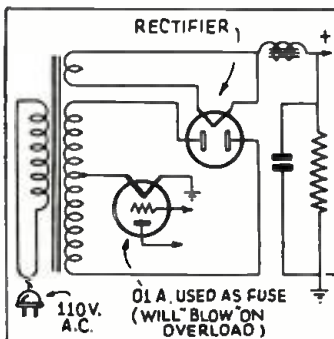
This tube rack is easy to make and very useful. My rack is thirty inches square and can accommodate fifty tubes. In making the wire loops, I used only one piece of No. eighteen wire for each row. To do this, first tack the wire at one edge of the board near the top. Then place a tube under the wire and 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.

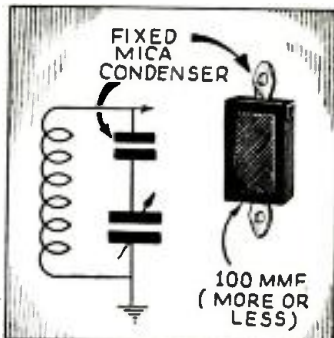
PREVENT BLOW-UPS!

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 0L-A tube filament between the center tap of the transformer and the ground. The drawing clearly shows this.—R. Woodward, W6LJN.



BETTER BAND-SPREAD

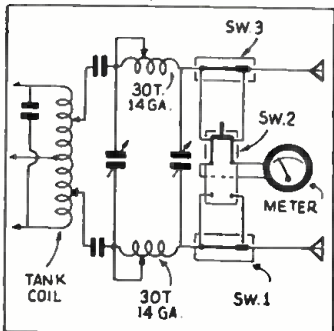
Instead of purchasing a special band-spread condenser, or removing some plates, which often ruins a condenser, one can



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

R. F. METER SWITCH

For those who cannot afford to have an dual 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-throw switch.—F. R. Harlow.



SHORT WAVES and LONG WAVES

Our Readers Forum

Our S-W Stations "Locals" to Britisher



Editor, SHORT WAVE & TELEVISION:

I wondered if you would care to hear from a British radio man. I am a reader of your splendid publication whenever I can get it, but only a few copies have reached my hands. I find the American radio ideas extremely interesting.

My present receiver is a superhet, employing five valves (tubes). A hexode for frequency changer and oscillator, (I think you call this a pentagrid), feeding an R. F. Pentode for 1st I. F.; then a double-diode-triode for AVC and 1st detector; valve 4 is a triode for 1st audio frequency amplifier and A. F. pentode output. The valves (tubes) are all battery operated from two volts low tension and 150-volts high tension, with 15-volts grid bias.

On a moving-coil loudspeaker, I have received D. X. from five continents, and over 80 countries! The Schenectady stations—2XAF, 2XAD and W2XE are "locals," as we receive these better than our own Daventry station.

I should like to say that I do not like the average American valve (tube) holders as the springs are flimsy and cause crackling sounds in the phones. Over here we use pins that are split and solid legs for our holders.

American valves are very good and cheaper than ours, but I think our battery valves are the best in the world.

In conclusion, I should like to hear from any American "Ham," and I will gladly reply.

Yours faithfully,
Stanley Francis Salmon,
Gannaway Norton Lindsey,
Warwick, England.

(Well, Stanley, we're glad to learn that W2XE, et al come in like "locals" over there. About our battery "valves" the boys seem to be "going places" with them anyway. Maybe the molecules behave a little better over there.—Editor.)

New Zealand Again!



Editor, SHORT WAVE & TELEVISION:

Being a reader of your magazine for the past 3 years, I must write and congratulate you on an excellent publication. Being a short-wave enthusiast since 1922, naturally I take an interest in any short-wave magazine that is published.

Have had them from all over the world, but I am forced to say that *Short Wave & Television* is the best of the bunch. Keep up the good work, and give us plenty of ultra-short wave data. That is the coming thing for experimenters now.

Would like to enter for your *Short Wave Scout Trophy*, but unfortunately, New Zealand being so far from the majority of the S-W stations, it is difficult for us to get veris back in time. It took me ten weeks to get a veri from F.Y.A. and they answered by return mail.

We receive 12,500-mile stations like "locals"; Zeesen and Paris are best, with Daventry not quite so good. W's are easy also; VK's, VE's are fair (R5-6) as are EAQ and PHH.

(Continued on page 106)

A. J. Young Proud of His Trophy

Editor, SHORT WAVE & TELEVISION:

I beg to acknowledge with thanks your very nice letter, informing me that I had won the twenty-fourth monthly *Short-Wave Scout Trophy*.

I received the Trophy a few days after this letter, and I can assure you that in reality, it is even more beautiful and more imposing an example of the silversmith's art than the illustration appearing in your magazine indicates. A graceful ornament, it adorns my "listening post" where it stands, the object of my affection and the admiration of all. It is impossible to convey to you in words my pride and heartfelt thanks on winning this handsome Trophy. I sincerely thank you for your words of congratulation, and I can only add that, in my capacity as "Official Listening Post" and a member of the short-wave fraternity, I will endeavor to the best of my ability, to supply you with the monthly reports asked for.

Sincerely yours,

Albert J. Young,
General Post Office,
Port of Spain,
Trinidad, B.W.I.



Albert J. Young, of Trinidad, likes his "Short Wave Scout" Silver Trophy, which may be seen just to the right of the receiving set.

He Built the "Midget" A.C.-D.C. Set. Results—Swell!

Editor, SHORT WAVE & TELEVISION:

I built the "Midget" A.C.-D.C. set which you described in the December issue of *Short Wave Craft*, written by H. G. Cisin, M. E.

This set sure is swell! With only one week of testing, I pulled in: DJC, DJB, PJP, 2RO, 6SA, 6SC, 6SL, HP5B, YV3RC, YV4RC, YV2RC, VK2ME, CJRO, CJRX, C'OCO, COCH, VEG6W, EAQ, PRFS, HJ4ABE, W8XAL, W8XX, W2XAF, W6Y, W2XAD, W9XAA, W9XE, WOO, XEBT, W8XAL, W3XAL, TIEP, WOA. My aerial broke loose from the pole and was lying on the roof. This set works a speaker on all of the 550-1500 kc. stations. Some of the amateur stations which are close by came in on the speaker. I made a few changes on the set; instead of a 2 meg. resistor across the grid, I used a 5 meg.; also a 1 mf. condenser across the volume control, instead of a .1 mf.

My aerial is about 75 ft. with No. 12 Enam copper (covered) wire with a 60 ft. lead-in.

I have been a reader of your magazine for three years and find it a swell magazine.

E. G. Hemmer,
507 N. 6th St.,
Newark, N. J.

From a Lady "Fan" in South Africa

Editor, SHORT WAVE & TELEVISION:

Recently I received a copy of *Short Wave & Television* from a friend in England, and I would like to take this opportunity of congratulating you on publishing such a fine magazine.

I often rise early in the morning and tune in W8XX and other U. S. stations, all of which are received excellently over here.

I would be very much indebted to you if you would kindly insert my name under your "Pen Pals" section. I will answer every letter sent to me from anywhere your magazine may be read.

Before concluding, I think I may mention that I belong to the "fairer sex."

Hoping that your magazine will remain as interesting as ever and with warm "Radio Greetings,"

Yours faithfully,
Doreen Joyce Alexander
94b Fifth St.,
Boksburg North, Transvaal, So. Africa.



"Ham License" Article Helpful

Editor, SHORT WAVE & TELEVISION:

I have purchased your magazine for a good many years at the newstands and sure read every word of it.

Just a few days ago I received my membership certificate in the *Short Wave League*, and am very proud of it. Many of the fellows have seen it, and then asked all about joining it. I went to work and cut out the coupon containing the application for membership of the S.W.L. to give to the fellow who fulfills your requirements. I sure liked the article on "Ham License Test Easy," and most of the boys interested in the code are helped out of their many misunderstandings. I hope to be able to pass the test soon.

I wish the best of luck to the best magazine on the market, and the S.W.L. "73."

William C. Franklin
179 Fifth Street, S.W.
Linton, Indiana

Found Denton's Article Valuable

Editor, SHORT WAVE & TELEVISION:

Just a word to say that you certainly have improved your magazine. By that I mean, for one thing, the new way you list the parts; it makes a much easier read list. Also by leaving out that stuff about "No Code On Five Meters."

You certainly have improved the magazine, I especially liked the article "What Size Condenser?" by Clifford E. Denton in the March 1937 issue. Let's hear more from him!

C. A. Doane, Jr.

166 So. 10th St.,
Marshfield, Oregon.

A "Boost" from England

Editor, SHORT WAVE & TELEVISION:

I have always read with interest the letters from English readers that you have published, and I think that now it is my turn to write, chiefly because I have finished one year of regular subscription to *Short Wave & Television*,



(Continued on page 100)

Mc.	Call		Mc.	Call		Mc.	Call	
9.490	XEFT	VERA CRUZ, MEXICO, 31.61 m. 11.30 am. to 4 pm., 7 pm. to 12 m.	7.975	HC2TC	QUITO, ECUADOR, 37.02 m. Thurs. and Sun. at 8 pm.	6.625	PRADO	RIOBAMBA, ECUADOR, 45.28 m. Thurs. 9-11.45 pm.
9.470	XEDQ	GUADALAJARO, GAL., MEXICO, 31.68 m. Irregular 7.30 pm. to 12.30 am.	7.901	LSL	HURLINGHAM, ARGENTINA, 37.97 m. Works Brazil at night.	6.558	HI4D	CIUDAD TRUJILLO, D. R., 45.71 m. Except Sun. 11.55 am.-1.40 pm.
9.460	ICK	TRIPOLI, N. AFRICA, 31.71 m. Works Rome, 5.30-7 am.	7.860	SUX	ABOU ZABAL, EGYPT, 38.17 m. Works with Europe, 4-6 pm.	6.550	XBC	VERA CRUZ, MEX., 45.8 m. 8.15-9 am.
9.450	TGWA	GUATEMALA CITY, GUATEMALA, 31.75 m., Addr. Ministre de Fomento. Daily 12 n. to 2 pm., 8 pm. to 12 m. Sat. 9 pm. to 5 am. (Sun.)	7.854	HC2JSB	QUAYAQUIL, ECUADOR, 38.2 m. Evenings.	6.550	TIRCC	SAN JOSE, COSTA RICA, 45.8 m., Addr. Radioemisora Catolica (Costarricense. Sun. 11 am.-2 pm., 6-7, 8-9 pm. Daily 12 n.-2 pm., 6-7 pm., Thurs. 6-11 pm.
9.440	FZF6	FORT de FRANCE, MARTINIQUE, 31.78 m. 11.30 am., 12.30 pm., 6.15-7.15 pm., 8-9 pm.	7.799	HBP	GENEVA, SWITZERLAND, 38.47 m., Addr. Radio-Nations. Irregular.	6.545	YV6RB	BOLIVAR, VENEZUELA, 45.84 m., Addr. "Ecos de Orinoco." 6-10.30 pm.
9.440	HC2RA	QUAYAQUIL, ECUADOR, 31.78 m. Irregularly till 10.40 pm.	7.715	KEE	BOLINAS, CAL., 38.89 m. Relays NBC and CBS programs in evening irregularly.	6.530	YN1GG	MANAGUA, NICARAGUA, 45.91 m., Addr. "La Voz de los Lagos." 8-9 pm.
9.428	COCH	HAVANA, CUBA, 31.8 m., Addr. 2 B St., Vedado. 7 am.-1 am.	7.626	RIM	TACHKENT, U.S.S.R., 39.34 m. Works with Moscow in early morning.	6.520	YV4RB	VALENCIA, VENEZUELA, 46.01 m. 11 am.-2 pm., 5-10 pm.
9.415	PLV	BANDOENG, JAVA, 31.87 m. Works Holland around 9.45 am.	7.610	KWX	DIXON, CAL., 39.42 m. Works with Hawaii, Philippines, Java and Japan, nights.	6.500	HIL	CIUDAD TRUJILLO, D. R., 46.15 m., Addr. Apartado 623. 12.10-1.40 pm., 5.40-7.40 pm.
9.350	HS8PJ	BANGKOK, SIAM, 32.09 m. Thursday, 8-10 am.	7.550	T18WS	PUNTA ARENAS, COSTA RICA, 31.71 m., Addr. "Ecos Del Pacifico", P. O. Box 75. 6 pm.-12 m.	6.500	T10W	PUERTO LIMON, COSTA RICA, 46.15 m., Addr. Ondas del Caribe. Daily 12 n.-1.30 pm.
9.330	CGA4	DRUMMONDVILLE, CANADA, 32.15 m. Works England irregularly.	7.520	KKH	KAHUKU, HAWAII, 39.89 m. Works with Dixon and broadcasts irregularly nights.	6.477	HI4V	SAN FRANCISCO de MACORIS, D. R., 46.32 m. 11.40 am.-1.40 pm., 5.10-9.40 pm.
9.330	OAX4J	LIMA, PERU, 32.15 m., Addr. Box 1166, "Radio Universal." 7 pm.-12 m.	7.510	JYP	NAZAKI, JAPAN, 39.95 m. Irregular.	6.470	YNLAT	GRANADA, NICARAGUA, 46.36 m., Addr. Leonidas Tenorio, "La Voz del Mombacho." Irregular.
9.300	YNGU	MANAGUA, NICARAGUA, 32.26 m. 12 n.-2 pm., 6-7 pm.	7.500	RKI	MOSCOW, U.S.S.R., 40 m. Works with RIM early am.	6.450	H18A	CIUDAD TRUJILLO, D. R., 46.51 m. 8.40-10.40 am., 2.40-4.10 pm. Sat. 9.40-10.40 pm. Sun. 2.40-4.40 pm.
9.280	GCB	RUGBY, ENGLAND, 32.33 m. Works Canada and Egypt evenings and afternoons.	7.390	ZLT2	WELLINGTON, N. Z., 40.6 m. Works with Sydney, 3-7 am.	6.420	HI1S	PUERTO PLATA, D. R., 46.73 m. 11.40 am.-1.40 pm., 5.40-7.40, 9.40-11.40 pm.
9.170	WNA	LAWRENCEVILLE, N. J., 32.72 m. Works England evenings.	7.380	XECR	MEXICO CITY, MEX., 40.65 m., Addr. Foreign Office. Sunday 6-7 pm.	6.410	TIPG	SAN JOSE, COSTA RICA, 46.8 m., Addr. Apartado 225, "La Voz de la Victor." 12 n.-2 pm., 6-11.30 pm.
9.150	YVR	MARACAY, VENEZUELA, 32.79 m. Works with Europe afternoons.	7.220	HKE	BOGOTA, COL., S. A., 41.55 m. Tues. and Sat. 8-9 pm. Mon. and Thurs. 6.30-7 pm.	6.400	YV5RH	CARACAS, VENEZUELA, 46.88 m. 7-11 pm.
9.125	HAT4	BUDAPEST, HUNGARY, 32.88 m., Addr. "Radiolabor," Gyalui ut, 22. Sun. and Wed. 7-8 pm., Sat. 6-7 pm.	7.200	YNAM	MANAGUA, NICARAGUA, 41.67 m. Daily at 9 pm.	6.380	YV5RF	CARACAS, VENEZUELA, 47.02 m., Addr. Box 983. 6-10.30 pm.
9.060	TFK	REYKJAVIK, ICELAND, 33.11 m. Works London afternoons.	7.100	FOBAA	PAPEETE, TAHITI, 42.25 m., Addr. Radio Club Papeete. Tues. and Fri. 11 pm.-12 m.	6.360	HRP1	SAN PEDRO SULA, HONDURAS, 47.19 m. 7.30-9.30 pm.
9.020	GCS	RUGBY, ENGLAND, 33.26 m. Works N. Y. C. evenings.	6.996	PZH	PARAMIRABO, DUTCH GUIANA, 42.88 m., Addr. P. O. Box 18. Daily 6.06-8.36 am., Sun. 9.36-11.36 am., Daily 5.36-8.36 pm.	6.360	YV1RH	MARACAIBO, VENEZUELA, 47.19 m., Addr. "Ondas Del Lago." Apartado de Correos 261. 7.30-11 pm.
9.010	KEJ	BOLINAS, CAL., 33.3 m. Relays NBC and CBS programs in evening irregularly.	6.977	XBA	TACUBAYA, D. F., MEX., 43 m. 9.30 am.-1 pm., 7-8.30 pm.	6.350	HRV	TEGUCIGALPA, HONDURAS, 47.21 m. 6.30-8.30 pm.
8.957	VWY	KIRKEE, INDIA, 33.43 m. Works with England in morning.	6.976	HCETC	QUITO, ECUADOR, 43m., Addr. Teatro Bolivar. Thurs. till 9.30 pm.	6.340	HIX	CIUDAD TRUJILLO, D. R., 49.32 m. Sun. 7.40-10.40 am., daily 12.10-1.10 pm., Tues. and Fri. 8.10-10.10 pm.
8.960	---	ALGIERS, ALGERIA, 33.48 m. Works Paris afternoons.	6.905	GDS	RUGBY, ENG., 43.45 m. Works N.Y.C. evenings irregularly.	6.316	HIZ	CIUDAD TRUJILLO, D. R., 47.5 m. Daily except Sat. and Sun. 11.10 am.-2.25 pm., 5.10-8.40 pm. Sat. 5.10-11.10 pm. Sun. 11.40 am.-1.40 pm.
8.950	HCJB	QUITO, ECUADOR, 33.5 m. 7-10 pm. except Monday.	6.860	KEL	BOLINAS, CALIF., 43.70 m. Tests irregularly. 11 am.-12 n., 6-9 pm.	6.300	YV4RG	MARACAY, VENEZUELA, 47.62 m. 8-10.30 pm.
8.795	HKV	BOGOTA, COLOMBIA, 34.09 m. Mon. and Thurs. 7-7.30 pm.	6.850	XGOX	NANKING, CHINA, 43.8 m. Daily 6.40-8.40 am., Sun. 4.40-6.05 am.	6.282	COHB	SANCTI SPIRITUS, CUBA, 47.76 m., Addr. P. O. Box 85. 4-6, 9-11 pm.
8.775	PNI	MAKASSER, CELEBES, N. I., 34.19 m. Works Java around 4 am.	6.800	HI7P	CIUDAD TRUJILLO, DOM. REP., 44.12 m., Addr. Emisoria Diaria de Comercio. Daily exe. Sat. and Sun. 12.40-1.40, 6.40-8.40 pm. Sat. 12.40-1.40 pm. Sun. 10.40 am.-11.40 am.	6.280	HIG	CIUDAD TRUJILLO, D. R., 47.77 m. 7.10-8.40 am., 12.40-2.10, 8.10-9.40 pm.
8.765	DAF	NORDDEICH, GERMANY, 34.23 m. Works German ships irregularly.	6.770	HIH	SAN PEDRO DE MACORIS, DOM. REP., 44.26 m. 12.10-1.40 pm., 7.30-9 pm. Sun. 3-4 am., 4.15-6 pm., 4.40-7.40 pm.	6.270	YV5RP	CARACAS, VENEZUELA, 47.79 m., Addr. "La Voz de la Phileo." Irregular.
8.760	GCQ	RUGBY, ENGLAND, 34.25 m. Works Africa afternoons.	6.775	WOA	LAWRENCEVILLE, N. J., 44.41 m., Addr. A. T. & T. Co. Works England evenings.	6.243	HIN	CIUDAD TRUJILLO, D. R., 48 m., Addr. "La Voz del Partido Dominicano." 12 m.-2 pm., 7.30-9.30 pm., irregularly.
8.750	FZES	DJIBOUTI, FR. SOMALILAND, AFRICA, 34.29 m. Works Paris around 2.30 am.	6.750	JVT	NAZAKI, JAPAN, 44.44 m., Addr. Kokusai-Denwa Kaisha, Ltd., Tokio. Irregular.	6.235	HRD	LA CEIBA, HONDURAS, 48.12 m., Addr. "La Voz de Atlantida." 8-11 pm.; Sat. 8 pm.-1 am.; Sun. 4-6 pm.
8.730	GCI	RUGBY, ENGLAND, 34.36 m. Works India 8 am.	6.720	PMH	BANDOENG, JAVA, 44.64 m. Relays NIROM programs. 5.30-9 am.	6.230	YV1RG	VALERA, VENEZUELA, 48.15 m. 6-9.30 pm.
8.720	VPD3	SUVA, FIJI ISLES, 34 m., Addr. (See 9.540 mc., VPD2). 5.30-7 am.	6.710	TIEP	SAN JOSE, COSTA RICA, 44.71 m., Addr. Apartado 257, La Voz del Tropic. Daily 7-10 pm.	6.230	OAX4G	LIMA, PERU, 48.15 m., Addr. Apartado 1242. Daily 7-10.30 pm.
8.680	GBC	RUGBY, ENGLAND, 34.56 m. Works ships irregularly.	6.672	YVQ	MARACAY, VENEZUELA, 44.95 m. Sat. 8-9 pm.	6.210	YV5RI	CORO, VENEZUELA, 48.31 m., Addr. Roger Leyba, care A. Urbina y Cia. Irregular.
8.665	CO9JQ	CAMAQUEY, CUBA, 34.62 m., Addr. 4 General Gomez. 5.30-6.30, 8-9 pm., daily except Sat. and Sun.	6.670	HC2RL	QUAYAQUIL, ECUADOR, S. A., 44.95 m., Addr. P. O. Box 759. Sun. 5.45-7.45 pm., Tues. 9.15-11.15 pm.	6.190	HI8Q	CIUDAD TRUJILLO, D. R., 48.47 m. 11.45 am.-1 pm., 4.45-6.45 pm.
8.580	YNLQ	MANAGUA, NICARAGUA, 34.92 m. 7.30-9.30 pm.	6.650	IAC	PISA, ITALY, 45.11 m. Works ships irregularly.	6.185	HI1A	SANTIAGO, D. R., 48.5 m., Addr. P. O. Box 423. 11.40 am.-1.40 pm.; 7.40-9.40 pm.; Wed. 6-10.30 pm.
8.580	WOO	OCEAN GATE, N. J., 35.05 m. Works ships irregularly.	6.630	HIT	CIUDAD TRUJILLO, D. R., 45.25 m., Addr. "La Voz de la RCA Victor," Apartado 1105. Daily exe. Sun. 12.10-1.40 pm., 5.40-8.40 pm.; also Sat. 10.40 pm.-12.40 am.	6.171	XEXA	MEXICO CITY, MEX., 48.61 m., Addr. Dept. of Education. 7-11 pm.
8.400	HC2CW	QUAYAQUIL, ECUADOR, 35.71 m. 11.30 am.-12.30 pm., 8-11 pm.						
8.380	IAC	PISA, ITALY, 35.8 m. Works Italian ships irregularly.						
8.180	XEME	MERIDA, YUCATAN, 36.63 m., Addr. Calle 59, No. 517, "La Voz de Yucatan desde Merida." 10 am.-12 m., 6 pm.-12 m.						
8.185	PSK	RIO DE JANEIRO, BRAZIL, 36.65 m. Irregularly.						
8.036	CNR	RABAT, MOROCCO, 37.33 m. Sun. 2.30-5 pm.						

→ S.W. BROADCAST BAND →

6.160 YV5RD CARACAS, VENEZUELA, 49.7 m. 11 am.-2 pm., 4-10.40 pm.

(Continued on page 89)

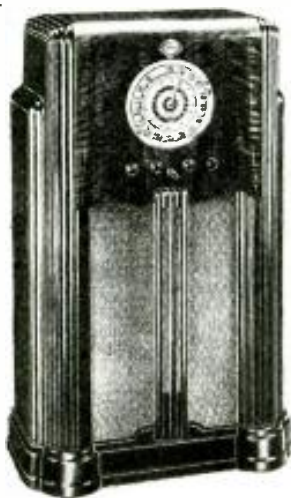
(All Schedules Eastern Standard Time)

WHAT'S NEW In Short-Wave Apparatus

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

ALL-WAVE 13-Tube Receiver Has *TELE-DIAL*

A new 13-tube, 3-band, all-wave high-fidelity receiver. The "Tele-Dial" enables the operator to tune in 17 different stations at a twirl of the dial.



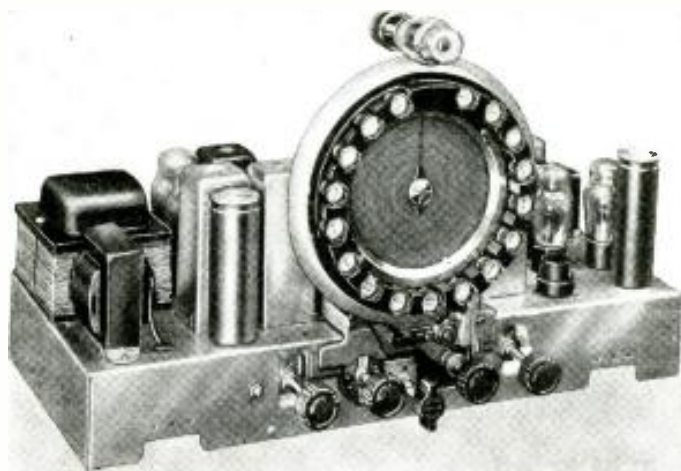
Note the handsome appearance of this 13-tube console model fitted with the new "Tele-Dial."

place a finger on a given button and pull the dial around to the stop in a manner similar to that employed in dialing a single numeral on a dial telephone. When the dial has been pulled around to the stop, whichever station was pre-set for that particular button will be accurately tuned in. Since there are 17

● MANY of the new receivers on the market this season employ automatic frequency control (AFC.) to bring the set into exact resonance after it has been roughly tuned to a station manually. With this device it is necessary to have a very strong carrier to make the AFC function properly. Servicing problems are naturally augmented in a set employing AFC.

In an attempt to provide a receiver with all the advantages of AFC and none of the disadvantages, the Lafayette Tele-Dial receiver was developed. AFC is not used. Instead, a mechanical dial of great accuracy is provided together with several unique compensating devices to counteract frequency drift due to heat and humidity.

The Tele-Dial has 17 control buttons arranged around its periphery. Each button is pre-set to tune in a given station. After this operation (which requires only a few moments and no skill or tools) it is only necessary to



Here we see the chassis of the 13-Tube Tele-Dial short-wave receiver. (No. 622.)

buttons, 17 different stations can be tuned-in in this manner. In addition, a conventional type dial mechanism is supplied for tuning in other stations. The mechanical adjustment of the automatic dial is accurate to within $2\frac{1}{2}$ kc.

A bi-metallic thermostatic condenser is used in the oscillator tuning circuits of the receiver, to compensate for frequency drift due to temperature changes. Specially designed and sealed fixed condensers are used in the intermediate frequency transformers and air-dielectric trimmers are employed in the oscillator circuits to minimize frequency drift caused by varying humidity conditions. As a result of these design features, the maximum drift from temperature change is 1 kc. and from humidity change is only 2 kc. This accuracy is better than that of the average AFC system and in addition, there is no detuning of the r.f. and detector circuits, as is the case with AFC systems. The net result is more accurate tuning and no sacrifice of performance in securing automatic tuning.

The Tele-Dial receiver employs an advanced type of super-heterodyne circuit and makes use of 13 tubes. The set covers the broadcast and short-wave bands from 530 to 18,300 kc. (16.4-568 meters) in three steps. Band-changing is accomplished by means of a switching arrangement. Among the features of the set are variable selectivity by means of a 2-step switch, which alters the band-pass of the I.F. circuits and permits high fidelity reception, automatic bass compensation at low volume levels, delayed AVC, cathode ray tuning indicator, and 20 watts output—using beam power tubes. (Continued on page 95)

Trans-Receiver Has 2.5 to 4,000 Meter Range

● A VERY interesting piece of apparatus is that here illustrated. It can be used as a S-W transmitter on wavelengths from 2.5 to 5 meters. It also serves as a S-W receiver on wavelengths from 2.5 to 4,000 meters in 12 bands. It can also be used for house-to-house communication or for inter-office call systems, with special hook-ups supplied by the manufacturer.

This versatile instrument, known as the Ultra Sky Rover, used two tubes—a 12A7 and the new 6J5G. With this tube as the detector excellent reception is afforded over the complete range of 2.05 to 4,000 meters. The 6J5G tube also works very efficiently when the set is used as a super-regenerative receiver on the ultra short waves; merely by changing the coils, the set is converted for straight regeneration over the range between 15 and 4,000 meters. A special regeneration control has been devised for this set, which is very smooth and linear over the entire tuning range.



New Trans-Receiver which has a receiving range of 2.5 to 4,000 meters. (No. 623.)

Continuous band-spread of the electrical type is incorporated; distances up to 75 miles have been covered in transmission with this set.

The reception range is of course practically unlimited on the usual short-wave channels; on 2.5 to 5 meters the reception range is at a maximum, due to the super-regenerative circuit used.

The metal cabinet measures $8\frac{1}{2}$ by $8\frac{1}{4}$ by $6\frac{1}{4}$ inches, and has a black wrinkle finish. The set is adapted for operation on 110 volts, A.C. or D.C., any cycle frequency, and sets are supplied when necessary for other voltages. The set weighs but twelve pounds. Loud-speaker operation is afforded when used as a receiver; plate modulation is employed when used as a transmitter.

This article has been prepared from data supplied by the courtesy of the Ultra High Frequency Products Company.

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

Mc.	Call	Location	Mc.	Call	Location	Mc.	Call	Location
6.160	VUZ	COLOMBO, CEYLON, 48.7 m. Daily exc. Thurs. and Fri., 7 1m.-12.30 pm.; Sun. 7-11.30 am.	6.085	HJ5ABD	CALI, COLOMBIA, 49.3 m., Addr. La Voz de Valle. 12m.-1.30 pm., 5.10-9.40 pm.	6.005	VE9DN	DRUMMONDVILLE, QUE., CAN., 49.96 m., Addr. Canadian Marconi Co. Sat. 11.30 pm.-2 am.
6.150	CSL	LISBON, PORTUGAL, 48.78 m. Irregular. 7-8.30 am., 2-7 pm.	6.083	VQ7LO	NAIROBI, KENYA, AFRICA, 49.31 m., Addr. Cable and Wireless, Ltd. Mon.-Fri. 5.45-6.15 am., 11.30 am.-2.30 pm., also Tues. and Thurs. 8.30-9.30 am.; Sat. 11.30 am.-3.30 pm.; Sun. 11 am.-2 pm.	6.000	ZEK	SALISBURY, RHODESIA, S. AFRICA, 50 m. (See 6.147 mc., ZEB)
6.150	CJRO	WINNIPEG, MAN., CANADA, 48.78 m., Addr. (See 11.720 mc.) 4-10 pm.	6.080	ZHJ	PENANG, FED. MALAY STATES, 49.34 m. 6.40-8.40 am., except Sun., also Sat. 11 pm.-1 am.	6.000	RV59	MOSCOW, U.S.S.R., 50 m. Irregular.
6.147	ZEB	BULAWAYO, RHODESIA, S. AFRICA, 48.8 m. Sun. 3.30-5 am.; Tues., Fri., 1.15-3.15 pm.; Mon. and Thurs. 11 am.-12 m.	6.080	CP5	LAPAZ, BOLIVA, 49.34 m. 7-10.30 pm.	6.990	XEBT	MEXICO CITY, MEX., 50.08 m., Addr. P. O. Box 79-44. 8 am.-1 am.
6.147	COKG	SANTIAGO, CUBA, 48.8 m., Addr. Box 137. 9-10 am., 11.30 am.-1.30 pm., 3-4.30 pm., 10-11 pm., 12 m.-2 am.	6.080	HP5F	COLON, PAN., 49.34 m., Addr. Carlton Hotel. 11.45am.-1.15 pm., 7.45-10 pm.	↑ S.W. BROADCAST BAND ↓		
6.145	HJ4ABU	PEREIRA, COL., 48.8 m. 9.30 am.-12 m., 6.30-10 pm.	6.080	W9XAA	CHICAGO, ILL., 49.34 m., Addr. Chicago Fed. of Labor. Relays WCFL irregular	6.970	HJ4ABD	MEDELLIN, COL., 50.26 m., Addr. La Voz Catia. 8-11.30 pm.
6.140	W8XK	PITTSBURGH, PA., 48.86 m., Addr. Westinghouse Electric & Mfg. Co. Relays KDKA 9 pm.-12 m.	6.079	DJM	BERLIN, GERMANY, 49.34 m., Addr. Broadcasting House. Irregular.	6.968	HVJ	VATICAN CITY, 50.27 m. 2-2.15 pm. daily; Sun. 5-5.30 am.
6.137	CR7AA	LAURENCO MARQUES, PORT. E. 48.87 m. 4-9, 10.30-11 am., 12 m.-3.30 pm., 11.15 pm.-1 am.	6.070	HJ3ABF	BOGOTA, COL., 49.42 m. 7-11.15 pm.	6.950	HJN	BOGOTA, COL., 50.42 m. 6-11 pm.
6.135	HJ1ABB	BARRANQUILLA, COL., 48.9 m., Addr. P. O. Box 715. 11.30 am.-1 pm., 4.30-10 pm.	6.070	CFRX	TORONTO, CAN., 49.42 m. Relays CFRB irregularly 7 am.-12 m.	6.940	TG2X	GUATEMALA CITY, GUAT., 50.5 m. 4-6, 9-11 pm.; Sun. 2-5 am.
6.135	HI5N	SANTIAGO, D. R., 48.9 m. 6.40-9.10 pm	6.070	YVIRE	MARACAIBO, VEN., 49.42 m. 6-11 pm.	6.930	YVIRL	MARACAIBO, VEN., 50.59 m., Addr. Radio Popular, Jose A. Higuera M., P. O. Box 247. Daily 11.43 am.-1.43 pm., 5.13-10.13 pm.; Sun. 9.13 am.-3.13 pm.
6.130	TGXA	GUATEMALA CITY, GUAT., 48.94 m., Addr. Giornal Liberal Progressista. Irregularly.	6.070	VE9CS	VANCOUVER, B. C., CAN., 49.42 m. Sun. 1.45-9 pm., 10.30 pm.-1am.; Tues. 6-7.30 pm., 11.30 pm.-1.30 am. Daily 6-7.30 pm.	6.925	HM2S	PORT-AU-PRINCE, HAYTI, 50.63 m., Addr. P. O. Box A103. 7-9.45 pm.
6.130	COCB	HAVANA, CUBA, 48.94 m., Addr. Calle G y 25, Vedado. Relays CMCD 11 am.-12 m., 7-10 pm.; Sun. 12m.-4 pm.	6.065	HJ4ABL	MANIZALES, COL., 49.46 m. Daily 11 am.-12 m., 5.30-7.30 pm.; Sat. 5.30-10.30 pm.	6.917	YV4RP	VALENCIA, VEN., 50.71 m. Irregular.
6.130	VE9HX	HALIFAX, N. S., CAN., 48.94 m., Addr. P. O. Box 998. Mon.-Fri. 9 am.-1 pm., 5-11 pm. Fri.; 1-3 pm., Sat.; Sun. 9 am.-1 pm., 2-11 pm. Relays CHNS.	6.060	W8XAL	CINCINNATI, OHIO, 49.6 m., Addr. Crosley Radio Corp. Relays WLW 5.30 am.-7 pm., 10 pm.-1 am.	6.900	TIMS	PUNTARENAS, COSTA RICA, 50.85 m. 6-10 pm.
6.130	ZGE	KUALA LUMPUR, FED. MALAY ST., 48.94 m. Sun., Tue. and Fri. 6.40-8.40 am.	6.060	W3XAU	PHILADELPHIA, PA., 49.5 m. Relays WCAU 7-10 pm.	6.898	YV3RA	BARQUISIMETO, VEN., 50.86 m., Addr. La Voz de Lara, 12 m.-1 pm., 6-10 pm.
6.130	LKL	JELOY, NORWAY, 48.94 m. 11 am.-6 pm.	6.060	OXY	SKAMLEBOAER, DENMARK, 49.5 m. 1-6.30 pm.	6.890	JIC	TAIHOKEU, FORMOSA, 50.93 m. Works Tokio 6-9 am.
6.125	—	MONTEVIDEO, URUGUAY, 48.98 m., Addr. Radio Electrico de Montevideo, Mercedes 823. 3.30-9 pm.	6.050	HJ3ABD	BOGOTA, COL., 49.59 m., Addr. Colombia Broadcasting, Box 509. 12m.-2 pm., 7-11 pm.; Sun. 5-9 pm.	6.885	HCK	QUITO, ECUADOR, 50.98 m. 8-11 pm.
6.125	OAX1A	CHICLAYO, PERU, 48.98 m., Addr. La Voz de Chiclayo, Casilla No. 9. 8-11 pm.	6.045	HI9B	SANTIAGO, D. R., 49.63 m. Irregular 6-11 pm.	6.875	HRN	TEGUCIGALPA, HONDURAS, 51.06 m. 1.15-2.16, 8.30-10 pm.; Sun. 3.30-5.30, 8.30-9.30 pm.
6.122	HJ3ABX	BOGOTA, COL., 49 m., Addr. La Voz de Col., Apartado 2663. 10.30 am.-2 pm., 5.30-11 pm.; Sun. 6-11 pm.	6.042	HJ1ABG	BARRANQUILLA, COL., 49.65 m., Addr. Emisora Atlantico. 11 am.-11 pm.; Sun. 11 am.-8 pm.	6.855	HI1J	SAN PEDRO DE MACORIS, D. R., 51.25 m., Addr. Box 204. 12 m.-2 pm., 6.30-9 pm.
6.120	W2XE	NEW YORK CITY, 49.02 m., Addr. Col. B'cast. System, 485 Madison Ave. 10-11 pm. Relays WABC.	6.040	W4XB	MIAMI BEACH, FLA., 49.65 m. Relays WIOD 12m.-2 pm., 5.30-6 pm., 10 pm.-12 m.	6.853	WOB	LAWRENCEVILLE, N. J., 51.26 m., Addr. A. T. & T. Co. Works Bermuda nights.
6.120	XEUZ	MEXICO CITY, MEX., 49.02 m., Addr. 5 de Mayo 21. Relays XEFO 1-3 am.	6.040	W1XAL	BOSTON, MASS., 49.65 m., Addr. University Club. Generally from 6-10 pm.	6.850	YV1RB	MARACAIBO, VEN., 51.28 m., Addr. Apartado 214. 8.45-9.45 am., 11.15 am.-12.15 pm., 4.45-9.45 pm.; Sun. 11.45 am.-12.45 pm.
6.115	OLR2C	PRAGUE, CZECHOSLOVAKIA, 49.05 m. (See 11.875 mc.)	6.040	YDA	TANDJONGPRIOK, JAVA, 49.65 m., Addr. N.I.R.O.M., Batavia. 10.30 pm.-2 am.; Sat. 7.30 pm., 2 am.	6.830	TDD	SHINKYO, MANCHUKUO, 51.46 m. Works Tokio 6-9 am.
6.110	XEPW	MEXICO CITY, MEX., 49.1 m., Addr. La Voz de Aguila Azteca desde Mex., Apartado 8403. Relays XEJW 11 pm.-1 am.	6.030	HJ4ABP	MEDELLIN, COL., 49.75 m. 8-11 pm.	6.830	TIGPH	SAN JOSE, COSTA RICA, 51.5 m., Addr. Alma Tica, Apartado 800. 11 am.-1 pm., 6-10 pm. Relays TIX 9-10 pm.
6.110	VUC	CALCUTTA, INDIA, 49.01 m. Daily 3-5.30 am., 9.30 am.-12 m.; Sun 7.30 am.-12 m.	6.030	HP5B	PANAMA CITY, PAN., 49.75 m., Addr. P.O. Box 910. 12m.-1 pm., 7-10.30 pm.	6.800	YV5RC	CARACAS, VEN., 51.72 m., Addr. Radio Caracas. Sun 8.30-11.30 am., 1.30-10.30 pm. Daily 10.45 am.-1.30 pm., 4-10.30 pm.
6.105	HJ4ABB	MANIZALES, COL., 49.14 m., Addr. P. O. Box 175. Mon.-Fri. 12.15-1 pm.; Tue. and Fri. 7.30-10 pm.; Sun 2.30-5 pm.	6.030	VE9CA	CALGARY, ALTA., CAN., 49.75 m. Thur. 9 am.-2 am.; Sun 12 m.-12 m.	6.790	JVU	NAZAKI, JAPAN, 51.81 m. Irregular.
6.100	W3XAL	BOUND BROOK, N. J., 49.18 m., Addr. Natl. Broad. Co. 5-10.15 pm.	6.030	OLR2B	PRAGUE, CZECHOSLOVAKIA, 49.75 m. (See 11.875 mc.)	6.780	OAX4D	LIMA, PERU, 51.9 m., Addr. P. O. Box 853. Mon., Wed. and Sat. 9-11.30 pm.
6.100	W9XF	CHICAGO, ILL., 49.18 m., Addr. N.B.C. 10.30 pm.-1 am.	6.025	HJ1ABJ	SANTA MARTA, COL., 49.79 m. 5.30-10.30 pm., except Wed.	6.750	YNOP	MANAGUA, NICARAGUA, 52.11 m. 8-9.30 pm.
6.100	HJ4ABE	MEDELLIN, COL., 49.18 m. 11 am.-12 m., 6-10.30 pm.	6.020	DJC	BERLIN, GERMANY, 49.83 m., Addr. (See 6.079 mc.) 11.35 am.-4.30 pm.	6.740	TGS	GUATEMALA CITY, GUAT., 52.26 m. Wed., Thur. and Sun. 6-9 pm.
6.097	ZTJ	JOHANNESBURG, S. AFRICA, 49.2 m., Addr. African Broad. Co. Sun.-Fri. 11.45 pm.-12.30 am.; Mon.-Sat. 3.30-7 am., 9 am.-4 pm.; Sun. 8-10.15 am., 12.30-3 pm.	6.020	XEUW	VERA CRUZ, MEX., 49.83 m., Addr. Av. Independencia 98. 8 pm.-12.30 am.	6.730	HC1PM	QUITO, ECUADOR, 52.36 m. Irregular 10 pm.-12 m.
6.095	JZH	TOKIO, JAPAN, 49.22 m., Addr. (See 11.800 mc., JZJ.) Irregular.	6.018	ZHI	SINGAPORE, MALAYA, 49.18 m., Addr. Radio Service Co., 20 Orchard Rd. Mon., Wed. and Thurs. 5.40-8.0 am.; Sat. 10.40 pm.-1.10 am.	6.720	YV2RB	SAN CRISTOBAL, VEN., 52.45 m., Addr. La Voz de Tachira. 6-11.30 pm.
6.090	HJ4ABC	IBAQUE, COL., 49.26 m. 7 pm.-12 m.	6.015	HI3U	SANTIAGO DE LOS CABALLEROS, D. R., 49.88 m. 7.30-9 am., 12m.-2 pm., 5-7 pm., 8-9.30 pm.; Sun. 12.30-2, 5-6 pm.	6.500	T15HH	SAN RAMON, COSTA RICA, 54.55 m. Irregular 3.30-4, 8-11.30 pm.
6.090	CRCX	TORONTO, CAN., 49.26 m., Addr. Can. Broadcasting Corp. Daily 5.30-11.30 pm.; Sun. 5-11.30 pm.	6.012	HJ3ABH	BOGOTA, COL., 49.91 m., Addr. Apartado 565. 6-11 pm.; Sun 12m.-2 pm., 4-11 pm.	6.145	PMY	BANDONG, JAVA, 58.31 m. 5.30-11 am.
6.090	ZBW2	HONGKONG, CHINA, 49.26 m., Addr. P. O. Box 200. Irregular.	6.010	VP3MR	GEORGETOWN, BRI. GUIANA, 49.9 m. Sun. 7.45-10.15 am.; Daily 4.45-8.45 pm.	6.077	WCN	LAWRENCEVILLE, N. J., 59.08 m., Addr. A. T. & T. Co. Works England late at night irregularly.
			6.010	COCO	HAVANA, CUBA, 49.92 m., Addr. P. O. Box 98. Daily 9.30 am.-1 pm., 4-7 pm., 8-10 pm.; Sat. also 11.30 pm.-2 am.	6.025	ZFA	HAMILTON, BERMUDA, 59.7 m. Works N. Y. C. irregularly at night.
			6.005	HP5K	COLON, PAN., 49.96 m., Addr. Box 33. 7.30-9 am., 12m.-1 pm., 6-9 pm.	6.000	TFL	REYKJAVIK, ICELAND, 60 m. Works Europe nighttime irregularly.
			6.005	CFCX	MONTREAL, CAN., 49.96 m., Can. Marconi Co. Relays CFCF 6 am.-11.15 pm.; Sun. 9 am.-11.15 pm.	4.975	GBC	RUGBY, ENG., 60.3 m. Works ships irregularly.
						4.820	GDW	RUGBY, ENG., 62.24 m. Works N.Y.C. nighttime irregularly.
						4.790	VE9BK	VANCOUVER, B. C., CAN., 62.63 m., Addr. Radio Sales Service, Ltd., 780 Beatty St. Except Sun. 11.30-11.45 am., 3-15, 8-8.15 pm.
						4.762	WOO	OCEAN GATE, N. J., 63.1 m., Addr. A. T. & T. Co. Works ships irregularly.

(Continued on page 100)

(All Schedules Eastern Standard Time)

NEW 1937 SHORT WAVE APPARATUS

(PROMPT SHIPMENTS ON ALL ITEMS)



EILEN ER-19-B 7-tube BANDSPREAD BEAM POWER RECEIVER

(8 1/2 to 3,000 meters)

Our largest, finest, and most sensitive new 1937 receiver, unequaled in appearance, performance and value. Uses a special, highly efficient and selective circuit producing results which WILL satisfy even the most discriminating short wave fan.

ER-19 is equipped with the famous EILEN NOISE SUPPRESSOR, the latest development of our laboratories and which is skyrocketing itself into immense popularity. This remarkable development, exclusive with EILEN, enables you to enjoy reception from those far-off stations with excellent clarity and volume.

Constructed of the finest materials and to conform with the highest engineering standards, this instrument uses two 6D6, two 6J5G, one 76, one 6L6, and one 2X3 high gain tubes as TUNED RF AMPLIFIER, TUNED ELECTRON COUPLED SCREEN-GRID REGENERATIVE DETECTOR, powerful 3 stage audio frequency amplifier with new beam amplifier tube output stage delivering 5 watts peak of audio power to the built-in high fidelity dynamic loudspeaker. VARIABLE NOISE SUPPRESSOR, rectifier and complete built-in HUM-FREE power supply. BANDSPREAD TUNING—a special electron tube circuit enabling the operator to reduce or eliminate certain types of noises occurring in all short wave receivers—automatic headphone jack—smooth and noiseless controls—highly efficient interchangeable inductors—doublet or aerial-ground connections—POWERFUL hi-fidelity audio system—large, illuminated airplane type vernier dial—sensitivity, volume, and selectivity that will amaze you—are features to be found in ER-19.

ER-19 in BEAUTY, as well as performance, is in a class by itself—heavy steel cabinet with hinged lid finished in durable black shrivel-colored dial lights behind black and white scale—chrome plated escutcheon—calibrated dial plates—plated chassis and shielding—Operates entirely from your 105 to 130 volts AC house current.

ER-19 under fair conditions will bring in dozens of foreign as well as domestic short wave stations with enormous volume. Order one and see for yourself.

ER-19, complete, READY TO USE, with 7 RCA or Sylvania tubes, 12 low-loss silver plated coils for 8 1/2 to 3000 meters, wired in cabinet, and instructions.....

\$21.95

For those who wish to build their own KIT of all parts, coils for 8 1/2-3000 meters, unwired (less tubes & cabinet).....

\$14.95

AMATEURS: Model ER-19-B has same specifications as ER-19, except that it is equipped with plate voltage cut-off switch and special bandspread coils for 20-40-80-160 M bands spreading these bands 80% of dial scale. Add \$1 to price of ER-19. (10 meter band coils if desired extra \$1.45.)

ER-20 8-TUBE BAND SPREAD BEAM POWER RECEIVER

(2 1/2 to 3,000 meters)

ER-20 and ER-20-AB have the same specifications as the above ER-19 and ER-19-AB, but is equipped with an EIGHTH TUBE (6J5G) enabling the wavelength range to be extended down to 2 1/2 meters. This additional tube is designed especially for ultra-high frequency wavelengths. This receiver is exceedingly simple to operate with excellent results. Also, a tone control for FIVE METER.

ADD \$4.50 to price of corresponding ER-19 or ER-19-AB model. Prompt delivery can be made.



BS-5

6-Tube Band switch Receiver

10 to 600 Meters

A powerful, sensitive, and selective SW receiver covering the entire wave-length span of 10 to 600 meters in 5 steps. NO PLUG-IN COILS are used. Simply turn the wavelength selector switch and enjoy reception on any wavelength within this range.

Uses two 6D6, one 76, one 43, one K42A, and one 25Z5 tubes as RF amplifier, electron coupled screen grid regenerative detector, powerful 2 stage audio amplifier with pentode output stage. Rectifier, and complete built-in power supply.

HUM-FREE—Hi-fidelity dynamic loudspeaker—illuminated, airplane type vernier dial—band spread tuning control—automatic headphone jack—extremely smooth acting controls—operates from your AC or DC house current—beautiful heavy, black shrivel finish chassis and cabinet.

DELIVERS GREAT LOUDSPEAKER VOLUME ON THE GREAT MAJORITY OF SHORT WAVE FOREIGN STATIONS UNDER FAIR CONDITIONS.

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AMATEURS:

Model BS-5-AB has same specifications as BS-5 except that it has special bandspread circuit for 20-10-80-160 M bands and is equipped with plate voltage cut-off switch. Add \$1.00 to above price.

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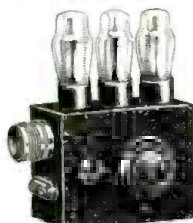
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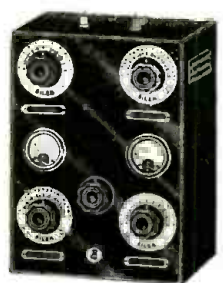
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TUNED electron coupled screen grid regenerative detector, two stage audio amplifier, rectifier & built-in power supply. HUM-FREE. POWERFUL. Really operates a speaker. Operates from your 105-130 volt AC house current.

AMATEURS: Model AN-5-AB has same specifications as AN-5 except that has plate voltage cut-off switch and special bandspread coils for 20-40-80-160 meter bands. Add \$1 to price of AN-5.

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BLILEY CRYSTALS

20-40-80-160 Meter Bands
\$3.95 up.
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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 3 3/4 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 9 1/2 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 3 3/4 inches and it uses a total of 8 tubes.

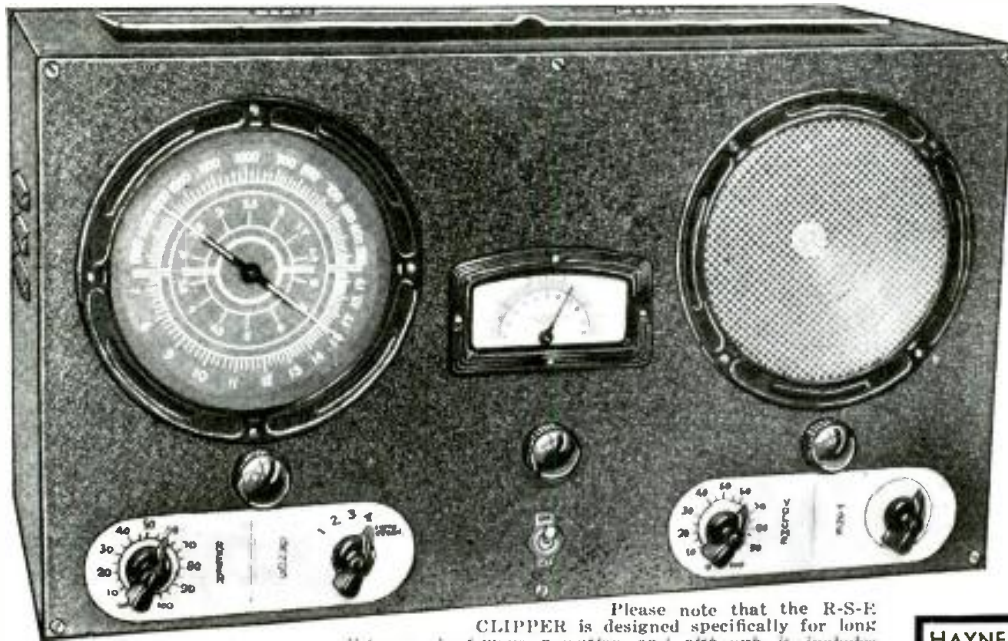
The cathode-ray tube is supplied with a potential of 1,000 volts. The images are viewed through a magnifying glass 6 1/4 inches in diameter and are enlarged to the size of a *postal card*, which is very good, considering the simple apparatus employed.

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.

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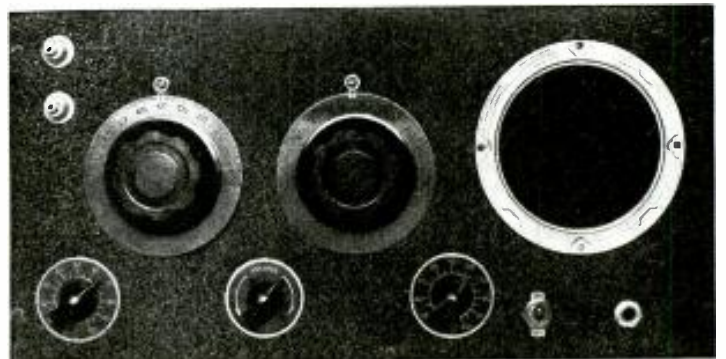
And when we say communication receiver we MEAN IT. The AC-4 is built to the highest amateur specifications for serious communication and long distance reception under all conditions. Isolantite insulated high frequency and bandspread tuning condenser; continuous, all electrical, bandspread; perfect regeneration stability; super-regeneration below 15 meters; and a host of other features. The 20 meter band, for instance, covers 180 degrees on the big 3½" German silver bandspread dial with NO hand capacity effort. You will be amazed at the way the AC-4 separates the crowded foreign stations on the short-wave bands.

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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-

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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 synchronizing 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 thyatron 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.



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capacity 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.

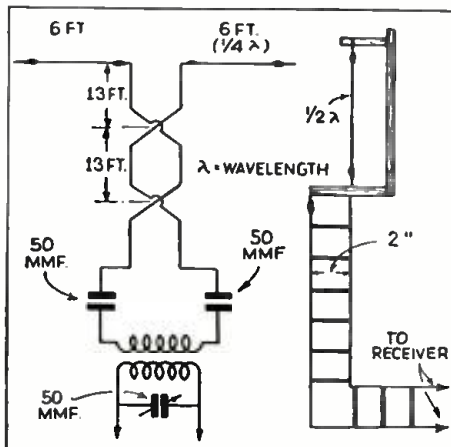


Fig. 8—Types of aerials for ultra-short waves.

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.

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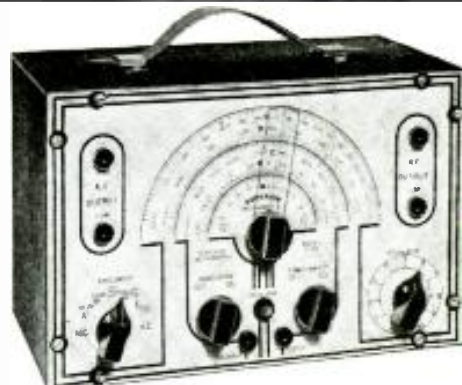
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This instrument works on 90-130 volts, a.c. or d.c. If a.c. is used it may be of any commercial frequency. Tubes are oscillator, rectifier and modulator. R-f output may be at high or low impedance, from separate posts. Also separate audio output enables testing P.A. systems and other a-t amplifiers.

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200A—4	26—12	49—3	1R3—3
201A—6	27—12	50—3	4A4—4
2A3—3	30—4	53—2	4A5—4
2A5—3	31—4	55—4	8A—4
2A0—6	32—4	56—5	8A—4
2A7—4	33—3	57—4	89—4
2B7—3	34—3	58—4	89—4
5Z3—3	35—4	59—4	119A—10
6A7—3	36—4	71A—12	6J10G—2
6B7—3	37—3	73—3	6L6G—2
6C6—3	38—3	76—3	6AK—2
6E6—3	39-44	77—3	6E5—2
6E5—2	40—3	78—3	6E5—2
6E7—4	41—3	79—3	6F6—2
210—6	42—2	80—3	6H6—2
12A7—2	43—3	81—2	6J7—2
12Z3—3	45—4	82—4	6K7—2
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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

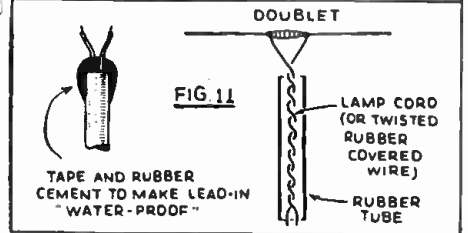
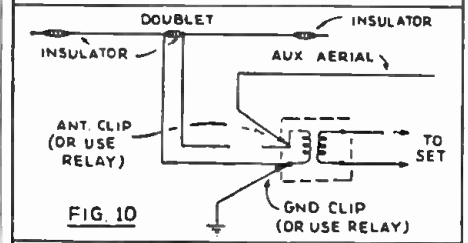
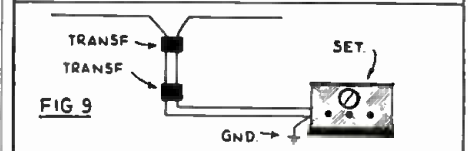
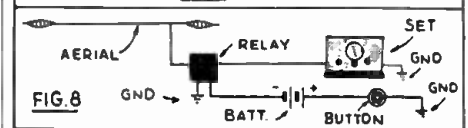
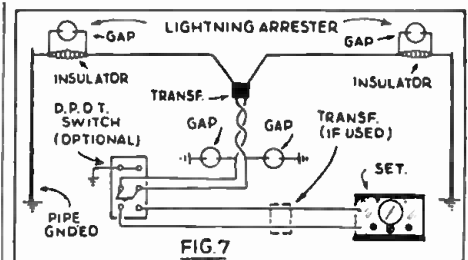


Fig. 7—Lightning "grounding" switch for doublet; 8—relay for "grounding" aerial; 9—"V" doublet connection. Fig. 10—Auxiliary aerial connected to doublet gives greater range in some cases; 11—homemade "waterproof" leadin.

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 had 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-

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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.

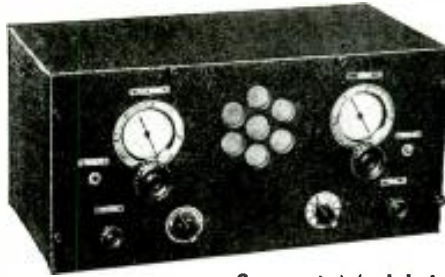
Improving Reception With Doublet

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 lead-in 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 lead-in 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 "lead-in" where the wires enter is covered with rubber tape or else rubber cement.

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When properly built, a T.R.F. receiver has selectivity closely approaching that of large, multi-tube receivers. Model 11, built to highest standards, has selectivity exceeded only by the most complicated receivers in the highest price range. On both C.W. and phone, the selectivity will surprise.

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Model 11 Universal covers the greatest continuous tuning range ever built into a receiver—9.5 to 20,000 meters. New advances in coil unit design have made this possible, there being no skips and no dead spots. Other tuning ranges available are 9.5 to 3,750 meters and 9.5 to 750 meters. Receivers for all 3 are identical, the only difference being in the coil units.

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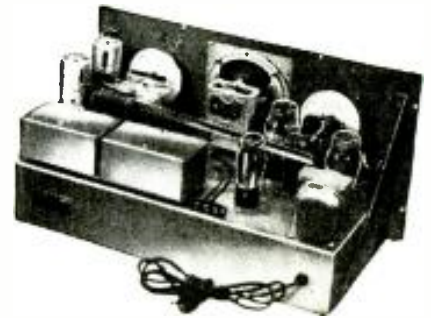
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For \$12.50 additional, Model 11 can be equipped to furnish 30 mills max. rectified output for operating recording relays, etc. These models, furnished upon special order, have a toggle switch to make output connections to either loud-speaker or rectifier.



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(Continued from page 77)

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- Two Pointer knobs, 1 1/8", type 286

- 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

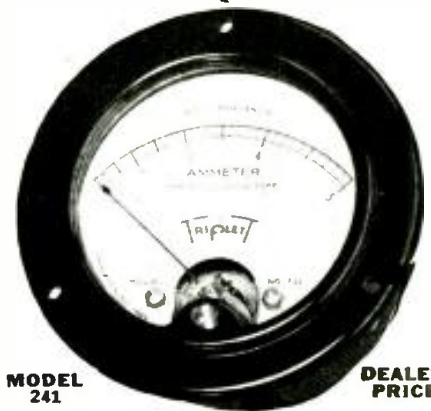
- One type 950 tube or one type 1F4 tube (see text)
- One type 951/1B1 tube

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.

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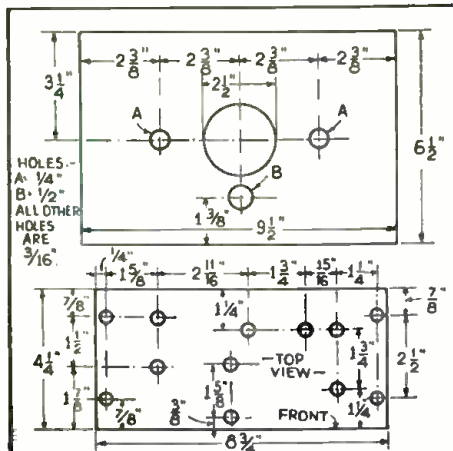
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By Edward M. Shiepe

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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 attenuator 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 mid-line 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	90-250 kc.
2	217-570 kc.
3	580-1500 kc.
4	1.45-10 mc.
5	3.9-110 mc.
6	10.7-310 mc.

The r.f. choke is wound on 3/4" 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.



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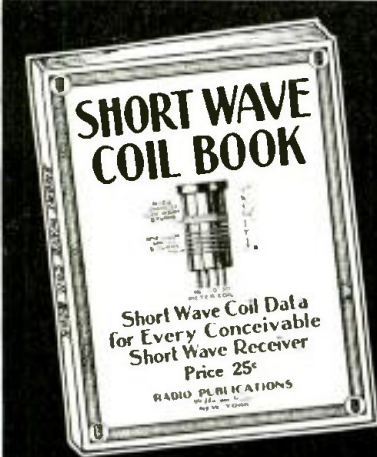
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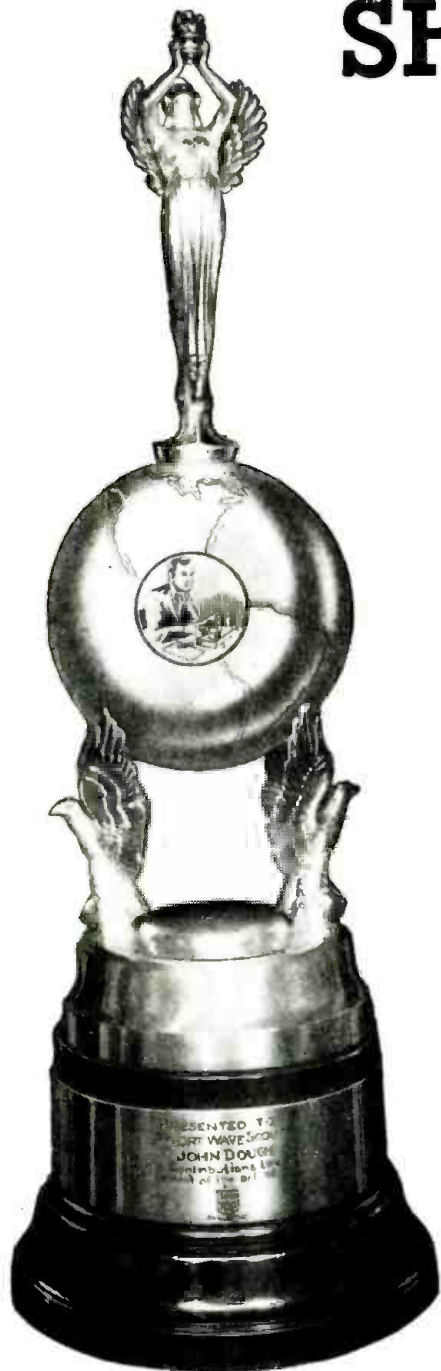
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For his contribution toward the advancement of the art of Radio

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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 22 1/2". The diameter of the base is 7 3/4". The diameter of the globe is 5 1/2". 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-dou-blet. 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.—Baund 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.—Zeeseen, 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

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- PCJ—15,220 kc.—Eindhoven, Holland
- PHI—17,775 kc.—Hilversum, Holland
- PHI—11,730 kc.—Hilversum, Holland
- ORK—10,330 kc.—Ruyssedele, 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
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- TG2X—5,940 kc.—Guatemala City, Guatemala
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- CO9JQ—8,665 kc.—Camaguey, Cuba
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- COCO—6,010 kc.—Havana, Cuba
- H13C—6,105 kc.—La Romana, Republica Dominicana
- H11J—5,865 kc.—San Pedro de Macoris, Dominican Republica
- H12Z—6,316 kc.—Cuidad Trujillo, Dominican Republica

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
- YV12RM—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, Colombia
- HJ1ABE—9,500 kc.—Cartagena, Colombia
- 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 September 25th are, Australia, Africa and Oceania.

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

For entries to be in the Editor's hands by November 25th, North America (including Central America, West Indies, Canada and Mexico) veris are to be in by 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 Ir- regular.
4.250	RV15	KHABAROVSK, SIBERIA, U.S.S.R., 70.42 m. 1-10 am.			

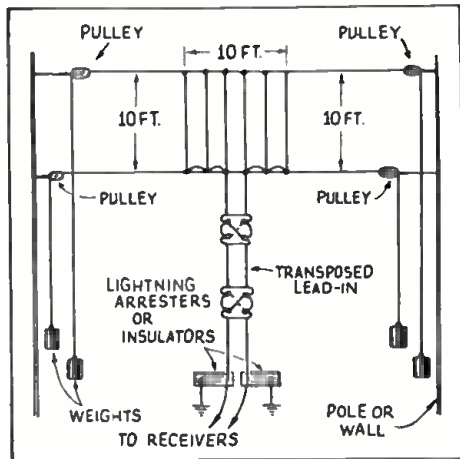
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World-Wide S-W Review

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.

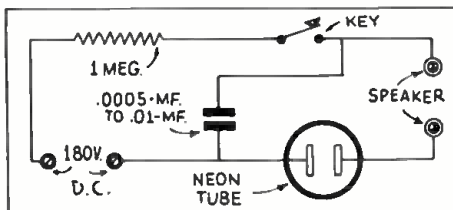
Neon Code Practice Oscillator

● 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, 5½ 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.

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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 EAL. 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 YVIRL 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

Here's Your Button

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



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

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

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; H12S, 11.960 mc., Domin. Rep. For details see the station list.

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
Club Secretary

This is the handsome certificate that is presented FREE to all members of the SHORT WAVE LEAGUE. The full size is 7 1/4" x 9 1/2". (see page 111)

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This is the most up-to-date book on the subject—edited and prepared by the author, V. S. K. It contains a wealth of material on the building and operation, not only of typical short-wave receivers, but short-wave converters as well.
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This book tells you everything you have ever wanted to know about short-wave reception. For a professional radio listener and radio fan for many years, the author gives you his long experience in radio reception and all that goes with it.
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HOW TO BECOME AN AMATEUR RADIO OPERATOR
By Lieut. Myron F. Eddy, whose experience in the amateur field has made him pre-eminent in this line. If you intend to become a licensed operator, if you wish to take up phone work eventually—this is the book you must get.
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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,
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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 País.
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 envíeme su tarjeta de verificación para cuyo objeto incluyo un Cupon Internacional de respuesta.

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

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Headset Adapter (No. 610)

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

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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 diode-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 diode-type requires a higher voltage. The English use the diode-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 ¾" 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 cracklac

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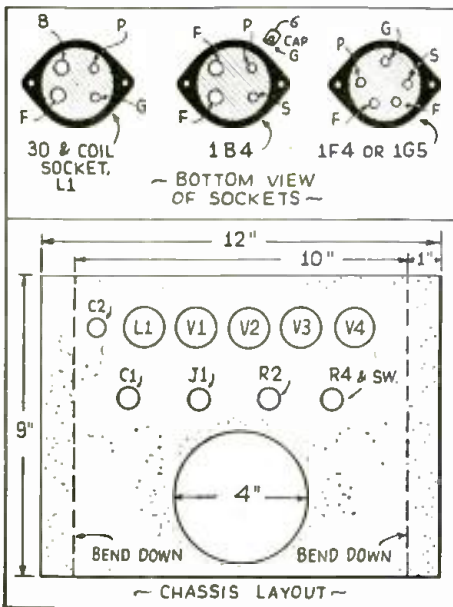
RADIO INSTRUCTION

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 14 1/2" by 9 3/4" by 8 1/4" 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

HANMARLUND

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

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 - 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.

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 - R4—Electrad 75,000 ohm potentiometer with switch, type 202-S.

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 - R6—200,000 ohm, 1/2 watt metallized resistor.
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 - R8—Same as R6.
 - R9—Same as R5.
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 - Aluminum chassis—as per sketch.
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 - 1—9 volt "C" battery, smallest type.

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 (Continued from page 79)

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New Zealand Again!
 (Continued from page 86)

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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 in 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 cath-

ode 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.

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 1/2 Watt fixed resistor
- 1—10 meg ohm 1/2 Watt fixed resistor
- 1—500 ohm 1/2 Watt fixed resistor

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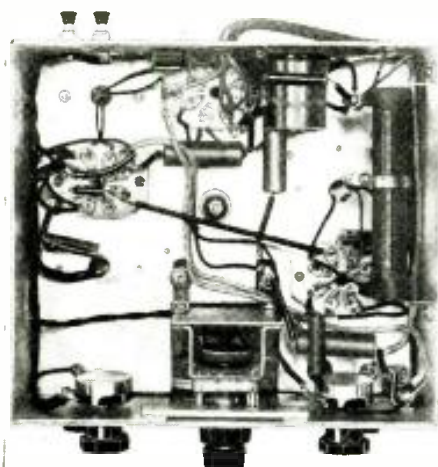
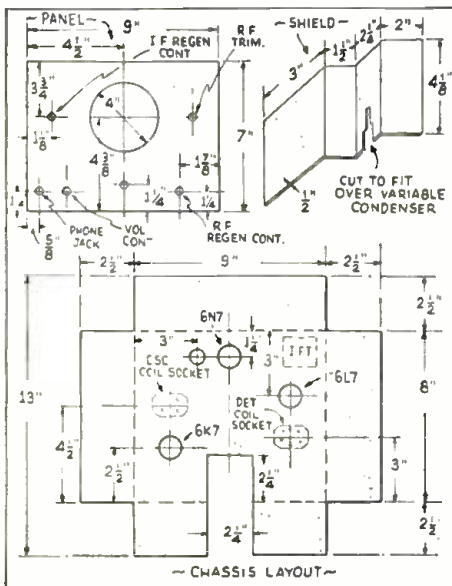
- 3—.1 mf. 400 Volt tubular condensers
- 2—.01 mf. 400 Volt tubular condensers
- 1—.005 mf. mica condenser
- 1—250 mmf. mica condenser
- 1—50 mmf. mica condenser
- 1—100 mmf. mica condenser
- 1—.001 mf. mica condenser
- 1—4 mf. electrolytic condenser

TRIMM

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- 2—1 3/4" dials
- 2—small knobs
- 1—five prong plug
- 1—binding post strip
- 1—midget jack



Bottom View of Receiver.

Garrett Receiver-Coil Data

Band	Grid Coil	Antenna Coil	Tap	Osc. Coil Turns	Grid	Tickler
10	3 1/4	3 1/4	1	3 1/4	1 1/4	
20	8 3/4	3 3/4	1	8 3/4	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 3/4-inch.

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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's 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.

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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 5:15-6:20 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 5:15-6:15 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!

Asiaties

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 SUKQ, Ramleh, Egypt, for his help on getting SU&MA 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 Sangien Powtongsook, HS8PJ, HS1PJ-1RJ,

CLASSIFIED

Advertisements are inserted at 5c per word to strictly amateurs, or 10c a word to manufacturers or dealers. Each word in a name and address is counted. Cash should accompany all orders. Copy for the July issue should reach us not later than May 5.

<p>AGENTS WANTED</p> <p>GOLD LETTERS FOR STORE Windows 5007, Profit Free Samples. Metallic Co., 433-R N. Clark, Chicago.</p> <p>CURIOS</p> <p>INDIAN RELICS, MINERALS, beadwork, coins, Curios, Catalogue for Indian Museum, Northbranch, Kansas.</p> <p>GENERATORS</p> <p>TURN SCRAP INTO MONEY. Autopower shows you how easily and economically auto generators can be converted into A.C. or D.C. generators, and D.C. motors, 2 to 1000 volts; for sound, radio, power, light, or welding. No previous experience necessary—complete information all in new book, with simple instructions and illustrations. Endorsed by thousands. Only \$1.00 postpaid. Autopower, 411-N So. Home Ave., Chicago.</p> <p>"HAM" OFFERS AND WANTS</p> <p>SKYRIDERS HALLICRAFTERS bargains, many makes new and used, will trade. Also Trade Lebra and Zelsa and Lenses, Wells-Smith, 71 E. Adams St., Chicago. Formerly at 26 N. Wells St.</p> <p>CANADIAN READERS—New Readi-rite tube-reader for sale. For information write A. Anderson, 911 South Railway Street, Medicine Hat, Alberta.</p> <p>MASTERPIECE IV RARE BARGAIN \$110. Write Baltzy, 1711 Riverside Ave., Muncie, Ind.</p> <p>SACRIFICE COMPLETE SW3 perfect condition W9VUQ, Pocatotts, Iowa.</p>	<p>INSTRUCTION</p> <p>AMATEUR RADIO, COMMERCIAL Radiotelephone and Radiotelegraph licenses, complete training. Resident and correspondence courses. Every graduate a licensed operator. N. Y. Wireless School, 1123 Broadway, New York.</p> <p>"EASY" CODE SHORTCUTS" with catalog "Radiobuilder" year—25c. Laboratories, 151-A Liberty, San Francisco.</p> <p>LEARN CODE, CHEAPEST, BEST system, details. WRD, 323 Thatford Ave., Brooklyn, N. Y.</p> <p>MISCELLANEOUS</p> <p>WE ORIGINALLY HAD FIVE thousand Stobatt Laminates for which the U.S. Government paid over \$30,000 each. We sold all but a very few. We cannot obtain more to sell at three times our present price. Send in your order before they are all sold at \$1.50 each, postage paid. Gold Shield Products, Room 14, Eleventh floor, 99 Hudson St., New York City.</p> <p>COIL, INDUCTANCE CHARTS—complete set for any size coil; accurate; \$2.15 prepaid. Slide Rules 4 1/2 inch circular type \$2.00; 8" dia., 20" scale, \$5.00 prepaid. Dataprint Co., Box 322, Ramsey, N. J.</p> <p>FOR YOUR BEN: WORLD'S MOST famous DX letter, Australian laurels, verified. Photostat 5x7, \$1.00 cash. Others 50 cents. Oliver Amille, % Magazine.</p> <p>PATENT ATTORNEYS</p> <p>INVENTORS, ALL PATENT AND trademark cases submitted given personal attention by members of the firm. From "Evidence of Invention" and Instructions free. Lanester, Allwine & Bonnell, 136 Bowen Building, Washington, D. C.</p>	<p>QSL—CARDS—SWL</p> <p>DIRECTORY OF SHORT WAVE Listeners 25c. Listing of Name & Address along with 8 1/2"x15" Certificate one year. 25c. Write SWL Directory, Sta. B, Box 116, Toledo, Ohio.</p> <p>SWLs, QSLs CARDS, ATTRACT- ive Reply getters, Samples (Stamps), W-8-E-S-N, 1827 Cone, Toledo, Ohio.</p> <p>QSL, SWL CARDS, SEAT, AT- tractive, reasonably priced, samples free. Miller, Printer, Ambler, Pa.</p> <p>RADIO EQUIPMENT</p> <p>HUNDREDS OF NEW AND RARE electrical items, replacement parts and supplies. Send 10c for new 60-page wholesale catalog. Autopower, 411 S. Home, Chicago.</p> <p>SHORT WAVE RECEIVERS</p> <p>SELL: NATIONAL ACSW5 WITH tubes and four pair coils \$11.00; All Star complete \$17.50; Skyride \$17.50; Tube complete \$25.00; Super-Skyride complete \$35.00; ACB-136 \$45.00. W.AMA, Butler, Missouri.</p> <p>SPECIAL! COMPLETE KITS FOR new, powerful! one tube 5 meter set. Postpaid \$1.50. Receives amateurs, experimental stations, Television! etc. Munson Radio, 151 Quincy Street, Brooklyn.</p> <p>TELEVISION KITS AND PARTS. Arthur Pohl, 2131 Palms, Detroit, Mich.</p> <p>WIND ELECTRIC PLANTS</p> <p>BUILD WIND LIGHT PLANT from automobile generator. Complete plans and catalog 10c. Fan Belt A. C. Generator; 50 other generator changes. Ledy Manufacturing, 1417 Lake, Minneapolis.</p>
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 Lock Box 322 RAMSEY, N. J.

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 kc., 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 kc.

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.

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D—Globe of the World **89c** Prepaid

D—89c each

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This beautiful map, measuring 18x26 in. and printed in 18 colors is indispensable when hung in sight or placed "under the glass" on the table or wall of the short wave enthusiast. It contains a wealth of information such as distances to all parts of the world, political nature of the country in which a broadcast station is located, etc., and from the manner in which the map is blocked off gives the time in different parts of the world at a glance.

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C—Radio Map of the World and Station Finder. **25c** Prepaid

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EE—SHORT WAVE LEAGUE label button, like the one described above but in solid gold. **\$2.00** Prepaid

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SHORT WAVE LEAGUE, 99-101 Hudson Street, New York, N. Y. 6-37

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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."

IITKM, 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, BW1, 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 GENERALE DE TELEGRAPHIE SANS FIL

Centre Radiotelegraphique de Saigon
12, rue de la Paix, Saigon
Le 26 Juin 1937

Mr. Joseph E. Miller
8847 2nd St
St. Louis

Dear Sir,

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

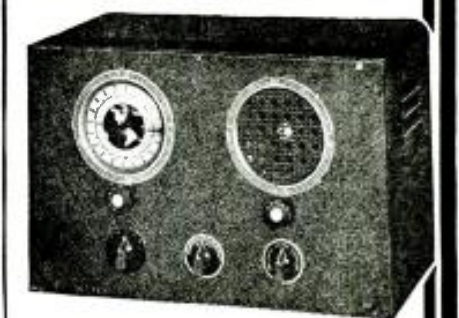
We were very glad to know that you heard our station under such excellent conditions.

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.

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4 Matched Sylvania Tubes..... **2.25**
All Metal Crystallized Cabinet..... **2.25**

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Use a 1-6J7 metal tube and 1-12A7 as a combined rectifier and pentode output tube. Coils furnished tune from 15 to 200 meters. Additional coils to extend the tuning range down to 9 1/2 and up to 2000 meters are also available. Airplane dial aids materially in tuning in stations. Complete Kit of parts, unwired, less tubes, additional coils and cabinet..... **\$4.50**
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"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, SUIAS, SUI5G, 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.

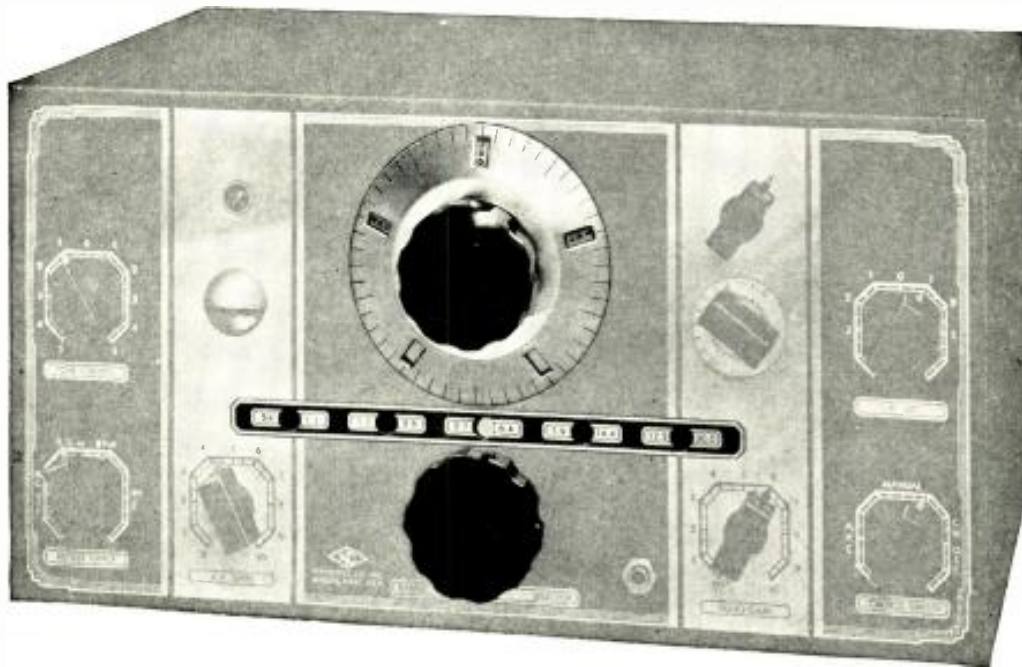
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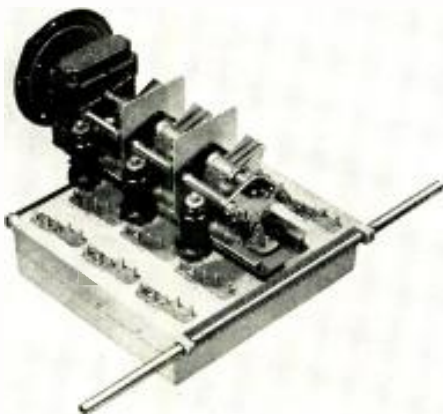
PRECISION THAT STAYS PRECISE

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

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.

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!

NATIONAL COMPANY, Inc.
MALDEN, MASS., U. S. A.



THE MOVABLE-COIL TUNING UNIT

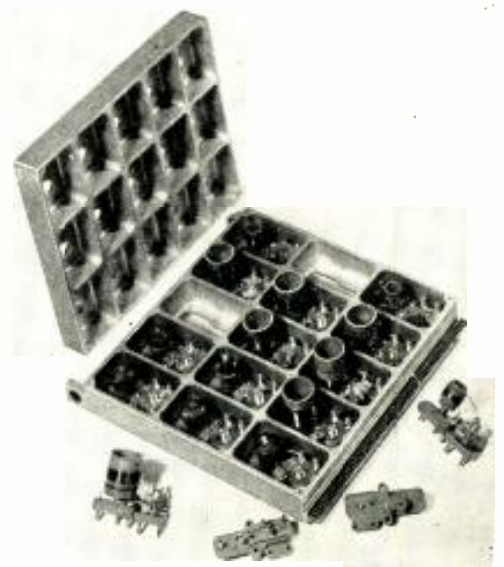
Accurate positioning of coils insures that calibration will not be affected by changes in stray inductance.

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-

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.



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



J. E. Smith, President National Radio Institute

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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 experi-



ments 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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National Radio Institute, Washington, D. C.

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

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