THE RADIO EXPERIMENTER'S MAGAZINE

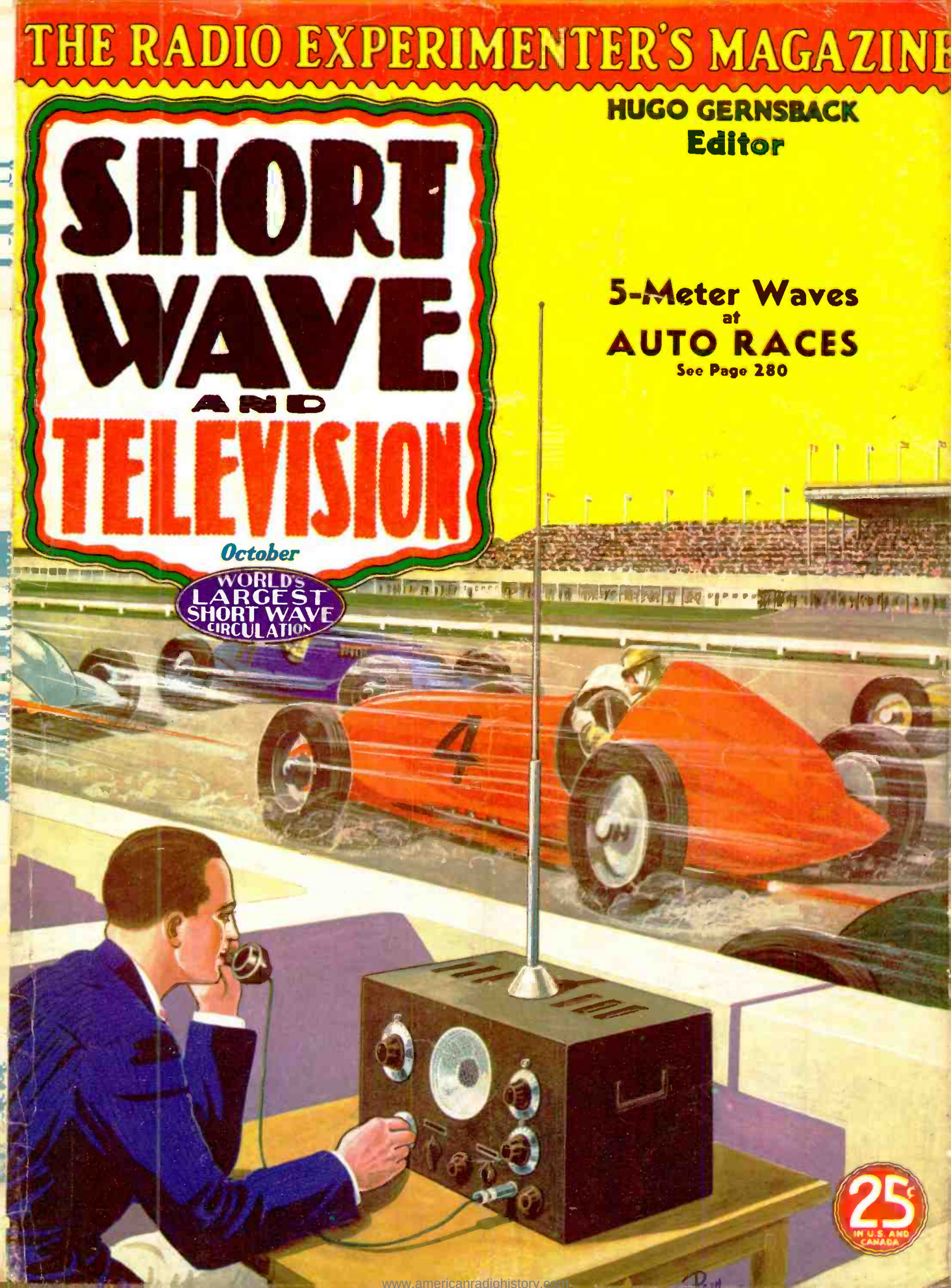
SHORT WAVE AND TELEVISION

HUGO GERNSBACK
Editor

5-Meter Waves
at
AUTO RACES
See Page 280

October

WORLD'S LARGEST SHORT WAVE CIRCULATION



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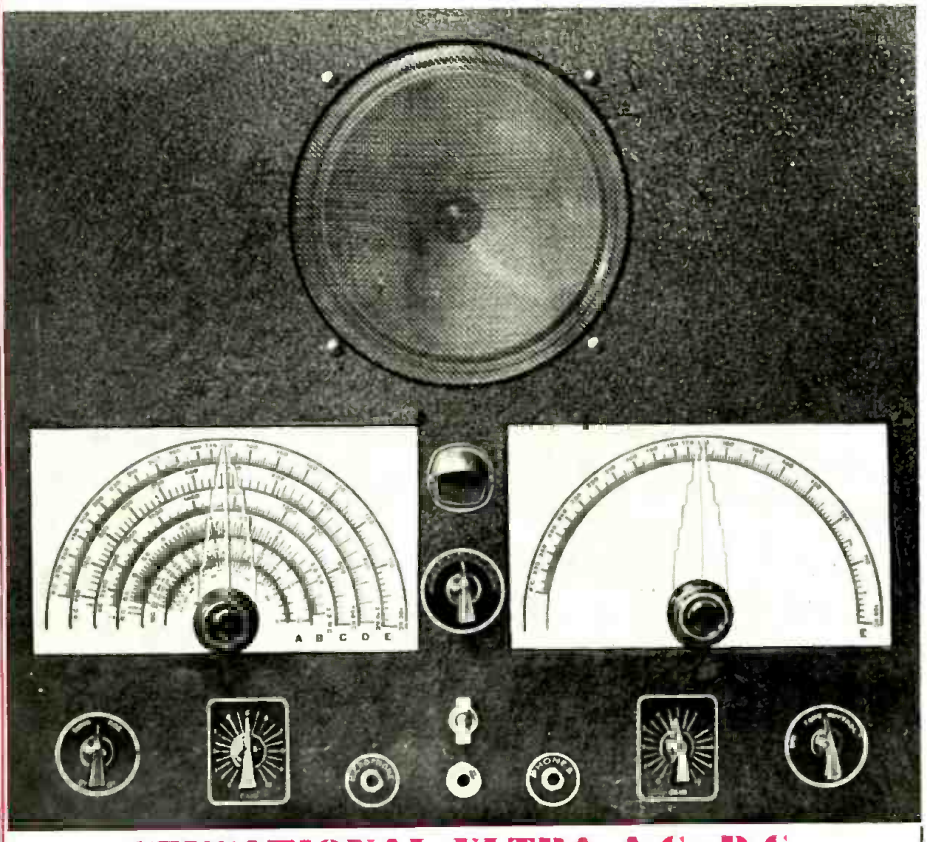

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- 2½ to 4000 Meters Trans-Receiver.
- *Ten tubes.
- 1—6K7 Regenerative Tuned R.F. Amplifier.
- 1—6J7 Regenerative Detector.
- 1—6J5G Super Regenerative Detector & Transmitting Osc.
- 2—6C5 P.P. 1st Audio stage.
- 2—25L6 P.P. Beam power output stage & modulators.
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- *Receives from 2½ to 4000 meters.
- *Transmits on 2½ & 5 meters.
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Wired and tested extra	4.50

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IN THIS ISSUE: PROMINENT SHORT-WAVE AND TELEVISION AUTHORS

Farnsworth • McEntee • Barnett • Kahlert • Lynch • Miller • Shuart

SHORT WAVE AND TELEVISION

HUGO GERNSBACK
Editor

H. WINFIELD SECOR
Managing Editor

GEORGE W. SHUART, W2AMN
Associate Editor

Combined With

Official SHORT WAVE LISTENER

Contents for October, 1937

Features in the November Issue

A new "portable" 5-meter transmitter and receiver—M.O.P.A. with excellent frequency stability, by George W. Shuart, W2AMN.

Reflecting Layer Heights Automatically Recorded.

The 4-in-2 Midget Space-Explorer, by H. G. Cisin, M. E.—For the S-W "Fan".

An All-Wave "Grid Dip" Oscillator, by Jim Kirk, W6DEG.

A 5-meter 100-Watt transmitter with adjustable frequency, by W2AMN.

Other articles for S-W "Fans," including Joe Miller's "Listening Tips," Harvey Gernsback's "World S-W Station List," etc.

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

OUR COVER

● ON our cover this month we illustrate one of the newest applications of 5-meter waves—their use at automobile speedways. The details of how the 5-meter transmitters and receivers ably served the requirements of the race officials are explained on page 280.

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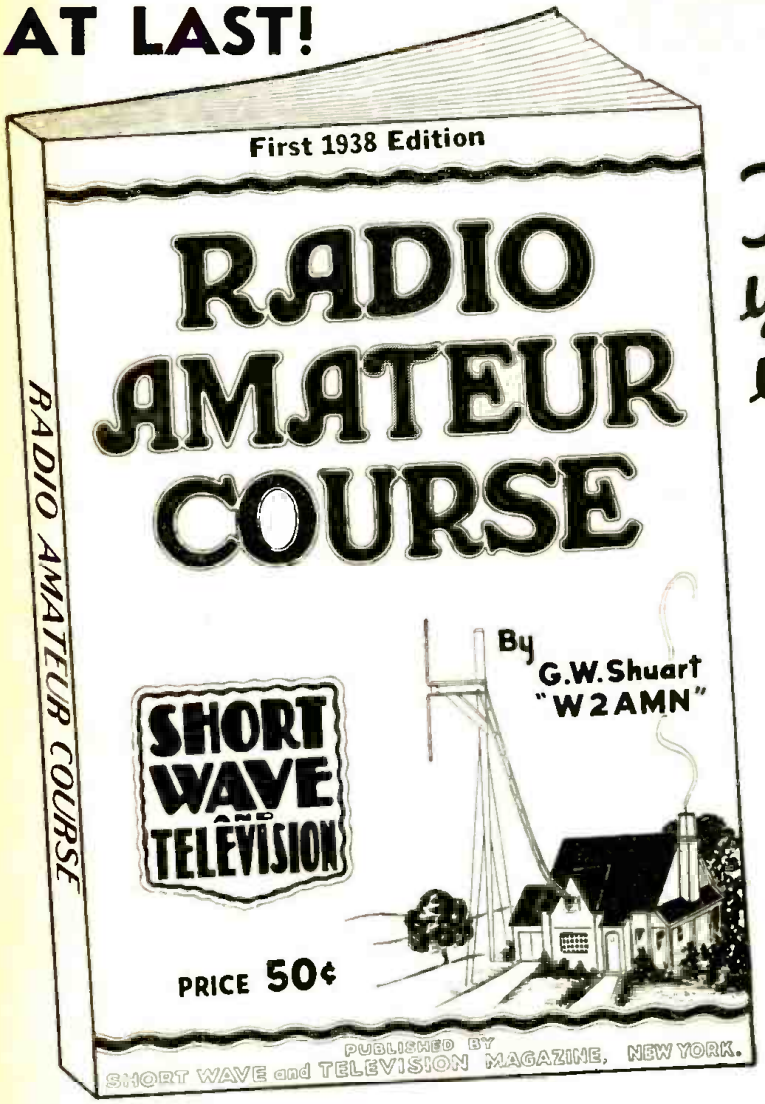
AT LAST!



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

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- The M.O.P.A. Transmitter
- The Fundamentals of Amplitude Modulation
- The Selection of Tubes in the Low Power Exciter Stages
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In the past few years we received thousands of requests from our readers in this and foreign countries urging us to issue a popular priced book that will describe in SIMPLE LANGUAGE the FUNDAMENTAL PRINCIPLES of short wave receivers and transmitters.

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

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

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

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

The book is now being printed and will be completed September 1st and shipped to thousands of chain, radio supply and book stores in time to make certain that when you call for your copy on September 15th, *it will be handed to you.*

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SHORT WAVE & TELEVISION, 99 HUDSON STREET, NEW YORK, N. Y.

HUGO GERNSBACK, EDITOR H. WINFIELD SECOR, MANAGING EDITOR

Television Today

By Philo T. Farnsworth

Vice President, Farnsworth Television Corporation, Philadelphia Pa.

● THE future of television is faced with the same uncertainty of opinion that is encountered by pioneers of any new and important scientific development. Nevertheless, I am convinced that the outlook for commercial application of television is brighter than generally believed, and that much of the pessimistic opinion is from biased persons who often criticize without even investigating. However, I admit my own bias and the possibility that I am over-optimistic. I think it may be worthwhile and instructive, therefore, to write out a balance sheet as of the present, listing the problems which are solved and those which must be solved in order that the general public may enjoy television broadcasting.

First in television's favor we have the fact that technically television is fairly well advanced. We have in the United States three television stations operating on 441 lines and transmitting images giving detail which is effectively equivalent to from 200 to 300 lines. The images are flickerless and the synchronism between transmitter and receiver good. Each of these stations could operate on a fairly regular schedule if it were expedient to do so. All three transmissions may be picked up on a single receiver without change in design, if within range of the particular station. There is a willingness on the part of television workers to adopt further standardization for transmission and reception when reasonably required. Development of program technique, while just starting, has, nevertheless, advanced far enough that continuous programs may be transmitted which have entertainment value quite aside from their novelty interest.

Philo T. Farnsworth is one of the leading American television engineers. His company is now conducting daily tests from an elaborate television studio in Philadelphia. Mr. Farnsworth has developed many new vacuum tube devices for television, which will revolutionize the method of transmission and reception of images by radio waves. When the history of American television is written, one of the brightest spots will be that recording the brilliant research performed by Philo Farnsworth.

The difficulties which must be solved by those of us who are interested in giving television to the public as soon as possible are, for the most part, clearly defined. The financial problem is of utmost importance. That a large sum of money will be required is recognized by everyone, although we may have some differences of opinion as to how much. Where the money is coming from and just how fast no one can predict as yet. The financial burden is, however, well distributed over the entire industry so that moderately good progress can be made without asking assistance from the general public.

In television, the public will be buying, not only a new form of entertainment and education, but it will be buying employment and opportunity for hundreds of thousands of people in practically every branch of human endeavor. Artists and artisans, scientists and engineers, will find new opportunity to do creative work in a new and interesting field. If I were a young man or woman just leaving college at this time, I should plan to make television a life's work, regardless of whether I had majored in mathematics, science, engineering, dramatic art, literature, or in any other subject. While I should expect the picking to be scant, and opportunity small, for the next several years, I know that ultimately I would be handsomely rewarded for my effort during this period. It seems obvious to me, therefore, that society can afford to pay a high price for commercial television.

Many people will want to invest in the television industry, as soon as they can be sure that plans have been carefully made and considered to insure them a fair chance to get full benefit from such participation. Investors, however, must be wary in making any purchases in television stock, as undoubtedly there will be a few "wildcat" promotions that are nothing but outright swindles.

Without a fairly large source of capital available, commercialization of television will proceed more slowly. Broadcasters cannot afford to spend the large sums of money necessary for maintenance of program schedules and the experimental work incident thereto, without having a fairly large number of receivers available. Manufacturers of receivers cannot be expected to manufacture many receivers *without programs to look at*, and until television receivers can be sold in fairly large quantities, they will remain an expensive luxury, which only a limited part of the public will be able to afford.

But we must not overlook the part which the radio amateur will play in getting television started. Inquiries as to our program schedules are constantly increasing in number and prospective set-builders are asking for information which will enable them to build satisfactory television receivers. We can expect such interest by the amateurs to increase exponentially as more and more of them are successful in receiving the experimental programs, and as the programs themselves become more regular. When the number of such

(*Continued on page* 324)

Tenth of a Series of "Guest" Editorials

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

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CBS Offers New *Foreign* S-W Programs

An Interview With Miss Elizabeth-Ann Tucker

Director Foreign S-W Programs for CBS

By H. W. Secor

Photo by Walter Seigal

Miss Elizabeth-Ann Tucker, Director of Foreign Short-Wave Programs for the Columbia Broadcasting System

● HERE is a short outline of Miss Elizabeth-Ann Tucker's personal history, and how she came to be appointed to her present important position as *Director of Foreign Short-Wave Activities* for the Columbia Broadcasting Corporation.

Miss Tucker is a born New Yorker; her first school attendance was at Kemper Hall, an Episcopal Convent at Kenosha, Wis. Returning east she attended St. Mary's at Garden City, L.I., and finished at Miss Deverell's in New York City. Joined the Columbia Broadcasting System the first week in December, 1929, as secretary to the Advertising and Sales Promotion Manager, eventually working into advertising research work. In March, 1931, Miss Tucker was transferred to the Engineering Department as secretary to the Chief Engineer, where she remained until receiving the present assignment. During this time, the handling of all mail reports for W2XE came under her supervision and through this contact with *short waves* she became interested in this phase of the broadcast art and its possibilities. Although not an engineer, she possesses a layman's knowledge of engineering terms and the technical principles. Therefore, having handled the mail and worked closely with all short-wave matters, Miss Tucker gained a knowledge of foreign reaction to *short-wave programming*, which in conjunction with personal inquiries made while abroad, plus a few ideas as to what might be done in short waves—led to her present appointment.

* * *

Interview With Miss Tucker

The first question I asked Miss Tucker was:

Q. "What is the general outline of the CBS new foreign S-W program plan, and what countries are the object of this plan?"

A. In forming the new W2XE Program Department, the CBS is taking into consideration the growing importance of *short-wave* radio in the promotion of international good will and accord—an instantaneous, almost personal bringing together of the peoples of the world through word-of-mouth. "DX-ing" has been confined for two reasons, I—(and the main one) being the lack of people owning short-wave sets, II—the lack of knowledge of the service rendered via the short waves. Now the all-wave or short-wave set is practically as common as the long-wave receiver in most thickly populated centers. People absolutely unschooled in the technical side of radio are listening to short-wave programs for the entertainment value, rather than from the "DX-ing" angle.

Realizing the above facts, Columbia is now devoting thought and care to the programs offered over W2XE. The network programs are, of course designed for American audiences, and for this reason are sometimes unsuitable for foreign listeners, due to the fact they are local or regional in text—subjects with which the peoples of other countries are completely unfamiliar.

No one particular country, or group of countries, is being singled out for recognition, but rather, by taking time-differences into consideration, W2XE will utilize its new high-power, completely modern facilities to render the best possible world-wide service at peak listening hours.

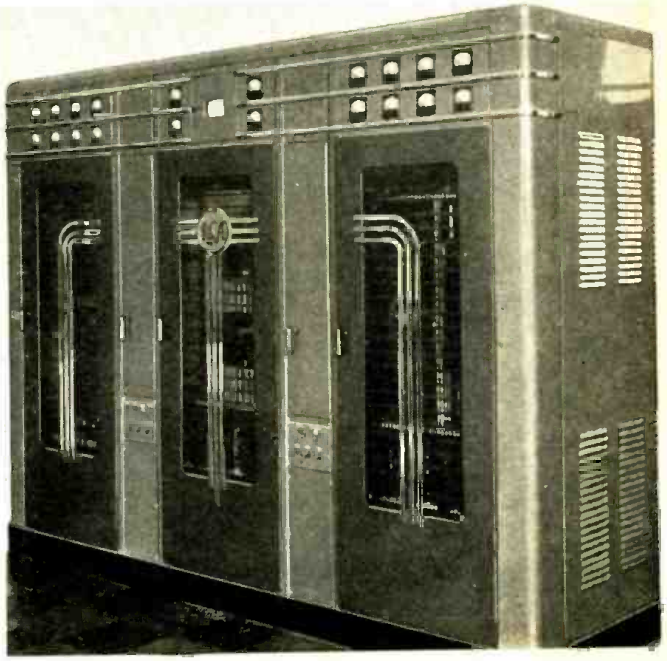
Q. "Miss Tucker, what types of programs do South Americans and Europeans seem to like, as found from your travels and experiences?"

A. Music, of course, is loved by everyone, regardless of nationality. Tastes vary widely as to whether it should be classical, light classical or popular, so in planning W2XE programs, a balance is maintained. Europeans, and our neighbors to the South, seem to like the American popular dance bands. Next come topical news broadcasts. To this end Mr. Alberto Zalamea presents the day's news in Spanish every evening except Saturdays and Sundays. Very shortly a special W2XE daily news broadcast will be inaugurated for the benefit of distant English-speaking peoples, at an hour in the afternoon here, which will bring it to them during their *evening's* entertainment. From time to time, other countries will receive programs in their *native* tongues. However, since the text of the majority of programs is in English, it is felt that those who speak the language will be the most ardent listeners.

South Americans seem particularly interested in American styles, preferring them even to those from Paris, and news of Hollywood and its stars.

Q. "What is the present power of the W2XE-CBS short-wave station, Miss Tucker; where is it located, and what are the frequencies used, and the time on the air?"

A. The present schedule is not our normal one, Mr. Secor, but was effected July 15, 1937 (until further notice) as the result of cooperative efforts between the (*Continued on page* 312)



Control panel of the new high-powered International Shortwave Broadcast Station W2XE. This short-wave station is located at the WABC transmitting plant, Wayne, New Jersey.

On May 12, 1937, the Columbia Broadcasting System inaugurated service with this new transmitter. In order to give maximum world-wide service, two sets of directional antennas are employed—one for European listeners during the day and the other for Central and South American audiences, after 5:30 P.M., E.S.T.

W2XE is licensed for two additional frequencies, 6120 kc., and 17760 kc.

Short-Wave PICTORIAL

Television and Short-wave events caught by the cameras of our roving reporters both at home and abroad.

Mariblanca, charming and popular singer of Spanish-American songs; rancheros, boleros, tangos, rhumbas and joropos. Her readings of Spanish-American poetry have also helped to enhance her great popularity. She is heard regularly from the popular "Radio Caracas" station YV5RC. Many other charming artists are heard regularly from this station and highly enjoyed by thousands of North American listeners.

Television is assured an important role in the 1939 New York World's Fair. David Sarnoff, president of RCA, and Grover Whalen, president of the World's Fair Corporation, recently signed a contract for extensive RCA and NBC participation at the Fair. Participating in the "televised" ceremony in the studio of NBC in New York were, left to right: Betty Goodwin, NBC television announcer; Lenox R. Lohr, president of NBC, who will be in charge of the RCA exhibits at the fair; Mr. Sarnoff and Mr. Whalen.

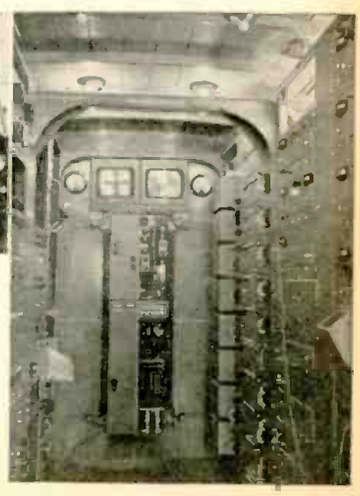
Television is going strong in London, according to advice from those who have visited the British Isles. The picture above shows an Alexandra Palace television pick-up, this scene being one transmitted during the golf program known as "Tee Time." Miss Poppy Wingate is seen here demonstrating her "grip" while Bernard Darwin looks on. Copyright photo reproduced by courtesy of British Broadcasting Corp.

Kay Francis and Ian Hunter in a scene from Warner Bros. picture "Another Dawn." Note the elaborate short-wave apparatus featured in this photoplay. The radio scenes are very exciting and every short-wave Fan and Ham will thoroughly enjoy this picture, we are sure . . . Below, Errol Flynn in a scene from "Another Dawn." Note the portable S-W army set and antenna here featured.

Above—Elizabeth Rethberg, famous Metropolitan Opera star, being televised at the NBC television studio during a test program. Tomorrow, opera and musical comedy stars will entertain millions of people, and we shall be able to see the faces of the singers as well as hear their voices. Opera enthusiasts agree that opera will be much more enjoyable when we can SEE the singers as well as hear them.

Below: WIXAL's international broadcasting of classroom lectures will be continued by Harvard University this fall because of the success of the experimental classroom broadcasts undertaken during the spring, officials at the university have announced. The broadcasting will again be done by the non-commercial S-W station WIXAL, which is entirely devoted to educational and cultural programs and which is financed by private donations and a grant from the Rockefeller Foundation.

Left—20,000 watt transmitter of Station WIXAL, short-wave educational station located in Boston, Mass.



B.B.C. mobile television transmitter—the two photos—above and at the right—show the powerful mobile television unit which can be dispatched to cover news events anywhere on short notice. The truck has a television transmitter and can relay the image and sound to a pick-up station at a considerable distance; or if a television cable of the coaxial type is at hand, the truck unit can be plugged into the cable, which then carries the image and voice to the television station.

5-METER WAVES PROVE WORTH AT AUTO RACES

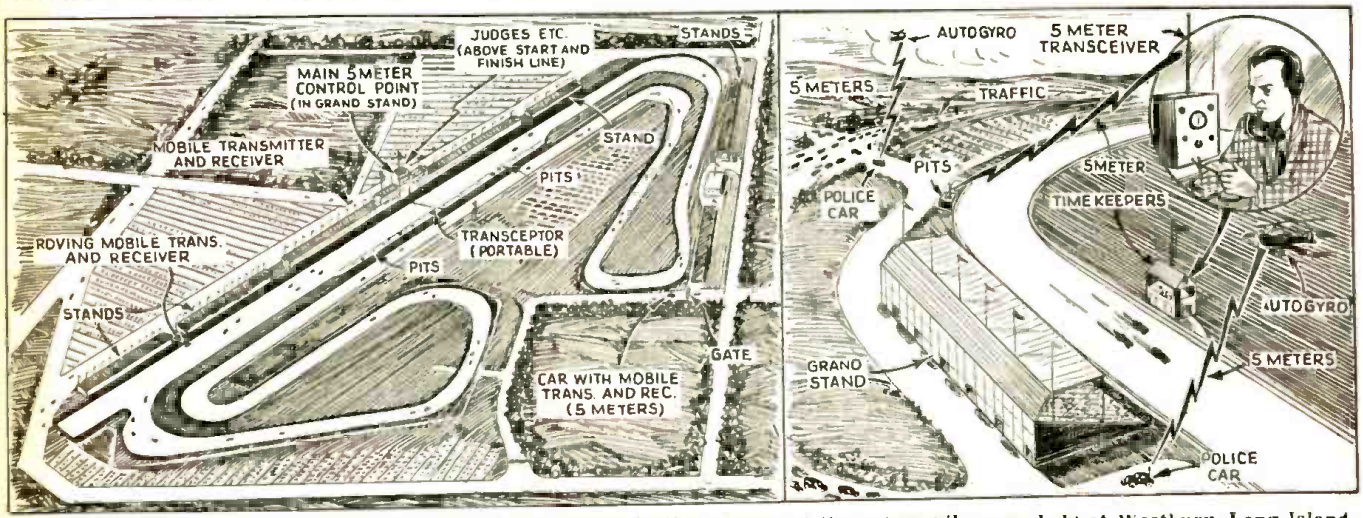


Illustration above shows application of 5-meter inter-communicating system at the automobile races held at Westbury, Long Island, and also at the auto races held at Pollsmoor, South Africa.

● FIVE-METER receivers operated by "Hams", proved very useful at the recent Vanderbilt Cup automobile race held on the Roosevelt Speedway, Westbury, Long Island.

A *master control* station was set up in the main grandstand overlooking the starting line of the race, adjacent to the judge's stand. This station directed traffic between several mobile two-way "Ham" stations. The equipment was used to relay messages when the private telephone system around the race-track was tied up with other messages.

One of the cars was located at one of the entrance gates to the race, whereas the others moved from place to place during the races, maintaining contact with the control station at all times.

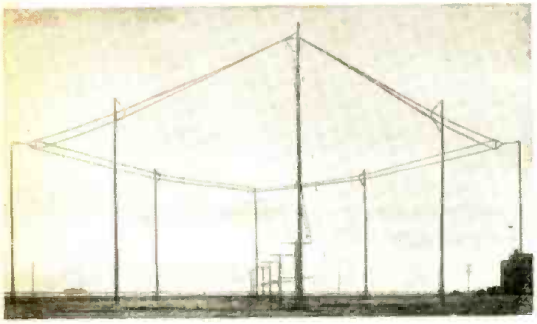
The 5-meter network was used to considerable advantage in locating missing persons and relaying messages to various officials connected with the race.

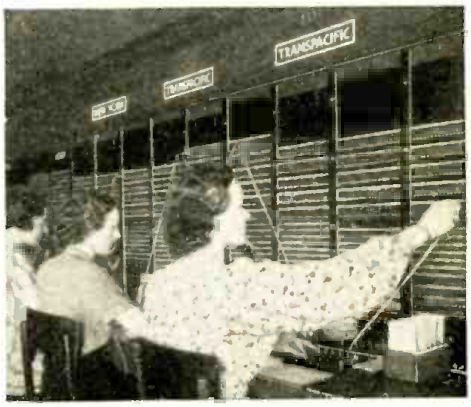
Down in South Africa 5-meter transceivers recently distinguished themselves during the Grand Prix Motor Race held at Pollsmoor. Six short-wave stations operating 5-meter transceivers were in continuous operation during the race.

Two of the transmitters were assigned for the purpose of maintaining communication from the time-keeper's tables opposite the grandstand to the pits, where the cars' repair crews were located.

Four of the 5-meter transceivers were used by traffic control authorities, and two autogiros equipped with 5-meter receivers were used to break-up congestion, short wave messages being sent from the (*Continued on page* 318)

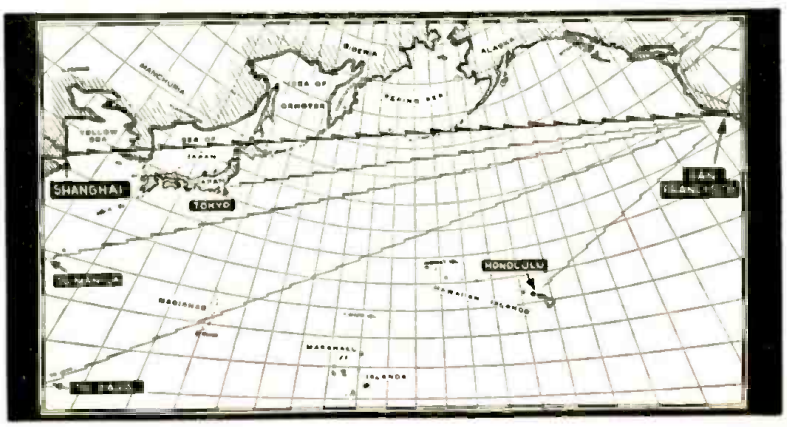
You Can Talk to China via S-W Phone





Above—Horizontal Rhombic antenna used at Dixon, Calif., for S-W phone transmission to the far East. Right—Switchboard operators at San Francisco who handle trans-pacific calls. Map at right shows S-W link between Frisco and Shanghai.

● RECENTLY a new short-wave long distance phone *link* across the Pacific was opened for public service by the A.T. & T. Co. This radio telephone circuit spans the Pacific and links all Bell and Bell-connecting telephones of North America with the telephone system of greater Shanghai. This remarkable S-W phone circuit spans a distance of 6,100 miles and is operated by stations of the A. T. & T. Co., located near San Francisco and Chinese government short-wave transmitting and receiving stations at Shanghai. It is interesting to note that all arrangements for *calls* and all other official conversations carried on between operators in San Francisco and Shanghai are in English, even though the operators may be Chinese. In other words the Chinese operators must speak English as well as their native tongue. This rule holds also for conversations between operators in other foreign countries connected with U.S. China is the seventieth country to be brought within the reach of Bell System subscribers and leaves but two large telephone systems, those of Russia and New Zealand, yet to be connected with the United States. Greater Shanghai has about 57,000 telephones. Various frequencies are used, depending on season, time of day, etc.



The Short-Wave Fraternity Will Miss Marconi

● THE Marquis Guglielmo Marconi has passed into the great beyond at the age of sixty-three. Unlike many inventors Marconi lived to see his invention worked out in detail and applied throughout the world as an everyday necessity. The short-wave fraternity will mourn the passing of one of the greatest inventors of all time, for up to the very last, the Marquis was intensely busy carrying out experiments and tests with the ultra short-waves from his floating laboratory, the *Elettra*.

A number of scientists had a faint inkling that radio waves might be applied someday to transmission of intelligence, but it took the genius of Guglielmo Marconi to harness the mathematical deductions of the great James Clerk Maxwell and the laboratory demonstrations of the existence of ether waves by Heinrich Hertz.

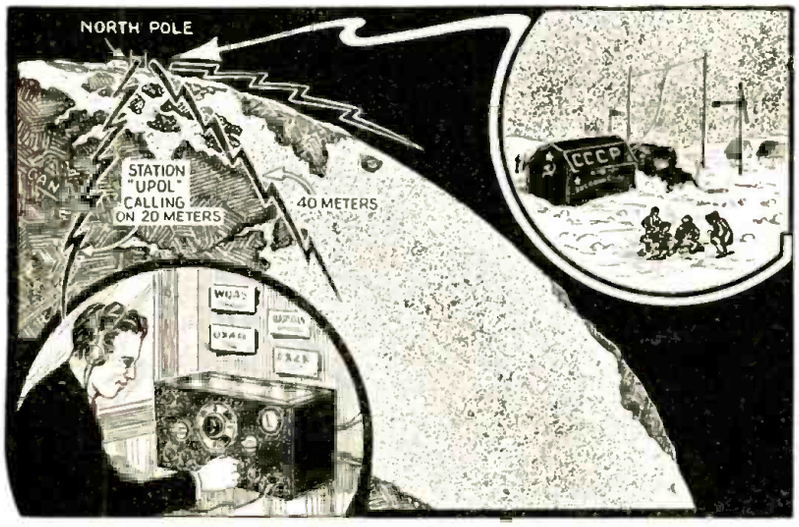
Marconi, in about the year 1895, having read of the work of Maxwell and Hertz, finally had the happy thought to erect aerial wires or antennae and connect these to the transmitting and receiving apparatus. He also connected one side of the apparatus to the ground. At first the distance covered was but a few yards, but shortly a distance of a mile was negotiated and by the year 1901 the first signals were transmitted across the broad Atlantic, the three dots constituting the letter "S" in code. Marconi has been closely identified with radio research ever since, and he has been an indefatigable worker.

Thousands of tests in various parts of the world were made from his floating radio laboratory aboard the *Elettra*, particularly with regard to short-wave and ultra short-wave transmission and reception. Italy may well be proud of her illustrious son.

Marconi was a fine example of the practical-minded engineer, who did not permit himself to become entangled in a lot of abstract mathematical theory, but proceed to carry (*Continued on page* 310)

A favorite photo of the late Guglielmo Marconi taken ahoard his yacht the "Elettra."

NORTH POLE SHORT WAVE BROADCAST HEARD



North Pole Short-Wave broadcasting station operated by Soviet scientists.

● "STATION U-P-O-L calling!" A new short-wave station using these call letters has been on the air recently and is operated by men landed on the polar ice by Soviet airplanes. In a recent report the Soviet North Pole camp reported via short-wave, that the temperature was 32 degrees Fahrenheit, and the ceiling overcast, with visibility from 3 to 6 miles. Such reports will prove invaluable to aviation and weather bureaus.

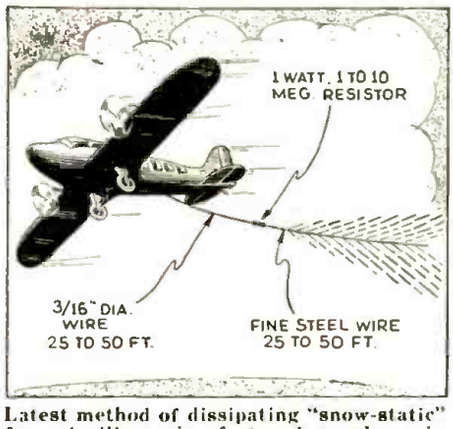
This remarkable short-wave station, located at the top of the world, began sending out short wave radio flashes to foreign amateur stations on the 20 and 40 meter channels, as early as June 29.

The general report regarding this station was to the effect that it will be on the air daily from 7:00 to 9:30 p.m. Greenwich Meridian time (3:00 p.m. and 5:30 p.m. Eastern Daylight Saving Time). The accompanying picture of the North Pole broadcast station is taken from a photo. As the cold increases, and providing this station is kept in operation, walls formed of ice blocks will be built up around the tents. Electric current is developed by a wind-driven generator, which can be seen at the right of the picture.

TRAIL WIRE RIDS PLANE OF "SNOW-STATIC"

● SNOW and rain static have long been the bugaboo of airplane pilots. Tests were often made but very little success was met with in trying to overcome it, but recently successful results in this direction are reported by H. M. Hucke, Superintendent of the Communications Laboratory, United Air Lines.

The accompanying picture shows one of the best experiments carried out for dissipating "snow-static." A small trailing wire was used with a resistor connected at some point along its length. According to Mr. Hucke, in general, a $\frac{3}{16}$" diameter wire is first connected to the metal frame of the plane. This wire extends rearward from 25 to 50 ft. and has a 1-watt, 1 to 10 megohms resistor connected at its outer end. A very fine steel wire extends from the resistor another 25 to 50 ft. rearward. The object, as Mr. Hucke points out, is to have the diameter of the steel wire smaller than the sharpest points on the plane's structure. Static will, therefore, dissipate more readily from the fine steel wire than from the rough edges on the plane itself.



Latest method of dissipating "snow-static" from trailing wire fastened to plane, in the manner shown.

The static discharge consists of a pure direct current corona. The electrical charge on the plane is accumulated from the tiny electrical charges on the snow flakes as the plane flies along, and the noise caused by the discharge of the accumulated static charges on the planes makes radio reception practically impossible at times.

To quote from Mr. Hucke's report given before a meeting of the Institute of Aeronautical Science, and the American Association for the Advancement of Science at Denver, Colorado.

"A study of the noise indicates that it has a very short wave length and that its attenuation with distance is rapid. The area of interference production is continuous with the trailing edges of the airplane. When a resistor was added in series with the point, the interference was materially reduced by a change in the noise *field-pattern* to a location in the rear of the airplane and comparatively isolated from it. Curves run on resistors (*Continued on page* 310)

Which is the best ANTENNA for the DX "FAN"?

By George W. Shuart, W2AMN

Short-Wave "Listeners" Can Greatly Improve their DX Results by using one or more of these simple directional receiving antennas.

● UNDOUBTEDLY the greatest part of radio as a hobby is in *short-wave listening* and *DX-ing*, for with the ever increasing number of short-wave broadcasting stations and the tremendous increase in the number of enthusiastic "fans," listening and DXing has come to win its place in radio the same as the well established group of amateur operators. Like amateur operating, listening and DXing has become an art in which haphazard, haywire and junk receiving equipment has almost completely vanished.

Today, the S-W listener is frequently equipped with *communications* type short-wave receivers of the latest design.

Assuming that no further improvement can easily be made in the receiver itself, the next stage, of course, is the proper choice of the most efficient type of receiving antenna. Of course, the entire discussion can be ended by merely stating that the conventional transmitting type antenna could be employed. However, the listener does not require an antenna constructed in accordance with such rigid specifications, and we proposed to speak in more or less general terms and discuss *simple* receiving antennas which provide tremendous improvement in reception.

Two Important Factors for Receiving Aerial

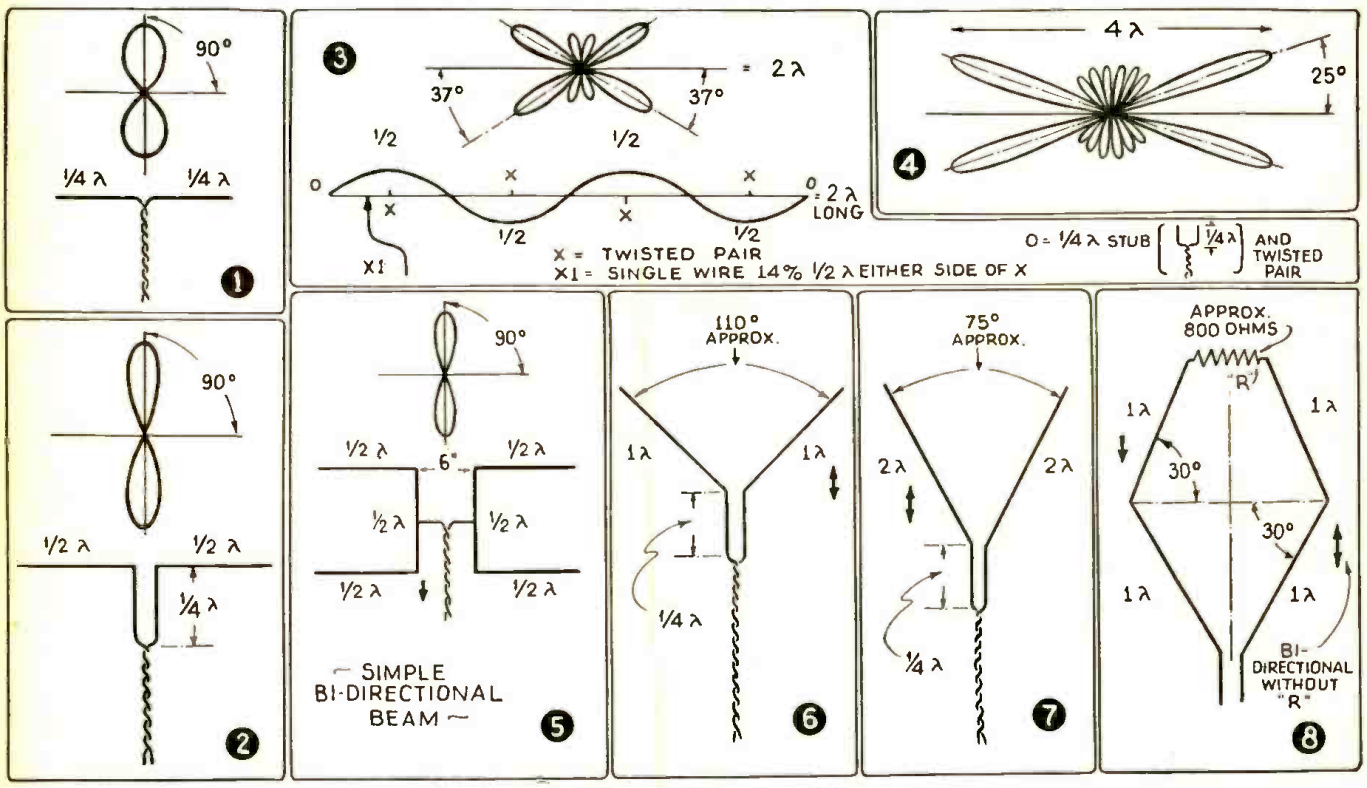
The two most important items that should be considered in the selection of receiving antennas are its *length* and its *directional* qualities, which are very closely related as will be pointed out later.

No Best Antenna for All Waves

First, let us say that there is no *best* all-wave antenna. There are a good many compromises but few of these are any better than a single 75 ft. piece of wire. Whether we desire it or not, *every* antenna has *directional* qualities; the vertical antenna, however, is probably the *least* directional of all, and under ordinary circumstances when absolutely in the clear, it is omni-directional, that is it will receive signals equally as well from *all* directions. Most vertical antennas, however, are not in the clear and do have directional qualities. It is almost impossible for the listener or "Fan" to measure the directional qualities of an antenna and therefore, he must construct an antenna according to theory and trust that it will somewhat approach the objective.

The "Simplest" S-W Antenna

The simplest of all antennas, of course, is the single half-wave doublet antenna. This should have a length equal to *one-half the wavelength in meters* of the band in which we wish to receive. In Fig. 1, we see this half-wave antenna with which almost everyone is now thoroughly familiar. It's directions of reception are at right-angles to the axis of the wire. By all means, if such an antenna is used, and it is horizontally mounted it should be positioned so that it receives signals best from that portion of the globe in which we are particularly interested. If the broad side of this antenna faces the hard-to-get stations, we will have a much better chance of attaining general coverage, for while the easy-to-get stations are not received so well, the fact that they are easy-to-get will permit them to be received regardless of the position of the wire. It is the



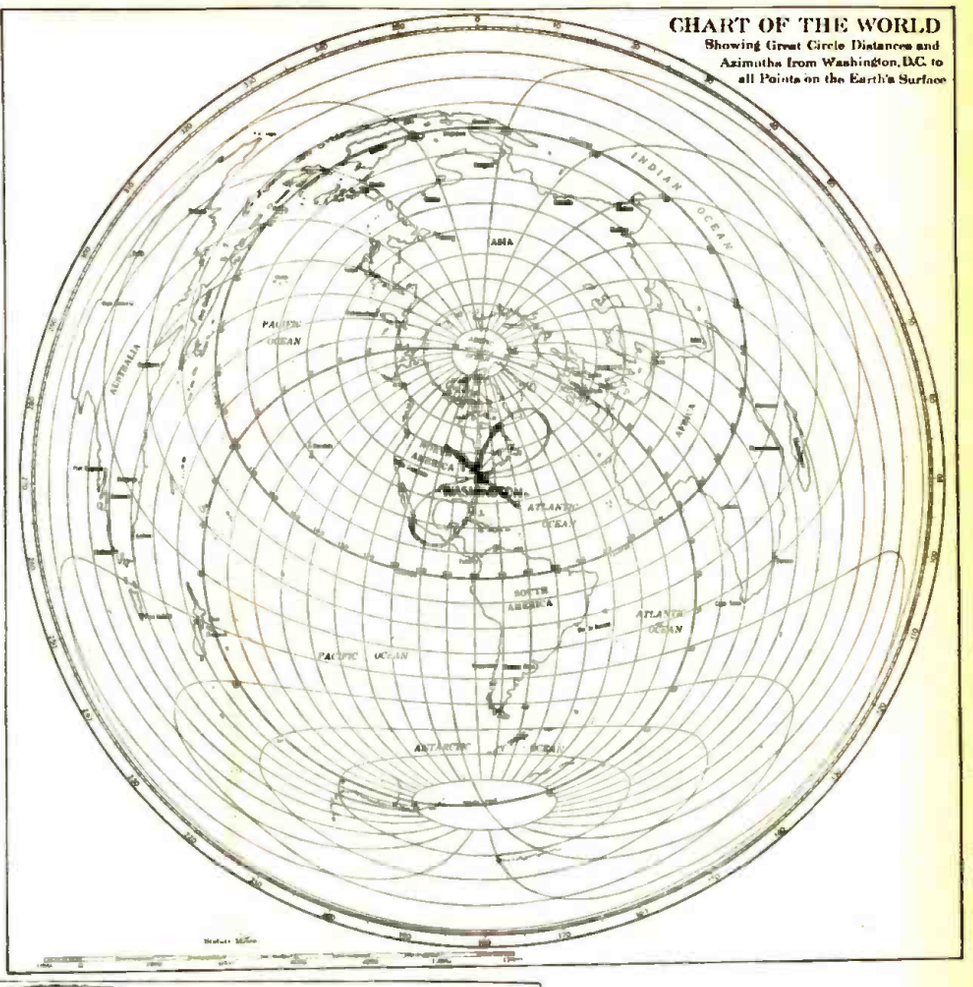
Various types of simple "directional" antennas.

very weak stations with which we are mostly concerned, or rather we should say, the stations in very remote parts of the world.

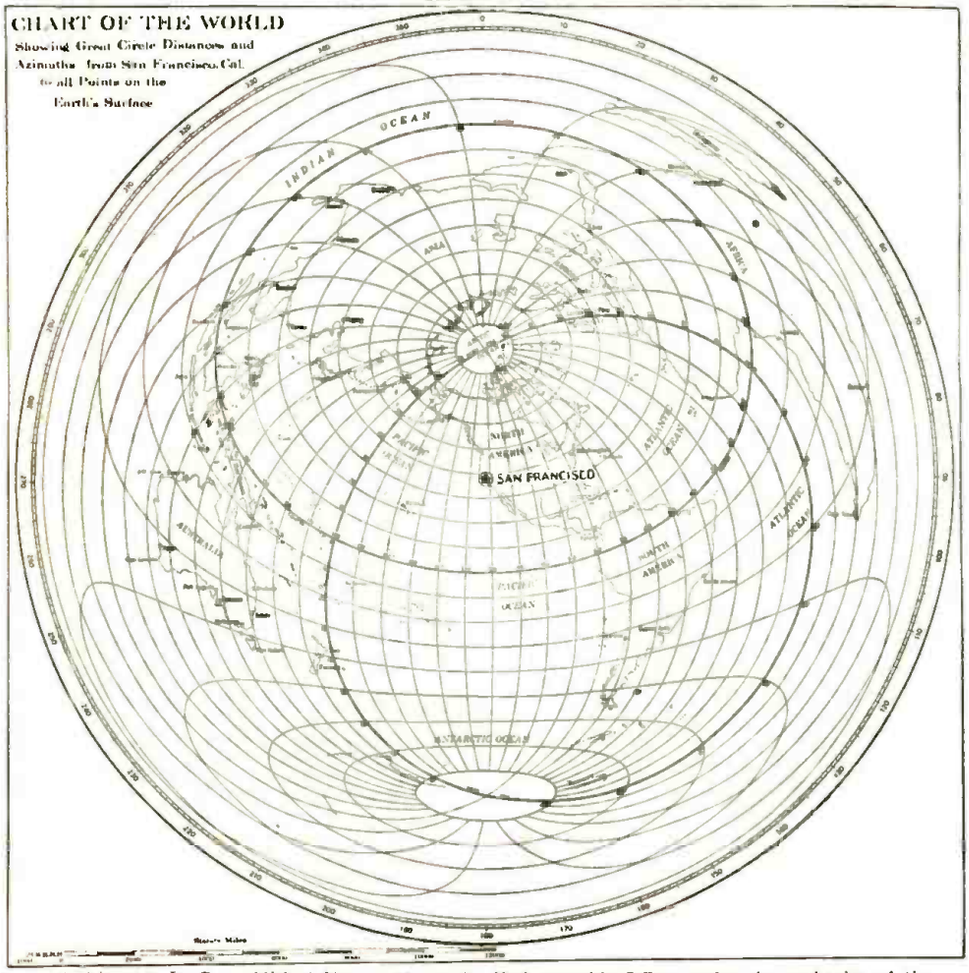
While signals greatly removed from the resonant frequency of this antenna will be received, it should be borne in mind that it will only function properly *at or near its natural wavelength*, which is *twice the length of the antenna, in meters.*

Improving "Half-Wave" Doublet

This half-wave doublet can be improved upon by increasing its length and changing slightly the method of connecting the lead-in. In Fig. 2, we find that the two halves are equal to one-half wavelength each, instead of ¼-wavelength as in Fig. 1, and the total length is a full wave-length. The twisted lead-in is not attached directly to the center of this antenna, but to what is termed a ¼ *wave matching stub*, which is nothing more than 2 wires spaced from 4" to 6" apart and running away from the antenna for a distance of ¼ wavelength. The directional qualities of this antenna are the same as in Fig. 1, except that they are more pronounced and it will have less



Right—"great circle" map centered on Washington. Below—another centered on San Francisco. These maps are essential for properly "positioning" the directive antenna, so that maximum reception from a certain direction will be assured.



Washington, D. C., published May, 1928, at the Hydrographic Office, under the authority of the SECRETARY OF THE NAVY

endwise pick-up. This antenna system is commonly termed 2-½-waves *in phase*. This antenna will also function on a wavelength equal to *twice* its total length in meters. In other words, this antenna, cut for 19 meter operation, will also function on 38 meters, while the lead-in will then operate approximately the same as the one shown in Fig. 1.

Considering a single wire, the longer it becomes the more directional it is—*endwise!* For instance, a single wire having a length equal to 4 times the wave-length it is operated on, will have a greater number of points of reception more closely associated with the end of the antenna.

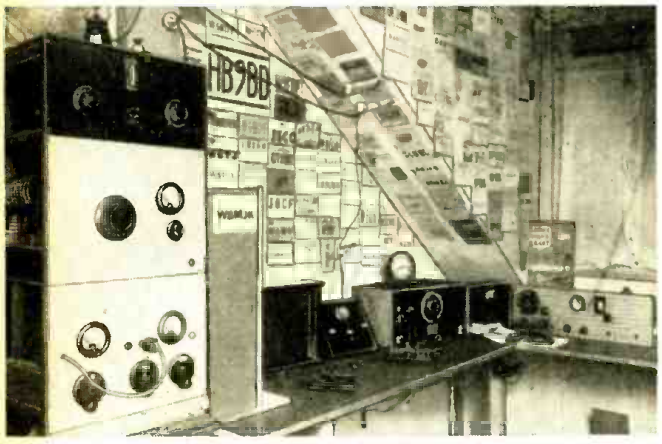
4 Half-Wave Antenna!

In Fig. 3, we observe an antenna which is four half-waves long, or 2 full waves! Here we find there are 4 predominant directions of pick-up, and these form an angle with the axis of the antenna equal to 37 degrees. Such an antenna, of course, requires considerable space for erection, since the wire must run in a straight line. If one is fortunate in having enough space available for this antenna, it can be so positioned that it will receive in 2, 3 or possibly 4 of the directions, in which we are particularly interested.

The method of *feeding* this antenna is shown in the drawing. For instance, the ¼-wave *matching section* with the twisted pair previously referred to, can be attached to the end points marked "O"; a twisted (*Continued on page* 325)

SHORT WAVES and LONG RAVES

Our Readers Forum



An S-W Voice From Switzerland

The Transmitter at the left is three-stage, with a 6L6 used as a CC Tri-Tet buffer and push-pull at 100 watts. The antenna used is a 40-meter (125 ft.) Zepp. with good results. The receiver is a National H.R.O. and works very satisfactorily.—Reinhard Lutz, HB9BD, Kasernenstr, 25, Zurich, Switzerland.

FROM SOUTH AFRICA

Editor, SHORT WAVE CRAFT:

My introduction to *Short Wave Craft* took place last year in June, when dropping in at the bookstore—I was on the lookout for any type of radio book. I noticed it, and glancing over it at once saw *that it was no ordinary book, but first-class material.* Needless to say, I at once purchased it, and by gosh, I sure was glad. Ever since then I have been a regular reader; month after month, I have worried the bookstore man, asking him for the latest edition, before it had even arrived. How I pore over the pages, studying each page carefully and thoroughly. I must congratulate you, Mr. Editor, on turning out such a fine magazine, at so low a price. I always look forward to the *Short Wave Kinks;* they are so useful to the experimenter. I might tell you that I am "raw" at the game, but have hopes of learning more about radio. I have built the Duo-Amplidyne (Mr. Shuart's) but have not completed it yet. I have great hopes for this little set. And if what Mr. Shuart says is true (I am sure it is), then I will be able to enjoy programs from all the American stations; at least some, I hope.

Wishing your paper success and luck,

CECIL J. THACKWRAY,
Head Office, Barclays Bank,
Church Square,
Pretoria, S. Africa.

(F. B., Cecil, and glad to know you find "S. W. & T." not only interesting but useful as well.—Editor.)

LIKES "JOE MILLER" DEPT.

Editor, SHORT WAVE & TELEVISION:

I have been reading your very fine magazine since December 1935. Up to November 1936 I secured my copy at the newsstand, but when I read your sixth anniversary offer, I sent in my subscription and also for my copy of the *Short Wave Guide.*

Every Short-wave *listener* and *experimenter* should have a copy of this excellent book. It contains some very valuable information and some excellent diagrams of short-wave receivers. I hope all of your readers take my advice and secure a copy of the *Short Wave Guide.*

Up-to-date I have "logged" thirty countries and have verified all of them. I have one hundred verification cards at present and I am aiming at two hundred during the summer.

I am a member of the *Short Wave League*, The *Radio Signal Survey League*, and *The International Broadcasting Club of London.*

I would like to hear from any other short-wave listeners, *foreign* or otherwise. I will answer all letters received and exchange S.W.L. cards. So get busy, fellows, and let me hear from you!

I hope Joe Miller keeps up the fine work he is doing. I enjoy his articles very much.

So here's wishing you success with your magazine; with best of luck, I remain,

"A Constant Reader"
FORREST CAMPBELL, JR.
405 East Fourth Street.
Berwick, Pennsylvania.

WE'RE HIS CHIEF SOURCE OF "INFO"

Editor, SHORT WAVE & TELEVISION:

SHORT WAVE & TELEVISION has been the chief source of my latest radio information for the past eight years. Of late, I am very much interested in Ultra High Frequency, and your magazine always contains new and better developments on five meter operations, etc.

Enclosed you will find photo of my "rigs." The one on the left is the 160 meter set which consists of 47X-46 buffer and a pair of 46's in the final C1. C. To modulate it is the double-button mike, 57 speech, 45 driver and a pair of 46's in class B. The receiver next to it is an 8 tube all-wave superhet. Above it is my 5 and 10 meter super-regen receiver, which contains 6C5 det; 76 audio and 42 final audio, with built-in dynamic speaker and power-supply. Hanging on the wall over the 160 meter "rig," is my 5-meter transmitter. It uses a pair of 45's in *long lines* with about 70 watts input. To modulate it, I used the same modulator which I employ with my 160 meter rig. The 5-meter antenna is a two-wire matched impedance, which is only 50 ft. above the ground. Recently I was heard in Indianapolis, Indiana, and in Cincinnati, Ohio—which I think is very good for 5-meters. The reason for my good DX is the method by which I couple the antenna to the *long-lines*, which is hairpin coupled and tuned with a midget condenser.

James D'Amato, W2BXL, and his station.

James D'Amato, W2BXL
703 Rogers Avenue,
Brooklyn, N. Y.

YOUNGEST FRENCH YL

Here is a very sweet young mademoiselle, we dare say the youngest French "YL." Photo submitted by Robert Muguet, 58 Rue de Verdun, Meudon, France. A high frequency receiver is shown at the left.

SMALL SETS PERFORM WONDERS

Editor, SHORT WAVE & TELEVISION:

On page 125 of the July 1937 issue, Mr. Kahlert, W2BHZ has a very timely article. I wish to add my "two-bits" worth to it. I am only an SWL at the present time, but enclose my DX list. My first receiver was a 2-lunger, 30-30, and my best DXing on it was PLN. I have heard plenty on this set, and I regret that I tore it apart.

My second receiver was a 30-33, it also did good work. While I am now using an A.C. receiver, I still have a great respect for those little "battery jobs." The DX list enclosed was made on the present set, which is a "Sky-Buddy."

Commercial Calls Heard; all are CW.

FNRS	LIJN	GBTT	PHSN	SPW	KWF
FXE	PDQ	VIS	SGNT	PDLA	KNS
PFG	DHDL	VBS	GSYN	GLY	DFC
IRJ	ICOF	JUM	FZN	GLQR	WJH
GFBI	LCPE	GMBF	FNTQ	KSL	CKA5
OXR	RIS	OYD	TFY	WVY	DLF
FNBG	PHEG	LDTZ	RKA	KFS	DLC
JNJ	HAS2	GJKF	IAC	FTS	KPH

Stations Heard On "Ham" Bands, both phone and CW.

G-2-3-5-6	HJ-1-4	XE-1-2-3	CE-3	YV-4-5	PY2
VK-2-3-4	LU-1-5	F-3-8	VO-1-6	CO-2-7-8	NY2
T-1-2-3	HK-1-3	HC-1	VP-2-3-7-9	CM-2-7	HH2
K-4-6	ON4	CE-3	HI-1-5-7	OA4	SM4

Calls Heard on 40-Meter CW.

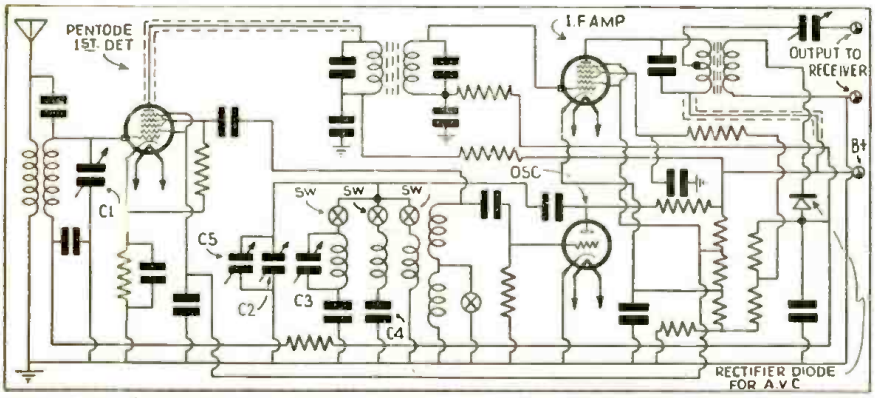
SM4VM	LAJ	FXG
W6GFS	NWV	EFC
EUF	NOT	FJQ
	W7FCM	G3DA

R. G. SUMMERS,
990 Lafayette Ave.,
Buffalo, N. Y.

(More "Short Waves and Long Raves" on page 335).

WORLD-WIDE SHORT-WAVE REVIEW

—Edited By C. W. PALMER



Short wave "converter" hook-up, covering waves from 5 to 350 meters. It is used with a regular B. C. receiver.

Two Interesting Short-Wave Schemes

● Two very interesting circuit developments were published in recent issues of German and Austrian radio magazines.

The first which appeared in *Funk* (Berlin) is a de luxe short-wave and ultra-short wave converter. The unit contains a coil switching arrangement covering the wave-lengths of 5 to 350 meters. A pentode first detector is used with a separate triode oscillator; the latter being plate-tuned for greatest frequency stability.

The frequency changer is followed by a stage of I.F. which is tuned by iron-dust core I.F. transformers tuned to a frequency of about 1370 kc. This high I.F. reduces the set to have repeat points on the oscillator condenser, and also allows the oscillator to be tuned to a high frequency for all bands, so that only 3 sets of coils are required to cover the wide frequency range of 60 mc. to 800 kc. The I.F. stage also adds to the sensitivity of the entire set and because of the double I.F., (the 1370 k.c. stage and the frequency of the I.F. in the regular broadcast receiver with which the converter is used) the sensitivity and selectivity of the set are unusually good.

The values of the parts are not shown, as the unit described is a commercial one available in Germany and the values of parts were not published. However, the advanced short-wave builder will have no trouble utilizing the ideas shown in a unit comprising American parts.

The second circuit idea appeared in *Radio Amateur (Vienna)*. It consists of coupling an ultra-short-wave oscillator to a receiver having one stage oscillating. (The set can be a super-regenerative set, a regenerative set or a superheterodyne.) The external oscillator is loosely coupled to the receiver and is tuned. Then, any station, irrespective of its frequency will be received when that frequency equals the difference between the oscillator and that to which the oscillating receiver is tuned. This novel *all-wave circuit* has been found to be quite selective in spite of its simplicity.

Since the oscillator is tuned to ultra-short waves, a very wide range of frequencies can be received without coil changing, and in fact, with the correct combination it is feasible to cover both the broadcast band and all the commonly used short-wave bands without any coil changing or switching.

The details of the local U.H.F. oscillator can be worked out by the constructor since no circuits were presented in the foreign magazine.

Mobile Short-Wave Equipment

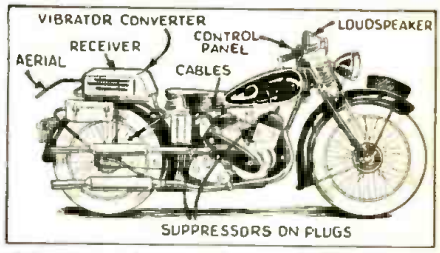
● IN England, radio amateurs hold "field days" in which portable equipment is demonstrated in transmitter spotting and in communication between mobile units. These field days replace the conventions and "hamfests" which are the usual means of getting together in this country.

The English hams are extremely jealous of their portable equipment developed for this purpose and the various clubs all vie for the best looking, most novel and most effective samples of mobile and portable equipment.

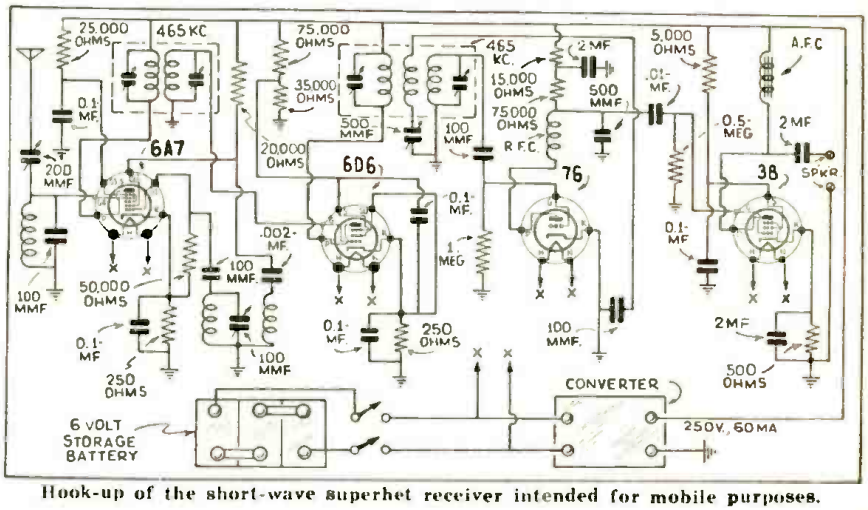
A good example of the extent to which this competition is carried is seen in the accompanying photo and circuit of a mobile superheterodyne receiver developed for use on a motorcycle, which was shown in a recent issue of *Television and Short-Wave World (London)*. This receiver, which is designed to cover one of the most popular amateur bands, uses American tubes in a conventional superhet circuit having a 456 kc. I.F., a triode second-detector with no A.V.C. and a pentode output tube for maximum signal voltage gain.

The entire set is housed in a metal container 12 ins. long by 6 ins. deep by 6½ ins. high. The aerial is a short metal rod projecting from the rear of the set cabi-

(*Continued on page* 322)



Mobile superhet receiver especially developed for use on a motorcycle.



Hook-up of the short-wave superhet receiver intended for mobile purposes.

$25.00 FOR GOOD 1-TUBE SET

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

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

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

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

A Real "Pocket-Size" S-W Receiver

By H. G. McEntee, W2FHP

Here is the smallest "complete" 2-tube short-wave receiver the editors have seen! The tiny receiver shown in the picture contains all the tuning apparatus, also the "A" and "B" batteries. It can easily be built to cover any desired range.

The author is shown tuning in a station on the "smallest" Pocket Receiver. Even a short aerial brings in lots of stations.

● IT has long been the writer's ambition to build a really small "vest pocket size" radio receiver. And, it had to be one that would contain all the batteries and not require a large overcoat pocket to fit in. It would necessarily have to contain all batteries, because really tiny sets have been built many times, but they were *not* truly vest pocket size—as another and much larger pocket was always required for the *batteries!*

Up until a short time ago the batteries, and especially the "B" battery, have always been the stumbling point, but with the advent of the special layer-built batteries intended for "weather balloon" use, the midget set-builder's troubles have come to an end. This 45 volt unit is just about the size of a single large flashlight cell. Of course the life is not very great, but it is quite sufficient when we consider that the current drain is only one milliampere or so.

Naturally, the smallest possible parts have been used throughout. The Hivac small-size tubes are highly efficient, yet of very small dimensions. It was originally intended that the tubes, which come with long prongs, should be used with the corresponding sockets. With the smallest possible dimensions as the goal, it was decided, however, to dispense with the sockets. Accordingly, the tube prongs were carefully sawed part way through, then bent until they came off. Connections are soldered directly to the stubs thus formed. Incidentally, these tubes are also made with short prongs, in which case the above work would be unnecessary.

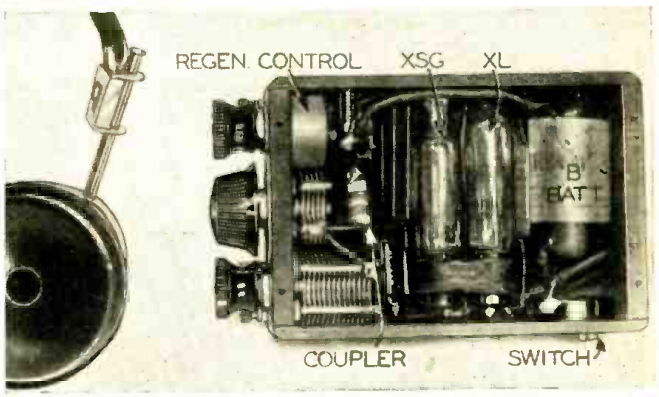
The tubes are bound with thread to an aluminum bracket, which in turn is screwed to the side of the case. The thread binding is smeared with Duco cement to hold it firmly.

There are two tuning condensers, a 100 mmf., and a 35 mmf., the latter being used for *band-spread*. Both are dismounted from their isolantite end-plates and fastened directly to the "panel" end of the case. The stator plate tie-rods are threaded to permit small nuts to be used for the purpose.

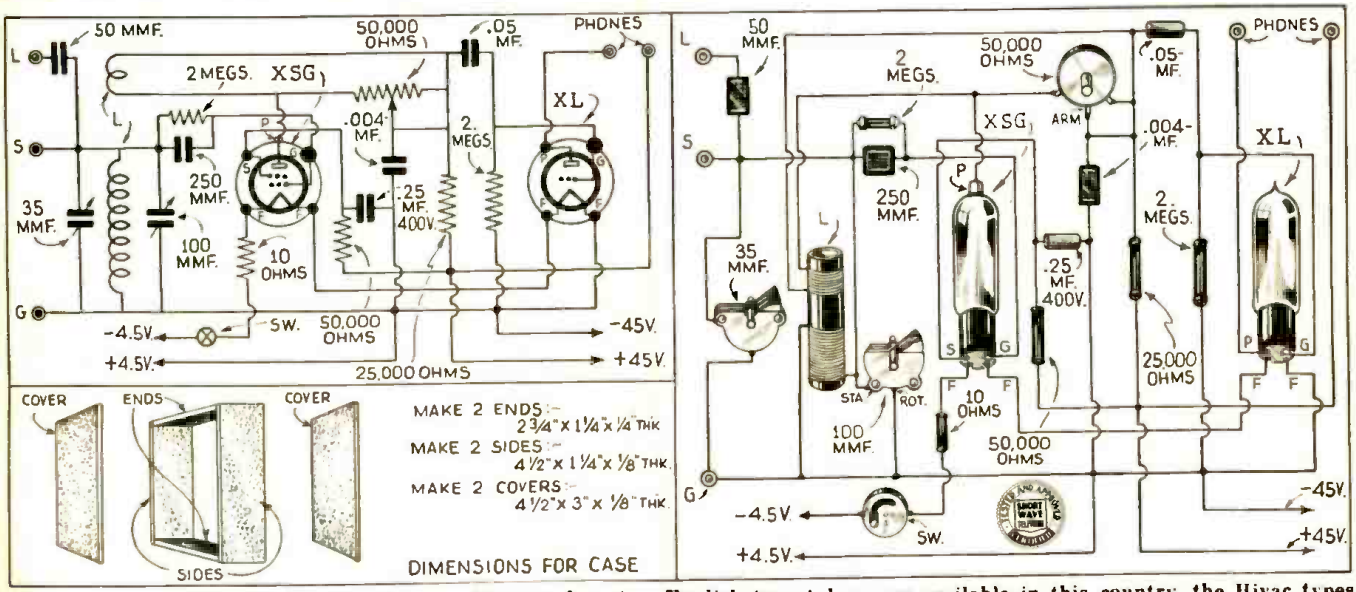
The "off-on" switch is a regular S.P.S.T. type as used on volume controls. A screw-head is soldered to the operating lever, and projects about 1/16" out from the slot in the case.

The case is made of *pressed wood*, all parts ⅛" thick, except the ends which are ¼". The frame is glued together first, then the sides are attached with tiny wood screws. The finish is obtained by two separate coats of clear lacquer, with sandings between and a final rub-down with powdered pumice. The surface is then given a coat of auto wax. All holes should be made before the finishing, so that the surface will not be marred.

The circuit is quite simple with no tricks whatsoever. Regeneration is controlled by a midget potentiometer connected across the tickler. The coils are made from a five-section R.F. choke. Only two are used, so the others are removed and the isolantite rod nicked in the center and broken in half. The number of turns used depends upon the band one desires to cover. With the two full coils in use, one as secondary and one as tickler, about the lower 2/5 of the broadcast band (200 to 340 meters) may be covered. With this as a starter, simply remove turns equally from both coils until the desired frequency is (*Continued on page* 318)



The headphone at left of picture shows by comparison the small size of this "pocket" receiver. It is essentially a headphone job, but plenty of "sock" is assured.

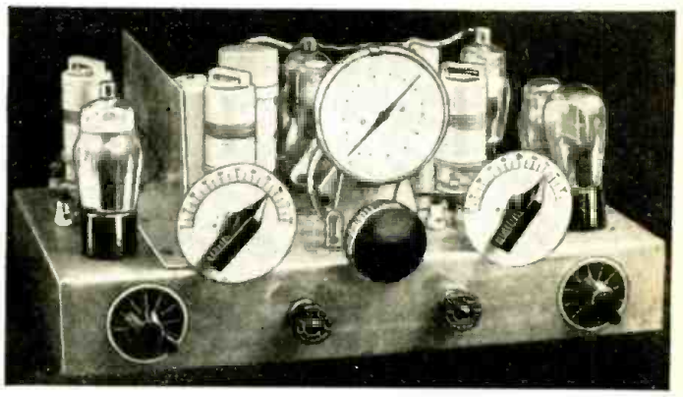


Wiring diagram for the "pocket" receiver, which employs two English type tubes now available in this country, the Hivac types XSG and XL.

A 7-Tube Battery Super-het

By Mander Barnett

This interesting receiver uses 7 two-volt battery tubes, and the plate-supply can be taken from 90 to 135 volt "B" battery or other plate-supply source. This set has a high signal-to-noise ratio and among other features it permits CW reception without the use of a beat oscillator.



Front View of the 7-Tube Battery Super-het

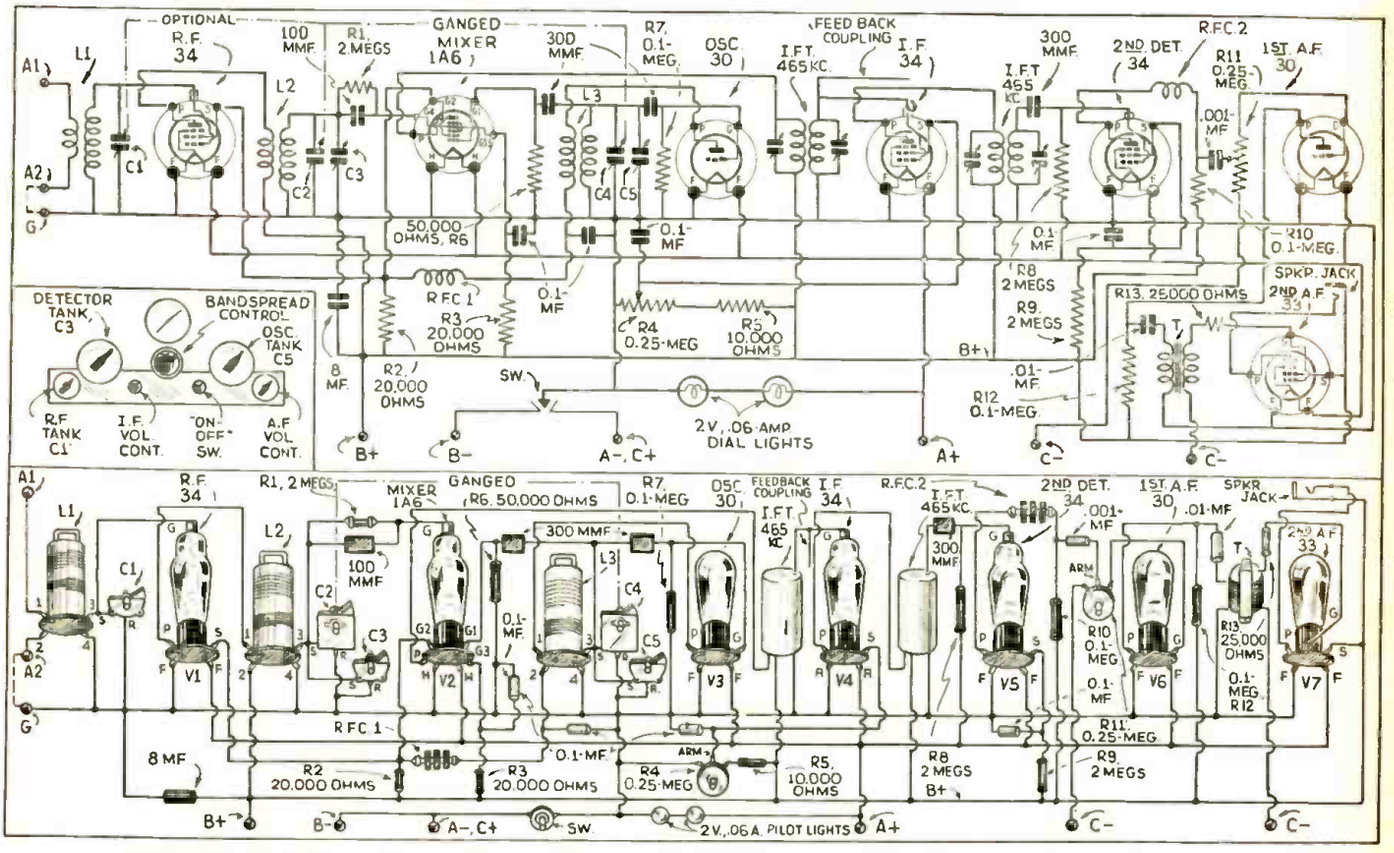
● FOR some odd reason, battery-operated short-wave receivers don't seem to receive the amount of attention they deserve. There are still many occasions when a battery receiver can be really useful and when no public power supply is available or when the supply is too erratic and poor to use for short-wave reception, a battery-operated receiver is essential. Apart from all this, the writer thoroughly likes a battery receiver and having set out to design a set which would do just a little more work than the average three and four-tube battery *straight* set, presents this seven-tube receiver which finally satisfied his requirements and which is capable of doing a lot of really useful work.

Of the seven tubes, a 34 is used in a pre-detector R.F. stage, and is followed by a 1A6 which is used as a mixer in conjunction with a type 30 as separate oscillator. This is followed by a 34 as I.F. amplifier and another tube of the same type as second detector, a type 30 and a 33 pentode completing the audio side of the receiver. Full band-spread tuning is employed and the set has put up a really good record for work. Used in England, it has pulled in short-wave stations from all over the world, including hams on the 10, 20 and 40 meter bands, besides many American police transmitters working between 8 and 10 meters, the best of which has probably been W2XEM, at Newark, N.J. Dozens of South Americans, as well as most of the usual North American broadcasters have been heard, and many of these stations will often come in with sufficient strength to fully "load" a speaker with the volume control open.

Set Easily Built, Using Standard Parts

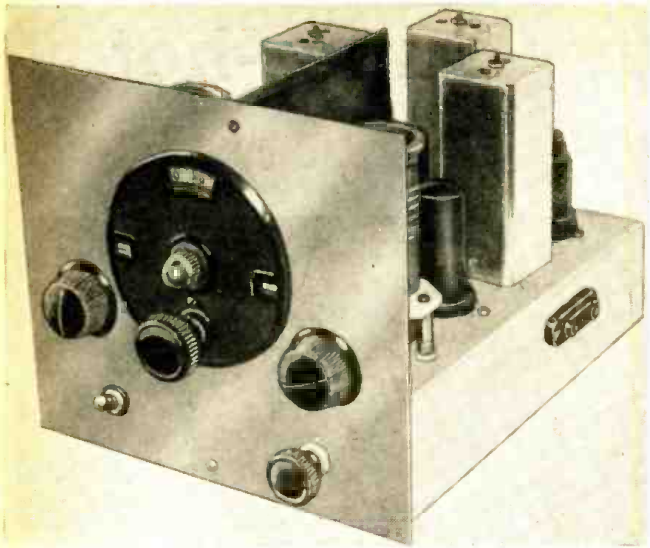
The set is easy to build and uses all standard parts. Home-made plug-in coils were used in the original but any type of efficient plug-in coils with primary and secondary windings (four-pin bases) will do. In the original set there are three sets of coils for each wave-band and all three sets are identical. The chassis is made of tin-plate and measures approximately 16¼" x 9¼" x 2½" deep and the general layout can be seen from the photographs.

To the immediate left of the chassis, viewing from the front, is the R.F. tube and coil. An aluminum screen, running the length of the chassis from (*Continued on page* 322)



Schematic, As Well As Picture Wiring Diagrams for Building the 7-Tube Battery Set, Are Given Above

The KAHLERT For "Fan"



The Kahlert 5-tube super-het makes a very neat looking job, as built by the author. It may be placed in a metal or other cabinet at the option of the reader.

● Many S-W enthusiasts have felt that they would like to get out of the T.R.F. class with a small super-het that didn't run into much money; one that, for its low construction cost, would provide plenty of *gain* and *selectivity*. In this case a large set, shield cans and trimmings were simply out of the question. We would like to present our answer to the problem, a set which gives surprising results amid our crowded short-wave channels. The set to be described is a *five-tuber*, using a 6A8 first detector, a 6F6 power-type electron-coupled oscillator, two high-gain I.F. stages employing 6K7's—and a 6N7 twin-triode second detector and beat oscillator. The new metal tubes with their self-shielding properties, help to make a compact layout and the set is mounted on a small chassis without shielding complications. At least we thought so until later experience showed that the shielding "skeleton" needed two more bones. The set is mounted on a chassis 7½ in. by 10 in., made of 1/16 aluminum and the front panel is 8½ in. by 7½ in. The chassis has a depth of 2¼ in. to take care of the resistors and condensers, with ample spece for experimentation. If the aluminum is carefully scored and bent it is possible to fool anyone into believing it was done on a power machine.

Panel Arrangement

Looking at the front panel we see the main tuning dial and to either side the *trimming condenser* knobs. Below the left trimmer knob, which is that of the first detector, is the beat oscillator switch and under the right trimmer knob the volume control. Looking at the top of the set the two coils are either side of the midget Hammarlund tuning condenser of 50 mmf. per section. These small condensers are among the finest we've seen and are ideal for a set like this. Immediately behind the coils are the 6A8 to the left and the 6F6 to the right, with the beat oscillator coil shield can between. The two I.F.'s are to the rear with the 6N7; this arrangement was attempted to give the *shortest* possible leads between stages, and to help cut down *stray-capacity feedback*. The antenna coupling coil leads are brought through a twin phone-jack, mounted on the side under the first detector coil and the phone leads through another jack on the right. Voltage leads are brought out to the back and terminate in a wafer socket. We are using isolantite throughout in the *front* end, where the *gain* would be low without it, even though this increased the cost. The system of tuning and band-spread employed permits the set to be used as a band-spread "ham" receiver and as a regular short-wave *broadcast* tuner, merely by changing the number of coil turns tuned by the main tuning condenser.

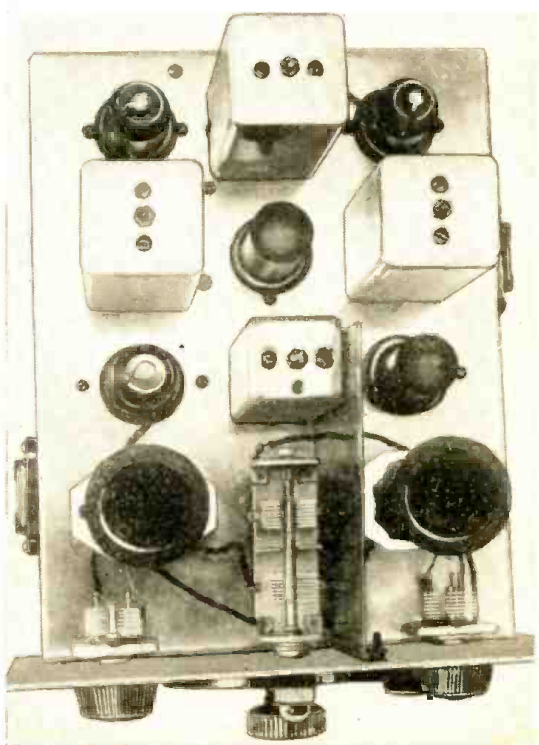
The Plug-in Coils

The coils themselves are wound on low-loss Hammarlund XP-53 coil forms with No. 30 wire. Tests were made with air-wound coils but we had difficulty through vibration of the oscillator coils, even though they were wound with No. 14 wire. For real sticklers on *low-loss* refinements we would suggest form-wound oscillator coils and self-supporting detector coils on the high frequencies. The goodly length of the XP-53 forms allows spreading out the turns of the high frequency coils to give real high Q where it is really needed. The antenna coils in all cases are wound on the "hot" ends of the coils.

The circuit of the *front* end employs a 6F6 electron-coupled power oscillator, to make certain we shall obtain plenty of current on the first grid of the 6A8, which modulates the electron stream. This oscillator supplies the necessary power *without pulling* and since the output is taken from the plate circuit, rather than the grid circuit, it is very stable. The output is taken from the oscillator plate through a 50 mmf. postage "stamp" type mica condenser. According to the tube data books the best conversion efficiency with the 6A8 is realized with from 10 to 25 volts rectified oscillator voltage on the No. 1 grid; this is an easy job for the set-up used. If one is in possession of an 0-1 scale milliammeter, correct operation of the 6A8 on any frequency can be visually verified by inserting the meter at X in the diagram. The right reading is between 0.2 and 0.5. The shell of the 6F6 in this instance is left *ungrounded* for better output, unless interaction makes better isolation necessary.

Iron-Core I.F. Transformers Used

The I.F. amplifier with the two 6K7's really takes care of the *gain* in the set and the new Hammarlund high-gain *iron-core* units are employed. We received a really agreeable surprise when we took the works out of the second stage transformer for inspection. In the first and second stage transformers, the grid connection is tapped down on the coil and the transformer to be connected between the second I.F. and the second detector has the regular connections. If this were not done, the *gain* in the tuned circuits would be too high for practical stability. Careful consideration too should be given to the circuit to keep down instability. Much trouble is often encountered in IF amplifiers on account of the fact that *self-bias* is used to get the negative grid voltage for bias and volume control. Nearly all *self-bias* arrangements have a tendency toward *regeneration* because the amplified signal flowing in the plate circuit produces a voltage drop in the bias resistor, and this drop is applied to the grid of the tube. The effect is much more apparent in audio amplifiers than in radio frequency stages, but the trouble it causes has the same effect. When trouble from oscillation develops in R.F. amplifiers much can often be done with R.F. chokes and large condensers in the grid bias and volume-control circuits. Volume is controlled in this set with a 10,000 ohm switch-type volume-control, the switch being in the B— lead to cut the plate voltage if desired.



Another view of the 5-tube superhet. It requires a minimum of shielding and works very smoothly, as tests "on the air" have demonstrated.

5-Tube Super-het or "Ham"

By Ernest Kahlert, W2BHZ

This 5-tube super-het will appeal to short-wave enthusiasts whether they are Fans or Hams. It uses plug-in coils, which greatly simplifies the construction. The plate-supply may be taken from any convenient unit. Grid power-detection is employed and iron-core I.F. transformers boost the "gain" remarkably.

Grid Power-Detection

In the second detector we decided to use grid power-detection instead of the more conventional plate rectification. This necessitated dropping the detector voltage to around 100 volts and the use of a grid condenser and grid-leak. The most satisfactory values are anywhere from 0.1 to 1.0 meg. for the grid-leak and from .00005 to .0005 mf. for the grid condenser. Those chosen are .4 meg. for the leak and .0001 for the condenser, as this gives about the best compromise between sensitivity and power handling capacity with the 6N7. The approximately 100 volts for the detector is taken through a voltage divider of 15,000 and 10,000 ohms. The high mu of the 6N7 triode is particularly adapted to this type of detector, which is most favorable to high mu tubes. A small R.F. choke and two 0.001's (mf.) take care of R.F. in the plate circuit. The *beat-oscillator* uses the other triode sections of the tube. The oscillator circuit is not the conventional one usually employed for beat oscillator triodes. As the beat oscillator transformer procured was for *screen-grid* and pentode tubes necessary modifications had to be made. The coil was unwound to the *tap* and a piece of insulation from an old "B.C." R.F. coil wound over the large part of the coil remaining. The wire taken off was then rewound, *scrambled fashion*, and four leads brought from the coil instead of three. In wiring one must be careful to get the proper polarity to the tickler coil, otherwise no oscillation will result.

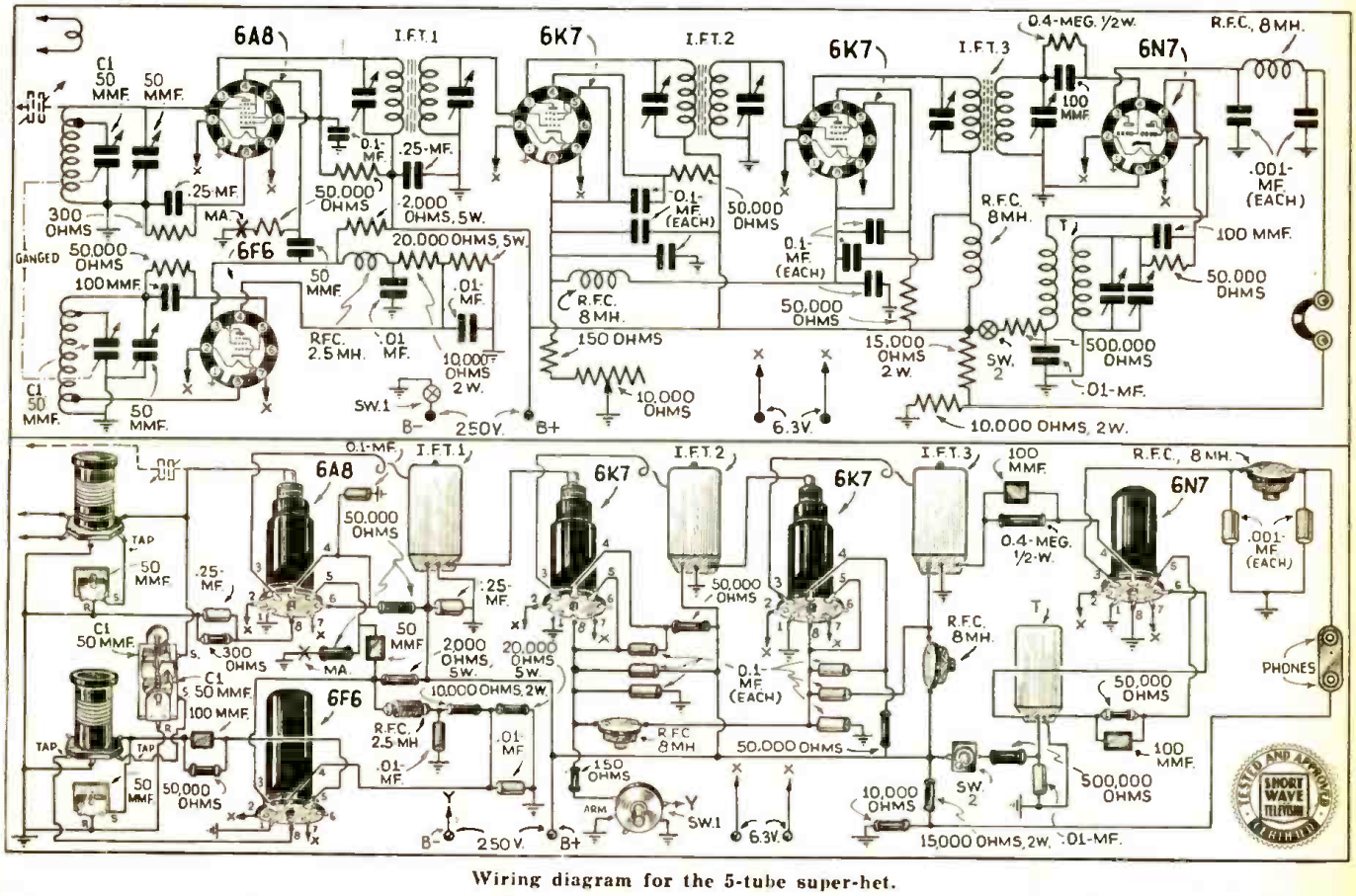
Test All Parts Before Assembling

After assembling the parts on the chassis it is wise to test all the resistors and condensers, especially if some are not new. Even with new parts, one is liable every now and then to find a "dud." It is best to make sure and test all resistors for continuity and the condensers for holding a charge. Wiring should be carefully done and checked, for, even with close attention, a mistake can be made and a lot of time can be uselessly spent before one realizes what the trouble really is. Getting a set going is generally a matter of individual preferment but in the case of a super the writer likes to get the *front* working first. This is easily done here by pressing into service the BC super tuned to 550 kc. Output is taken from the 6A8 plate through a condenser, choke and a couple of feet of hookup wire to the antenna post. In tuning up this model it seems that the first detector circuit is slightly regenerative, which greatly increases the *gain* and *selectivity* necessary to keep the image down to a minimum or reduce it to nothing at all. After trying the front end, the I.F.'s were lined up. Personally we think it best to use a test oscillator and output meter, but this is rarely the case. A loud station can be tuned in and the I.F. tuning condensers varied till the loudest signal is obtained.

B-Supply

Regarding the B-supply, it is best to use three condensers in a double-section filter to keep down hum, or three condensers and one choke—two of the condensers being connected in parallel across the output. The pack here is one of three condensers with one choke and the field of the dynamic speaker, A 41 amplifier stage is also built into

(*Continued on page* 319)



Wiring diagram for the 5-tube super-het.

The 5-40-400 Transmitter

By Arthur H. Lynch, W2DKJ

Chairman, Ultra-High Frequency Committee, Garden City (N. Y.) Radio Club

Third of a series. We now come to the consideration of the power and modulating equipment.

The operating shack at W2DKJ, Garden City, L.I., N.Y. At the time the picture was made, the station was running at 400 watts, 200 ma., on the right-hand meter; 30 ma., of excitation on the left-hand meter. Placing the modulator, oscilloscope, microphone and receiver on the operating table has proven a great convenience and reduced the feedback which was noted when the speech amplifier was nearer the R.F. portion of the "rig."

● PERHAPS it is a bit unfortunate that all the equipment we are about to describe was constructed and in operation before George Shuart's illuminating article on *modulation* appeared in the August number of *Short Wave and Television*. We have in mind applying some of the ideas which he suggests and believe that the ham who really knows what it is all about, will have no difficulty in making the few changes in the equipment we will now consider, which will enable him to secure the results which have been so thoroughly worked out by others.

While our own transmitter has been designed to have an input of four hundred watts, to the final stage, it will be observed that the improved efficiency with which that wattage may be employed by suitable modulation, for voice transmission, if the necessary precautions are taken, we will have an effective power output of much the same distance covering ability as seven hundred watts would give us in the ordinary manner. If we are interested in those bands in which i.c.w. is permitted, the capability of our rig will be extended even further. When, to the above, we go so far as to consider that the suggested increase in effective power is accompanied with an actual reduction in the interference we cause other stations, it would seem too good to be true.

Of course it is possible to go on with a lot of glittering generalities, but the proof of the pudding is in the eating" and, since our second article was written, we have been *on the air* quite a bit and the results have been very gratifying. We can not refrain, in passing, from having a few remarks about our own experiences which may save others many of the headaches we had to endure, before things really began to happen in the fashion for which we had hoped.

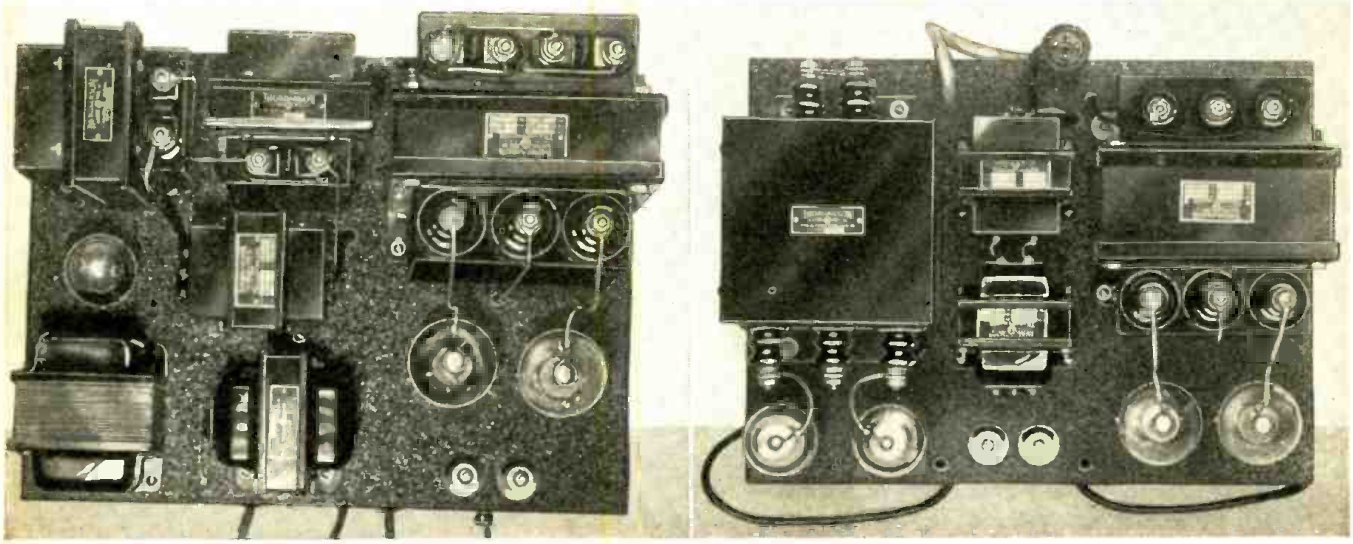
Antenna Most Important Element

Our second article described a rotary beam antenna, for five meter operation, which was made of four half wave elements, in phase. It is very light, easy to construct and very effective. In fact, our reason for mentioning it again is to emphasize the fact that whatever else we have said or will say about our transmitter is of much less importance than the selection of a suitable antenna for use with it.

The cheapest and by far the best way to increase power is by improving the antenna.

A Bit of Proof

For example, our first contact with the five meter band was accomplished with a transceiver, made up with a 30 and a 32 tube, with 90 volts on the plate of the oscillator. It was used in connection with a half-wave doublet, made up of two quarter wave elements, center-fed, by a low impedance line. Very satisfactory contacts were made up to five miles. Increasing the power to forty watts increased the range to about seven miles. Of course, we are not considering the frequent occasions when much greater distances were possible, when there was no interference on the other end. Increasing the power to seventy watts, increased the reliable range to not more than fifteen miles. When we changed the antenna to a pair of half waves, in phase, stacked ver-



Above—Top view of the complete R.F. power supply, all mounted on a 13"x17"x3" heavy duty steel sub-panel. The 5Z3 delivers the supply for all the low-power tubes, including the RK-37. The 66 rectifiers deliver the voltage for the final stage. This view is misleading—the transformers are really quite high, and there is none too much room in a metal cabinet, designed to take two 8¾"x17" front panels, as the rear view on the opposite page shows. Right, above—Top view of the modulator power-supply. The smoothing chokes and filter con densers are mounted on the upper front panel.

tically, the range went up to twenty miles and we now come to the point which we trust will demonstrate the desirability of making the antenna as good as possible.

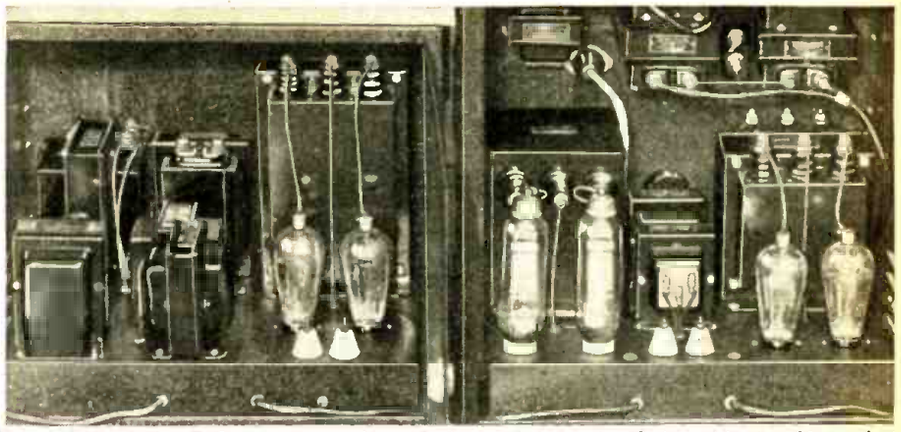
100 Miles on 5 Meters

Still using the two half-waves, in phase, and making no other changes we increased power from seventy to four hundred watts. Stations which were within fifteen miles told us that we had a terrific "sock" and that we should really "go to town." Stations twenty or thirty miles distant told us that we were doing nicely, until some *local* came on with ten or twelve watts and then we were swamped. It was not until we finished our beam and began operating it that we really began getting any benefit from our 500% increase in power.

Now, with three hundred instead of the four and five hundred watts we had been using, our signal is giving us reliable coverage up to fifty miles and frequent coverage up to seventy-five, with occasional contacts up to more than a hundred miles. A few entries in our log tell the story graphically. Similar results are now being reported by many others using similar beams.

And so to the consideration of the power and modulation equipment for our transmitter.

The jump in the cost of power equipment when we get above four hundred watts input to the final stage, is likely to make the average ham think of the war debt, so we have striven to get as much power per dollar as possible, without resorting to the very questionable practise of using parts of an unknown or inferior nature because they are cheap. Our own power equipment was designed for 400 watt operation and it may be run up to 500 watts for long periods without any indication of distress. We make the statement with absolute confidence, because it has been run that way for long periods. The difference in actual distance covered, however, is another question and we find



Rear view of the R.F. power supply and the modulator in their cabinets. Note that all the units for the modulator smoothing circuit are attached directly to the upper 8¾"x17" panel. The tubes to the right are the 66 rectifiers and those to the left are the RK-31s. Except for the resistors and filter condensers, everything used in the R.F. power-supply may be seen in this rear view. The "heavy-duty" sub panel holds it all.

that everything we desire is accomplished with 300 watts input to the final and that is the way it is being run right now.

Last night, (July 21), we had a long chat with W1AUK, at New Haven, Conn. The night before last, we had a similar chat with W3DZD(at Perkasie, Pa. And so it goes. Running on reduced power, in our case is made possible by the simple expedient by loosening the coupling to the antenna.

It may be that some other fellows would like to have the information on other power and modulation equipment, which will do the trick in connection with the radio frequency portion of our transmitter, described in the August number. With that idea, in mind, we will summarize a complete unit of that nature, which has been working the world on the twenty meter band, with a rhombic antenna, from Westbury, Long Island, where another member of the Garden City Radio Club holds forth, under the call of W2FPB—"Two full pint bottles." It will run the 5-40-400 transmitter at 300 watts input.

Furthermore, it is not suggested that our own transmitter has been a child for which we may claim complete responsibility. It is a combination of ideas, gleaned from our contact with hams from all over the country, both personal and on the air. Nor can we forget that it would not be existant at all, were it not for the expert workmanship of two other members of the Garden City Radio Club, who built it, namely: Ed Ruth and Harry Lawson, who are known, on the air as W2GYL and W2IER, respectively.

Not For the Tyro

To the fellow who has been on the air some time, the details of the power supplies and modulating equipment beyond those given here are hardly necessary. To those without such experience we suggest that attention be given units of a more modest type. We make this suggestion with one thought uppermost in our mind. Power, of the nature we are considering, is extremely dangerous. It is very doubtful that one would live to make more than (*Cont'd on page* 329)

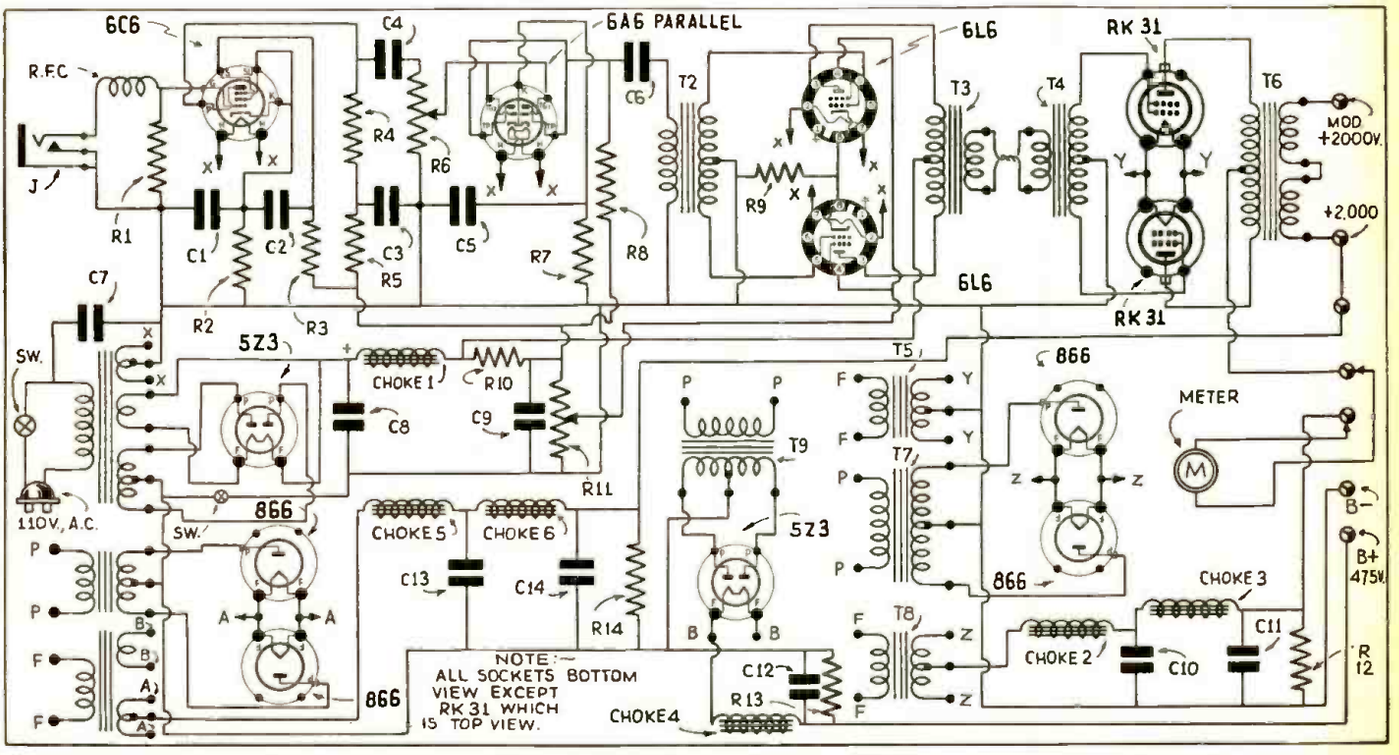
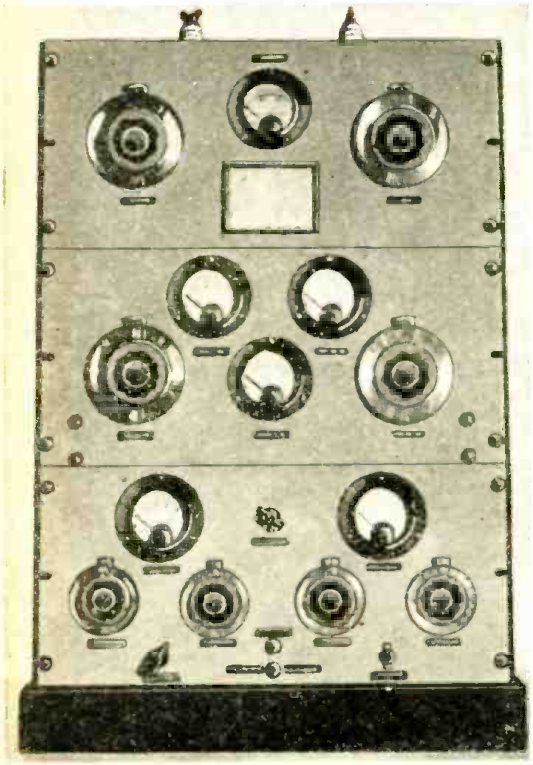


Diagram for speech amplifier, modulator and R.F. power-supply for 400-500 watt input. Diagram for R.F. portion appeared in the August S. W. & T.

H-G-M Medium



Front view of the H-G-M transmitter which features band-switching.

● IT has long been thought by this writer that the usual exciter was much too complicated, with its multiplicity of plug-in coils, and that a little study would produce great results in simplification and convenience. This has been proven the case in the unit shown here, which will produce an output of about 25 watts on 80, 40, or 20 meters and about 15 on 10 meters with only a single switch to shift.

The now commonly used "beam" tubes, 6L6 and RK39, are used, driven by a 6F6 pentode oscillator. The latter and the 6L6 tube constitute the "Pentet" circuit popularized by W2AMN and it leaves little to be desired in power output and, above all, low crystal current.

Variable Crystal Used

Since we have *rapid* band-changing with this unit, it was decided to go still further in this direction and use a variable frequency crystal. This is operated by the left hand dial on the panel and will change the output about 6 kc. on its fundamental frequency in the 80 meter band. This gives us nearly 25 kc. in the 20 meter phone band, which is quite sufficient to get cut from under tough QRM.

Also on the panel is a knob for the crystal switch, which in the original exciter selects any one of three crystals. The variable crystal is mounted in the socket set vertically next to the panel. Incidentally, the variable crystal does not change noticeably in output power over its entire range. It may be seen then that an exceedingly flexible arrangement, capable of from 15 to 25 watts output on 10 to 80 meters is the result of this combination of features.

Since the final amplifier does not need anywhere near the top output of the exciter, all the tubes are run at very moderate ratings. The final is one of the new RK20A's, which is really a "tougher" RK20. It is similar to the latter in all characteristics, but draws 3.25 amperes filament current and has a hard glass envelope. This tube will give between 80 and 90 watts output at 1200 volts, as it is run in this transmitter. The 10 meter output is somewhat lower, of course, around 70 watts being the limit.

As a safety measure, all plate circuits in the transmitter are of the parallel feed type, thus all tuning condensers are mounted directly on the chassis and are "hot" only with R.F. Another safety measure is the use of fixed bias throughout. It is a wonderful feeling when, on failure of excitation, all meters drop downward instead of bending their needles around their respective pins!

Enclosed Cabinet Recommended

Although the transmitter may be built in any type of cabinet or rack, it is strongly recommended that the sectional *enclosed* type as used here be employed. All equipment is then protected from dust or damage, and the rack may be added to at any time. This latter feature is of great importance since a forthcoming article will describe a complete power-supply and modulator in sectional units which will bolt on to those shown here.

Construction is quite straightforward throughout. Sockets for the 6F6 and 6L6 are mounted ¾" above the chassis, while the RK39 is mounted in the vertical shield. The plate coils L1 and L2 are wound on 1" diameter isolantite forms, although bakelite would

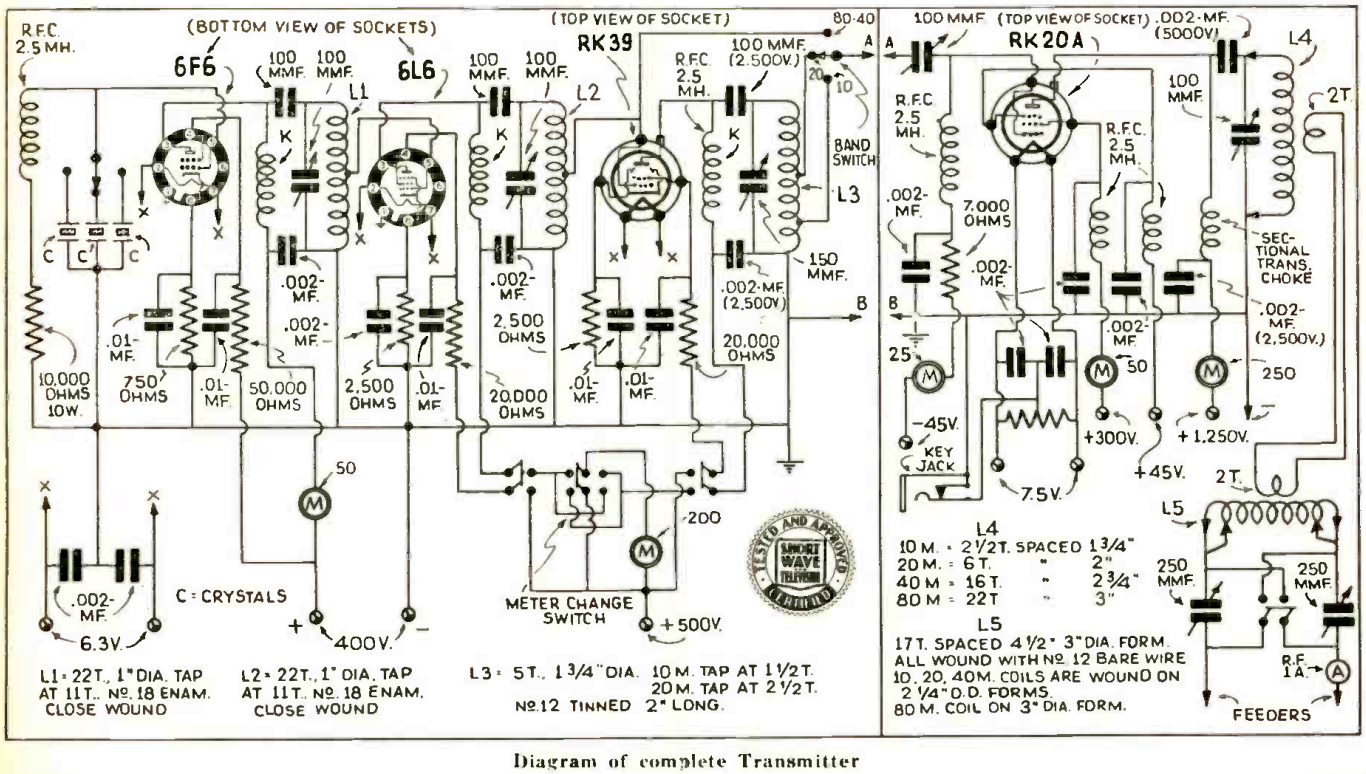


Diagram of complete Transmitter

Power Transmitter

By Howard G. McEntee, W2FHP

This transmitter has been carefully worked out by the author and tried on the air with excellent results. It uses the latest parts and has an output of 90 watts. Band-switching is a new feature and the transmitter may be used for either C.W. or phone. The bands covered are 80, 40, 20 and 10 meters.

do quite well. The coil, L3, is self-supporting and after being adjusted to the correct size, strips of celluloid glued to the turns hold it quite rigid.

It is advisable to follow the layout shown as it has proved to be quite trouble-free and no self-oscillation is apparent in any of the circuits. When working with a 40 meter crystal the 6L6 will sometimes oscillate feebly, but only when the 6F6 is not in operation. With excitation, the 6L6 behaves very nicely. The RK39 is always used as a multiplier and so gives no oscillation troubles.

Final Amplifier

The *final amplifier* is very simple. The 100 mmf. grid coupling condenser is mounted on feed-through insulators, one of which has a banana jack soldered to the bottom. A lead from the band-changing switch connects to this by means of a banana plug. A base-plate is used on the final amplifier chassis to prevent coupling back to the crystal and other preliminary circuits, and this connection scheme permits easy removal.

The RK20A is mounted horizontally, and the socket is held in an aluminum casting originally made for front-of-panel vertical-tube mounting. It is necessary to drill new socket holes so that the tube will lie with the various filament strands in a vertical plane. The plate end of the tube is supported on a feed-through insulator by means of a small fuse clip. It was found that the circuit worked better with the plate choke mounted under the chassis, rather than as shown—probably because it was then out of the field of the plate tank.

The three photos at the right show respectively from top to bottom—rear view of antenna tuning unit; rear of "final amplifier" stage and lower view—rear of the "exciter" stage.

The 80 meter coil is longer than the others, so two jacks are mounted on one of the stand-off insulators that support the coils.

All power connections are made to both chassis by cable plugs, the only exception being the final amplifier high voltage which goes in through a feed-through insulator on the rear. This mode of connection makes it a cinch to remove any of the units from the rack.

Aerial Tuning Unit

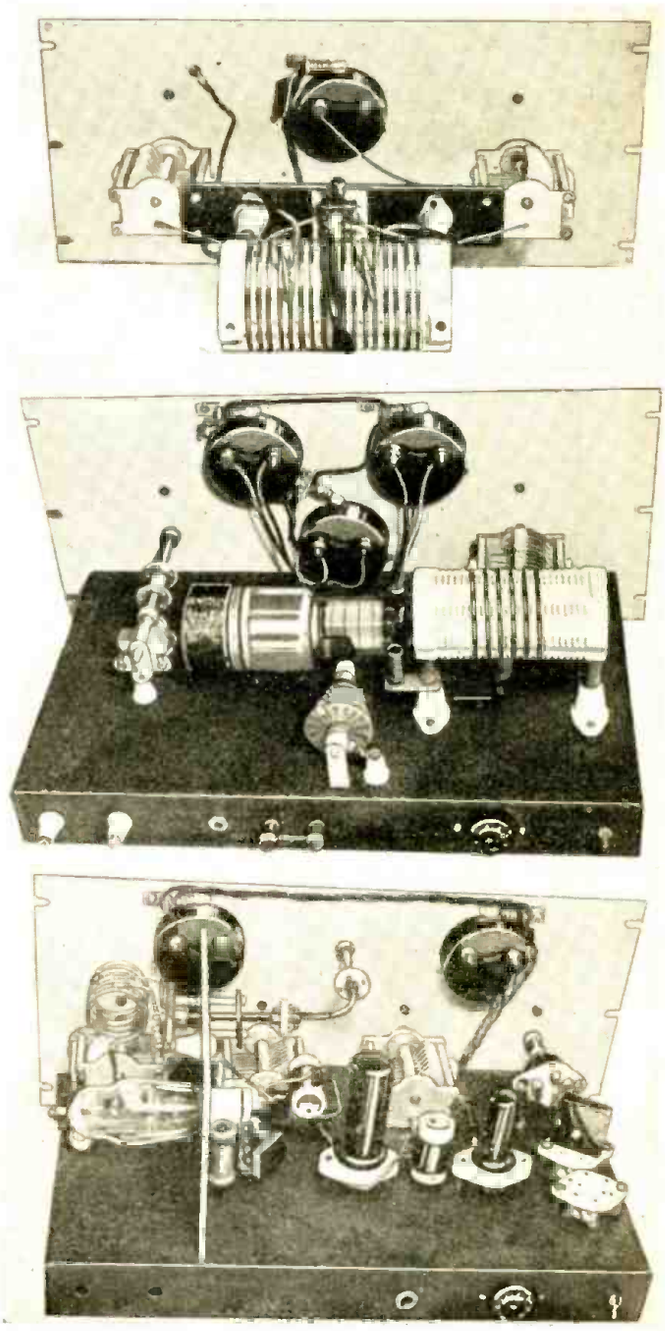
The antenna tuning unit needs little description. The condensers must be insulated from the panel, and have a bakelite strip fastened to the rear of them which supports the coil and the condenser switch. When the latter is open the condensers are in series with each feeder, while when closed they are both in parallel across the coil.

Getting the set into operation consists chiefly of getting the coils cut to proper size, and once this is done and the supply voltages are correct, full operation is easy to obtain.

With an 80 meter crystal, the condenser across L1 will be set at about 75, while with one of 40 meters it runs near 20. The 6F6 always works as a straight pentode oscillator and with a plate supply of 400 volts it should draw about 15 to 20 ma. when loaded. The tank condenser across L2 tunes about the same. For 40 or 80 meter output the band-switch stays on the same tap. Considerable power is lost in the grid circuit of the RK39, but as more than sufficient power is available for driving the RK20A, it was not thought worth the extra complication to switch the RK39 out of the circuit. The latter tube should be tuned to a *resonance dip* to keep the plate current at a reasonable value. The 6L6 runs at between 40 and 60 ma. plate current, depending upon load and upon whether it is doubling or not.

For 20 meter output the band-switch is shifted and the condenser across L3 is set about 80. The 6L6 plate tank must be tuned to 40 meters. For 10 meter output simply shift the band-switch again and tune the RK39 plate to 10 meters or about 20 on the dial. This tube will run at about 50 ma. when driving the RK20A grid to 15 ma., the latter tube unloaded.

While the supply voltage for the 6L6 and RK39 is 500 volts it should be noted that with the cathode bias employed, the actual plate voltage is much less than this, being well under 400 volts on both tubes, since both are run at rather high bias. A toggle switch changes the 200 ma. meter from one tube to the other, while other switches are provided to cut the plate and screen circuits (*Continued on page* 314)



Short Wave Scouts

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

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

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

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

FORTY-SECOND TROPHY

Presented to

SHORT WAVE SCOUT

LI CHI CHIANG

217 Richelieu St.

St. Johns, Quebec, Canada

102 Stations—96 Foreign

For his contribution toward the advancement of the art of Radio

by

SHORT WAVE TELEVISION

Magazine

● MR. CHIANG wins the forty-second Trophy with the excellent total of 102 stations. In his report he mentions that 160 stations were contacted for verification, but only 102 came through. He also mentions that some stations refuse to verify after two to three reports.

The receiver employed by Mr. Chiang was a G. E. 8-tube superhet. Some additions were made to this receiver, such as phone-jack and beat oscillator in order to aid in reception. The antenna employed was 78 ft. of the doublet type with 50 ft. of transposed lead-in. This is coupled to the receiver through a tuner built from data given in the article by George W. Shuart in *Short Wave & Television*.

To quote Mr. Chiang: *"This gadget is sure helpful at times, especially when it is very noisy."*

We congratulate you, Mr. Chiang, on your excellent work in obtaining 102 verification cards and hope you like the trophy.

List of Short Wave Stations Heard and Verified from February 18th to March 19th, 1937

Total, 102 Stations—96 Foreign

Canada

Call—Frequency Location

CFCX—6065 kc.—Canadian Marconi Company, Montreal, Quebec.
CFRX—6070 kc.—"Rogers" Short Wave Station, Toronto, Ontario.
CRCX—6090 kc.—Canadian Broadcasting Corp., Bowmanville, Ont.
CJRX—11720 kc.—James Richardson & Son, Ltd., Winnipeg, Man.
CJRO—6150 kc.—James Richardson & Son, Ltd., Winnipeg, Man.
VE9HX—6130 kc.—Maritime Broadcasting Co., Ltd., Halifax, N.S.

Foreign Short Wave Stations

United States

W1XAL—6040 kc.—World Wide Broadcasting Corp., Boston, Mass.
W2XE—6120 kc.—Columbia Broadcasting System, Inc., New York, N.Y.
W2XAF—9530 kc.—General Electric Station, Schenectady, N.Y.
W2XAD—15330 kc.—General Electric Station, Schenectady, N.Y.
W3XAU—6060 kc.—Philadelphia, Pa.
W3XAU—9590 kc.—Philadelphia, Pa.
W3XAL—6100 kc.—National Broadcasting Co., Bound Brook, N.J.
W3XAL—17780 kc.—National Broadcasting Co., Bound Brook, N.J.
W9XAA—11830 kc.—"The S.W. Voice of Labor," Chicago, Ill.
W9XF—6100 kc.—National Broadcasting Co., Chicago, Ill.
W8XAL—6060 kc.—The Nation's Station, Cincinnati, Ohio.

Central America

Mexico

XECR—7380 kc.—Oficina de Propaganda, Mexico, D.F.
XEBR—11820 kc.—Radiodifusora de Sonora, Hermosillo, M.
XEWI—11900 kc.—Estacion Radio Cultural, Mexico, D.F.
XEUZ—6120 kc.—National Broadcasting Network, Mexico, D.F.

Guatemala

TGWA—9450 kc.—Radiodifusora Nacional, Guatemala City.
TG2X—5940 kc.—De La Policia Nacional, Guatemala City.

Panama

HP5B—6030 kc.—Radio club Miramar, Panama City.
HP5J—9590 kc.—La Voz de Panama, Panama City.

Honduras

HRD—6235 kc.—La Voz de Atlantida, La Ceiba.

West Indies

Cuba

COCO—6010 kc.—Havana.
COCX—11600 kc.—La Voz del Radio Philco, Havana.
COCQ—9750 kc.—Havana.
COCH—9428 kc.—General Broadcasting Co., Havana.
COCD—6130 kc.—La Voz del Aire, S.A., Havana.

Dominican Republic

HIT—6630 kc.—La Voz de la Victor, Ciudad Trujillo.
HIH—6780 kc.—La Voz del Higuamo, San P. de Macoris.
HIX—6340 kc.—Ciudad Trujillo.
HI2X—11960 kc.—Ciudad Trujillo.
HI1J—5865 kc.—San P. de Macoris.

Haiti

HH2S—5910 kc.—Societe Haitiannede Radiodiffusion, Port-au-Prince.

Honorable Mention

FRED LANAWAY

London, England

STANLEY LA RUE

Beverly Hills, Calif.

South America

Venezuela

YV1RH—6360 kc.—Ondas del Lago, Maracaibo.
YV1RL—5930 kc.—Radio Popular, Maracaibo.
YV1RB—5850 kc.—Ecos del Zulia Maracaibo.
YV1RD—6070 kc.—Radiodifusora Maracaibo, Maracaibo.
YV1RI—6210 kc.—Radio Coro, Coro.
YV5RC—5800 kc.—La Habla a la Nacion, Caracas.
YV5RF—6375 kc.—Ecos del Caribe, Caracas.
YV5RD—6150 kc.—Radiodifusora Venezuela, Caracas.
YV5RH—6400 kc.—Emisora Ondas Populares, Caracas.

Colombia

HJU—9510 kc.—La Voz del Pacifico, Buenaventura.
HJ1ABG—6042 kc.—Emisora Atlantico, Barranquilla.
HJ1ABP—9600 kc.—Radiodifusora Cartagena, Cartagena.
HJ3ABD—6050 kc.—Emisora Nueva Granada, Bogota.
HJ3ABH—6012 kc.—La Voz de le Victor, Bogota.
HJ4ABP—6030 kc.—Emisora Philco, Medellin.
HJ4ABU—6145 kc.—La Voz de Pereira, Pereira, Caldas.

Ecuador

HC2JSB—7854 kc.—Ecuador Radio, Guayaquil.
HC2RL—6635 kc.—Quinta Piedad, Guayaquil.
El Rrado—6625 kc.—Riobamba.

Chile

CB615—12300 kc.—Radio Service, Santiago de Chile.

Brazil

PRF5—9501 kc.—Comb. Radio Internacional de Brasil, Rio de Janeiro.

Argentina

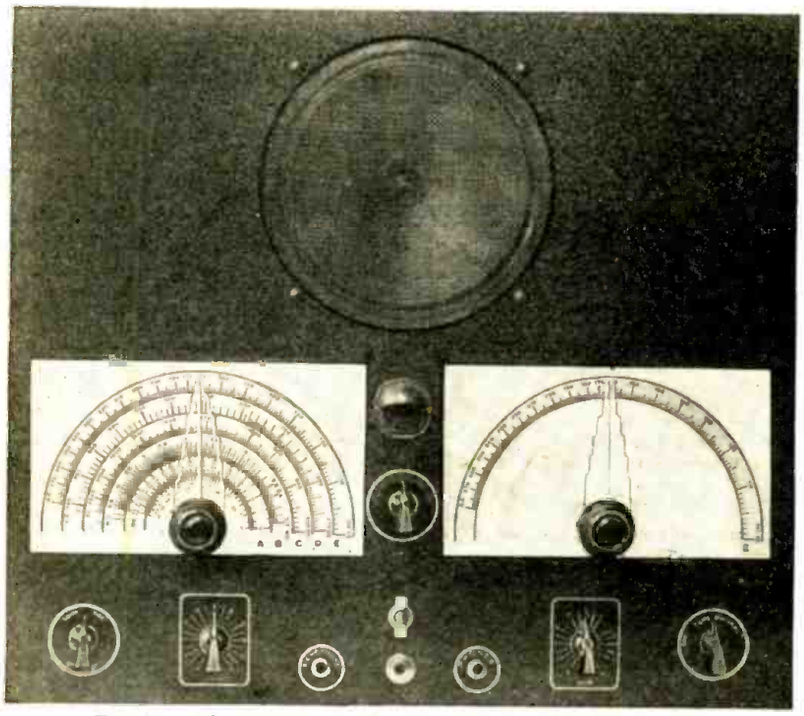
LRX—9660 kc.—Radio el Mundo, Buenos Aires.

(*Continued on page* 323)

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.

A De Luxe 10-Tube Trans-Receiver



Front panel appearance of the "Ultra Stratosphere Ten".

This interesting combination transmitter-receiver has a receiving range of 2.5 to 4,000 meters, and transmits on 2.5 and 5 meters. It has dynamic loudspeaker, band-spread, large calibrated tuning dials, built in A.C.-D.C. power-supply, tone control, etc. Set is available in kit form or assembled and wired.

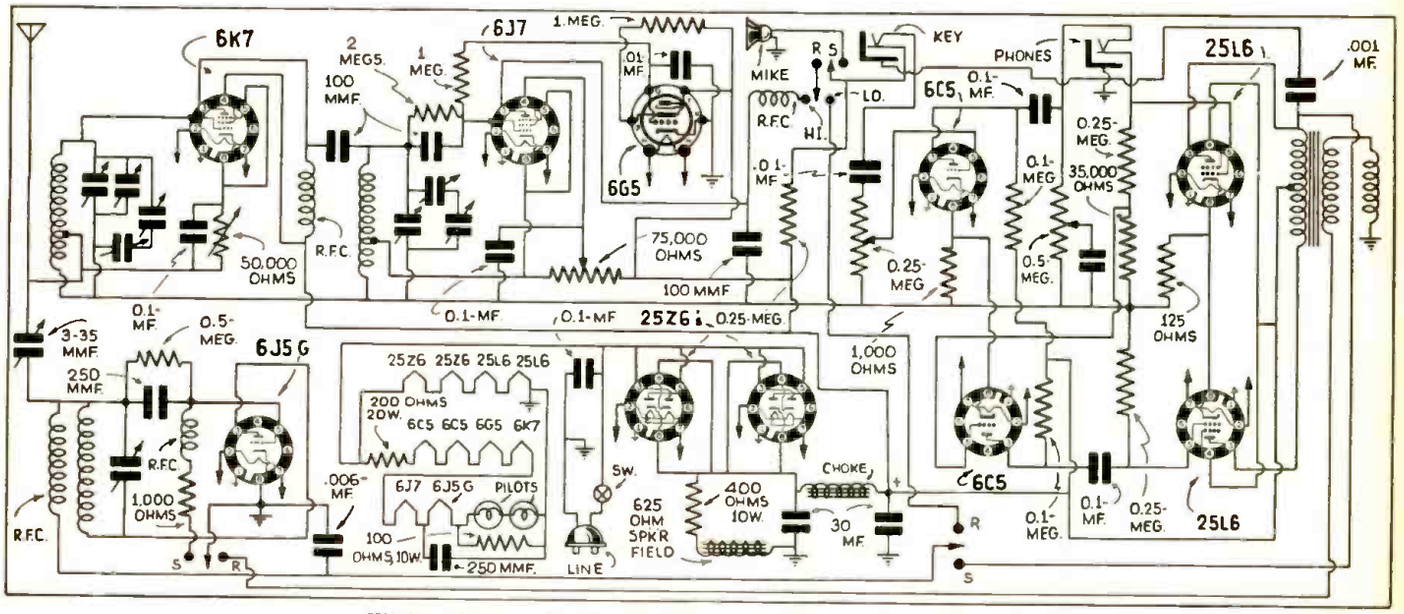
● THE new 1938 "Ultra Stratosphere Ten" is an interesting transmitter-receiver recently developed, and owing to the form of circuit worked out for it, it is a very flexible set, highly suited to the various requirements of the S-W experimenter. The ten tubes are used as follows:

1—6K7, regenerative tuned R.F. amplifier; 1—6J7, regenerative detector from 15 to 4,000 meters; 1—6J5G, super-regenerative detector from 2½ to 15 meters and transmitting oscillator from 2½ to 5 meters; 2—6C5s push-pull 1st audio speech amplifier, and driver stage; 2—25L6s, beam power output stage and modulators; 2—25Z6s, parallel rectifiers; 1—6G5, electronic tuning indicator and R meter, together with sensitivity control.

Among the features of this new transmitter-receiver is that it may be built from a kit of parts by the average Ham, or it is available completely assembled, wired and tested. As a receiver its range is 2.5 to 4,000 meters, while the transmitter unit of the set operates on 2.5 and 5 meters, at the option of the operator. An 8" dynamic speaker is part of the set-up. Other features are a calibrated R.F. gain control, an A.F. gain control, tone control, and an R.F. resonator control. Separate electrical band-spread is provided and the dials are large illuminated 8-inch diameter affairs. The set may be used for I.C.W. and phone transmission and also as a code practice oscillator. Standby switch is provided, and an automatic phone jack. There is an A.C.-D.C. built-in power supply, also.

The R.F. stage is tuned to produce greatest efficiency. Sufficient regeneration is incorporated to derive all possible tube gain, yet the spill-over point into oscillation is never approached on any band. The tube used in this stage is a 6K7. A resonator control is provided for this stage to always keep it tuned to resonance.

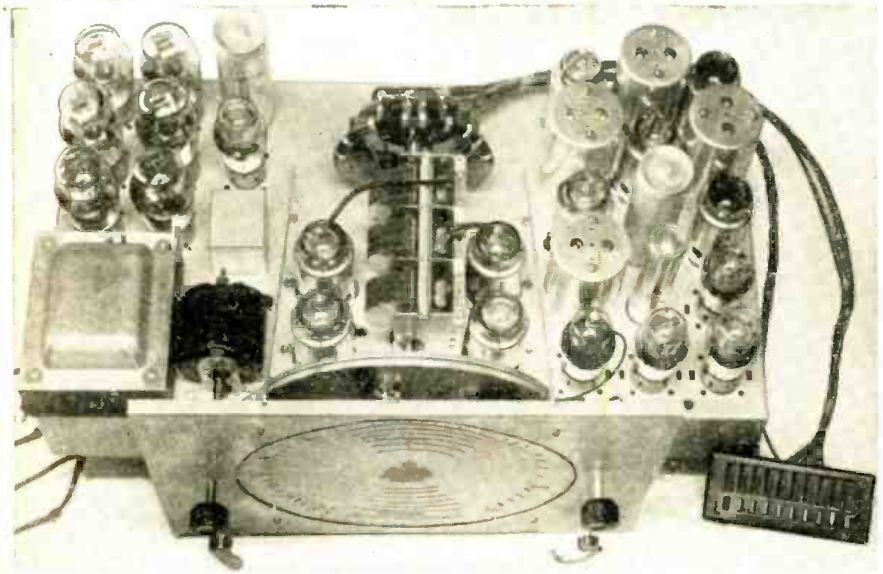
The regenerative detector is used to cover only from 15 to 4,000 meters. For the shorter wave- (*Continued on page* 315)



Wiring diagram for the 10-tube transmitter-receiver. No. 653.

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

MULTI-PURPOSE SWITCH ON NEW 20-TUBE SET



20-tube Midwest chassis with new tone and A.F.C. control here described. No. 651.

● A VERY interesting feature of the Midwest 1938 Deluxe line, is an ingenious control, which performs a multiplicity of functions.

The control takes the form of a switch, having two rotating fingers, each at ground potential and spaced four contacts apart. The switch can be rotated into eight positions.

The circuits are so arranged that the switch controls the tone cycle and the audio expansion features of the receiver, both motorized with Automatic Frequency Control and non-motorized without A. F. C. The above is illustrated clearly in the picture diagram of Fig. 1.

Figure 2 indicates the manner in which the set is made to operate, either motorized or non-motorized by means of the control. It will be noted that the electrical push-button return, which is required to be at ground potential to allow the motor to operate, is connected to contacts Nos. 1, 2, 3, and 4 only, of the control. The receiver is then motorized in these 4 positions only. In any other position the push-button return is open-circuited. Thus, it can be seen that the control is able to discriminate against the motorized feature of the receiver, at the will of the listener.

Referring now to Fig. 3, which is a duplicate of the lower portion of Fig. 2, it will likewise be seen that the control does not offer this discriminating characteristic, insofar as the tone cycle, or tone control of the receiver is concerned. It is obvious that after arm (B) moves from contact No. 5, to the next contact beyond No. 8 (not shown in figure), arm (A) moves over the same contacts, i.e., Nos. 5, 6, 7 and 8. Since the circuits associated with the tone control are terminated in these contacts, the tone cycle is in no way altered when switching from non-motorized position to motorized position or vice versa.

What has been said for the non-discriminatory characteristic of the control regarding the tone, and with respect to motorized and non-motorized operation, may be said for the volume expansion feature, since likewise the control circuit for the expander terminates at No. 5 contact.

Now refer to Fig. 4 which explains the operation of the control, as far as A. F. C. is concerned; it is seen that the "hot" side of the discriminator voltage line is connected to contacts Nos. 9, 10, 11 and 12 of the control. As Arm (B) traverses from contacts No. 9 to No. 12 inclusive, the A. F. C. control voltage is "grounded" so that it is no longer available to operate the A. F. C. feature. The control thus exhibits the same discriminating characteristic against A. F. C., as mentioned previously.

In order to solidify the entire function of the control in the reader's mind, Fig. 5 is shown, which is a composite diagram of all the figures illustrating each phase of operation of the switch.

When arm (A) is in positions 1, 2, 3 or 4, during which time arm (B) is in position 5, 6, 7 or 8 respectively, the push-button return, which must be grounded to permit

(*Continued on page* 316)

1 to 16 RECEIVERS FROM 1 ANTENNA

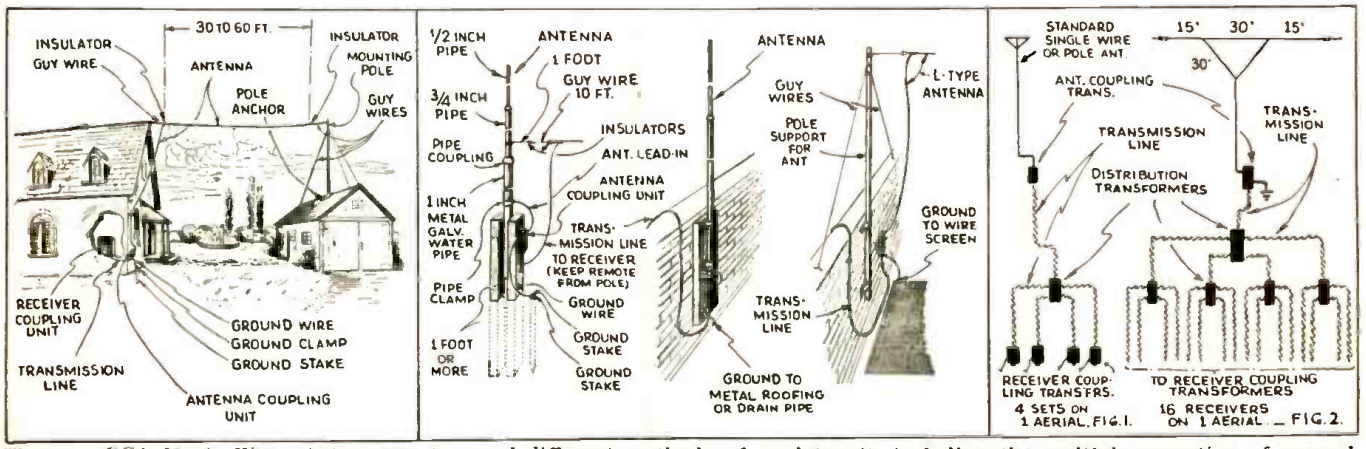
● A NEW antenna system available to the general public for use with their all-wave receiver and known as the *Magic Wave Antenna System*, permits the use of from 1 up to 16 different radio receivers from a single antenna. This new antenna system provides noise-reduction on both standard broadcast and international short-wave bands, (530 to 23,000 kc.). This new RCA antenna makes possible greatly improved all-around radio performance. The engineers have worked out a very interesting system, which involves the use of newly developed magnetite core antenna and coupling transformers. Tests have shown that this new antenna has greatly superior noise-reducing properties, and it is, at the same time, more easily installed than most of the antennas offered thus far. The operation of more than 1 set-up to 16 in fact—with a single antenna of this new type, is accomplished by the use of the new distribution transformers as shown in the diagram.

The antenna basic kit consists of one aerial coupling transformer, one receiver coupling transformer, 60 ft. of antenna wire, 45 ft. of transmission cable, 5 ft. of ground wire, 5 porcelain insulators, and one ground clamp. Where greater pick-up is desired, this antenna is entirely flexible and antenna lengths from 20 to 120 may be used, depending upon the space available. The length of the active antenna used is not critical as is the case with most doublets.

As the illustrations show, a very efficient vertical antenna may be assembled from several lengths of ordinary iron pipe and reduction couplings. By using submarine cable, also available from the manufacturers of the antenna, the transmission line from the antenna to the set may be installed under ground thus eliminating all unsightly wiring. This new antenna system is ideally suited for use in apartment buildings. A screen may be used on the roof in some cases as the *ground* for the antenna coupling transformer.

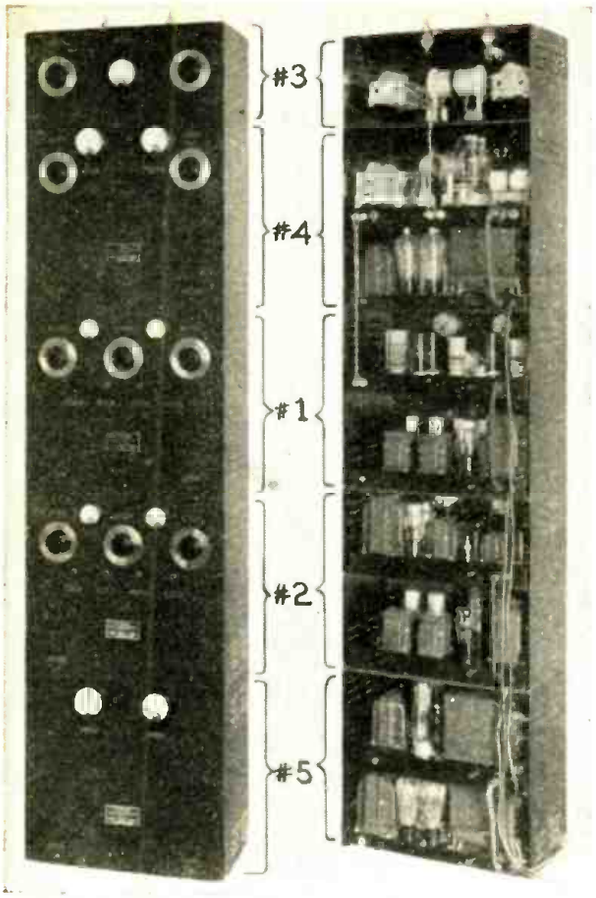
In apartments where a number of antennas are on the same roof, the vertical installation shown in one of the pictures will prove to be not only efficient, but easily installed. For large installations, where more than four receivers are to be operated from a single antenna, the special aerial shown in Fig. 2 is recommended.

This article has been prepared from data supplied by the RCA Manufacturing Co.



The new RCA Magic Wave Antenna system and different methods of applying it, including the multiple operation of several sets from the single antenna. No. 652.

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



Two photos above show the Utah amateur transmitter; the numbers with their brackets show the kit numbers, as described in the accompanying text. A fine-looking job, suited to the average pocketbook. No. 650.

New Xmitter Kits

Allow

Progressive Construction

Up to 500 Watts

● ONE of the most perplexing problems that amateurs face at some time or other is what to do with their low-power equipment, when they feel the natural urge to increase power. Usually, one must rebuild completely and end up with a lot of extra parts. This *left-over* equipment usually represents the most expensive part of increasing power.

A happy solution is presented by a new series of five transmitter kits, which are in themselves self-contained units and which may be combined with a minimum of effort. These kits are produced by the Utah Radio Products Company. Into this new idea has gone more than a full year of design and test in order to produce a transmitter which would be the last word in modern transmitter construction, and yet which would be simple and economical enough to satisfy even the most modest beginner.

All high frequency insulation is of steatite. Variable condensers are made by the National Company. For the filter condensers and mica by-pass condensers, the dependable products of the Cornell-Dubilier Corporation were chosen. The heart of any transmitter—the power equipment—quite naturally consists of sturdy, conservative transformers and chokes. Unusually great care has been taken to combine equipment of the highest quality for dependable results.

Special consideration was given to the type of circuit used, and regenerative crystal oscillator, grid circuit tuning, and link coupling throughout, increased the overall efficiency to an amazing degree. Indeed it may safely be said that compared to existing transmitters and transmitter kits, this new transmitter gives twice the power output and with one-third less cost.

Separate Cabinet for Individual Units: In keeping with the main theme of independently complete units, each section (a description of which follows) is housed, together with its associated power equipment, in an attractive crackle finished cabinet, durably constructed of automobile steel. The cabinets are of uniform size and are designed to be stacked one on top of the other to produce a six-foot high transmitter of decidedly commercial appearance. The accompanying illustrations clearly show the front and back view of the complete transmitter.

To fully describe the many features and advantages of these units would require practically every page in this magazine, so we must be content with a brief description of each unit.

Eighty Watt CW Transmitter: Kit No. 1 (*Continued on page* 312)

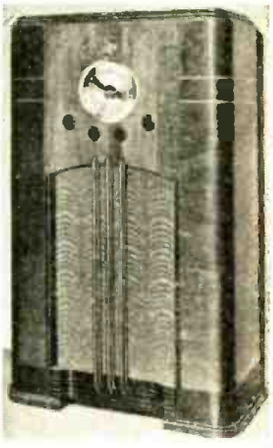
11-Tube All-Wave Receiver Features

MIRRO-DIAL—Has Figures Fused on Convex Glass

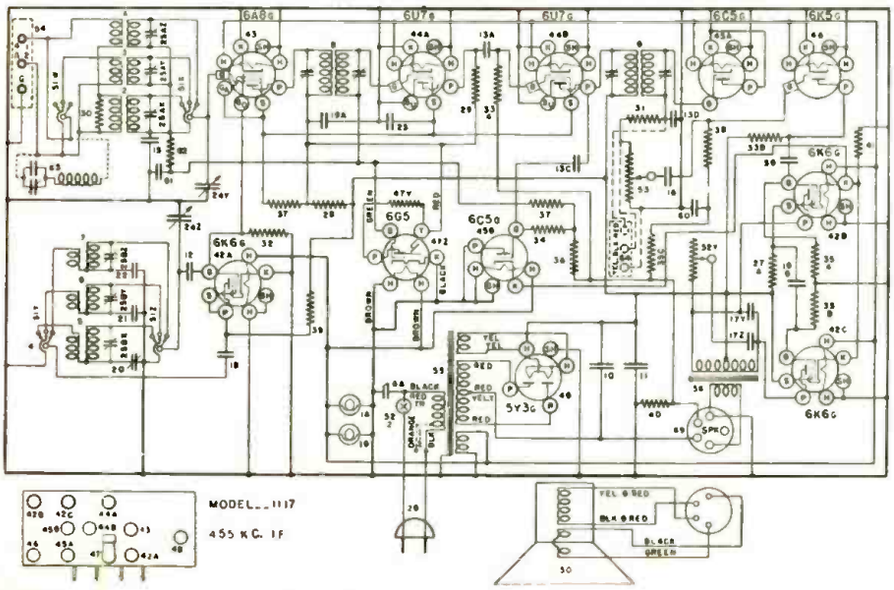
● ONE of the new Crosley models is here illustrated and an interesting feature is the new reflector type Mirro-Dial with the graduations fused on the convex glass. This dial is edge-illuminated and gives a three-dimensional effect, so that the figures stand out clearly as if they were in relief.

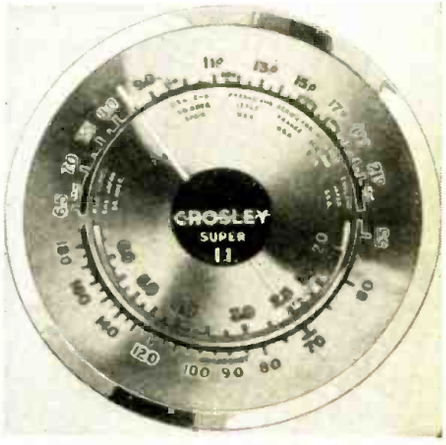
All of the latest features are incorporated in this line of all-wave receivers, and this particular model here shown, 1117, tunes over the following bands: 1.9 to 6.6 mc., 6.4 to 22 mc., and 540 to 1,850 kc. This model has a wave-trap incorporated, as the hook-up shows, so that interfering *code* stations are automatically tuned out and this trap is adjustable for different frequencies.

Set receives American, foreign, police, amateur, aviation and ships-at-sea broadcasts 525-22,000 kc. *continuous*. Has octal-base tubes, push-pull pentode output, broad automatic volume-control, continuously variable tone-control, iris tuning indicator, power-supply noise filter, 10" electro-dynamic speaker with plug-in (*Continued on page* 333)



Left—diagram of model 1117, 11-tube Crosley receiver; at right—appearance of one of these sets in a handsome console is shown.

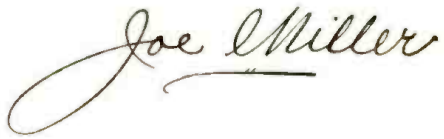




A close-up of the new Crosley Mirro-Dial—the glass is convex and the numbers appear as in relief. Nu. 649.

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

Let's Listen In With . .



Our Short Wave "DX" Editor

Winner of 30th "S-W Scout" Trophy

OZ7KG—This striking card, blue letters, red outline recently received from Denmark.

● AS we write this in mid-summer, DX conditions are holding up surprisingly well on all bands, ranging from the 31 meter band to the high frequencies. Static is often troublesome, but many stations are coming in from the Orient with unusual strength and regularity, despite the usual slight slump expected at this time of the year.

From now on, conditions will certainly continue to improve, and by the time this issue appears on newsstands, Fall DX conditions, in our humble opinion just about the finest of the year, should be in full swing.

Several special *broadcasts* are being arranged for the coming DX season, and our advice is to watch this column every month for notice on any "specials" which have been arranged.

To all DXers in every locality in the U. S., we will begin with this issue to indicate the location of each U. S. DXer reporting reception, by giving his call area number after his name, as John Smith, W7, which district indicates the Northwest, as shown in the Amateur Call Book. Using this device, a DXer can readily see what DX is reported heard in his general locale, and our gain is in the saving of some valuable space.

Several letters from DXers show that they do not believe every verification published in these articles are our very own, received as confirmation of reception. We wish to state, in all sincerity, that each and every verification ever published in our DX articles *are our very own*, selected for publication from our large and varied collection. However, we do often welcome interesting photos of DX stations, and have so far printed several received from kind DXers.

And now to DX:

MADAGASCAR

Radio Tananarive has honored us with a 2nd verification by letter and explain their long delay of 7 months in verifying our reception of last November.

It seems that the organization operating the station, The Post and Telegraph Dept., has moved and all correspondence was delayed.

What is more important, this 2nd veri gives us authentic data as to the frequencies and schedules in effect, the first reliable data lately received in the U. S., we believe. No call letters are given, but here's the dope, direct from veri: Frequencies: 49.90 and 31.50 meters, or roughly, 6.01 and 9.52 mc. SCHEDULE: Daily, 12:30-12:45 a.m.; 3:30-4:30 a.m.; 10-11 a.m.; all times E.S.T.

In the 2 veries received, this station is mentioned only as Radio-Tananarive, so we doubt that FIQA, the call often mentioned as assigned to this station, is authentic. The above schedule is also that of the long-wave station at Tananarive, operated simultaneously with the higher frequencies.

We are going to try to snare the 9 mc. frequency this Fall, and should be able to do so, as the 6 mc. frequency we consider much more difficult to log. Try for this ace catch this Fall, OM's the best time for reception in the East should be between 3:30-4:30 a.m., and for the West, between 10-11 a.m., E.S.T. The full QRA was given in the last issue.

PHILIPPINE ISLANDS

KZRM, 9.57 mc., Manila, the call assigned to this new station which is also the call of the famous BCB station heard all over the world, has changed frequency in the last month, from 11.84 mc., and is being heard excellently here daily, on their announced schedule of 9 p.m.—9 a.m. E.S.T. They are located just on the L. F. side of VK3LR and can be easily *logged* any morning, with a surprisingly FB signal, best near 5:30-6 a.m., E.S.T. in the East. They announce as "KZRM, Radio Manila."

Ashley Walcott, W6, and Roy Myers, W6, also report this catch, Ashley adding that KZRM is audible in the West between 4:30-9 a.m., E.S.T., right on top of W1XK.

KAZ, 9.97 mc., Manila has been heard lately phoning at 6 a.m., with a strong signal.

CEBU ISLAND, PHILIPPINES

KZGG, 7.83 mc., and located on Cebu Island, one of the main islands in the Philippine group, was heard several days in a row during July, when Mr. A. D. Sison, Radiophone Station Supervisor sent a Special Broadcast to Y.T., on July 15, 16, 17, between 4:30-4:40 a.m., E.S.T., consisting of recorded music, interspersed with announcements giving call letters and frequency. KZGG was well received on the first two days, but QRN was too bad on the 17th.

We regret very much that the KZGG, 6.98 mc., veri, which informed us of the *special*, gave us no opportunity to inform our readers of this FB Special, being received just before scheduled broadcast.

Roy Myers, W6, also heard KZGG Special, but adds "very weak." Surprisingly, we could bring up the signal to an R-7-8, but QRN was much too bad to use all of our receiver's gain.

Mr. Sison adds that "our working schedules are 8:30 p.m.-1:15 a.m.; 3-6:15 a.m., E.S.T. until all commercial traffic is cleared." Xmtr used at KXGG, which uses a rhombic antenna directive to Manila, 350 miles distant, is a Western Electric 400 watt outfit.

JAPAN

JFZC, the S. S. Chichibu Maru, has confirmed a report from Bill Harriman, W6, and the Chief Operator, *Yasusaburo Takatsu*, requests reports to be sent to following QRA: Y. Takatsu, c/o A Section of General Affairs, Yokohama Post Office, Yokohama, Japan.

This station is owned by the Ministry of Communications, not NYK, as previously listed. Power used is 2 KW. Frequencies used to communicate with America and Hawaii are: 17.61, 13.22, 8.84, 6.65 and 4.4225 ms. Frequencies for Asia: 17.70, 13.30, 8.88, 6.65, 4.44 mc.

Data received direct from Japan in new schedule, show JZK, 15.16 mc., to begin operation daily from 6:30-7:30 a.m., E.S.T., beginning August 1. JZK should be easily heard at this time.

Roy Myers, W6, reports JZRB, on 8.90 mc., heard contacting JZB, 6.33 mc., at 7 a.m. JZRB uses Morse Code tone signal and "chopper."

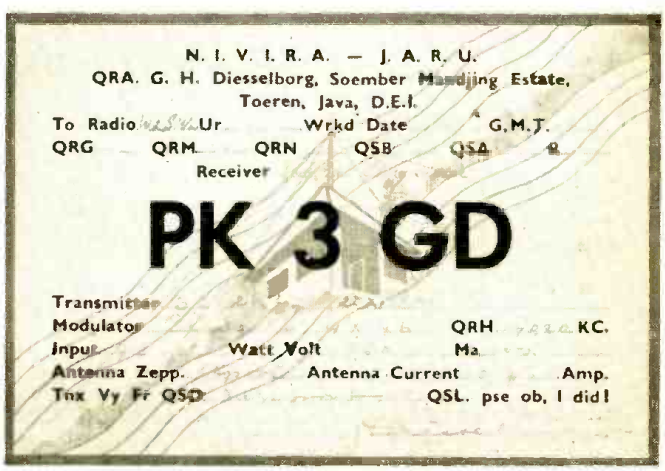
JZL, 17.785 mc., Tokio, heard 3-3:30 a.m. one morning testing. by Ashley Walcott.

FEDERATED MALAY STATES

Ashley Walcott, W6, reports a letter from the Senior Engineer, Posts and Telegraphs Dept., Selangor and Pahang, Kuala Lumpur, stating that the Administration will not confirm reception reports on any commercial service, this in answer to a report on ZGB, 13.643 mc. Ashley adds "if you hear ZGB, don't waste a reply coupon on them." Unfortunately, we already have! We heard ZGB at 7:40 a.m., lately, too.

Ashley also adds that ZGE, the BC station at Kuala Lumpur is still "staggering all over the dial Sundays, Tuesdays and Fridays from 6:40-8:40 a.m." Last heard on 6.17 mc., ZGE is listed on 6.21 mc., but has shifted very often, inside a range between 6.14-6.255 mc.

(*Continued on page* 300)



PK3GD—A FB QSL from Java, with brown call and light green edge.

CORRECTED AND REVISED Monthly

World S-W Station List

Complete List of Broadcast, and Telephone Stations

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

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

S.W. BROADCAST BAND

Mc.	Call	
31.600	W3XEY	**BALTIMORE, MD.,** 9.494 m., Relays WFBR 4 pm-12m.
31.600	W2XDV	**NEW YORK CITY,** 9.494 m., Addr. Col. Broad. System, 485 Madison Ave. Daily 5-10 pm.; Sat. and Sun. 12.30-5, 6-9 pm.
31.600	W4XCA	**MEMPHIS, TENN.,** 9.494 m., Addr. Memphis Commercial Appeal. Relays WMC.
31.600	W8XAI	**ROCHESTER, N. Y.,** 9.494 m., Addr. Stromberg Carlson Co. Relays WHAM 7.30-12.05 am.
31.600	W8XWJ	**DETROIT, MICH.,** 9.494 m., Addr. Evening News Ass'n. Relays WWJ 6-12.30 am., Sun. 8 am-12 m.
31.600	W9XPD	**ST. LOUIS, MO.,** 9.494 m., Addr. Pulitzer Pub. Co. Relays KSD.
26.400	W9XAZ	**MILWAUKEE, WIS.,** 11.36 m., Addr. The Journal Co. Relays WTMJ from 1 pm.
26.100	GSK	**DAVENTRY, ENG.,** 11.49 m., Addr. B. B. C., London. Operates irregularly 5.45-8.55 am., 9.55 am.-12 n.
25.950	W6XKG	**LOS ANGELES, CAL.,** 11.56 m., Addr. B. S. McGlashan, Wash. Blvd. at Oak St. Relays KGFJ 24 hours daily.
21.550	GST	**DAVENTRY, ENG.,** 13.92 m., Addr. (See 26.100 mc.) Irregular at present.
21.540	W8XK	**PITTSBURGH, PA.,** 13.93 m., Addr. Grant Bldg. Relays KDKA 7-9 am.
21.530	GSJ	**DAVENTRY, ENG.,** 13.93 m., Addr. (See 26.100 mc.) 5.45-8.55 am., 9.15 am.-12n.
21.520	W2XE	**NEW YORK CITY,** 13.94 m., Addr. Col. Broad. Syst., 485 Madison Ave. Relays WABC 6.30-9.30 am., Sun. 7-9 am.
21.470	GSH	**DAVENTRY, ENG.,** 13.97 m. (See 26.100 mc.). 5.45-8.55 am., 9.15 am.-12 n.

S.W. BROADCAST BAND

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

S.W. BROADCAST BAND

17.790	GSG	**DAVENTRY, ENG.,** 16.86 m., Addr. B.B.C., London. 1-3.15 am., 5.45-8.55 am., 9 am.-12 n., 12.20-3.45, 4-6, 9-11 pm.
17.785	JZL	**TOKIO, JAPAN,** 16.87 m. Tests irregularly.
17.780	W3XAL	**BOUND BROOK, N. J.,** 16.87 m., Addr. Natl. Broad. Co. 8 am.-8 pm.
17.770	PHI	**HUIZEN, HOLLAND,** 16.88 m., Addr. (See PHI, 11.730 mc.) Daily except Wednesday, 8.25-10 am., Sat. till 10.40 am., Sun. 7.25-10.35 am.
17.760	DJE	**BERLIN, GERMANY,** 16.89 m., Addr. Broadcasting House. 12.05-5.15 am.; 5.55-11 am. Sun. 11.10am.-12.25 pm.
17.760	W2XE	**NEW YORK, N. Y.,** 16.89 m., Addr. Col. Broad. System. 485 Madison Ave.
17.755	ZBW5	**HONGKONG, CHINA,** 16.9 m., Addr. P. O. Box 200. 4-10 am. irregular.

S.W. BROADCAST BAND

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

S.W. BROADCAST BAND

15.340	DJR	**BERLIN, GERMANY,** 19.56 m., Addr. Br'dcast'g House, 8-9am., 4.50-10.45pm.
15.330	W2XAD	**SCHENECTADY, N. Y.,** 19.56 m., Addr. General Electric Co. Relays WGY 10 am. to 8 pm.
15.310	GSP	**DAVENTRY, ENG.,** 19.6 m., Addr. (See 26.100 mc.) 6.20-8.30 pm.
15.290	LRU	**BUENOS AIRES, ARG.,** 19.62 m., Addr. El Mundo. 7-9 am.
15.280	HI3X	**CIUDAD TRUJILLO, D. R.,** 19.63 m. Relays HIX Sun. 7.40-10.40 am. Weekdays 12.10-1.10pm.
15.280	DJQ	**BERLIN, GERMANY,** 19.63 m., Addr. Broadcasting House. 12.05-5.15, 6-8, 8.15-11 am., 4.50-10.45 pm.
15.270	W2XE	**NEW YORK CITY,** 19.65 m., Addr. (See 21.520 mc.) 2-5 pm. Sun. 12 n-3 pm., 4-5 pm.

(Continued on page 301)

(All Schedules Eastern Standard Time)

EA9AH—Yellow card with blue edging, everyone should send for one of these.

CHINA

XTV, 9.49 mc., Canton, heard between 6-9 a.m., sometimes changes frequencies to about 9.548 mc., just on top of YDB, while phoning other Chinese stations.

XTB, Shanghai, has changed frequency from 11.415 to 11.48 mc., Swatow has given up XTS, 11.47 mc., for XTR, 9.36 mc., with XTB's change. This all by courtesy of Ashley Walcott.

Incidentally, we may add that Mr. Walcott is our DX representative for the Golden Gate Chapter of the I.D.A., in San Francisco.

Chinese heard here the past month include XTR, XTB, XTK, 9.08 mc., XOJ, 15.795 mc., XTV, 9.49 mc., XGW, 10.42 mc. All these heard near 6 a.m., with FB signals. XOJ phones JVE. 15.66 mc., or JVF, 15.61 mc., at Tokyo, near 6 a.m.

STRAITS SETTLEMENTS

Ashley Walcott has received a FB veri from ZHJ, at Penang, giving frequency as 49.3 meters or 6.08 mc., with 49 watts output. However, Ashley hears ZHJ on 6.057 mc., and adds that evidently ZHJ's secretary is not aware that his crystal has somehow shifted. This is a difficult catch indeed, especially for the East, but may be heard this Winter when conditions are very good and quiet. QRA of ZHJ is: Penang Wireless Society, 40, Perak Road, Penang, S. S.

BURMA AND INDIA

The Government Radio Station, Rangoon, is still broadcasting on an announced frequency of 6.007 mc., daily from 9 to about 9:35 a.m. A form letter received by Ashley Walcott from W. J. Byrne, Engineer-in-Charge, Gov't Radio Station, Mingaladon, Burma, states that the broadcasts are merely experimental ones intended primarily for reception and report by the Burma radio stations. They are not intended as entertainment for the public, generally, but reports from listeners who may happen to pick up the programs are most welcome. This is certainly a boost for DXers, having a station warmly welcoming reports of reception as of value to them. QRA is stated in this paragraph.

Also, VWY2, Poona, India, is reported irregularly between 7 and 9 a.m., on 17.48 mc. Heard here at 8 a.m., VWY2 usually contacts GAU, 18.62 mc., Rugby at this time. VWY2 is not as active as formerly and signal poor in comparison with past reception.

VVS, 12.87 mc., Mingaladon, Burma, is heard here nearly daily about 6 a.m., with an average R6-8 signal, though rarely heard in conversation. One morning at 6:15 a.m., to our great surprise, we heard Oriental music emanating from VVS, a commercial station.

SWEDEN

QRA of SBG at Motala is: Motala Rundradio Station SBG, Tjansterbrev, NR4, Motala. Schedule is: 7:30 a.m.-11 p.m. Sundays, 9 a.m.-11 p.m. Frequencies are 11.71 mc., used before 7:30 p.m., and 6.065 mc., used after 7 p. m. This station is being well heard throughout the U. S.

SIAM

HSE2. 19.016 mc., Bangkok, Siam was again heard at 5:40 a.m., contacting DFB, 17.52 mc., Nauen, Germany. HSE2, however, calls DFB as "Berlin."

HS8PJ, Bangkok, again changes schedule, reverting to one in use months ago, returning the 19.02 mc., to use on Mondays 8-10 a.m., and continuing the 9.35 mc., frequency on Thursdays from 8-10 a.m. Ed Goss reports this from a recent HS8PJ veri, as does Ashley Walcott.

AFRICAN REVIEW

VQG, 19.62 mc., Nairobi, Kenya Colony, heard once at 7:55 a.m., but with the usual weak signal. VQG often contacts GAU, Rugby.

SUZ, 13.83 mc., Cairo, Egypt, was heard one morning at the unusual time of 5:55 a.m., contacting GBB, 13.58 mc., Rugby. SUZ usually heard at 11 a.m., daily.

ZSS, 18.89 mc., Klipheuvel, Union of South Africa, heard working GAU at 6:45 a.m., within their usual contact time of 6:30-7 a.m. ZSS should be well heard this Fall and every DXer should try for them. They verify promptly and are quite easy to log, demanding no long reports in order to verify.

FZE8, 17.28, Djibouti, French Somaliland, reported by Ashley Walcott, phoning Paris at 8:30 a.m., their usual time, when they simply pound in here. FZE8 can be "spotted" nearly daily on CW, A FB signal.

DX REVIEW

VK9MI, 6.01 mc., "SS Kanimbla," reported by Roy Myers on Sundays at 6:30 a.m., broadcasting with a YL announcer.

WXA, Alaska also heard by Roy Myers on a new frequency of 9.95 mc., at 4 a.m.

"Radio Philco" in English, or "Station Boy-Landry" in French, now heard on 11.70 and 5.90 mc., reported by Ashley Walcott.

Congrats to W. S. Wade, W7, who just received veries from Ace Catches VQ7LO and CR7BH! FB DX, OB!

HAM STARDUST

THE catch for July is VS1AI, the new *ham* station in Singapore, Straits Settlements, heard on 14244 at 6:30 a.m., while in QSO with XE2AH and W4KR. XE2AH gave VS1AI a QSA5, R7 report, W4KR gave him a QSA3 R3 report, while Y. T., using the new matched impedance 20 meter doublet, could bring VS1AI's sigs up to an R8 peak at 6:50 a.m., although QSA was only 2-3, due to local QRM and summer QRN! Our only Asiatic ham this month, but we certainly aren't complaining!

Going across the continent to California, the Asiatic DXer's paradise, many hams are active, and Ashley Walcott reports from Pacific Coast H. Q. the following:

VS3AE, 14240, Johore, Non-Federated Malay States, heard 10 a.m., again on 14370, from 9-10 a.m., with a very good signal.

XZ is the new prefix for Burma, now considered a separate country from India.

Reported this month from Burma are XZ2EH. "England. Honolulu," on 14040, and XZ2EZ, "England Zanzibar" on 14350, both heard occasionally between 8-10 a.m.

To get QRAs for Burma, one merely has to look up India in the Call Book, and find call whose last 3 units correspond with amateur heard, as all Burma calls are merely Indian calls, with XZ substituted for VU.

PK4VR, "Valencia Roma," 14360, heard irreg., "PK4WS, Washington, Spain, San Francisco, Siam or Sweden" 14145 very often heard with an excellent sig. PK2AY, "America, Yesterday," 14270. All PK's heard on West Coast between 5-10 a.m.

PK1MO, and PK6AJ, 14110, also reported by Roy Myers. Roy hears from 6 to a dozen daily, in "round tables," but all talking in native language, which Roy finds maddening, in trying to identify them, Hi!

XU8HW, 14080, China, verifies to Ashley stating he has 80 watts input.

J2LU, 14260, Japan, heard from 8-10 a.m. irregularly, with one of the best Japanese sigs.

(*Continued on page* 317)

CR6AA—41.8 meter QSL from Angola, Portugese, West Africa. Red call dark blue edging.

Mc.	Call	
15.260	GSI	**DAVENTRY, ENG.,** 19.66 m., Addr. (See 26.100 mc.) 12.20-3.45, 9-11 pm.
15.252	RIM	**TACHKENT, U.S.S.R.,** 19.67 m. Works RKI near 7 am.
15.250	W1XAL	**BOSTON, MASS.,** 19.67 m., Addr. University Club. Daily 2-4 pm.
15.245	TPA2	**PARIS, FRANCE,** 19.68 m., Addr. 98 bis. Blvd. Haussmann. "Radio Colonial." 5-10 am.
15.230	HS8PJ	**BANGKOK, SIAM,** 19.32 m. Irregularly Mon. 8-10 am.
15.230	OLR5A	**PRAGUE, CZECHOSLOVAKIA.** Daily 2-2.15 pm. Mon. and Thurs. 8-9.15 pm.
15.220	PCJ	**HUIZEN, HOLLAND,** 19.71 m., Addr. N. V. Philips' Radio, Hilversum. Tues. 4.30-6 am., Wed. 8-11 am.
15.210	W8XK	**PITTSBURGH, PA.,** 19.72 m., Addr. (See 21.540 mc.) 9 am.-7 pm.
15.200	DJB	**BERLIN, GERMANY,** 19.74 m., Addr. (See 15.280 mc.) 12.05-5.15 am. 5.55-11 am., 4.50-11 pm. Also Sun. 11.10 am. to 12.25 pm.
15.190	ZBW4	**HONGKONG, CHINA,** 19.75 m., Addr. P. O. Box 200. 11.30 pm. to 1.15 am., 4-10 a.m. Sat. 9.15 pm.-1 am. Sun. 3-9.30 am.
15.180	GSO	**DAVENTRY, ENG.,** 19.76 m., Addr. (See 26.100 mc.) 1-3.15 am., 4-6, 6.20-8.30 pm.
15.180	RW96	**MOSCOW, U.S.S.R.,** 19.76 m., Sun 2-3 pm.
15.165	XEWW	**MEXICO CITY, MEXICO,** 19.78 m. Irregular 9 a.m.-6 pm.
15.160	JZK	**TOKIO, JAPAN,** 19.79 m., 3-4 pm., 4.30-5.30 pm., 12.30-1.30, 8-9 am.
15.150	YDC	**BANDOENG, JAVA,** 19.8 m., Addr. N. I. R. O. M. 6-7.30 pm. 10.30 pm.-2 am., Sat. 7.30 pm.-2 am., 5.30-10.30 am.
15.140	GSF	**DAVENTRY, ENG.,** 19.82 m., Addr. (See 26.100 mc.) 10.30 am.-12 n., 4-6, 6.20-8.30 pm.
15.120	HVJ	**VATICAN CITY,** 19.83 m., 10.30-10.45 am., except Sun., Sat. 10-10.45 am.
15.110	DJL	**BERLIN, GERMANY,** 19.85 m., Addr. (See 15.280 mc.) 12 m-2, 8-9 am., 11.35 am. to 4.30 pm. Sun. also 6-8 am.

S.W. BROADCAST BAND

15.090	RKI	**MOSCOW, U.S.S.R.,** 19.88 m. Works Tashkent near 7 am. Broadcasts 7-9.15 pm. daily. Relays RAN.
15.055	WNC	**HIALEAH, FLORIDA,** 19.92 m., Addr. A. T. & T. Co. Calls Central America daytime.
14.980	KAY	**MANILA, P. I.,** 20.03 m., Addr. RCA Comm. Works Pacific Islands.
14.970	LZA	**SOPHIA, BULGARIA,** 20.04 m., Addr, Radio Garata. Sun. 12.30-8 am., 10 am. to 4.30 pm. Daily 5-6.30 am., 12 n.-2.45 pm.
14.960	PSF	**RIO DE JANEIRO, BRAZIL,** 20.43 m., Works with Buenos Aires daytime.
14.950	HJB	**BOGOTA, COL.,** 20.07 m. Calls WNC daytime.
14.940	HH1	**CIUDAD TRUJILLO, D. R.,** 20.08 m., Phones WNC daytime.
14.940	HJA3	**BARRANQUILLA, COL.,** 20.08 m. Works WNC daytime.
14.845	OCJ2	**LIMA, PERU,** 20.21 m. Works South American stations daytime.
14.790	ROU	**OMSK, SIBERIA, U.S.S.R.,** 20.28 m. Works Moscow irregularly 7-9 am.
14.730	IQA	**ROME, ITALY,** 20.37 m. Tests irregularly.
14.653	GBL	**RUGBY, ENG.,** 20.47 m. Works J VH1-7 am.
14.640	TYF	**PARIS, FRANCE,** 20.49 m. Works Saigon and Cairo 3-7 am, 12 m.-2.30 pm.
14.600	JVH	**NAZAKI, JAPAN,** 20.55 m. Broadcasts irregularly 5-11.30 pm. Works Europe 4-8 am.
14.590	WMN	**LAWRENCEVILLE, N. J.,** 20.56 m., Addr. A. T. & T. Co. Works England morning and afternoon.
14.535	HBJ	**GENEVA, SWITZERLAND,** 20.64 m., Addr. Radio Nations. Broadcasts Sat. 5.30-6.15 pm., 7-8.30 pm.
14.530	LSN	**BUENOS AIRES, ARG.,** 20.65 m., Addr. (See 20.020 mc.) Works N. Y. C. afternoons.
14.500	——	**ASMARA, ERITREA, AFRICA,** 20.69 m. Works Rome and Addis Ababa 6.30-7.30 am
15.500	LSM2	**BUENOS AIRES, ARG.,** 20.69 m., Addr. (See 21.020 mc.) Works RIO and Europe daytime.
14.485	TIR	**CARTAGO, COSTA RICA,** 20.71 m. Works Central America and U. S. A. daytime.
14.485	YSL	**SAN SALVADOR, SALVADOR,** 20.71 m. Irregular.
14.485	HPF	**PANAMA CITY, PANAMA,** 20.71 m. Works WNC daytime.
14.485	TGF	**GUATEMALA CITY, GUATEMALA,** 20.71 m. Works WNC daytime.
14.485	YNA	**NICARAGUA, MANAGUA,** 20.71 m. Works WNC daytime.
14.485	HRL5	**NACAOME, HONDURAS,** 20.71 m. Works WNC daytime.
14.485	HRF	**TEGUCIGALPA, HONOURAS,** 20.71 m. Works WNC daytime.
14.470	WMF	**LAWRENCEVILLE, N. J.,** 20.73 m., Addr. A. T. & T. Co. Works England daytime.
14.460	DZH	**ZEESEN, GERMANY,** 20.75 m., Addr. (See 15.360 mc.) Irregular.
14.440	GBW	**RUGBY, ENG.,** 20.78 m. Works U. S. A. afternoons.
14.200	EA9AH	**TETUAN, SPANISH MOROCCO,** 21.13 m. Daily except Sun. 2.15-5,7 and 9 pm.
13.990	GBA	**RUGBY, ENG.,** 21.44 m., Works Buenos Aires late afternoon.
13.820	SUZ	**ABOU ZABAL, EGYPT,** 21.71 m. Works with Europe 11 am. to 2 pm.
13.690	KKZ	**BOLINAS, CALIF.,** 21.91 m., Addr. RCA Communications. Irregular.
13.635	SPW	**WARSAW, POLAND,** 22 m., Mon., Wed. Fri., 12.30-1.30 pm.
13.585	GBB	**RUGBY, ENG.,** 22.08 m. Works Egypt and Canada afternoon.
13.415	GCJ	**RUGBY, ENG.,** 22.36 m. Works Japan and China early morning.
13.410	YSJ	**SAN SALVADOR, SALVADOR,** 22.37 m. Works WNC daytime.
13.390	WMA	**LAWRENCEVILLE, N. J.,** 22.4 m., Addr. A. T. & T. Co. Works England morning and afternoon.
13.380	IDU	**ASMARA, ERITREA, AFRICA,** 22.42 m. Works Rome daytime.
13.345	YVQ	**MARACAY, VENEZUELA,** 22.48 m. Works WNC daytime.
13.285	CGA3	**DRUMMONDVILLE, QUE., CAN.,** 22.58 m. Works London and ships afternoons.
13.330	IRJ	**ROME, ITALY,** 22.69 m. Works Tokio 5-9 am. irregularly.
13.075	VPD	**SUVA, FIJI ISLANDS,** 22.94 m. Irregularly.
12.840	WOO	**OCEAN GATE, N. J.,** 23.36 m., Addr. A. T. & T. Co. Works with ships irregularly.
12.825	CNR	**RABAT, MOROCCO,** 23.39 m., Addr. Director General Tele. & Teleg. Stations. Works with Paris irregularly.
12.800	IAC	**PISA, ITALY,** 23.45 m. Works Italian ships mornings.
12.780	GBC	**RUGBY, ENG.,** 23.47. Works ships irregularly.
12.485	HIN	**CIUDAD TRUJILLO, D. R.,** 24 m. "Broadcasting National." 12 n.-2 pm. 6-11 pm. approx.
12.325	DAF	**NORDDEICH, GERMANY,** 24.34 m. Works German ships daytime.
12.300	CB615	**SANTIAGO, CHILE,** 24.39 m., Addr. Louis Desmaras, Casilla, 761. 11 am.-1 pm., 4-8 pm., Sun. 4-10 pm.
12.290	GBU	**RUGBY, ENG.,** 24.41 m. Works N. Y. C. evenings.
12.250	TYB	**PARIS, FRANCE,** 24.49 m. Irregular.
12.235	TFJ	**REYKJAVIK, ICELAND,** 24.52 m. Works Europe mornings. Broadcasts Sun. 1.40-2.30 pm.
12.215	TYA	**PARIS, FRANCE,** 24.56 m. Works French ships in morning and afternoon.
12.150	GBS	**RUGBY, ENG.,** 24.69 m. Works N. Y. C. evenings.
12.130	DZE	**ZEESEN, GERMANY,** 24.73 m., Addr. (See 15.360 mc.) Tests irregular.
12.120	TPZ2	**ALGIERS, ALGERIA,** 24.75 m. Calls Paris 12 m.-6.30 am.
12.060	PDV	**KOOTWIJK, HOLLAND,** 24.88 m. Tests irregularly.
12.000	RNE	**MOSCOW, U.S.S.R.,** 25 m. Daily 3-6 pm., Sat., Sun., Tues., Thurs., 10.15-10.45 pm., also Sun. 6-11 am., Mon 6-7 am. and 8.30-9 pm. Wed. 6-7 am., Thurs. 8.30-9 pm.
11.991	FZS2	**SAIGON, INDO-CHINA,** 25.02 m. Phones Paris mornings.
11.960	HI2X	**CIUDAD TRUJILLO, D. R.,** 25.08 m., Addr. La Voz de Hispaniola. Relays HIX Tue. and Fri. 8.10-10.10 pm.
11.955	IUC	**ADDIS ABABA, ETHIOPIA,** 25.09 m. Works IAC around 12 midnight.
11.950	KKQ	**BOLINAS, CALIF.,** 25.1 m. Tests irregularly evenings.
11.940	FTA	**STE. ASSISE, FRANCE,** 25.13 m. Works Morocco mornings and Argentina late afternoon.

S.W. BROADCAST BAND

11.900	XEWI	**MEXICO CITY, MEXICO,** 25.21 m. Monday, Wed. and Fri. 3-4 pm., 9 pm. 12 m. Tues. to Thurs. 7.30 pm.-12 m. Sat. 9 pm. to 12 m. Sunday 12.30-2 pm.
11.895	HP5I	**AGUADULCE, PANAMA,** 25.22 m., Addr. La Voz del Interior. 7.30-9.30 pm.
11.880	TPA3	**PARIS, FRANCE,** 25.23 m., Addr. (See 15.245 mc.) 1-4 am., 11.15 am.-5 pm.
11.870	W8XK	**PITTSBURGH, PA.,** 25.26 m., Addr. (See 21.540 mc.) 7-10.30 pm.
11.860	YDB	**SOERABAJA, JAVA,** 25.29 m., Addr. N. I. R. O. M. Sat. 7.30 pm. to 2.30 am., daily 10.30 pm. to 2 am.
11.860	GSE	**DAVENTRY, ENG.,** 25.29 m., Addr. (See 26.100 mc.) Irregular.
11.855	DJP	**BERLIN, GERMANY,** 25.31 m., Addr. (See 15.280 mc.) Irregular 11.35 am. to 4 pm.
11.840	——	**MANILA, P. I.,** 25.35 m. Addr. Erlanger & Gallinger, Box 283. 9 pm.-10 am.
11.840	CSW	**LISBON, PORT.,** 25.35 m. Nat'l Broad. Stat. 11.30 am.-1.30 pm.
11.840	OLR4A	**PRAGUE, CZECHOSLOVAKIA,** 25.35 m. Addr. Czech Shortwave Sta., Praha XII, Fochova 16. Daily 2-4.30 pm., Mon. and Thurs., 7-8 pm.
11.830	W9XAA	**CHICAGO, ILL.,** 25.36 m., Addr. Chicago Federation of Labor. Irregular.
11.830	W2XE	**NEW YORK CITY,** 25.36 m., Addr. Col. Broad. System, 485 Madison Av., N.Y.C., relays WABC 5.30-11 pm. Sun. 6-11 pm.
11.820	XEBR	**HERMOSILLA, SON., MEX.,** 25.38 m., Addr. Box 68. Relays XEBH. 2-4 pm., 9 pm.-12m.
11.820	GSN	**DAVENTRY, ENG.,** 25.38 m., Addr. (See 26.100 mc.). Irregular.
11.810	2RO	**ROME, ITALY,** 25.4 m., Addr. E.I.A.R., Via Montello 5. Daily 6.43-10.30 am., 11.30 am.-5.30 pm., 6-7.45 pm. Sun. 6.43-9 am., 11.30 am.-5.30 pm.
11.805	OXY	**SKAMLEBOAK, DENMARK.** 25.41 m. Testing 6-9 pm. and at other times.
11.803	JZJ	**TOKIO, JAPAN,** 25.42 m., Addr. Broadcasting Co. of Japan, Overseas Division. 8-9 am, 3-4, 4.30-5.30 pm.
11.800	OER2	**VIENNA, AUSTRIA,** 25.42 m. Daily 10 am.-5 pm. Sat. until 5.30 pm.
11.795	DJO	**BERLIN, GERMANY,** 25.43 m., Addr. (See 15.280 mc.). Irregular.
11.795	OAX5B	**ICA, PERU,** 25.43 m., Addr. Radio Universal. 11 am.-12 n, 4-11.15 pm.
11.790	COGF	**MATANZAS, CUBA,** 25.45 m., Addr. Gen. Betancourt 51. Relays CMGF. 2-3, 4-5, 6-11 pm.
11.790	W1XAL	**BOSTON, MASS.,** 25.45 m., Addr. (See 15.250 mc.) Daily 4—5.30 pm. Sat. 5-5.30 pm.
11.770	DJD	**BERLIN, GERMANY,** 25.49 m., Addr. (See 15.280 mc.) 11.35 am.-4.30 pm., 4.50-11 pm.
11.760	OLR4B	**PRAGUE, CZECHOSLOVAKIA,** 25.51 m., Addr. (See 11.875 mc.) Irregular.
11.750	GSD	**DAVENTRY, ENG.,** 25.53 m., Addr. B. B. C., London. 1-3.15 am., 12.20 3.45 pm., 6.20-8.30, 9-11 pm.

(*Continued on page* 303)

(All Schedules Eastern Standard Time)

How You Can Identify Short-Wave Stations

S-W broadcast stations in various parts of the world have unique identification signals and a number of these are given here. Other identification signals were given in the past three issues of this magazine. Keep these lists of interval signals, as they will prove valuable to every short-wave listener.

World-Wide Identification List

Part Four

Freq. Station
Mc. Call Type—Location—Service

10.96 ZLT4. See ZLT4, 11.05 mc.

10.91 KTR C—Manila, Philippines. Identifies at beginning and end of Xmission, "*This is Station KTR, Manila, P. I., on 10910 kc. now—.*"

10.77 GBP C—Rugby, England. Heard daily in contact with VLK, 10.52 mc., early a.m., using inv. sp. Often contacts ZLT4 through VLK.

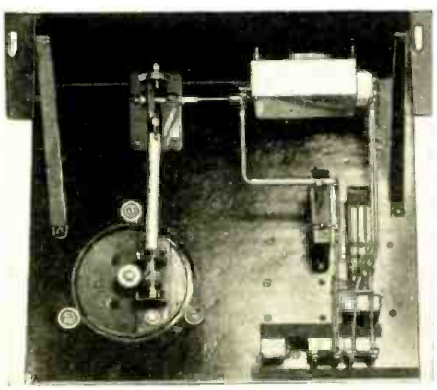
10.74 JVM B and C—Nazaki, Japan. See JVN. Often phones San Francisco. Identifies in English.

10.68 PLQ C—Bandoeng, Java. Identifies in Dutch at beginning of Xmission only: "*Hallo, Medan, hier ist Bandoeng.*" Or in English: "*Hello, Kuala Lumpur, here is Bandoeng calling PLQ.*" After contact inverted speech used.

10.66 JVN B-C—Tokyo, Japan. On phone Xmissions, inverted speech is used; call given in Japanese at beginning and end of Xmission, in clear speech. Relaying JOAK programs, opening and closing with Japanese Anthem "Kimigayo," and after closing with Anthem, gongs are rung in following sequence: 3 gongs, 2 gongs, pause, 1 gong, pause, 1 chime. These may also be heard irregularly during program. English news at 4:55 a.m., E.S.T.

10.535 JIB C—Taihoku, Taiwan (Formosa). Identifies in Japanese at start of Xmissions. Always phones, using inv. sp. (inverted speech.)

10.52 VK2ME-VLK-VLZ. C—Sydney, Australia. See VLZ, 13.34 mc.



German S-W stations use an electro-magnetic device to broadcast their interval or "identification" signals. A number of steel reeds tuned to different notes are plucked in the proper musical sequence, by means of revolving cylinders fitted with pins.

10.43 YBG C—Medan Sumatra. Identifies in Dutch at beginning of phone Xmission: "*Hallo Bandoeng, hier ist Medan.*" Inv. sp. always used.

10.42 XGW C—Shanghai, China. Identifies in English at start and finish of Xmission. Inv. sp. always used. QRA: Mr. T. C. Loo, Engineering Department, Chinese Government Radio Administration, Ministry of Communications, Sassoon House, Shanghai, China.

10.375 JVO C—Nazaki, Japan. Usually phones TDE, Manchukuo, 10.065 mc., early mornings. Inv. sp. always used with TDE.

10.37 EAJ43 B—Santa Cruz de Tenerife, Canary Islands. Plays various National Anthems; at beginning of English "news" period, woman announcer calls various countries, then station announcements. During calling of countries, "*Hello Ireland*" noticed in every series of 2 or 3 countries called.

10.35 LSX B-C—Buenos Aires, Argentina. Occasionally uses slogan "*Transradio Internacional,*" announcing call in Spanish as "*ellay-essay-exay.*" Closes BCs with "*San Lorenzo*" March. Often heard phoning in late afternoons.

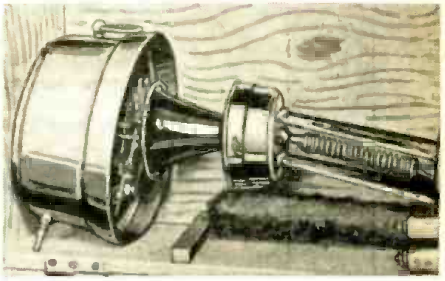
10.35 ORK B-C—Brussels, Belgium. Interval signal a carrillon. Closes with the famous "*Brabanconne.*" Rarely heard phoning with OPM, 10.14 mc., Belgian Congo, after 3 p.m. EST, also in early morning between 1:30-3 a.m.

10.26 PMN B—Bandoeng, Java. See YDC, 15.15 mc.

10.17 RIO C—Baku, USSR. Heard phoning other Soviet stations in clear Russian speech near midnite, EST. Man or woman heard.

10.14 OPM C—Leopoldville, Belgian Congo. Phones in clear speech contacting ORK. Heard afternoons and early AMs. Speaks in French, calling "*Allo Bruxelles.*" Rarely heard broadcasting programs.

10.135 CQN B—Macao, Portuguese, China. Call and location given very slowly and clearly after every 2nd selection. QRA: Govt. Broadcasting Station, P.O. Bldg., Macao, Port. China.



An alarm clock placed in front of a microphone was used to produce the "ticking of a clock" sound at an early date. It was one of the first "identification signals" employed by a S-W broadcast system.

10.08 RIR C—Tiflis, USSR. Usually heard late AMs. See RIO, 10.17 mc.

10.065 TDE C—Shinkyo, Manchukuo. Whenever heard phoning, JVO may also be heard in conversation. Stands by for hours every AM. Uses inv. sp. QRA: Kanjoshi Xmitting Station. Manshu Denshin Denwa Kaisha, Shinkyo, Manchukuo.

10.05 SUV C—Cairo, Egypt. See SUZ, 13.82 mc. Phones England, Italy and Germany, afternoons. Rarely heard using clear speech, then in Special BCs.

9.925 JDY C—Dairen, Kwantung, Manchuria. Ident. in Japanese at beginning of Xmission only. Inv. sp. always used.

9.94 CSW B—Lisbon, Portugal. See CSW, 11.04 mc.

9.86 EAQ B—Madrid, Spain. Announces "*La Voz de Espana.*"

9.83—IRM C—Rome, Italy. Irreg.

(*Continued on page* 322)

VISUAL BROADCAST STATIONS IN THE UNITED STATES

CALL LETTERS	POWER VISUAL	POWER AURAL	LICENSEE	LOCATION
TELEVISION STATIONS				
2000-2100 kilocycles for rural service				
W9XAK	125w	125w	Kansas State College of Agriculture & Applied Science	Manhattan, Kans.
W9XG	1500w		Purdue University	West Lafayette, Ind.
W9XK	100w		University of Iowa	Iowa City, Iowa
42000-56000, 60000-86000 kilocycles				
W2XAX	50w		Columbia Broadcasting System, Inc.	New York, N.Y.
W6XAO	150w		Don Lee Broadcasting System	Los Angeles, Calif.
W3XPF	4kw	1kw	Farnsworth Television, Inc.	Philadelphia, Pa.
(Construction Permit)				
W9XAL	300w	150w	First National Television, Inc.	Kansas City, Mo.
W1XG	500w		General Television Corp.	Boston, Mass.
W9XD	500w		The Journal Company	Milwaukee, Wis.
W2XBS	12kw	15kw	National Broadcasting Co., Inc.	New York, N.Y.
W2XBT	750w		National Broadcasting Co., Inc.	Portable
W2XF	12kw		National Broadcasting Co., Inc.	New York, N.Y.
W3XE	1500w	250w	Philco Radio & Television Corp.	Philadelphia, Pa.
W2XDR	1000w	500w	Radio Pictures, Inc.	Long Island City, N.Y.
W3XAD*	500w	500w	RCA Manufacturing Co., Inc.	Portable
W3XEP	30kw	30kw	RCA Manufacturing Co., Inc.	Camden, N.J.
W1OXX	50w		RCA Manufacturing Co., Inc.	Portable
W8XAN	100w	100w	Sparks-Withington Co.	Jackson, Mich.
W9XUI	100w		University of Iowa	Iowa City, Iowa
W9XAT	500w		Dr. George W. Young	Portable
FACSIMILE STATIONS				
W9XAF	500w		The Journal Company, 41000 kilocycles	Milwaukee, Wis.
W9XAG	1kw		The Journal Company, 1614, 2398, 3492.5, 4797.5, 6425, 8655 kilocycles	Milwaukee, Wis.
W7XBD	1kw		Oregonian Publishing Co., 1614, 2398, 3492.5 kilocycles	Portland, Ore.
W2XBH	500w	1kw	Radio Pictures, Inc., 1614, 2012-2398, 23100-41000, 86000 400000 kilocycles	Long Island City, N.Y.

*Licensed to operate on 124000-130000 kilocycles only.

Mc.	Call	
11.730	——	**SAIGON, INDO CHINA,** 25.57 m., Addr. Radio Philco. 11 pm.-1 am, 5.30-9.30 am.
11.730	PHI	**HUIZEN, HOLLAND,** 25.57 m., Addr. N. V. Philips' Radio. Irregular.
11.720	CJRX	**WINNIPEG, CANADA.** 25.6 m., Addr. James Richardson & Sons, Ltd. 4-10pm.
11.718	CR7RH	**LAURENCO MARQUES, PORTUGESE, E. AFRICA,** 25.6 m. Daily 11.45 pm.-12.30 am., 9.30-11 am., 12.45-3.45 pm. Sun. 5.30-7 am., 10 am.-12.30 pm., 1.30-3.20 pm.
11.715	TPA4	**PARIS, FRANCE,** 25.61 m., (See 15.245 mc.) 5.15-7.15 pm., 9 pm.-12 m.
11,710	SBG	**MOTALA, SWEDEN,** 25.63 m., 7-9, 11 am.-1.30 pm. Sunday 3 am.-1.30 pm.
11.700	HP5A	**PANAMA CITY, Pan.,** 25.65 m. Addr. Box 58. Testing from 9-11 pm.

↑ S.W. BROADCAST BAND ↑

11.680	KIO	**KAHUKU, HAWAII,** 25.68 m., Addr. RCA Communications. Irregularly.
11.595	VRR4	**STONY HILL, JAMAICA, B. W. I.,** 25.87 m. Works WNC daytime.
11.560	VIZ3	**FISKVILLE, AUSTRALIA,** 25.95 m., Addr. Amalgamated Wireless of Australasia Ltd. Tests irregularly.
11.500	XAM	**MERIDA, YUCATAN,** 26.09 m. Irregular 1-7.30 pm.
11.500	PMK	**BANDOENG, JAVA,** 26.09 m. Tests irregularly.
11,435	COCX	**HAVANA, CUBA,** 26.19 m P. O. Box 32. 6.55 am.-1 am. Sun. till 12 m. Relays CMX.
11.413	CJA4	**DRUMMONDVILLE, QUE., CAN.,** 26.28 m. Tests irregularly.
11.402	HBO	**GENEVA, SWITZERLAND,** 26.31 m., Addr. Radio Nations. Sat. 5.30-6.15, 7-8.30 pm.
11.280	HIN	**CIUDAD TRUJILLO, D. R.,** 26 m., Addr. La Voz del Partido Dominicano. Irregular.
11.050	ZLT4	**WELLINGTON, NEW ZEALAND,** 27.15 m. Works Australia and England early morning.
11.040	CSW	**LISBON, PORTUGAL,** 27.17 m., Addr. Nat. Broadcasting Sta. 1.30-5 pm.
11.000	PLP	**BANDOENG, JAVA,** 27.27 m. Relays YDB. 5.30-10.30 or 11 am. Sat. until 11.30 am.
10.970	OCI	**LIMA, PERU,** 27.35 m. Works Bogota, Col. evenings.
10.840	KWV	**DIXON, CALIF.,** 27.68 m., Addr. A. T. & T. Co. Works with Hawaii evenings.
10.770	GBP	**RUGBY, ENGLAND,** 27.85 m. Works Australia early morning.
10.740	JVM	**NAZAKI, JAPAN,** 27.93 m. Works U.S.A. 2-7 am.
10.675	WNB	**LAWRENCEVILLE, N. J.,** 28.1 m., Addr. A. T. & T. Co. Works with Bermuda irregularly.
10.670	CEC	**SANTIAGO, CHILE,** 28.12 m. Daily 7-7.15 pm.
10,660	JVN	**NAZAKI, JAPAN,** 28.14 m. Broadcasts daily 2-8 am. Works Europe irregularly at other times.
10.550	WOK	**LAWRENCEVILLE, N. J.,** 28.44 m., Addr. A. T. & T. Co. Works S. A. nights.
10.535	JIB	**TAIWAN, FORMOSA,** 28.48 m. Works Japan around 6.25 am.
10.520	VLK	**SYDNEY, AUSTRALIA,** 28.51 m., Addr. Amalgamated Wireless of Australasia Ltd. Works England 1-6 am.
10,430	YBG	**MEDAN, SUMATRA,** 28.76 m. 5.30-6.30 am., 7.30-8.30 pm.
10.420	XGW	**SHANGHAI, CHINA,** 28.79 m. Works Japan 12 m.-3 am.
10.410	PDK	**KOOTWIJK, HOLLAND,** 28.8 m. Works Java 7.30-9.40 am.
10.410	KES	**BOLINAS, CALIF.,** 28.8 m., Addr. RCA Communications. Irregular.
10.370	JVO	**NAZAKI, JAPAN,** 28.93 m. Broadcasts around 5 am.
10.370	EHZ	**TENERIFFE, CANARY ISLANDS,** 28.93 m. Relays EAJ43 2.15-3.15, 6.15-9.
10.350	LSX	**BUENOS AIRES, ARG.,** 28.98 m., Addr. Transradio International. Broadcasts 5-6 pm. Mon. and Fri. Tests irregularly at other times.
10.330	ORK	**RUYSSELEDE, BELGIUM,** 29.04 m. 1.30-3 pm.
10.300	LSL2	**BUENOS AIRES, ARG.,** 29.13 m., Addr. Cia. Internacional de Radio. Works Europe evenings.
10.290	DZC	**ZEESEN, GERMANY,** 29.16 m., Addr. (See 15.360 mc.) Irregular.
10.260	PMN	**BANDDENG, JAVA,** 29.24 m., Relays YDB 5.30-10.30 or 11 am., Sat. to 11.30 am.
10.250	LSK3	**BUENOS AIRES, ARG.,** 29.27 m., Addr. (See 10.310 mc.) Works Europe and U.S.A. afternoons and evenings.
10.230	CED	**ANTOFAGASTAN, CHILE,** 29.33 m. Tests 7-9.30 pm.
10.220	PSH	**RIO DE JANIERO, BRAZIL,** 29.35 m. Irregular.
10.170	RIO	**BAKOU, U.S.S.R.,** 29.15 m. Works Moscow 10 pm.-5 am.
10.140	OPM	**LEOPOLDVILLE, BELGIAN CONGO,** 29.59 m. Works Belgium around 3 am. and from 1-4 pm.
10.080	RIO	**TIFLIS, U.S.S.R.,** 29.76 m. Works Moscow early morning.
10.070	EDM-EHY	**MADRID, SPAIN,** 29.79 m. Works S. A. evenings.
10.065	JZB-TDB	**SHINKYO, MANCHUKUO,** 29.81 m. Works Tokio 6.30-7 am.
10.055	ZFB	**HAMILTON, BERMUDA,** 29.84 m. Works N. Y. C. irregular.
10.055	SUV	**ABOU ZABAL, EGYPT,** 29.81 m. Works Europe 1-6 pm.
10.042	DZB	**ZEESEN, GERMANY,** 29.87 m., Addr. Reichspostzenstralamt. Irregular.
9.990	KAZ	**MANILA, P. I.,** 30.03 m., Addr. RCA Communications. Works Java early morning.
9.950	GCU	**RUGBY, ENGLAND,** 30.15 m. Works N. Y. C. night time.
9.930	HKB	**BOGOTA, COL.,** 30.21 m. Works Rio evenings.
9.930	CSW	**LISBON, PORTUGAL,** 30.31 m., Addr. Nat. Broad. Station. 5-7 pm.
9.890	LSN	**BUENOS AIRES, ARG.,** 30.33 m., Addr. (See 10.300 mc.) Works N. Y. C. evenings
9.870	WON	**LAWRENCEVILLE, N. J.,** 30.4 m., Addr. A. T. & T. Co. Works England nights.
9.860	EAQ	**MADRID, SPAIN,** 30.43 m., Addr. Post Office Box 951. Daily 5.15-7.30 pm., Sat. also 12 n.-2 pm.
9.830	IRM	**ROME, ITALY,** 30.52 m. Works Egypt afternoons.
9.800	LSI	**BUENOS AIRES, ARG.,** 30.61 m., Addr. (See 10.350 mc.) Tests irregularly.
9.790	GCW	**RUGBY, ENGLAND,** 30.64 m. Works N. Y. C. evenings.
9.760	VLJ-VLZ2	**SYDNEY, AUSTRALIA,** 30.74 m., Addr. Amalgamated Wireless of Australasia Ltd. Works Java and New Zealand early morning.
9.750	WOF	**LAWRENCEVILLE, N. J.,** 30.77 m., Addr. A. T. & T. Co. Works London, night time.
9.740	COCQ	**HAVANA, CUBA,** 30.78 m. Addr. 25 No. 445, Vedado, Havana. 6.55 am.-1 am. Sun. till 12 m.
9.710	GCA	**RUGBY, ENGLAND,** 30.89 m. Works S. A. evenings.
9.675	DZA	**ZEESEN, GERMANY,** 31.01 m., Addr. (See 10.042 mc.) Irregular.
9,670	TI4NRH	**HEREDIA, COSTA RICA,** 31.02 m., Addr. Amando C. Marin, Apartado 40. 8.30-10 pm., 11.30 pm.-12 m.
9.660	LRX	**BUENOS AIRES, ARG.,** 31.06 m., Addr. El Mundo. 9.30 am.-11.30 pm.
9.650	CT1AA	**LISBON, PORTUGAL,** 31.09 m., Addr. Radio Colonial. Tues., Thurs. and Sat. 3.30-6 pm.
9.650	YDB	**SOERABAJA, JAVA,** 31.09 m., Addr. N.I. R.O.M. Daily exc. Sat. 6-7.30 pm., 5.30 to 10.30 or 11 pm. Sat. 5.30-11.30 am.
9.650	DGU	**NAUEN, GERMANY,** 31.09 m., Addr. (See 20.020 mc.) Works Egypt afternoons.
9.645	HH3W	**PORT-AU-PRINCE, HAITI,** 31.1 m., Addr. P. O. Box A117. 1-2, 7-8 pm.
9.645	YNLF	**MANAGUA, NICARAGUA,** 31.1 m. 8-9 am., 12.30-2.30, 6.30-10 pm.
9.635	2RO	**ROME, ITALY,** 31.13 m., Addr. (See 11.810 mc.) Tues., Thurs. and Sat. 6-7.45 pm.
9.630	HJ2ABD	**BUCARAMANGA, COL.,** 31.14 m. 11.30 am.-12.30 pm., 5.30-6.30, 7.30-10.30 pm.
9.620	HJ1ABP	**CARTAGANA, COL.,** 31.19 m., Addr. P. O. Box 37. 11 am.-1 pm., 5-11 pm. Sun. 10 am.-1 pm., 3-6 pm.
9.615	HP5J	**PANAMA CITY, PANAMA,** 31.22 m. Addr. Apartado 867. 12 n. to 1.30 pm., 6-10.30 pm.

↓ S.W. BROADCAST BAND ↓

9.600	RAN	**MOSCOW, U.S.S.R.,** 31.25 m. Daily 7-9.15 pm.
9.600	CB960	**SANTIAGO, CHILE,** 31.25 m. Heard after 9.30 pm.
9.595	HBL	**GENEVA, SWITZERLAND,** 31.27 m., Addr. Radio Nations. Irregular.
9.590	PCJ	**HUIZEN, HOLLAND,** 31.28 m., Addr. (See 15.220 mc.) Sun. 2-3, 7-8 pm. Tues. 1.30-3 pm. Wed. 7-10 pm.
9.590	VK6ME	**PERTH, W. AUSTRALIA,** 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd. 6-8 am. exc. Sun.
9.590	VK2ME	**SYDNEY, AUSTRALIA,** 31.38 m., Addr. Amalgamated Wireless of Australasia, Ltd., 47 York St. Sun. 12.30-2.30 am. 4.30-8.30, 9.30-11.30 am.
9.590	W3XAU	**PHILADELPHIA, PA.,** 31.28 m. Relays WCAU 11 am. to 7 pm.
9.580	VK3LR	**MELBOURNE, AUSTRALIA,** 31.32 m., Addr. 61 Little Collins St. Daily 3.30-8.30 am. Sun. 3.30-7.30 am. Sun.-Fri. 9.30 pm.-2.30 am.
9.575	HJ2ABC	**CUCUTA, COL.,** 31.34 m. 8 pm. to 12 m.
9.570	——	**MANILA, P. I.,** 31.35 m., addr. Erlanger & Galinger, Box 283. 9 pm.-10 am.
9.570	W1XK	**SPRINGFIELD, MASS.,** 31.35 m., Addr. Westinghouse Electric & Mfg. Co. Relays WBZ 6 am. to 12 m. Sun. 7 am. to 12 m.
9.560	DJA	**BERLIN, GERMANY,** 31.38 m., Addr. Broadcasting House. 12.05-5.15 am., 4.50-10.45 pm.
9.555	HJ1ABB	**BARRANQUILLA, COL.,** 31.39 m., Addr. P. O. Box 715. 11.30 am. to 1 pm., 4.30-6 pm.
9.550	OLR3A	**PRAGUE, CZECHOSLOVAKIA,** 31.41 m. See 11.840 mc.
9.550	XEFT	**VERA CRUZ, MEX.,** 31.41 m, 11.30 am.-4 pm., 7 pm.-12 m.
9.540	DJN	**BERLIN, GERMANY,** 31.45 m., Addr. (See 9.560 mc.) 12.05-5.15 am., 4.50-10.45 pm.
9.540	VPD2	**SUVA, FIJI ISLANDS,** 31.45 m., Addr. Amalgamated Wireless of Australasia, Ltd. 5.30-7 am.
9.535	JZI	**TOKIO, JAPAN,** 31.46 m., Addr. (See 11.800, JZJ)
9.530	W2XAF	**SCHENECTADY, N. Y.,** 31.48 m., Addr. General Electric Co. 4 pm.-12 m.
9.525	ZBW3	**HONGKONG, CHINA,** 31.49 m., Addr. P. O. Box 200. Irregular 11.30 pm. to 1.15 am., 4-10 am.
9.525	LKJ1	**JELOY, NORWAY,** 31.29 m. 5-8 am.
9.520	HJ4ABH	**ARMENIA, COLOMBIA,** 31.51 m. 8-11 am., 6-10 pm.
9.520	XEDQ	**GUADALAJARA, GAL., MEXICO,** 31.5 m. Irregular 7.30 pm. to 12.30 am.
9.510	VK3ME	**MELBOURNE, AUSTRALIA,** 31.55 m., Addr. Amalgamated Wireless of Australasia, 167 Queen St. Daily except Sun. 4-7 am.
9.510	GSB	**DAVENTRY, ENGLAND,** 31.55 m., Addr. (See 9.580 mc.—GSC) 1-3.15 am., 12.20-6 pm., 9-11 pm.
9.505	HJ1ABE	**CARTAGENA, COLOMBIA,** 31.57 m. Addr. P. O. Box 31. 5-10.30 pm.
9.500	XEWW	**MEXICO CITY, MEX.,** 31.58 m. Addr. Apart. 2516. Relays XEW.
9.500	HJU	**BUENAVENTURA, COLOMBIA,** 31.58 m., Addr. National Railways. Mon., Wed. and Fri. 8-11 pm.

(Continued on page 305)

(All Schedules Eastern Standard Time)

MANILA

● KZRM at Manila in the Philippine Islands is on the air with a new s-w transmitter. It is reported to be operating from 9 p.m.-9 a.m. on either 11.84, 9.57 or 9.65 mc. Address Erlanger and Galinger, Inc., Box 283.

DENMARK

OXY at Skamleboak is testing a new transmitter, apparently of high power. Directional antennas for North America and other areas are used. It is heard on 11.805 mc. testing with the North American antenna from about 6 to 7:45 p.m. when another antenna is switched on. Tests then continue till about 9 p.m. The station is reported testing at other hours of the day also.

PANAMA

HP5A, Panama City, is testing on 11.7 mc. from 9 p.m. on. This station operates on 6.122 mc. normally.

CUBA

We are indebted to José Carriazo, Jr. of Havana for furnishing us with a revised list of new and old Cuban stations, together with schedules. Most of the old stations have new schedules, which have been included in the Station List of the World on page 299, together with the new ones. New ones are COBZ on 9.030 mc., COCW on 6.880 mc., COCM on 9.4 mc. For details see the Station List.

Here's Your Button

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

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

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

SHORT WAVE LEAGUE

HONORARY MEMBERS

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

Executive Secretary

WHEN TO LISTEN IN

by M. Harvey Gernsback

(All Schedules in Eastern Standard Time)

SHORT-WAVE SERVICE IN SIX LANGUAGES STARTED BY NBC

A new *short-wave service in six languages* to Europe, South and Central America and other parts of the world over the National Broadcasting Company's short-wave station W3XAL at Bound Brook, N.J., was inaugurated recently by the National Broadcasting Company.

Lenox R. Lohr, NBC president, in announcing the start of these broadcasts to millions of listeners abroad, stated that the new service marks continuation of the company's policy of providing the greatest possible service in the field of *international* short-wave broadcasting.

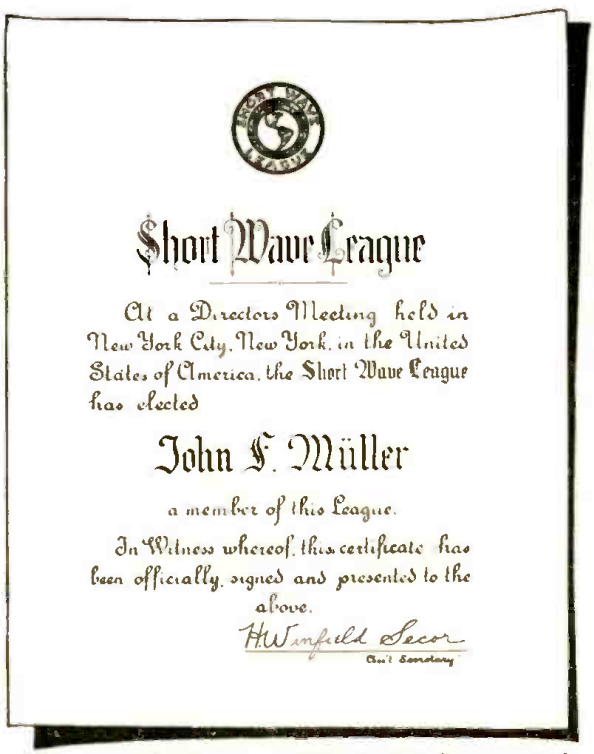
NBC's two new directional beam antennae were put into regular operation for the first time, Mr. Lohr said. The antennae, one for Europe and one for Latin America, have been in use on an experimental basis since early this year. Reports from many countries, especially in South America, indicate a great improvement in reception of W3XAL's signal.

The new short-wave schedule will carry the pick of NBC sustaining programs from both the Red and Blue Networks. Hitherto, Mr. Lohr pointed out, the company's international short-wave service has consisted chiefly of programs from the Blue Network and specially arranged programs for Latin America broadcast by W3XAL over a non-directional beam. Extension of short-wave service to other countries has been under way for several months, following visits by John F. Royal, NBC vice president in charge of programs, to Europe and South America.

Details of the new schedule have been worked out by Charles Carvajal, production director of W3XAL, under the supervision of Phillips Carlin, NBC sustaining program manager. In addition to the network broadcasts, programs of particular interest to individual countries will be put on the air from time to time and the specially arranged programs for Latin America will be continued.

Announcements in English, French, German, and Italian will be made on all programs broadcast to Europe, and in English, Spanish and Portuguese on programs broadcast to South and Central America. Speakers of French, German, and Italian have been added to the announcer's staff, which already had Spanish and Portuguese-speaking members.

Service to Europe will be available on the directional beam, with a frequency of 17,780 kilocycles, 16.8 meters, from 8:00 a.m. to 2:00 p.m. The announcements will be made by Ernst Kotz, a recent addition to the staff, and Miss Lisa (*Continued on page* 326)



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
Gen'l Secretary

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

See page 332 how to obtain certificate.

Mc.	Call	
9.500	PRF5	RIO DE JANIERO, BRAZ., 31.58 m. Irregularly 4.45 to 5.45 pm.
9.478	EAR	MADRIO, SPAIN, 31.65 m., Addr. (See 9.860 mc.) Exc. Mon. 2.30-3, 6.30-7, 7.30-9.30 pm., Mon. 7.30-9.30 pm.

S.W. BROADCAST BAND

9.460	ICK	TRIPOLI, N. AFRICA, 31.71 m. Works Rome, 5.30-7 am.
9.450	TGWA	GUATEMALA CITY, GUATEMALA, 31.75 m., Addr. Ministre de Fomento. Daily 12 n. to 2 pm., 8 pm. to 12 m. Sat. 9 pm. to 5 am. (Sun.)
9.440	FZF6	FORT de FRANCE, MARTINIQUE, 31.78 m. 11.30 am., 12.30 pm., 6.15-7.15 pm., 8-9 pm.
9.440	HC2RA	GUAYAQUIL, ECUADOR, 31.78 m. Irregularly till 10.40 pm.
9.428	COCH	HAVANA, CUBA, 31.8 m., Addr. 2 B St., Vedado. 7 am.-1 am.
9.415	PLV	BANDOENG, JAVA, 31.87 m. Works Holland aroud 9.45 am.
9.400	COCM	HAVANA, CUBA, 31.91 m. Addr. Transradio Columbia, P. O. Box 33. 7 am.-12 m. Relays CMCM.
9.350	COBC	HAVANA, CUBA, 32.09 m. Addr. P.O. Box 132. Relays CMBC. 6.55 am.-12.30 am.
9.350	HS8PJ	BANGKOK, SIAM, 32.09 m. Thursday; 1-2.30, 7.30-10 am.
9.330	CGA4	DRUMMONDVILLE, CANADA, 32.15 m. Works England irregularly.
9.330	OAX4J	LIMA, PERU, 32.15 m., Addr. Box 1166, "Radio Universal." 7 pm.-12 m.
9.300	YNGU	MANAGUA, NICARAGUA, 32.26 m. 12 n.-2 pm., 6-7 pm.
9.280	GCB	RUGBY, ENGLAND, 32.33 m. Works Canada and Egypt evenings and afternoons.
9.170	WNA	LAWRENCEVILLE, N. J., 32.72 m. Works England evenings.
9.150	YVR	MARACAY, VENEZUELA, 32.79 m. Works with Europe afternoons.
9.125	HAT4	BUDAPEST, HUNGARY, 32.88 m., Addr. "Radiolabor," Gyali-ut, 22. Sun. and Wed. 7-8 pm., Sat. 6-7 pm.
9.060	TFK	REYKJAVIK, ICELAND, 33.11 m. Works London afternoons.
9.030	COBZ	HAVANA, CUBA, 33.2. m. Addr. P. O. Box 866. 7.45 am.-12 m. Irreg. 12 m.-2 am. Relays CMBZ.
9.020	GCS	RUGBY, ENGLAND, 33.26 m. Works N. Y. C. evenings.
9.010	KEJ	BOLINAS, CAL., 33.3 m. Relays NBC and CBS programs in evening irregularly.
8.957	VWY	KIRKEE, INDIA, 33.43 m. Works with England in morning.
8.960	TPZ	ALGIERS, ALGERIA, 33.48 m. Works Paris afternoons.
8.950	HCJB	QUITO, ECUADOR, 33.5 m. 7-10 pm. except Monday.
8.795	HKV	BOGOTA, COLOMBIA, 34.09 m. Mon. and Thurs. 7-7.30 pm.
8.775	PNI	MAKASSER, CELEBES, N. I., 34.19 m. Works Java around 4 am.
8.765	DAF	NORDDEICH, GERMANY, 34.23 m. Works German ships irregularly.
8.760	GCQ	RUGBY, ENGLAND, 34.25 m. Works Africa afternoons.
8.750	FZE8	DJIBOUTI, FR. SOMALILAND, AFRICA, 34.29 m. Works Paris around 2.30 am.
8.730	GCI	RUGBY, ENGLAND, 34.36 m. Works India 8 am.
8.720	VPD3	SUVA, FIJI ISLES, 34 m., Addr. (See 9.540 mc., VPD2). 5.30-7 am.
8.680	GBC	RUGBY, ENGLAND, 34.56 m. Works ships irregularly.
8.665	COJK	CAMAGUEY, CUBA, 34.62 m., Addr. 4 General Gomez. 5.30-6.30, 8-11 pm., daily except Sat. and Sun.
8.580	YNLG	MANAGUA, NICARAGUA, 34.92 m. 7.30-9.30 pm.
8.560	WOO	OCEAN GATE, N. J., 35.05 m. Works ships irregularly.
8.400	HC2CW	GUAYAQUIL, ECUADOR, 35.71 m. 11.30 am.-12.30 pm., 8-11 pm.
8.380	IAC	PISA, ITALY, 35.8 m. Works Italian ships irregularly.
8.190	XEME	MERIDA, YUCATAN, 36.63 m., Addr. Calle 59, No. 517, "La Voz de Yucatan desde Merida." 10 am.-12n., 6 pm.-12 m.
8.185	PSK	RIO DE JANEIRO, BRAZIL, 36.65 m. Irregularly.
8.036	CNR	RABAT, MOROCCO, 37.33 m. Sun. 2.30-5 pm.
7.975	HC2TC	QUITO, ECUADOR, 37.62 m. Thurs. and Sun. at 8 pm.
7.901	LSL	HURLINGHAM, ARGENTINA, 37.97 m. Works Brazil at night.
7.860	SUX	ABOU ZABAL, EGYPT, 38.17 m. Works with Europe, 4-6 pm.
7.854	HC2JSB	GUAYAQUIL, ECUADOR, 38.2 m. Evenings.
7.797	HBP	GENEVA, SWITZERLAND, 38.48 m., Addr. Radio-Nations. Irregular.
7.715	KEE	BOLINAS, CAL., 38.89 m. Relays NBC and CBS programs in evening irregularly.
7.626	RIM	TACHKENT, U.S.S.R., 36.34 m. Works with Moscow in early morning.
7.610	KWX	DIXON, CAL., 39.42 m. Works with Hawaii, Philippines. Java and Japan, nights.
7.550	TI8WS	PUNTA ARENAS, COSTA RICA, 39.74 m., Addr. "Ecos Del Pacifico", P. O. Box 75. 6 pm.-12 m.
7.520	KKH	KAHUKU, HAWAII, 39.89 m. Works with Dixon and broadcasts irregularly nights.
7.510	JVP	NAZAKI, JAPAN, 39.95 m. Irregular.
7.500	RKI	MOSCOW, U.S.S.R., 40 m. Works with RIM early am.
7.390	ZLT2	WELLINGTON, N. Z., 40.6 m. Works with Sydney, 3-7 am.
7.380	XECR	MEXICO CITY, MEX., 40.65 m., Addr. Foreign Office. Sunday 6-7 pm.
7.220	HKE	BOGOTA, COL., S. A., 41.55 m. Tues. and Sat. 8-9 pm. Mon. and Thurs. 6.30-7 pm.
7.200	YNAM	MANAGUA, NICARAGUA, 41.67 m. Daily at 9 pm.
7.100	FO8AA	PAPEETE, TAHITI, 42.25 m., Addr. Radio Club Papeete. Tues. and Fri. 11 pm.-12 m.
6.996	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.
6.977	XBA	TACUBAYA, D. F., MEX., 43 m. 9.30 am.-1 pm., 7-8.30 pm.
6.976	HCETC	QUITO, ECUADOR, 43m., Addr. Teatro Bolivar. Thurs. till 9.30 pm.
6.905	GDS	RUGBY, ENG., 43.45 m. Works N.Y.C. evenings irregularly.
6.880	COCW	HAVANA, CUBA, 43.62 m. Addr. La Voz de las Antillas, P. O. Box 130. 6.55 am.- 1 am. Sun. 10 am.-10 pm.
6.860	KEL	BOLINAS, CALIF., 43.70 m. Tests irregularly. 11 am.-12 n., 6-9 pm.
6.850	XGOX	NANKING, CHINA, 43.8 m. Daily 6.40-8.40 am., Sun. 4.40-6.05 am.
6.800	HI7P	CIUDAD TRUJILLO, DOM. REP., 44.12 m., Addr. Emisoria Diaria de Commercio. Daily exc. Sat. and Sun. 12.40-1.40, 6.40-8.40 pm. Sat. 12.40-1.40 pm. Sun. 10.40 am.-11.40 am.
6.770	HIH	SAN PEDRO DE MACORIS, DOM. REP., 44.26 m. 12.10-1.40 pm., 7.30-9 pm. Sun. 3-4 am., 4.15-6 pm., 4.40-7.40 pm.
6.775	WOA	LAWRENCEVILLE, N. J., 44.41 m., Addr. A. T. & T. Co. Works England evenings.
6.750	JVT	NAZAKI, JAPAN, 44.44 m., Addr. Kokusai-Denwa Kaisha, Ltd., Tokio. Irregular.
6.730	HI3C	LA ROMANA, DOM. REP., 44.58 m., Addr. "La Voz de la Feria." 12.30-2 pm., 5-6 pm.
6.720	PMH	BANDOENG, JAVA, 44.64 m. Relays NIROM programs. 5.30-9 am.
6.710	TIEP	SAN JOSE, COSTA RICA, 44.71 m., Addr. Apartado 257, La Voz del Tropico. Daily 7-10 pm.
6.672	YVQ	MARACAY, VENEZUELA, 44.95 m. Sat. 8-9 pm.
6.670	HC2RL	GUAYAQUIL, ECUADOR, S. A., 44.95 m., Addr. P. O. Box 759. Sun. 5.45-7.45 pm., Tues. 9.15-11.15 pm.
6.650	IAC	PISA, ITALY, 45.11 m. Works ships irregularly.
6.630	HIT	CIUDAD TRUJILLO, D. R., 45.25 m., Addr. "La Voz de la RCA Victor," Apartado 1105. Daily exc. Sun. 12.10-1.40 pm., 5.40-8.40 pm.; also Sat. 10.40 pm.-12.40 am.
6.625	PRADO	RIOBAMBA, ECUADOR, 45.28 m. Thurs. 9-11.45 pm.
6.558	HI4D	CIUDAD TRUJILLO, D. R., 45.74 m. Except Sun. 11.55 am.-1.40 pm.
6.550	XBC	VERA CRUZ, MEX., 45.8 m. 8.15-9 am.
6.550	TIRCC	SAN JOSE, COSTA RICA, 45.8 m., Addr. Radioemisora Catolica Costarricense. Sun. 11 am.-2 pm., 6-7, 8-9 pm. Daily 12 n.-2 pm., 6-7 pm., Thurs. 6-11 pm.
6.545	YV6RB	BOLIVAR, VENEZUELA, 45.84 m., Addr. "Ecos de Orinoco." 6-10.30 pm.
6.530	YN1GG	MANAGUA, NICARAGUA, 45.94 m., Addr. "La Voz de los Lagos." 8-9 pm.
6.520	YV4RB	VALENCIA, VENEZUELA, 46.01 m. 11 am.-2 pm., 5-10 pm.
6.500	HIL	CIUDAD TRUJILLO, D. R., 46.15 m., Addr. Apartado 623. 12.10-1.40 pm,. 5.40-7.40 pm.
6.500	TIOW	PUERTO LIMON, COSTA RICA, 46.15 m., Addr. Ondas del Caribe. Daily 12 n.-1.30 pm.
6.477	HI4V	SAN FRANCISCO de MACORIS, D. R., 46.32 m. 11.40 am.-1.40 pm., 5.10-9.40 pm.
6.470	YNLAT	GRANADA, NICARAGUA, 46.36 m., Addr. Leonidas Tenoria, "La Voz del Mombacho." Irregular.
6.450	HI8A	CIUDAD TRUJILLO, D. R., 46.51 m. 8.40-10 40 am., 2.40-4.10 pm. Sat. 9.40-10.40 pm. Sun. 2.40-4.40 pm.
6.420	HI1S	SANTIAGO, D. R., 46.73 m. 11.40 am. -1.40 pm., 5.40-7.40. 9.40-11.40 pm.
6.410	TIPG	SAN JOSE, COSTA RICA, 46.8 m., Addr. Apartado 225, "La Voz de la Victor." 12 n.-2 pm., 6-11.30 pm.
6.400	YV5RH	CARACAS, VENEZUELA, 46.88 m. 7-11 pm.
6.380	YV5RF	CARACAS, VENEZUELA, 47.02 m., Addr. Box 983. 6-10.30 pm.
6.360	HRP1	SAN PEDRO SULA, HONDURAS, 47.19 m. 7.30-9.30 pm.
6.360	YV1RH	MARACAIBO, VENEZUELA, 47.19 m., Addr. "Ondas Del Lago," Apartado de Correos 261. 6-7.30 am., 11 am.-2 pm., 5-11 pm.
6.350	HRY	TEGUCIGALPA, HONDURAS, 47.24 m. 6.30-8.30 pm.
6.340	HI1X	CIUDAD TRUJILLO, D. R., 49.32 m. Sun. 7.40-10.40 am., daily 12.10-1.10 pm., Tues. and Fri. 8.10-10.10 pm.
6.316	HIZ	CIUDAD TRUJILLO, D. R., 47.5 m. Daily except Sat. and Sun. 11.10 am.-2.25 pm., 5.10-8.40 pm. Sat. 5.10-11.10 pm. Sun. 11.40 am.-1.40 pm.
6.310	TG2	GUATEMALA CITY, GUAT., 47.55 m., Addr. Secretaria de Fomento. Relays TG1 11 pm.-1 am.
6.300	YV4RG	MARACAY, VENEZUELA, 47.62 m. 8-10.30 pm.
6.280	COHB	SANCTI SPIRITUS, CUBA, 47.77 m. Addr. P. O. Box 85. 9-11.30 am.,12.30 1.30, 4-7, 8-11 pm.
6.280	HIG	CIUDAD TRUJILLO, D. R., 47.77 m. 7.10-8.40 am., 12.40-2.10, 8.10-9.40 pm.
6.270	YV5RP	CARACAS, VENEZUELA, 47.79 m., Addr. "La Voz de la Philco." Irregular.
6.243	HIN	CIUDAD TRUJILLO, D. R., 48 m., Addr. "La Voz del Partido Dominicano." 12 m.-2 pm., 7.30-9.30 pm., irregularly.
6.235	HRD	LA CEIBA, HONDURAS, 48.12 m., Addr. "La Voz de Atlantida." 8-11 pm.; Sat. 8 pm.-1 am.; Sun. 4-6 pm.
6.230	YV1RG	VALERA, VENEZUELA, 48.15 m. 6-9.30 pm.

(Continued on page 307)

(All Schedules Eastern Standard Time)

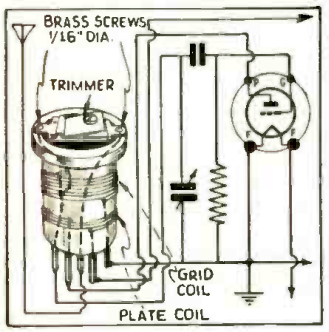
$5.00 FOR BEST SHORT-WAVE KINK

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

$5.00 PRIZE

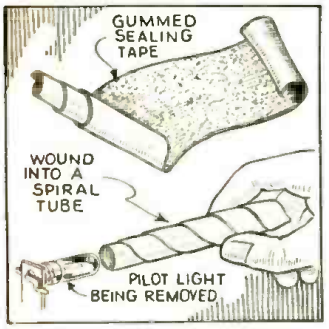
PLUG-IN ANTENNA CONDENSER

In my opinion much time can be saved with this Kink, so I am passing it along



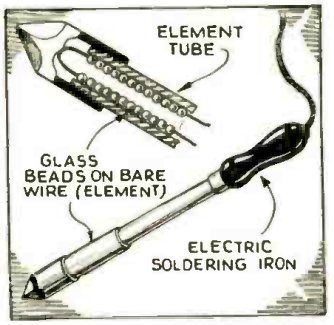
to your readers. I mount the antenna trimmers on the plug-in coils. (I use 5 prong coils, the extra prong for the antenna connection.) After the coils are wound and the trimmers are mounted, coils should be plugged in one by one and the trimmers adjusted. I got tired of hunting up the old screw driver every time I adjusted the trimmers, so I hit upon this method of getting away from it.—Norman V. Bays.

▼ ▼ ▼



TIME SAVER

I wish to submit the following Kink. The most ordinary things are worthwhile as I found out the other day when I found a serviceman trying to manipulate the pilot light in a set with two very chubby fingers. It was in crowded quarters and after several tries he said: "Guess I'll have to pull the chassis." I suggested that it was unnecessary. I took a piece of gummed paper such as they use in sealing cartons and twisted it into a spiral tube, thin enough to fit over the pilot light. The old light came out with no trouble at all, and the new one was put in the same way. I got the idea from one of those trick finger traps that—the more you pull, the tighter they get.—Donald Wade.



REPAIRING SOLDERING IRON

Many times soldering irons are discarded when they blow fuses. In the majority of cases the only fault with the iron is the deteriorated or broken insulation. I have repaired my own iron in the fashion shown in the drawing. Small glass beads are threaded on the bare wire element and provide excellent insulation; the iron is then good for many more years of service.—O. J. Harman.

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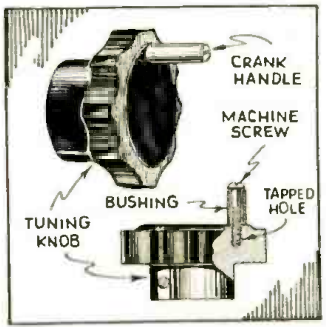

TUNING AID

Here is my favorite tuning aid Kink. I have found it very helpful in tuning from one hand to another. In that it speeds the tuning up and saves the wrist (also temper). The drawing is self-explanatory, and there is no great deal of work involved. An ⅛" hole should be drilled a ¼" from the edge of the main tuning knob. This should be about a ¼" deep depending on the knob. This hole should then be tapped 6-32. A ⅝" bushing was placed on a 1" screw and the assembly was screwed on the knob. This assembly has taken the place of the broken fast speed on my receiver. I hope that you will find this acceptable.—Jennings David.

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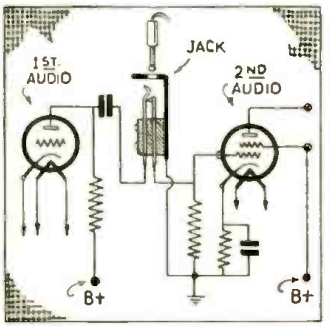


PHONE JACK

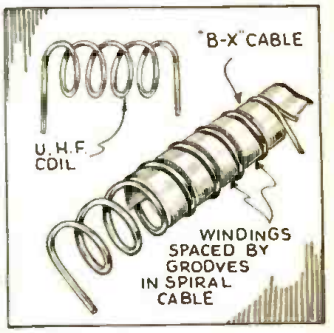
Recently I have made use of two kinks that I think are worth passing on to other experimenters. The first is an earphone jack to be used between two stages of an audio amplifier. Its advantages are: a "dead" jack frame; and elimination of "B" current from the earphone circuit. Previously, it has not been very safe to have an earphone jack on a grounded panel. Crystal earphones can be used in this circuit.

The second concerns a way of connecting a "stand by" or "send-receive" switch in a receiver. If this switch cuts out only the detector and R.F. stages (if any) it is a lot easier on the eardrums. Also, if the power-supply has no bleeder resistor, it lessens chances of condenser breakdown.—Guy Black.

▼ ▼ ▼

FORMING SMALL COILS

I wish to submit a Kink that should interest the short-wave experimenters that wind their own coils. I find this method very useful on the ultra-high frequencies. Obtain a piece of scrap spiral tubing (BX)



such as that used by electricians in house wiring. Wind the coil wire in the grooves of the spiral. After the desired number of turns have been wound, the coil is unscrewed from the tubing and the coil squeezed together for the scraper spacing. —Robert K. Benson.

▼ ▼ ▼

FOR BETTER DOUBLE-SPACING

Ordinarily, when a variable condenser is double-spaced, one has great difficulty in centering the rotor in relation to the stator plates. A great deal of time is spent procuring washers, etc., to space the stator plates so the rotor will center. Sometimes the un-used rotor plates are laboriously cut and filed into the shape of a washer for this use. All the trouble and labor can be saved by simply not discarding the unused rotor plates, but utilizing the extra rotor plates by placing them two together. The accompanying diagram will show this clearly.—Floyd R. Penning, W6FOF.

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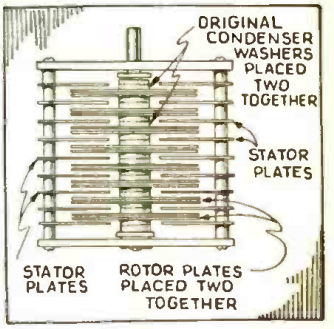


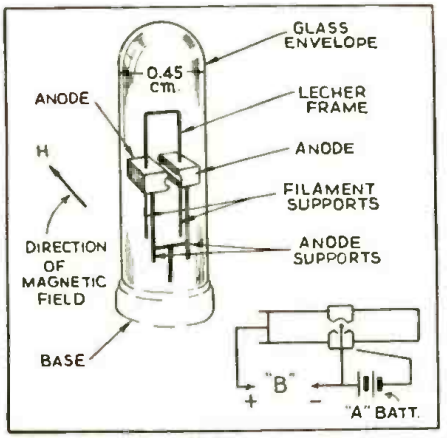
DID YOU READ OUR "CALL" FOR MORE AND BETTER "KINKS" IN THE LAST ISSUE?

THIS TUBE GENERATES ONE-QUARTER INCH WAVES

● A tiny vacuum tube which is capable of producing continuous waves measuring but ¼-inch or 0.64 centimeter in length created quite a furore in radio circles recently. This tube for the production of ¼-inch waves was described by Drs. C. E. Cleeton, and N. H. Williams, and we are indebted to *The Physical Review* for the following technical data on this remarkable tube. The work in the development of these ¼-inch waves was performed by these two gentlemen.

An investigation was undertaken to determine the practical short-wave limit for electromagnetic waves produced by vacuum tubes. Stable continuous waves of 0.64 cm. wave-length were produced by means of a split anode magnetron operating in the electronic mode of oscillation. The wave-length was measured to within one percent by an echelette grating spectrometer, which has been described in previous papers. The receiver was an iron pyrite crystal connected to a sensitive galvanometer.

The table gives information concerning the construction and operation of three micro-ray tubes designed to operate at wave-lengths below 2 cm. Ra is the anode radius in cm., L is the distance in cm. from the shorting bar on the Lecher frame to the filament, V is the anode potential in volts, H is the magnetic field strength in oersteds, and λ is the wave-length in cm.



Arrangement of Elements in One-Quarter Inch Wave Oscillator

The tube producing the shortest wave-length (No. 3) produced about 4×10^{-9} ampere in a crystal detector placed at the focus of the receiving mirror, and at a distance of 15 meters from the tube. In order to obtain the magnetic field necessary to operate tube No. 3, the elements were enclosed in an envelope whose outside diameter was 0.45 cm.

It may be concluded that continuous electromagnetic waves may be produced as short as 6 mm. by means of a split anode magnetron, and that the lower limit is determined by the strength of the magnetic field which it is practicable to obtain. The tubes will operate with sufficient stability and output to serve as sources of electromagnetic radiation for many researches in this wave-length region.

Tube No.	Ra	L	V	H	λ
1	0.045	0.99	830	6,600	1.87
2	0.035	0.75	1350	9,900	1.22
3	0.019	0.38	1200	24,000	0.64

Mc.	Call	
6.230	OAX4G	LIMA, PERU, 48.15 m., Addr. Apartado 1242. Daily 7-10.30 pm.
6.210	YV5RI	CORO, VENEZUELA, 48.31 m., Addr. Roger Leyba, care A. Urbina y Cia. Irregular.

↓ S.W. BROADCAST BAND ↓

6.190	HI8Q	CIUDAD TRUJILLO, D. R., 48.47 m. 11.45 am.-1 pm., 4.45-6.45 pm.
6.185	HI1A	SANTIAGO, D. R., 48.5 m., Addr. P. O. Box423. 11.40am.-1. 40 pm.; 7.40-9. 40 pm.; Wed. 6-10.30 pm.
6.171	XEXA	MEXICO CITY, MEX., 48.61 m., Addr. Dept. of Education. 7-11 pm.
6.160	YV5RD	CARACAS, VENEZUELA, 48.7 m. 11 am.-2 pm., 4-10.40 pm.
6.160	VPB	COLOMBO, CEYLON, 48.7 m. Daily exc. Thurs. and Fri., 6.30 am.-12.30 pm.; Sun. 7-11.30 am.
6.150	CSL	LISBON, PORTUGAL, 48.78 m. Irregular. 7-8.30 am., 2-7 pm.
6.150	CJRO	WINNIPEG, MAN., CANADA, 48.78 m., Addr. (See 11.720 mc.) 4-10 pm.
6.147	ZEB	BULAWAYO, RHODESIA, S. AFRICA, 48.8 m. Sun. 3.30-5 am.; Tues., Fri., 1.15-3.15 pm.; Mon. and Thurs. 11 am.-12 m.
6.147	COKG	SANTIAGO, CUBA, 48.8 m., Addr. Box 137. 9-10 am., 11.30 am.-1.30 pm., 3-4.30 pm., 10-11 pm., 12 m.-2 am.
6.145	HJ4ABU	PEREIRA, COL., 48.8 m. 9.30 am.-12 m., 6.30-10 pm.
6.140	W8XK	PITTSBURGH, PA., 48.86 m., Addr. Westinghouse Electric & Mfg. Co. Relays KDKA 9 pm.-12 m.
6.137	CR7AA	LAURENCO MARQUES, PORT. E. 48.87 m. 4-9, 10.30-11 am., 12 m.-3.30 pm., 11.15 pm.-1 am.
6.135	HJ1ABB	BARRANQUILLA, COL., 48.9 m., Addr. P. O. Box 715. 11.30 am.-1 pm., 4.30-10 pm.
6.135	HI5N	SANTIAGO, D. R., 48.9 m. 6.40-9.10 pm
6.130	TGXA	GUATEMALA CITY, GUAT., 48.94 m., Addr. Giornal Liberal Progressista. Irregularly.
6.130	VP3BG	GEORGETOWN, BRIT. GUIANA, 48.94 m. From 5 pm. on.
6.130	COCD	HAVANA, CUBA, 48.94 m., Addr. Calle G y 25, Vedado. Relays CMCD 10 am-10 pm.
6.130	VE9HX	HALIFAX, N. S., CAN., 48.94 m., Addr. P. O. Box 998. Mon.-Fri. 9 am.-1 pm., 5-11 pm. Fri.; 1-3 pm., Sat.; Sun. 9 am.-1 pm., 2-11 pm. Relays CHNS.
6.130	ZGE	KUALA LUMPUR, FED. MALAY ST., 48.94 m. Sun., Tue. and Fri. 6.40-8.40 am.
6.130	LKL	JELOY, NORWAY, 48.94 m. 11 am.-6 pm.
6.125	CXA4	MONTEVIDEO, URUGUAY, 48.98 m., Addr. Radio Electrico de Montevideo., Mercedes 823. 10 am.-12 n., 2-8 pm.
6.125	OAX1A	CHICLAYO, PERU, 48.98 m., Addr. La Voz de Chiclayo, Casilla No. 9. 8-11 pm.
6.122	OAX4P	HUANCAYO, PERU, 49 m. La Voz del Centro del Peru. 8 pm. on.
6.122	HP5A	PANAMA CITY, PAN., 49. m. Addr. Box 58. 12 n-1 pm., 8-10 pm.
6.122	HJ3ABX	BOGOTA, COL., 49 m., Addr. La Voz de Col., Apartado 2665. 12 n.-2 pm., 5.30-11 pm.; Sun. 6-11 pm.
6.120	W2XE	NEW YORK CITY, 49.02 m., Addr. Col. B'cast. System, 485 Madison Ave. Irregular.
6.120	XEUZ	MEXICO CITY, MEX., 49.02 m., Addr. 5 de Mayo 21. Relays XEFO 1-3 am.
6.115	OLR2C	PRAGUE, CZECHOSLOVAKIA, 49.05 m. (See 11.875 mc.)
6.110	XEPW	MEXICO CITY, MEX., 49.1 m., Addr. La Voz de Aguila Azteca desde Mex., Apartado 8403. Relays XEJW 11 pm.-1 am.
6.110	VUC	CALCUTTA, INDIA, 49.1 m. Daily 3-5.30 am., 9.30 am.-12 m.; Sun 7.30 am.-12 m.
6.105	HJ4ABB	MANIZALES, COL., 49.14 m., Addr. P. O. Box 175. Mon.-Fri 12.15-1 pm.; Tue. and Fri. 7.30-10 pm.; Sun 2.30-5 pm.
6.100	W3XAL	BOUND BROOK, N. J., 49.18 m., Addr. Natl. Broad. Co. 8.15 pm.-12 m.
6.100	W9XF	CHICAGO, ILL., 49.18 m., Addr. N.B.C.
6.100	HJ4ABE	MEDELLIN, COL., 49.18 m. 11 am.-12 m., 6-10.30 pm.
6.097	ZTJ	JOHANNESBURG, S. AFRICA, 49.2 m., Addr. African Broad. Co. Sun.-Fri. 11.45 pm.-12.30 am.; Mon.-Sat. 3.30-7 am., 9 am.-4 pm.; Sun. 8-10.15 am., 12.30-3 pm.
6.095	JZH	TOKIO, JAPAN, 49.22 m., Addr. (See 11.800 mc., JZJ.) Irregular.
6.092	OAX4Z	LIMA, PERU 49.25 m. Radio National 7-11 pm.
6.090	HJ4ABC	IBAGUE, COL., 49.26 m. 7 pm.-12 m.
6.090	CRCX	TORONTO, CAN., 49.26 m., Addr. Can. Broadcasting Corp. Daily 5.30-11.30 pm.; Sun. 5-11.30 pm.
6.090	ZBW2	HONGKONG, CHINA, 49.26 m., Addr. P. O. Box 200. Irregular.
6.085	HJ5ABD	CALI, COLOMBIA, 49.3 m., Addr. La Voz de Valle. 12m.-1.30 pm., 5.10-9.40 pm.
6.083	VQ7LO	NAIROBI, KENYA, AFRICA, 49.31 m., Addr. Cable and Wireless, Ltd. Mon.-Fri. 5.45-6.15 am., 11.30 am.-2.30 pm., also Tues. and Thurs. 8.30-9.30 am.; Sat. 11.30 am.-3.30 pm.; Sun. 11 am.-2 pm.
6.080	ZHJ	PENANG, FED. MALAY STATES, 49.34 m. 6.40-8.40 am., except Sun., also Sat. 11 pm.-1 am.
6.080	CP5	LAPAZ, BOLIVA, 49.34 m. 7-10.30 pm.
6.080	HP5F	COLON, PAN., 49.34 m., Addr. Carlton Hotel. 11.45am.-1.15 pm., 7.45-10 pm.
6.080	W9XAA	CHICAGO, ILL., 49.34 m., Addr. Chicago Fed. of Labor. Relays WCFL irregular
6.079	DJM	BERLIN, GERMANY, 49.34 m., Addr. Broadcasting House. Irregular.
6.070	VP3MR	GEORGETOWN, BRI. GUIANA, 49.42 m. Sun. 7.45-10.15 am.; Daily 4.45-8.45 pm.
6.070	HJ3ABF	BOGOTA, COL., 49.42 m. 7-11.15 pm.
6.070	CFRX	TORONTO, CAN., 49.42 m. Relays CFRB 6.30 am-11 pm. Sun. 9.30 am.-11 p. m.
6.070	YV1RE	MARACAIBO, VEN., 49.42 m. 6-11 pm.
6.070	VE9CS	VANCOUVER, B. C., CAN., 49.42 m. Sun. 1.45-9 pm., 10.30 pm.-1am.; Tues. 6-7.30 pm., 11.30 pm.-1.30 am. Daily 6-7.30 pm.
6.065	HJ4ABL	MANIZALES, COL., 49.46 m. Daily 11 am.-12 m., 5.30-7.30 pm.; Sat. 5.30-10.30 pm.
6.065	SBG	MOTALA, SWEDEN, 49.46 m. Relays Stockholm 1.30-5 pm.
6.060	W8XAL	CINCINNATI, OHIO, 49.6 m., Addr. Crosley Radio Corp. Relays WLW 5.30 am.-7 pm., 10 pm.-1 am.
6.060	W3XAU	PHILADELPHIA, PA., 49.5 m. Relays WCAU 7-10 pm.
6.060	OXY	SKAMLEBOAEK, DENMARK, 49.5 m. 1-6.30 pm.
6.050	HJ3ABD	BOGOTA, COL., 49.59 m., Addr. La Nueva Granada, Box 509. 12m.-2 pm., 7-11 pm.; Sun. 5-9 pm.
6.045	HI9B	SANTIAGO, D. R., 49.63 m. Irregular 6-11 pm.
6.042	HJ1ABG	BARRANQUILLA, COL., 49.65 m., Addr. Emisora Atlantico. 11 am.-11 pm.; Sun. 11 am.-8 pm.
6.040	W4XB	MIAMI BEACH, FLA., 49.65 m. Relays WIOD 12m.-2 pm., 5.30-6 pm., 10 pm.-12 m.
6.040	W1XAL	BOSTON, MASS., 49.65 m., Addr. University Club. Generally from 6-10 pm.
6.040	YDA	TANDJONGPRIOK, JAVA, 49.65 m., Addr. N.I.R.O.M., Batavia. 10.30 pm.-2 am.; Sat. 7.30 pm.-2 am.
6.030	HJ4ABP	MEDELLIN, COL., 49.75 m. 8-11 pm.
6.030	HP5B	PANAMA CITY, PAN., 49.75 m., Addr. P.O. Box 910. 12m.-1 pm., 7-10.30 pm.
6.030	VE9CA	CALGARY, ALTA., CAN., 49.75 m. Thur. 9 am.-2 am.; Sun 12 m.-12 m.
6.030	OLR2B	PRAGUE, CZECHOSLOVAKIA, 49.75 m. (See 11.875 mc.)
6.025	HJ1ABJ	SANTA MARTA, COL., 49.79 m. 5.30-10.30 pm. except Wed.
6.020	DJC	BERLIN, GERMANY, 49.83 m., Addr. (See 6.079 mc.) 11.35 am.-4.30 pm.
6.020	XEUW	VERA CRUZ, MEX., 49.83 m., Addr. Av. Independencia 98. 8 pm.-12.30 am.
6.018	ZHI	SINGAPORE, MALAYA, 49.18 m., Addr. Radio Service Co., 2 Orchard Rd. Mon., Wed. and Thu 10 5.40-8.0 am., Sat. 10.40 pm.-1.10 am.
6.015	HI3U	SANTIAGO DE LOS CABALLEROS D. R., 49.88. m. 7 30-9 am., 12m.-2 pm., 5-7 pm., 8-9.30pm; Sun. 12.30-2, 5-6 pm.
6.012	HJ3ABH	BOGOTA, COL., 49.91 m., Addr. Apartado 565. 12 n.-2 pm., 6-11 pm.; Sun. 12m.-2 pm., 4-11 pm.
6.010	COCO	HAVANA, CUBA, 49.92 m., Addr. P. O. Box 98. Daily 7.55 am.-12m., Sun. till 11 pm.
6.005	HP5K	COLON, PAN., 49.96 m., Addr. Box 33. 7-9 am., 11.30 am.-1 pm., 6-11 pm.
6.005	CFCX	MONTREAL, CAN., 49.96 m., Can. Marconi Co. Relays CFCF 6 am.-11.15 pm.; Sun. 9 am.-11.15 pm.
6.005	VE9DN	DRUMMONDVILLE, QUE., CAN., 49.96 m., Addr. Canadian Marconi Co. Sat. 11.30 pm.-2 am.
6.000	ZEA	SALISBURY, RHODESIA, S. AFRICA, 50 m. (See 6.147 mc., ZEB.)
6.000	RV59	MOSCOW, U.S.S.R., 50 m. Irregular.
5.990	XEBT	MEXICO CITY, MEX., 50.08 m., Addr. P. O. Box 79-44. 8 am.-1 am.

↓ S.W. BROADCAST BAND ↓

5.970	HJ4ABD	MEDELLIN, COL., 50.26 m., Addr. La Voz Catia. 8-11.30 pm.
5.958	HVJ	VATICAN CITY, 50.27 m. 2-2.15 pm. daily; Sun. 5-5.30 am.
5.950	HJN	BOGOTA, COL., Radiodifusora Nacional, 50.42 m. 6-11 pm.
5.940	TG2X	GUATEMALA CITY, GUAT., 50.5 m. 4-6, 9-11 pm.; Sun. 2-5 am.
5.930	YV1RL	MARACAIBO, VEN., 50.59 m., Addr. Radio Popular, Jose A. Higuera M, P. O. Box 247. Daily 11.43 am.-1.43 pm., 5.13-10.13 pm.; Sun. 9.13 am.-3.13 pm.
5.925	HH2S	PORT-AU-PRINCE, HAYTI, 50.63 m., Addr. P. O. Box A 03. 7-9.45 pm.
5.917	YV4RP	VALENCIA, VEN., 50.71 m. Irregular.
5.900	TIMS	PUNTARENAS, COSTA RICA, 50.85 m. 6-10 pm.
5.898	YV3RA	BARQUISIMETO, VEN., 50.86 m., Addr. La Voz de Lara, 12 m.-1 pm., 6-10 pm.
5.890	JIC	TAIHOKU, FORMOSA, 50.93 m. Works Tokio 6-9 am.
5.885	HCK	QUITO, ECUADOR, 50.98 m. 8-11 pm.
5.875	HRN	TEGUCIGALPA, HONDURAS, 51.06 m. 1.15-2.16, 8.30-10 pm.; Sun 3.30-5.30, 8.30-9.30 pm.
5.855	HI1J	SAN PEORO DE MACORIS, D. R., 51.25 m., Addr. Box 204. 12 m.-2 pm., 6.30-9 pm.
5.853	WOB	LAWRENCEVILLE, N. J., 51.26 m., Addr. A. T. & T. Co. Works Bermuda nights.
5.850	YV1RB	MARACAIBO, VEN., 51.28 m., Addr. Apartado 214. 8.45-9.45 am., 11.15 am.-12.15 pm., 4.45-9.45 pm.; Sun. 11.45 am.-12.45 pm.
5.830	TDD	SHINKYO, MANCHUKUO, 51.46 m. Works Tokio 6-9 am.
5.830	TIGPH	SAN JOSE, COSTA RICA, 51.5 m., Addr. Alma Tica, Apartado 800. 11 am., 1 pm., 6-10 pm. Relays TIX 9-10 pm.
5.800	YV5RC	CARACAS, VEN., 51.72 m., Addr. Radio Caracas. Sun. 8.30am.-10.30 pm. Daily 7-8 am., 10.45 am.-1.30 pm., 4-9.30 pm.
5.796	JVU	NAZAKI, JAPAN, 51.81 m. Irregular.
5.780	OAX4D	LIMA, PERU, 51.9 m., Addr. P. O. Box 853. Mon., Wed. and Sat. 9-11.30 pm.
5.758	YNOP	MANAGUA, NICARAGUA, 52.11 m. 8-9.30 pm.

(Continued on page 318)

(All Schedules Eastern Standard Time)

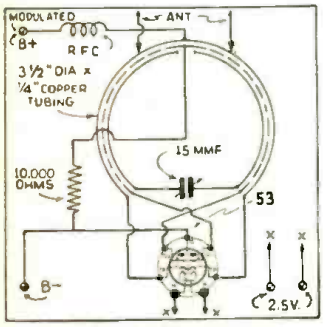
SHORT WAVE QUESTION BOX

EDITED BY G.W. SHUART, W2AMN

● Because the amount of work involved in the drawing of diagrams and the compilation of data, we are forced to charge 25c each for letters that are answered directly through the mail. This fee includes only hand-drawn schematic drawings. We cannot furnish "picture-layouts" or "full-sized" working drawings. Letters not accompanied by 25c will be answered in turn on this page. The 25c remittance may be made in the form of stamps, coin or money order.

Special problems involving considerable research will be quoted upon request. We cannot offer opinions as to the relative merits of commercial instruments.

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



Simple Oscillator—1087

UNITY-COUPLED OSCILLATOR

Cornelius Sarosdy, Pittsburgh, Pa.

(Q.) I have on hand the type 53 tube and would like to construct a unity-coupled oscillator. I would greatly appreciate your printing the diagram together with the values. This is for 5 meter operation.

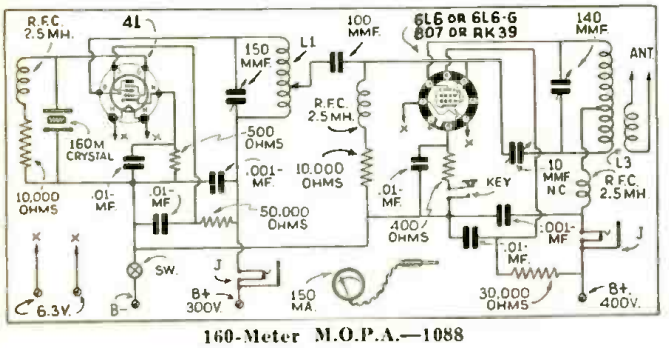
(A.) The popular unity-coupled oscillator diagram is shown. This is one of the easiest oscillators to get going that anyone can choose. The large coil is a single turned affair, 3½" in diameter. It is constructed of ¼" copper tubing. The grid coil is threaded inside this copper tube and the grid return lead is taken from the center of the grid coil through a hole filed in the copper tubing. Make sure the grid wire of one tube enters the copper coil at the plate terminal of the other tube. This cross-over connection is necessary for proper operation. No power supply diagram or modulator unit is shown; these can be found in past issues of the Question Box.

ELECTRONIC KEYING

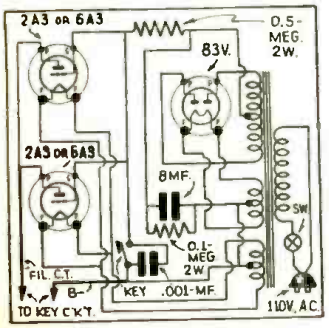
Paul Robinson, San Francisco, Calif.

(Q.) I am interested in a really *fool-proof* method of eliminating key-clicks in a transmitter; I have heard much of the electronic method of keying. Would you kindly print what you feel would be the most suitable arrangement.

(A.) Electronic or vacuum tube keying works out exceptionally well and in most cases key clicks are entirely absent. The method shown makes use of 2 type A3 triodes connected in parallel. We suggest building this into a complete separate unit employing its own power-supply, and we have shown the complete diagram. The two leads marked "to key circuit" connect as shown in the diagram; this method is used when keying is employed in the cathode or filament return lead. When the key is closed, the grids are at zero potential, permitting the tubes to pass current and turn the transmitter on. When the key is open, bias is applied to the grids through the ½ meg. 2-watt resistor. The output voltage of the transformer-rectifier system should be approximately 400 volts for use with small transmitters. Remember that the voltage drop across this keying circuit forms a grid bias for your keyed stage. Therefore, the external bias which is employed should be cut down. If a grid-leak is used, its size should be reduced until the grid current of the keyed amplifier reaches the same value as before the new keying system was installed. The plate current will be slightly less than without the keying tubes, because in reality the tubes are in series with the B circuit. The voltage drop across the keying tubes should be subtracted from the plate supply voltage in order to determine the voltage being applied to the amplifier.



160-Meter M.O.P.A.—1088



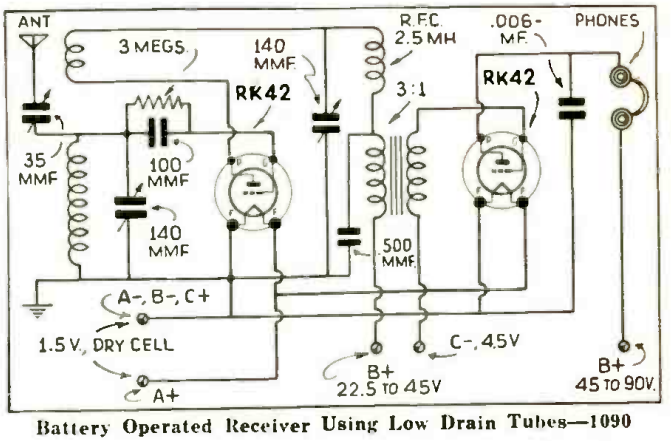
Electronic Keyer—1089

160-METER TRANSMITTER

Sam Tarantino, Chicago, Ill.

(Q.) I would like to build a small transmitter, something fairly simple with an output of around 15 to 20 watts. This should be crystal control and operated on 160 meters. Would you be kind enough to print the necessary details together with coil data.

(A.) In the diagram we have shown a 41 pentode crystal oscillator and a 6L6 beam tube amplifier. Various types of tubes may be employed in the final amplifier as well as the oscillator. For instance the 6F6, 6V6G, or the 42 may be substituted for the 41. The 6L6G, 807 or RK39 may be substituted for the 6L6 amplifier. The oscillator plate coil L1 should be wound on a ½" diameter form and consists of 50 turns of No. 24 wire close wound, and tapped at ¼" the total number of turns from the B end. L2 should be identical to L1. The antenna coil L3, will depend upon the particular antenna system employed.



Battery Operated Receiver Using Low Drain Tubes—1090

1-TUBE BOOSTER

Charles Sanford, Troy, N. H.

(Q.) I am a constant reader of your Question Box and would like to have you print a diagram of an R.F. stage which can be added to my 3-tube battery operated receiver, in order that the radiated squealing of this receiver may be eliminated as other sets in the neighborhood are affected.

(A.) The complete diagram of the R.F. stage is shown. Connection (A) should go to the antenna post of your present receiver. Since you are probably using a common set of B batteries for the two units, the ground connection will automatically be made. However, if an antenna coil is employed in your receiver, the binding post marked "ground" should be connected to the B negative terminal of the receiver if such a connection does not already exist. The coil "L" and condenser "C" should have the same dimension as in your present receiver.

BEST ANTENNA

Charles Ackerson, Providence, R.I.

(Q.) I've experimented with a number of short-wave antennas for receiving purposes, but found all worked the same. I would like to know if there is some special type of receiving antenna which would produce really good results.

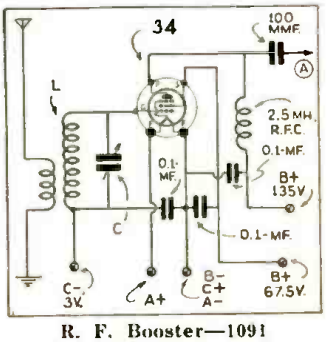
(A.) Elsewhere in this issue you will find a complete article on various types of short-wave antennas. Properly constructed, anyone of these should improve your reception.

PORTABLE USING NEW LOW DRAIN TUBES

John Hannigan, Brooklyn, N. Y.

(Q.) I would like to build a 2-tube portable receiver employing the new RK-42 1.5 volt battery tubes and 90 volts of midget B batteries. Would you kindly print the diagram showing plug-in coils and a throttle condenser for regeneration control.

(A.) The advent of the RK-42 tube greatly simplifies portable receiver construction inasmuch as only one dry cell (1.5 volts at .06 amp.) is needed. The circuit diagram is conventional in all respects and if properly constructed together with the use of standard low-loss parts, excellent results will be obtained. We would suggest building the receiver in a small metal box; this greatly simplifies construction and tends to minimize hand-capacity effects.



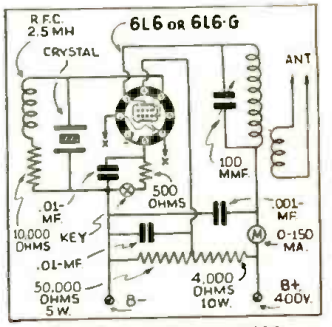
R. F. Booster—1091

SIMPLE 6L6 TRANSMITTER

Frank Little, Jr., Greybull, Wyo.

(Q.) I would like to use a single 6L6 transmitter, crystal controlled, of course. Will you please print the diagram together with values of the parts.

(A.) We have shown the conventional circuit employing the beam type tube. It is keyed in the cathode circuit and it becomes necessary to employ a voltage divider to obtain screen voltage. Do not use a single series dropping resistor for screen voltage when keying the oscillator.



6L6 Transmitter—1092

The Biggest 50c "Ham" Book ever published! See Page 276.

Short-Wave Fraternity Will Miss Marconi

(*Continued from page* 281)

out experiments to prove the truth or falsity of his newly conceived ideas. Probably no scientist ever received so many decorations as did the Marquis. He received degrees from colleges and universities in all parts of the world. It is certain that the next generation will revere the name of Marconi as much as the present generation—a name that brings to mind initiative, power of conception and most important of all, vision.

Marconi's burial place is near the tomb of Luigi Galvani, the eighteenth century Bologna scientist, who discovered electricity in chemical action. The body will remain there until the government selects a final resting place, which will be a national shrine.

The Veteran Wireless Operators Association have announced that plans are underway to erect a monument to Marconi in New York City, as a tribute to the man who consecrated his life to radio.

Trail Wire Rids Plane of "Snow-Static"

(*Continued from page* 281)

indicate that at least 100,000 ohms and in some cases up to 10 megohms are necessary. Moving the point away from the plane takes advantage of the rapid attenuation and gives a better pattern.

"This indicated that a trailing discharge point, as far as possible behind the plane, with suitable suppressor resistors had possibilities for discharging the plane. Up to 1 milliampere discharge at 50 ft. could be obtained with 100,000 volts without disturbance in the radio using the regular antenna. A 25 microampere discharge from a point without suppressors two feet from the plane prevented radio reception. Since the mechanical troubles of a trailing wire are not desirable, a second version of this idea was tried. Here a series of 17 three-foot, three-thousandths inch diameter wires, having a 5 megohm resistor in each, was attached to suitable points on the wing and tail surfaces. Test flights of these dischargers are still in progress. Results in the air have verified the tests made on the ground. The single trailing wire appears superior to the individual short wires, though tests are not yet conclusive. The dischargers are still considerably short of a commercial cure, and to date will only clear up radio range reception in about 15 per cent of the conditions encountered. Apparently the rate of discharge is not yet fast enough when the plane enters areas where the water particles have too high a potential. Although this system is not yet commercially practical, we feel that it is the first step on the road to a final solution.

"Our antenna tests indicate that *snow-static* interference is considerably worse at the rear than at the front of a plane. When the snow-static noise was of average strength, the loop located in the teardrop housing and the loop on the belly were both rotated and indicated that the source of maximum disturbance was toward the *rear* of the plane. When the static became extreme, rotating the loops indicated static in all directions. Probably corona had started on the wing tips and propellers in conditions of severe static.

"Although we did not test a trailing wire as an antenna, we did conclude from our study that it should be about the worst form of antenna for reception in snow-static. It would carry as high as 2 milliamperes of discharge current in vigorous "warm front" conditions. The static leak connected across the input of the average receiver is about ½ megohm; with a 2 milliampere peak current the voltage drop across the antenna input circuit of the receiver could be 1000 volts. The noise modulation on this D.C. voltage would be less than 1%, or only a few volts of random AC."

CBS Offers New Foreign S-W Programs

(*Continued from page 278*)

Columbia Broadcasting System, the British Broadcasting Corporation and L'Union International de Radiodiffusion. *(See attached news release.—Editor.)*

Q. "How are programs planned," I asked, "as to the time they will be received in Europe, South America, etc.?"

A. The afternoon hours, 2:00 to 5:00 P.M. Eastern Standard Time, are the evening listening hours abroad—1900 to 2200 Greenwich Mean Time. So it is between these hours that programs of special interest will be broadcast for the benefit of European audiences. When Columbia network programs are of such a nature as to be interesting to *foreign* audiences as well as the American audience, they are also broadcast over W2XE. However, at times, the programs are of rather a local or regional content, such as talks, the subjects of which are entirely unfamiliar or unimportant to the peoples of Europe. For these, special programs are substituted, such as music, both classical and popular, and, at times, repeat broadcasts of outstanding programs which took place at an earlier date, during evening hours here—early morning abroad—risking the chance that avid DXers who listen until the early morning hours will hear the same program again.

Q. How are the verification *cards sent out and how many requests on the average each week are received from foreign countries, or listeners who hear programs over W2XE, Columbia's short-wave station?*

A. Verification cards for reception of W2XE are sent upon receipt of sufficient details to enable our checking them with the station logs as to time, frequency, titles of musical numbers, names of artists, or speakers, subjects of talks, etc. Each report received is checked, and every attempt is made to give verification. However, due to the great number of requests received, it is impossible to even attempt to check hazy reports and we believe in fairness to those taking the time and trouble to make detailed logs of their reception, those who merely send time, closing announcement, or, for example, "song by a man," are not entitled to receive one. In this way only will the receipt of a W2XE verification be worth while to fans. The average number of reports received each week is approximately 100. At the present time more reports are being received from *foreign* countries. We are always pleased to hear from listeners and their reports aid greatly in determining the best possible operation of the station.

Q. How many foreign artists and announcers speaking in Spanish, and other languages are engaged on the CBS staff to introduce American-made programs for these foreign audiences?

A. At the present time, Mr. Alberto Zalamea is the Spanish News Commentator on our staff, presenting the news in Spanish every Monday through Friday, and acting as announcer on special programs such as the recent exchange broadcasts in connection with the Argentine crew and cadets of the training ship "Presidente Sarmiento." We cannot, at this time, give any information as to what future plans will be made for broadcasts in other languages.

Station identification is given in four languages—English, French, German and Spanish.

Q. What do you think of the opportunities for young women in the broadcasting field from your own experience?

A. Radio broadcasting offers countless opportunities for young women, as it is essentially a business where initiative is practically a requisite—not the fact whether one is on the distaff side or no. There are, for instance, continuity writing; publicity; research; promotion—the first step being to find the particular niche to which one is suited and then "giving it everything you've got!"

New Xmitter Kits Allow Progressive Combinations

(*Continued from page 297*)

consists of a 6L6 regenerative crystal oscillator, link coupled to a pair of 6L6 tubes. The husky power supply in this unit enables an input of 80 watts with ease (actually up to 100 watts obtainable). The power output is dependent upon the band in which the transmitter is operated and varies from approximately 60 watts on the 80 and 160 meter bands down to 45 watts on 10 meters. The output may be coupled directly to a pre-tuned antenna or to any ordinary antenna by means of the antenna coupler. (Kit No. 3, which is described later.)

75 Watt Phone Transmitter

Kit No. 2 is a high-fidelity speech amplifier and modulator. Its outstanding features are Class AB fixed bias push-pull 6L6 output tubes, electronic mixer, adjustable output impedance and universal input. Any type of microphone or pickup may be used with this high gain amplifier. An output tap of 500 ohms is provided. Attach a few large dynamic speakers to this unit and you can have a perfect public address system, which is a valuable adjunct to its everyday role as a first-class 50 watt modulator. This power supply uses a 5Z3 and also an 80 for separate bias voltage. The audio line-up is 6J7 resistance, coupled to a 6N7 transformer, coupled to a pair of 6C5's which in turn drive the 6L6G's.

Add this unit to unit No. 1 and you have a complete 75 watt high-fidelity radiophone transmitter, the *broadcast quality* of which will stamp the operator as a really modern Ham.

500 Watt RF Amplifier: Kit No. 4 employs two type T-55 tubes in a high efficiency circuit which, link coupled to Kit No. 1, provides a conservative input of 500 watts. The oversize power unit of this kit requires two 866 mercury vapor rectifier tubes.

400 Watt Phone Transmitter: To increase the audio output of Kit No. 2 this kit, No. 5, is connected. An output of 250 watts of undistorted audio power is available. This is sufficient to modulate 100% the power output of Kit No. 4. The tube complement is two 203-Z (or ZB120) and two 866's.

Antenna Coupler: The fifth kit of this series is Kit No. 3. As mentioned above, this is an antenna coupling unit. It may be used in conjunction with either the low-power transmitter or the full-power combination. Its purpose is to match the transmitter output impedance to any tuned feeder antenna system.

Ease of Construction: Of greatest value to the home constructor is the manner in which these kits are presented. The standard size chassis and cabinets have all holes drilled, greatly simplifying the actual assembly. The equipment supplied is complete down to the last detail. Even a generous supply of colored-coded hook-up wire is included. Truly, no more than a screwdriver, pliers, and soldering iron are needed in the construction of this entire transmitter.

The diagram, instructions, and operating details are clear, simple, yet are amazingly complete. The veriest "lid," following these instructions can set up and put *on the air* a transmitter that will be the envy of his more experienced acquaintances.

Proof of Versatility: As an especially interesting example of how versatile these units are, we point out the fact that Kits No. 2 and 5 are recommended to modulate the "5-40-400 Transmitter," as described by Arthur H. Lynch. A special combination is also available consisting of the *power-supply* chassis only, of Kits No. 1 and 4. This special kit supplies all of the necessary voltage for the oscillator, doubler, buffer, and final amplifier of the 5-40-400 transmitter.

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

Two great books on Short Waves and Television. See Page 330.

The H-G-M Medium Power Transmitter

(*Continued from page* 293)

of either tube.

The final amplifier is merely tuned to resonance. The coupling condenser is set at maximum and the tube "loaded up." It will then be found that the coupling condenser may be greatly reduced without cutting down the output. When loaded to about 100 ma. plate current, the screen current will be around 30 ma., and the grid current a little over 5 ma. Of course, for preliminary tests and tuning all plate voltages in the set should be reduced at least 30 per cent.

Little can be said about the antenna tuning as it varies with the antenna and feeder system used. The coupling between this unit and the P.A. plate coil is a link with two turns on each end.

The next article will describe the power-supply and modulator units, which will complete a transmitter capable of turning out close to a 100 watts, both phone and C.W.—on any band from 10 to 80 meters. This, and the simplicity and flexibility of operation afforded by the exciter unit, should make this an interesting job for the home constructor.

LIST OF PARTS

AEROVOX
5—.01 mf. mica condensers (1000 V.)
8—.002 mf. mica condensers (1000 V.)
2—.002 mf. mica condensers (2500 V.)
1—100 mmf. mica condenser (2500 V.)
1—.002 mf. mica condenser (5000 V.)
2—100 mmf. mica condensers (1000 V.)

I R C
2—50 ohm 1 W. resistors
1—10,000 ohm 10 W. resistor
1—750 ohm 25 W. resistor
1—50,000 ohm 25 W. resistor
2—20,000 ohm 25 W. resistors
2—2500 ohm 25 W. resistors
1—7000 ohm 25 W. resistor

HAMMARLUND
4—250 mmf. condensers (MTC250C)
1—150 mmf. condenser (MTC150C)
1—100 mmf. condenser (MTC100B)
1—100 mmf. condenser (MC100M)

RAYTHEON
1—RK20A
1—RK39
1—6L6
1—6F6

METERS
2—50 ma. meters
1—250 ma. meter
1—25 ma. meter
1—200 ma. meter
1—1 Amp. RF meter

BUD
3—complete 8¾" rack sections with panels
1—rack top and bottom
2—10" x 18" x 2" chassis.
4—4" silver dials
4—2¾" silver dials
2—DPST toggle switches
1—DPDT toggle switch
1—set coil forms
20—name plates
4—panel bushings with shafts
6—small R.F. chokes
1—cast aluminum socket base
1—crystal holder
5—5-prong Ceramic sockets
2—Octal Ceramic sockets
2—7-prong bakelite sockets
2—7-prong plugs
1—plug and closed circuit jack
8—¾" feed-through insulators
6—1" isolantite threaded insulators
6—soldering lug strips
1—transmitting R.F. choke
2—insulated flexible couplings

BLILEY
1—Variable frequency crystal with holder

MISCELLANEOUS
1—band change switch (3 position)
1—DPST knife switch
100 feet No. 12 tinned wire

S-W Fans will find plenty of new subjects to interest them in the November issue!

A De Luxe 10-Tube Trans-Receiver

(*Continued from page 295*)

lengths the super-regenerative detector is used. The time tried electron-coupled circuit is used for this stage. Regeneration is controlled by varying the screen voltage. The cathode tap on each coil is so adjusted that the detector spills over smoothly into oscillation, at the point where the best screen voltage is reached. The importance of the proper screen voltage and smooth oscillation taking place simultaneously is quickly realized by experienced operators of regenerative receivers.

Super-Regenerative Detector and Transmitting Oscillator: For detection from 2½ to 15 meters, a 6J5G is used in the highly efficient ultra audion super-regenerative circuit. This is the smoothest and at the same time most sensitive circuit known for the ultra high frequencies. The use of the phenomenal 6J5G tube results in additional efficiency. When the send-receive switch on the front panel is thrown to "Send," this stage becomes an oscillator for transmitting on 2½ and 5 meters.

First A.F. Stage and Code-Practice Oscillator: Two 6C5 tubes in push-pull comprise the first audio stage. This, together with the push-pull 25L6 output stage, results in a powerful, high-gain audio amplifier which brings the weakest signals to loudspeaker volume. Merely by inserting a key into a jack which is provided, the audio amplifier automatically turns into a *code-practice* oscillator, which is a great help for prospective amateurs and operators who are learning the code. The pitch of the note is approximately 1,000 cycles and the volume of sound may be controlled. Input is provided for a single-button carbon microphone when it is desired to transmit. No coupling transformers or mike batteries are necessary. Mike current is internally supplied.

Beam Power Output Stage and Modulators: The output stage which supplies 6 watts of undistorted power to the rugged 8-inch dynamic speaker, consists of two 25L6 beam power tubes. When transmitting, this stage becomes a modulator which 100% plate modulates the 6J5G transmitting oscillator. The tone quality is equal to that of many more expensive units. A tone control is provided, which is helpful to reduce noise in certain locations when listening to extremely weak signals.

Parallel Rectifiers and Power-Supply: Two 25Z6 tubes are used to supply 200 ma., to meet the current requirements of the entire unit. Sixty microfarads of filter insure perfect hum-free operation. The set will operate on 110 volts A.C. or D.C. any cycle, and can easily be adapted for line voltages higher than 110.

Electronic Tuning Indicator and R. Meter: A 6G5 is used as a tuning indicator, and the R.F. gain control is directly calibrated in "R" indications, together with the tuning eye. An "R" meter facilitates rapid calculation of the signal strength of an incoming signal.

General Description: Refinements of every description are incorporated in this set. Planetary drives are used on both the tuning and band-spread condensers. Transparent pointers are mounted on the slow-motion end of the planetary drives for accurate and precise tuning. Needless to say electrical as well as mechanical band-spread is used. Separate controls are provided for A.F. and R.F. gain. A *stand-by* switch leaves the tube filaments lit, but removes the plate voltage when the set is used as a receiver in conjunction with a separate transmitter. The phone jack automatically silences the speaker when the phones are plugged in. A sensitive 8-inch dynamic speaker insures good volume and a high standard of tone quality.

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

Multi-Purpose Switch on New Set

(Continued from page 296)

motorized tuning is grounded through the arm (A).

It should be noted that in position (1-5) to (4-8) contacts 9, 10, 11, and 12 are open-circuited. The Automatic Frequency Control voltage source is thereby permitted to vary the mutual conductance of the control tube in accordance with the mistuning of the receiver, which in turn applies the correction factor to the oscillator frequency. In other words, the receiver is operating with A. F. C.

Positions (1-5) to (4-8) provide successively, with motorized tuning, and A. F. C. (1-5) the normal audio characteristic of the receiver with audio expansion, (2-6) a special base accentuating circuit without expansion, (3-7) and (4-8) circuits for different degrees of high frequency attenuation, both *without* expansion.

Position (1-5) deserves some extra acknowledgment, insofar as the volume expansion is concerned. The 20-tube Deluxe Midwest 1938 model incorporates an *electronic volume expander*, the exciting voltage for which is derived from the diode load. The expander tube only is shown in the figure. The actual expander tube, which is shunted across the main audio channel, is rendered operative only when its plate current is completed.

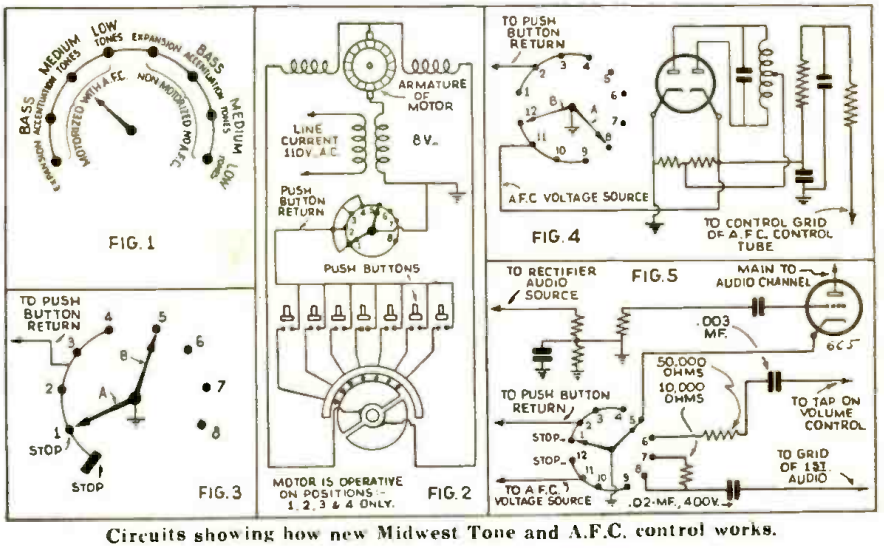
The cathode of this expander tube when opened, renders the expander *inoperative*. It is this function which the control switch can perform at the will of the listener, remembering however, that expansion is available with or without motorized tuning.

It should be remembered that, even though the motorized tuning feature is provided in these first four positions, *manual tuning* with all the above features, is also available, by virtue of the manual tuning control knob provided.

Now consider positions (5-9) to (8-12). It will be noted that in any of these positions, there are two functions eliminated from the total of those available in the first four positions. These are motorized tuning (push-button return opened) and A. F. C. (control voltage source grounded). The *tone-control* action is identical with the first four positions and, the same tone cycle is repeated from position (5-9) to (8-12) as from (1-5) and (4-8).

Thus, the listener has quite a variety of combinations from which he is able to adapt the receiver to any type of reception. The switch is ingenious in that only one knob is required to control a large number of functions.

This article has been prepared from data supplied by courtesy of Midwest Radio Corp.—(R. Nathan, Engineering Dept.)



Circuits showing how new Midwest Tone and A.F.C. control works.

Radio Compass with Visual Bearing Indicator

No. 647

● HERE is a new radio compass receiving set with special loop antenna, with a range of 200 to 3,500 meters, which should prove of inestimable benefit to owners of small yachts and other vessels. It is known as the model-100, and it was developed by the well-known house of E. M. Sargent, builders of high-grade short-wave receivers. This set is very businesslike in appearance and has excellent engineering design.

It has 5 kc. selectivity on radio beacons and 10 kc. selectivity on broadcast waves. It has a beat oscillator for code and time-signal operation and a fully calibrated tuning dial. A dynamic speaker is built into the set and it has a 360 degree bearing scale, accurately calibrated.

The average man can operate this receiver and it covers the broadcast and other bands, such as marine and airplane beacons, time-signals and weather. 600 meter ship telegraph band, etc., with a range of 250 to 2,500 miles.

By means of the visual bearing indicator, it has now become possible to reduce the error in taking bearings to less than one-fourth of that by the customary audible method. With this new set the bearings are taken by eye.

By means of this new radio compass set, a bearing has been taken on a beacon one mile distant and the ship's position was indicated to an accuracy of closer than 40 ft.—less than the length of the boat in most cases. The visual bearing indicator makes accurate bearings possible through static and background noise that hamper accuracy with the audible-null method.

This article has ben prepared from data supplied by courtesy of E. M. Sargent Co.

Let's Listen In With Joe Miller

(*Continued from page* 300)

XU6AZ has QSL'd our report of May 1 with a vy FB card, which will be shown in next month's magazine. Y. K. Luk, operator of this FB Asiatic phone, made his WAC phone the day before our reception with the assistance of CE1AO.

Also PK3GD has QSL'd our report with a nice card, giving freq. as 14020, and input wattage as 45. QSL is pictured in this month's article.

Frequencies of other Asiatics submitted are given as follows: VS7RF, 14336, Ceylon. XU6LN, 14050; XU8HR, 14230; XU8JR, 14130, all in China. VS6AB, 14030; VS6AG, 14084, both in Hongkong. J7CR, 14280, J7CJ, 14350 in Japan. VS1AB, 14250; VS1AD, 14340 in Singapore. PK4DG, 14382, 14392. All these Asiatics are heard in the early morning hours. J2MI, 14270, 8:35 a.m.; KA1JR, 14250, 4:10 p.m., and KA1AP, 14223, 7:40 a.m.; reported by Jim Doyle, W9.

AFRICANS

CN8AM, 14100, French Morocco, heard FB at 5:30 a.m.

EA8AE, on 14060, heard daily in evenings working amateurs in South and Central America, using English and Spanish. Announces "EA8 Arriba Espana." Heard as late as 1:50 a.m.

EA9AH, on 14004, our old standby at Tetuan, Spanish Morocco, also heard daily with a terrific signal most all times. As seen in this article, EA9AH sends an FB QSL, and QSLs all correct reports. QRA is Box 124, Tetuan. Try daily from 5 p.m., to midnight.

Other Africans reported are CN8MU, 14130, French Morocco. FA8GT, 14340, Algeria. ZS5AB, 14060, ZT5P, "Zero-Tommy-5-Peter" LF end 20 meter band. ZS1B, 14065, ZS6AM, 14358, and the following, mostly in LF end. ZS5B. ZU6N, ZT6N, ZT2B, all these in South Africa. Look for these boys this coming October and November around 11 p.m., to midnight.

Also reported are ZE1JY, 14050, ZE1JR, 14044, 14265, and ZE1JF, all in Southern Rhodesia.

HAM REVIEW

HB9J, 14030, Switzerland, heard at 7:20 p.m. CT2AB, 14400, Azores, at 5:15 p.m. SM5SV, 14400, Sweden, heard at 6:20 p.m. Also reported are LY1HB, 14100, Lithuania and LA4P, 14111, Norway, in afternoons.

VP1JR, 14400, VP1MD, HF side and VP1WP, in British Honduras all reported heard.

Catching up on our list of veries, the following have been received of late: CR6AA, 9.66 mc.; VK2WR, EA8AE, OE3AH, HB9AB, ZT2G, RV15, 52 m., ZBW3, VPD, 8.73 mc.; ZS6AM, SM5SX, CN8AJ, SU1SG, Poste Bizertin, SM5SV, SV1KE, VK3AL, VK3WD, CN8MB, FT4AG, W1OXDA, Greenland; ZS6AU, SM7YA, HS8PJ, 19.02 mc.; OZ7KG, FZE8, VK2JZ, HB9AY, ZU6E.

Here's looking forward to the Fall DX season, certain that it will be a great time for all DXers who want to snare all the rare 'uns. 73 and the best of DX to all!

Television Images Picked Up 6,000 Miles

Mr. C. G. J. Angilley, of Cape Town, Africa has reported that he has received Alexandra Palace television transmissions in Cape Town, Africa. His report has been confirmed officially, and according to reports, this feat can be repeated. Just imagine actually receiving television images 6,000 miles away! Mr. Angilley has a home-built vision receiver, and states that satisfactory pictures were seen, but that synchronism was poor. Mr. Angilley, an ultra-short-wave experimenter, is confident that good pictures can be received providing that a suitable aerial is used with a sensitive receiver.

"Pocket-Size" Receiver

(*Continued from page 286*)

reached. *Be sure* to have the *outside* of one coil go to plate, and the *inside* of the other to grid condenser, or vice versa. Otherwise no oscillation will take place. Depending on the antenna used, it is usually possible to obtain *super-regeneration* from the B.C. band right on down, simply by turning in all resistance on the regeneration control.

The only other special item needed is the 10 ohm resistor in series with the filaments. It is made from a wire-wound unit of the type constructed on a flat piece of fiber. Note that the filaments are in series as are the three pen-light cells that constitute the "A" battery.

Two antenna posts are provided, one of which has a *series condenser* for use with a *long* antenna. A very *short* antenna may be connected directly to the grid.

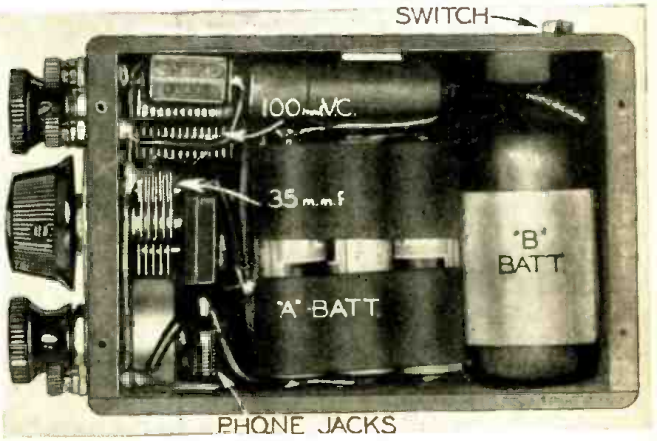
Coil to cover about 40-70 meters

Secondary 35T, No. 30 enamel on form ⅜" diameter.

Tickler 45T, No. 30 enamel wound over secondary, with paper layer between.

List of Parts

WHOLESALE RADIO SERVICE CO., INC.
One Hivac type XSG tube.
One Hivac type XL tube.
NAT'L. CARBON CO.
One Eveready Type X-180, 45 V. battery.
Three Eveready pen-light cells.
HAMMARLUND
One CHX choke.
One HF 100 condenser.
One HF 35 condenser.
UTAH
One 50,000 ohm midget potentiometer.
CORNELL-DUBILIER
One 50 mmf. mica condenser.
One 250 mmf. mica condenser.
One .004 mf. mica condenser.
One .05 200 V. tubular paper condenser
One .25 mf. 200 V. condenser.
I.R.C.
Two 2 meg. ½ W. resistor.
One 25,000 ohm ½ W. resistor.
One 50,000 ohm ½ W. resistor.
MISCELLANEOUS
One 10 ohm resistor (see text).
One "on-off" switch.
Case material.
Three knobs, hardware, wire, etc.
Two pin jacks.



5-Meter Waves at Auto Races

(*Continued from page 280*)

planes aloft to police cars equipped with 5-meter sets. In this way, the police traffic experts were provided with a "long-distance" eye, thanks to the radio-equipped autogiros, in the same manner as modern army officers are provided with an *aerial-eye* in the form of radio transmitters aboard planes.

World S-W Station List

(*Continued from page 307*)

5.740	TGS	**GUATEMALA CITY, GUAT.,** 52.26 m. Wed., Thur. and Sun. 6-9 pm.	4.975	GBC	**RUGBY, ENG.,** 60.3 m. Works ships irregularly.
5.730	HC1PM	**QUITO, ECUADOR,** 52.36 m. Irregular 10 pm.-12 m.	4.820	GDW	**RUGBY, ENG.,** 62.24 m. Works N.Y.C. nightime irregularly.
5.720	YV2RB	**SAN CRISTOBAL, VEN.,** 52.45 m., Addr. La Voz de Tachira. 6-11.30 pm.	4.790	VE9BK	**VANCOUVER, B. C., CAN.,** 62.63 m. Addr. Radio Sales Service, Ltd., 780 Beatty St. Except Sun. 11.30-11.45 am., 3-3.15, 8-8.15 pm.
5.500	TI5HH	**SAN RAMON, COSTA RICA,** 54.55 m. Irregular 3.30-4, 8-11.30 pm.			
5.145	PMY	**BANDOENG, JAVA,** 58.31 m. 5.30-11 am.	4.752	WOO	**OCEAN GATE, N. J.,** 63.1 m., Addr. A. T.& T. Co. Works ships irregularly.
5.077	WCN	**LAWRENCEVILLE, N. J.,** 59. 7 m. Addr. A. T. & T. Co. Works England late at night irregularly.	4.600	HC2ET	**GUAYAQUIL, ECUADOR,** 65.22 m, Addr. Apartado 249. Wed. and Sat 9.15-11 pm.
5.025	ZFA	**HAMILTON, BERMUDA,** 59.7 m. Works N. Y. C. irregularly at night.	4.272	WOO	**OCEAN GATE, N. J.,** 70.22 m., Addr. A. T. & T. Co. Works ships irregularly.
5.000	TFL	**REYKJAVIK, ICELAND,** 60 m. Works Europe nightime irregularly.	4.250	RV15	**KHABAROVSK SIBERIA, U. S. S. R.,** 70.42 m. 1-10 am.

The Kahlert 5-Tube Super-het

(*Continued from page* 289)

this unit and it takes care of all audio power requirements. The plate current drain of the set is about 55 ma.

While tuning up and testing it was found necessary to add a few parts and pieces of shielding to kill I.F. oscillation and cut down feed-back from the oscillator into the rest of the set. The first was to shield the plate leads of the 6A8 and the two 6K7's and place a small copper baffle 2" by 5" between the detector and oscillator and the I.F.'s. Another baffle, isolating the oscillator was also needed as were two R.F. chokes, one in the cathode of the I.F.'s and one in the plate lead of the second I.F. tube. The shell of the 6F6 had to be grounded. With this done there was no interlocking between the detector and oscillator or oscillation of the I.F. stages. The copper for the baffles was taken from a defunct short-wave tuner in this case. Those building the set from the start could use the regular 1/16th inch aluminum stock.

Coil connections are for inductive coupling which is used in this model, as we believe it helps on the *image* problem, but coupling to the grid of the 6A8 can be accomplished just as easily through a small condenser.

The antenna is best high and long, or preferably one of the special types often described in these pages. Careful attention should be given the antenna as the added benefits resulting therefrom certainly help far more than one might believe.

Bottom View of Receiver

PARTS LIST (For Kahlert Set)

HAMMARLUND

1—HFD-50 midget 2 gang condenser
2—HF-5) padding condensers
2—Isolantite 8 prong sockets
2—Isolantite 5 prong sockets
3—Iron core I.F.'s, ICT-3-4-5 for 2 stage I.F. amplifier
1—CH-X 2.5 mh. choke
3—8 mh. R.F. chokes
1—Beat oscillator transformer (see text)

SOLAR

3—.01 400 volt paper condensers
7—.1 400 volt paper condensers
2—.25 400 volt paper condensers
3—.0001 postage stamp mica condensers
1—.00005 postage stamp mica condenser
2—.001 postage stamp mica condensers
All values in mf.

I.R.C.

1—10,000 ohm volume control
1—20,000 2 watt resistor
2—10,000 2 watt resistors

1—15,000 2 watt resistor
1—2,000 5 watt resistor
2—50,000 ½ watt resistors
1—400,000 ½ watt resistor
1—300 1 watt resistor
1—150 1 watt resistor
1—500,000 1 watt resistor
4—50,000 1 watt resistors

RAYTHEON

1—6F6
1—6A8
1—6N7
2—6K7

MISC.

3—8 prong wafer sockets

Tuning coils, condensers center-tapped across whole coil for S.W. broadcast bands. The 20 meter coil covers 19 to 32 meters. The 40 meter coil covers 30 to 55 meters and 80 meter coils from 50 to 95 meters. The coils are wound on XP53-5 prong Hammarlund forms.

Coil Data

Band.	Total turns Osc. and Det. Coils.	Tuning Cond. tap from ground.	OSC. Cathode tap from ground.	Ant. Coil
20M.	6½T.	2T.	1½T.	3T.
40M.	13T.	5T.	2T.	4T.
80M.	32T.	20T.	4T.	6T.

T = turns

All-Electric 3-Tube All-Wave Receiver

By H. G. Cisin

● THE latest addition to the Air Scout Junior family of short and long wave receivers is the all-electric model 3 AE.

This is a three tube set employing two 37 or 76 tubes as detector and rectifier and a K-105-A, as ballast tube. Five plug-in coils are used to cover from 8¼ to 660 meters and a special long wave coil and unit extends the range up to 3,000 meters.

The receiver kit includes panel, chassis, antenna trimmer, low-loss rotating plate variable condenser, dual regeneration control potentiometer and switch, variable antenna trimmer, compact twin-section high-capacity dry electrolytic condenser, grid-leak, grid condenser, fixed resistors and condensers, sockets, calibrated dial, knobs, hook-up wire, line cord, plug, broadcast coil, 70 to 200 meter coil, connection clips, earphone, schematic wiring diagram and tuning directions.

In other words, the kit as furnished, when assembled and wired, is ready to be plugged in and operated, except for the three low cost tubes. As noted above, two coils are included in the kit. The other coils are available as auxiliary components. For amateur code reception, or for other purposes where finer tuning is essential, the use of the band-spread auxiliary unit is recommended.

This set uses slightly more current than a 25 watt lamp.

This set can be operated from any house-lighting circuit at any voltage from 105 to 130 volts. It operates equally well on d.c. or a.c. For foreign use, an adapter can be obtained so that the set can be operated on 220 or 230 volts a.c. or d.c.

The panel is 11" by 5"; the chassis is 10" by 5" by 3½" high. Weight is approximately four pounds—including tubes, but not the speaker and smaller auxiliaries.

This article has been prepared from data supplied by courtesy of Allied Engineering Institute. Refer to No. 648.

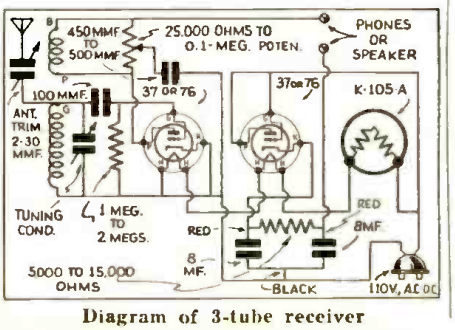


Diagram of 3-tube receiver

Nikola Tesla Receives Honors

Yugoslavia has honored Dr. Tesla by reproducing his likeness on a postage stamp; a cancelled stamp is reproduced above.

● NIKOLA TESLA the famous radio and electrical genius recently celebrated his eighty-first birthday, on July 10 to be exact. Dr. Tesla was honored with high orders from the Yugoslav and Czechoslovak governments.

Dr. Tesla announced the perfection of a new vacuum tube which he said would make it possible to smash the atom and produce cheap radium. At a birthday luncheon Dr. Tesla was presented with the Grand Cordon of the White Eagle, the highest order bestowed by Yugoslavia, and also received the Grand Cordon of the White Lion, this order having been granted but to few other distinguished Americans, including Secretary Kellogg, and Dr. Nicholas Murray Butler. When presenting this order the spokesman said: *"Our Czechoslovak nation's brotherly feeling toward you as a son of Yugoslavia made it a duty, not a privilege to give you this decoration in the name of the President of our nation, Dr. Edouard Benes."*

A diploma certifying Dr. Tesla's honorary degree as a doctor of the University of Prague was also presented.

Dr. Tesla gave a long statement to the guests at the luncheon, in which he outlined his newest discoveries.

BBC TELEVISION "SIGS" HEARD HERE

● IT IS generally conceded that it is almost impossible to pick up short-wave signals of 6 or 7 meters over distances as great as 2500 miles, but that the transmission is limited to "line of sight" reception.

Now comes the interesting news that the *sound* signals from the BBC 3 kw. transmitter operating on 7.2 meters in England has been picked up by the RCA station "Radio Central," at Riverhead, Long Island. These signals have been picked up over a much greater distance than this, however, as their reception is also reported by listening posts at LeRoy, Indiana, at a distance of about 4,000 miles.

The ionizing effect of the sun's rays on the reflecting layers of the atmosphere is interesting, and it is to be noted that the signals heard from the BBC transmitter in America were picked up at 9:45 to 11 a.m. E.S.T., but that the 4 to 5 p.m. schedule has not yet been picked up.

The reason for the reception of these extremely short waves in America is undoubtedly due to repeated reflections between the Heaviside layer and the earth, and these surprising results only go to prove that we know but very little as yet about ultra short-wave transmission.

The BBC television transmitter operates on a frequency of 6.6 meters and it is rated at 17 kilowatts.

See Page 320 for the 6 Best Short Wave Books.

A 7-Tube Battery Super-het

(*Continued from page* 287)

back to front and some 4¼" in height screens this stage from the rest of the receiver and this, together with the screening cans over the 1A6 and 30 tubes in the mixer stage, completes the shielding. The receiver is perfectly stable owing to the layout of the parts and it is advised that the layout be followed as closely as possible if similar results are expected.

The coil sockets are mounted at a height of about one inch from the chassis by means of small insulating pillars (miniature stand-off insulators), in order to remove the bottom of the coil windings from the metal chassis and thus reducing damping. The main tuning dial controls the band-spread condensers C2 and C4. Both these condensers have one fixed and one moving plate, with an approximate maximum capacity of 15 mmf. The remaining condensers, C1, C3 and C5 are *tank* condensers, having maximum capacities of 150 mmf. each. C1 is mounted below the chassis immediately underneath the R.F. tube (the first control on the left of the chassis). C3 is mounted above the chassis to the left of the band-spread gang and C5 is mounted in the same position on the other side of the gang. These two condensers are equipped with 0-100 degree scales and pointer knobs in order to permit easy *band-setting*. The scales are only necessary on these two condensers as the tuning of C1 is not so critical. Tuning is simplified by the omission of a third scale and a symmetrical layout is obtainable.

This receiver does not have single-dial tuning in the true sense of the phrase, but tuning is not at all difficult, as it is only necessary to set the three tanks for any one particular band and the whole of that band can then be explored on the main tuning dial.

How C.W. Stations Are Tuned in

The plug-in coils associated with the 1A6 and 30 tubes (see diagram) are mounted immediately behind the two tank condensers and the two tubes are behind the coils, thus allowing short and direct point-to-point wiring. It will be noticed that a single piece of wire is connected to the input grid of the I.F. tube which apparently is not connected to any other point. The free end of this wire is inserted in one of the trimming holes of the second I.F. transformer can just sufficiently far for the I.F. tube to break into self-oscillation when the volume control R4 is turned half-way up. This permits the reception of C.W. stations and when the I.F. transformers are correctly lined up, this method had practically no ill-effects on the trimming and allows the reception of C.W. stations without the use of a *separate* beat-frequency oscillator. This represents a saving of a tube which is definitely worthwhile in a battery receiver.

The grid condenser and resistance associated with the second detector tube are mounted inside the I.F. can and a screened lead is brought directly out of the top of the can to the tube grid connector cap. Care must be taken with both the I.F. cans to see that, in the first one—the wire used to obtain the *feed-back* effect does not touch and make contact with any metal inside the can (the end of the wire can be taped up); and in the second one, to see that neither the condenser nor the resistance can actually touch any metal part or either of the windings.

The choke RFC2 in the plate circuit of the second detector must be capable of operating efficiently at 465 kcs. and therefore must *not* be of the short-wave type. The other choke RFC1 *is* a short-wave type and is used in the plate circuit of the oscillator tube, V3.

It should be noted that the first A.F. tube is parallel-fed to the output tube and a grid stopper resistance R12 is used in the grid circuit of the 33 pentode.

With plate feed resistances as shown in the diagram, the receiver can be used successfully with any "B" voltage supply from 90 to 135 volts, and by slightly overbiasing the two audio tubes, the total consumption on 90 volts can be cut down to a very low figure and, even so, the output of the set is quite considerable.

The use of a three-point on-off switch should be noted. This cuts off the "B" supply as well as the filament supply, as otherwise there would be a slight permanent drain on the "B" battery, even when the receiver is not in use, owing to the potentiometer network R4 and R5. The resistance R5 as used in our original model had, as shown in the diagram, a resistance of 10,000 ohms. This could be increased in size with advantage, in order to prevent excessive consumption when the volume control is turned up. With the value given, the volume control must not be turned further than just beyond the point where oscillation commences.

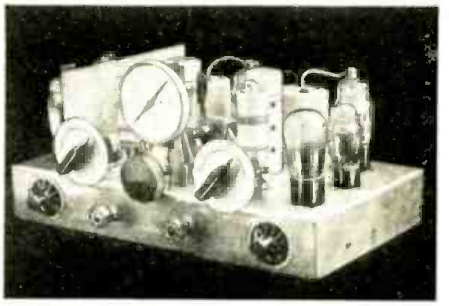
The receiver is very sensitive and has a very good signal-to-noise ratio, the R.F. tube doing a lot of good work in amplifying at signal frequency. The use of an A.F. volume control as well as an R.F. control will be found very useful. Best results will generally be obtained by turning the A.F. control up and keeping the R.F. control down as low as possible.

R.F. and Detector Coils

Turns sec	Turns on tickler	Length of Second winding	Size Sec. wire
6	4	1"	20
14	6	1⅜"	22
25	10	1⅛"	26
53	15	1⅜"	28

Oscillator Coils

6	4	1"	20
13	7	1¼"	22
22	9	1"	26
42	10	1⅛"	28



Another view of the 7-tube Super-het.

How You Can Identify S-W Stations

(*Continued from page* 302)

phones Egypt afternoons, calling "*Pronto Cairo, equa Roma.*"

9.76—VLZ C—Sydney, Australia. See VLZ, 13.34 mc.

9.75 COCQ B—Havana, Cuba. Uses dual call, with slogan as follows: "*CMQ de Jabon Candado y COCO de la Crema Dental Colgate y el jabon Embellecedora Palmolive.*" Ident. signals numerous, as a siren, baby crying, etc.

Mobile S-W Equipment

(*Continued from page* 285)

net. The "B" voltage is obtained from a vibrator type converter supplying 250 volts at 60 ma. The filaments of the tubes and the "B" unit are fed from the regular storage ignition battery of the motorcycle.

The way in which the set is installed on the cycle and an idea of the compactness may be gained from the picture.

Short Wave Scouts

(*Continued from page 294*)

Peru

OAX4D—5780 kc.—All America Cables, Inc., Lima.

Europe

France

TPA2—15245 kc.—Radio Coloniale, Paris.
TPA3—11880 kc.—Radio Coloniale, Paris.
TPA4—11715 kc.—Radio Coloniale, Paris.

Holland

PCJ—9590 kc.—Philips Radio, Eindhoven.
PCJ—15220 kc.—Philips Radio, Eindhoven.
PHI—11730 kc.—Philips Radio, Hilversum.

Switzerland

HBL—9595 kc.—Radio Nations, Geneva.
HBP—7797 kc.—Radio Nations, Geneva.
HBO—11402 kc.—Radio Nations, Geneva.

Czechoslovakia

OLR—11900 kc.—Prague.
OLR—9550 kc.—Prague.
OLR—6010 kc.—Prague.

Germany

DJE—17760 kc.—Broadcasting House, Berlin.
DJT—15360 kc.—Broadcasting House, Berlin.
DJR—15340 kc.—Broadcasting House, Berlin.
DJQ—15280 kc.—Broadcasting House, Berlin.
DJB—15200 kc.—Broadcasting House, Berlin.
DJL—15110 kc.—Broadcasting House, Berlin.
DZH—14460 kc.—Broadcasting House, Berlin.
DZC—10290 kc.—Broadcasting House, Berlin.
DJP—11855 kc.—Broadcasting House, Berlin.
DJD—11770 kc.—Broadcasting House, Berlin.
DJN—9540 kc.—Broadcasting House, Berlin.
DJA—9560 kc.—Broadcasting House, Berlin.
DJC—6020 kc.—Broadcasting House, Berlin.

Italy

2RO-3—9635 kc.—E.I.A.R., Rome.
2RO-4—11820 kc.—E.I.A.R., Rome.

Portugal

CT1AA—9650 kc.—Radio Colonial, Libson.
CSW—9940 kc.—Emissora Nacional, Lisbon.
CSW—11040 kc.—Emissora Nacional, Lisbon.

England

GBW—14440 kc.—Rugby, England.
GBC—8680 kc.—Rugby, England.

Sweden

SRG—11705 kc.—Motala Broadcasting Station, Motala.

Poland

SPW—13635 kc.—Polskie Radio, Warsaw.

Spain

EAQ—9860 kc.—La Voz de Espana, Madrid.

Belgium

ORK—10330 kc.—Radio Ruysselede, West Flanders.

Iceland

TFJ—12235 kc.—Iceland State Broadcasting Service, Reykjavik.

Africa

Ethiopia

IUC—11955 kc.—Addis Ababa.

French Somaliland

FZE-8—17280 kc.—Djibouti.

Australia

VK2ME—9590 kc.—Amalgamated Wireless (A/SIA) Ltd., Sydney.
VK3ME—9510 kc.—Amalgamated Wireless (A/SIA) Ltd., Melbourne.
VK3LR—9580 kc.—Australian Broadcasting Commission, Melbourne.

Trophy Contest Rules

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

A notarized affidavit must be sent with the veri cards and, of course, all of the veris will have to be for the contest assigned for each particular contest. The *Asia* "listening in" contest will close Aug. 25th, and the trophy award will be announced in the November number.

A—By midnight Sept. 25th all entries for the *Australia*, *Africa* and *Oceania* contest must there-fore be in the hands of the Editors, together with the veris and the notarized oath that the contestant personally listened to all of the stations listed.

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

C—Bear in mind that the veri cards should be absolute verifications, and not simply an acknowledgment 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. The contest for the November issue will close in New York City, September 25th, etc.

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

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

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 the Editor's hands by October 25th, includes the veris from European short-wave stations, including Iceland.

For entries to be in the Editor's hands by Novemher 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.

New mike for use on stringed instruments; foot-operated volume control shown below mike.

New Mike With Foot-Operated Volume Control

● THIS mike can be used on all vibration instruments such as guitar, violin, double bass, etc. When used with violins or other instrument having a tail-piece, the Kontak microphone is merely inserted under the tail-piece. With other instruments, it can be placed in position by the special adhesive tape used underneath the flaps. No tools or drilling necessary.

The new Amperite microphone has a flat response from 40 to 9000 cycles, and for that reason gives natural reinforcement without peaks or other undesirable affects. It has an unusually high output of -40 db and will operate on any amplifier having two stages of amplification or more. The foot-operated volume control increases the range and effects of the instrument tremendously. It permits pipe organ crescendos and volume—permitting a more flexible interpretation of music—a much less mechanical interpretation.

With this microphone, an ordinary violin can be made to have the depth of a Stradivarius.

This article has been prepared from data supplied by courtesy of Amperite Corporation.

Television Today by Philo T. Farnsworth

(Continued from page 277)

experimental receivers in the field is large enough and the program reception dependable enough, *commercial interest will increase to a point where we will have television regardless of any reasonable requirement as to financial outlay.*

Which is Best Antenna for the DX "Fan"

(*Continued from page* 283)

pair alone may be connected to points marked "X," or a single wire may be attached to a point equal to 14% of a ½-wavelength, at either side of any of the points marked "X". Being able to connect the lead-in, in a number of places greatly facilitates matters, inasmuch as by careful selection of this point, a long lead-in which is not desirable in any case, may be eliminated.

Effect of Increasing Antenna Length

By increasing the length of this antenna still further, as in Fig. 4, to 4 wavelengths or eight ½-wavelengths it has become still more directional endwise. The 4 predominant points of reception are at an angle of 25 degrees with the axis of the wire. The main idea in the construction of such an antenna, as in Fig. 3 and 4, is to have one of these predominant lobes or points of maximum pick-up point exactly at the section of the earth from which we wish to receive. Of course, as said before, if we can so position the antenna that 2 or more of them point at some of the hard-to-get stations, we are just that much better off.

When we speak of a ½-wavelength we mean that the length of the antenna is equal to ½ the wave length in meters. Its length in feet then will be 468,000 divided by frequency in kilocycles, or 468 divided by the frequency in megacycles. This will give us the number of feet in a half-wavelength. Ordinarily a slight allowance would be made for what is termed *end-effects* but for general reception purposes that can be totally disregarded, for the listener and DX "Fan" is not willing to confine himself to one particular frequency, but rather one *band* of frequencies.

In Fig. 5, we have another type of *directional* antenna, which, of course, requires more effort in construction than the others previously described. It is *bi-directional*, that is, the pick-up is from 2 directions. these from an angle of 90 degrees with the axis of the antenna, the same as in the case of Fig. 1, and Fig. 2. This antenna consists of six ½-wave sections divided into 2 groups and shaped in the form of a "U", and the 2 "U's" are spaced approximately 6" apart. To the exact center we may connect a twisted pair. This antenna is merely a glorified example of that shown in Fig. 2 and due to its multiple element construction provides further gain, or in other words, exhibits more sensitivity by supplying more signal voltage to the receiver.

The "V" Antenna

Aside from the single *straight-wire* antenna, the next easiest to construct for directional effects is the "V". We have shown 2 examples of such an antenna in fig. 6, and fig. 7. In fig. 6, the 2 side wires have a total length of 1 wavelength, and form an angle of 110 degrees. This also is used with a quarter-wave matching stub and a twisted pair, the same as shown in fig. 2. If the side wires become longer, the angle of the 2 wires becomes less. For example in fig. 7, we have the same type of antenna with side wires 2 wavelengths long, and here the angle is approximately 75 degrees. If one should have sufficient space to construct such an antenna as shown in fig. 6 or 7, but finds for some reason the angle specified cannot be employed, a slight deviation of 5 or 10 degrees either way will not present any difficulty or change the operating characteristics noticably, for these angles are computed for an antenna in free space and not surrounded by building, trees, etc.

The "Rhombic" Aerial

Am improvement over the "V" antenna is shown in fig. 8. This is the *Rhombic;* these are considerably more difficult to construct and for all general purposes will not serve much better than the "V" antennas shown in fig. 6 and 7. However, the constructional data are given should anyone desire to construct such an affair. With a resistor at the end of this antenna it is *uni-directional*. The arrow on the left indicates the direction of the reception. Without the resistor, reception is bi-directional, the same as with the "V" or doublets.

The height above ground in an antenna of scientific construction would be an important consideration, however, for all general purposes, so long as the height above the earth is at least ½ wavelength, the listener and DXer can be thoroughly satisfied. It is important to keep antennas out in the clear, away from surrounding buildings and trees because these affect its *directional* qualities.

How to "Focus" Antenna

In determining the position of the antenna in order to obtain best reception, in certain directions, we cannot use the ordinary flat map; either the world globe or a *great-circle* map must be used. When using the globe, the antenna should point the greatest circle around the globe. When employing a great circle map, you may use a straight edge, such as a ruler and merely extend it from the point where the antenna is located, to the point where the station is located, and the degrees east or west of the poles will be indicated around the outer edge of the map. Great circle maps are based on a particular center, for instance, one map may be based on Washington, D. C., as its center, and it will only serve for location near this point. In any event, they only hold true for the point on which they are centered. The best procedure is to use a world globe.

In closing, we might say one word about the previously mentioned *twisted-pair* lead-in. So long as it does not get wet and dirty, ordinary lamp cord will work satisfactorily. However, it is best to use any one of the well-known commercial varieties; Giant Killer Cable for instance, is an excellent form of lead-in.

When to Listen In

(*Continued from page* 304)

Sergio. Miss Sergio, who is serving for the present as a guest announcer with NBC, will handle temporarily the announcements in Italian and French. Kotz will make the announcements in German. This European service also will be available from 2:00 to 6:00 p.m., but will be broadcast over W3XAL's non-directional antennae.

Programs will be broadcast to South and Central America on the directional beam, with a frequency of 17,780 kilocycles, 16.8 meters, from 6:00 to 8:00 p.m., and with a frequency of 6,100 kilocycles, 49.1 meters, from 8:15 p.m., to 12 m. The station will be silent from 8:00 to 8:15 p.m., while the frequency is changed.

Announcements for South and Central America will he made in English, Spanish, and Portuguese by Martin Viale, of the Argentine; Pinto Tameirao, of Brazil, and Armando Mencia, of Cuba. Mencia is a new member of the announcing staff.

DAVENTRY

Since the new aerial system has been placed in service, the transmissions directed away from North America are not heard as well as formerly.

At the present time the only transmissions directed to North America are in the latter part of transmission four, and all of transmissions five and six. In transmission four from 4 to 6 p.m., GSG is directed at North America. This will probahly be replaced by GSP in September. GSO is directed at South America and GSF at Central America. In transmission five from 6:17 to 8:30 p.m., GSD and GSP are directed at North America, GSF and GSB at Central America, and GSO at South America.

In transmission six from 9 to 11 p.m. GSI, GSG and GSD are directed at Western Canada and GSB at Central America. GSG will probably be replaced by GSC.

Transmission one from 1 to 3:15 a.m., although directed to Australia and the Far East is sometimes well heard on GSB and GSD, hecause the signals are directed westward and pass over Central America and South America en route to Australia.

MADRID

EAQ on 9.860 mc. is temporarily off the air. All programs at present are radiated on EAR on approximately 9.5 mc.

ARGENTINA

A special program for North American listeners is sent out every Friday from 4 to 5 p.m., over LRX 9.66 meg., and LSY 18.115 meg., at Buenos Aires. The program consists of music and talks and is sponsored by the Argentine government.

High-Voltage Oil Capacitors

● After lengthy experimentation and numerous tests, a truly satisfactory high-voltage oil capacitor in minimum bulk is now made available. The units are housed in very small square steel cans. They are provided with high-tension pillar insulator terminals. The rolled-seam steel cans insure perfect hermetic sealing. These units are available in D. C. working voltages of 600 to 2000, and in capacities of 1, 2, and 4 mf.

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

In Next Issue! HAMS will find a number of important features—one, a 5-meter portable set described by George W. Shuart, W2AMN.

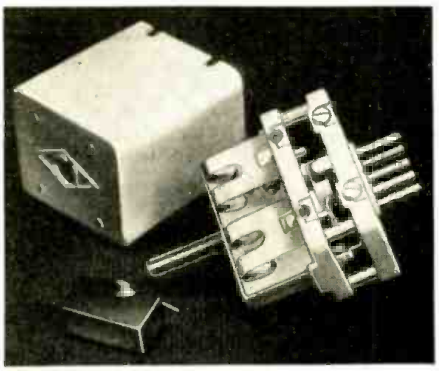
New HAM Essentials

New Socket

● THE new National sockets have many features. The contacts have been specially designed for use with ceramic insulation. They extend up into the body of the socket, and grip the whole length of the tube prong firmly. No metal extends through to the face of the socket, and accidental false connections can not be made. Wiring to the socket will not break off and go adrift, for the terminals do not twist and wobble, yet they are free to float slightly. For *beneath-the-chassis* mounting, the isolantite body is clamped securely in place by a metal plate. It can be rotated in the metal holder to any one of six positions for easiest wiring, yet when mounted it is locked in place by keyways.

Latest type sockets introduced by National

Any socket except the octal may also be mounted on a single stand-off insulator for *above-chassis* use. A special isolantite stand-off for this use is supplied with each socket. Needless to say, this stand-off has hundreds of uses when not required for its intended purpose. Two standard metal mounting pillars are furnished with the octal socket instead of the single isolantite stand-off. These new sockets are available in 4, 5, 6, 7L, 7S and octal types.



This multiple crystal holder will appeal to up-to-the-minute "Hams."

Multiple Crystal-Holder

A choice of crystal-controlled frequencies is available in the transmitter that uses this new National crystal holder. Four separate crystals are accommodated, any one of which may be selected by the built-in switch. One plate, common to all four crystals, is of solid metal 2 3/16" by ⅜" thick. This large mass of metal retards temperature changes and provides cooling for the crystal. The switch has extremely low distributed capacity, insuring that only the desired crystal will be active. The unit has a standard five-prong plug-in base and in most cases can be substituted for existing holders without charge. Provision has also been made for mounting behind the panel, with *front-of-panel* control.

This article has been prepared from data supplied by courtesy of the National Company.

A New Code Teaching System

● It has been our privilege to review the new, revised junior code course prepared by Mr. Candler. This particular course is intended for the beginner or one who desires to become a radio operator and has had no previous training. There are ten lessons in all, each contains much valuable information. Not only is code taught in this course, but the person is prepared mentally in order to be in a receptive mood.

Quoting a short passage from the second lesson will give the reader an idea as to how thoroughly the science of code is taught in this system.

"To be able to focus or center your thoughts on whatever work you may be doing, is one of the essentials to the successful accomplishment of that task. This is more particularly applicable to telegraphing I believe, than to any other one thing. A grave error many unguided students make, one which always thwarts their purposes and hopelessly scatters their powers, is trying to force themselves to concentrate. Some things, by their very nature, are unamendable to blind force, and *concentration* seems to be one of them."

Then, of course, the lesson goes on to explain how to acquire the ability to concentrate correctly. Thus, the student is not left to assimilate the mere knowledge of code characters, but is thoroughly trained so as to really make the task easy. The various code exercises which are presented are also selected so that they will be attuned to the degree of ability of the student. Penmanship is treated at length in the second lesson, and thoroughly explains to the student how writing may be simplified and how all of the nervous strain may be eliminated, permitting the person to be free of perhaps one of the worst enemies of telegraphy.

We are all familiar with the forces of habit, and know how hard it is to rid oneself of an unpleasant one. Use of habit is made in this code system in that it leads one to form a habit of code reception and transmission rather than mere mechanical ability.

Lesson eight shows how to prevent "glass arm," one of the radio operator's biggest enemies. Exercises are given for developing the small muscles and nerves of the arm, making the fingers, wrists and forearm strong and flexible for writing, sending and using the typewriter. This lesson continues with instructions in fast, accurate sending, and gives commonly used "ham" abbreviations and "Q" code signals.

Lesson nine shows the student how to *carry words in his mind while copying.* This enables him to copy behind without mental or nervous strain. This ability encourages high speeds. The student is shown, step-by-step, how to learn to copy behind. Then the handling of regulation radio messages, weather bulletins, etc., is taken up and the student is thoroughly instructed in this important phase of amateur and commercial radio.

Lesson ten continues with the instructions of previous lessons and gives specific directions for review, for building up weak places, so that balanced work can be accomplished without conscious effort, practice suggestions and a general summary.

CORRECTION NOTICE

● ON page 258 of the September issue, the photograph shown of the aerial system for the Spitz Flight Recorder was the incorrect picture, and actually a photograph of the A. T. & T. Co., antenna system for carrying on communication with China.

Next Issue!

The 5-meter 100 watt Transmitter with adjustable frequency, by George W. Shuart, W2AMN, will appear in the next number.

"CQ"

A customer in Lakemba, (Sydney) purchased an 8 valve (tube) set. Five weeks later a service call was made. The complaint was that consumption was too high, being 15% higher than previous occasions. After consumption was checked and found normal, the customer was told that extra consumption must be from some other source. The customer then seriously asked the serviceman if the set could be run cheaper off gas. Hi! (A couple of Hi! hi's! Editor.)

—An Australian Reader.

"CQ"

While on a street car returning from a lecture on crystal oscillators, my friend and I were discussing them. From somewhere to the back of us, a woman said to her husband:

"When are those fellows going to learn something more advanced in radio. They've been playing with those crystal sets ever since they built one for our Johnny ten years ago!"

—George Sangrik.

"CQ"

W1JYT woke up early one morning to work some morning DX. After dressing up in a hurry he went out to the Ham shack, and while tuning the rig, he glanced down and found that in his hurry he had put on two different shoes! Hi!

—Marcel Weiss.

"CQ"

The other day I was looking all around the workshop for one of my new aluminum shelves, in order that I might do some more work on my new transmitter, which, by the way, is the one on page 538 of the January issue. Well, I could not find it anywhere. Finally I gave up and asked the O.W. if she had seen anything of it. She replied, "Why, yes, I am using it. It makes a very excellent cookie pan. Just fits the oven."

Well, I got it back O.K. and I hope the rig works as well as those cookies tasted.

—Francis L. Cawdrey, RM2C, W7BGE, and NERS.

"CQ"

I happened to be listening on the 20 meter band, with a sweet YL hanging around, when she heard a "Ham" give his call as "VU2HG—(Honolulu, Germany)."

"Well, I'm blessed," was her comment. "I always thought Honolulu was in Hawaii!"

—E. H. Wordsworth.

VALUABLE DATA IN BACK NUMBERS!

● MANY short-wave set-builders frequently need constructional data on certain transmitters or receivers as well as converters and other allied apparatus.

Recently many inquiries have been received asking for data on "1-meter" sets, for example. The January, 1936, issue contains a very good article describing how to build and operate a transmitter and a receiver of modern type, tuning over a range of from ½ to 1 meter.

This shows how important it is to retain all back numbers of this magazine, as they may prove extremely valuable at any moment. Back numbers are available from the Subscription Dept.

Substantial binders are available for preserving these back numbers.

U.S. Patent Office Grants Patent On A.C.-D.C. Circuit to Harry G. Cisin

● On July 6, 1937, the United States Patent Office issued Patent No. 2,086,526, to Harry G. Cisin. The Cisin circuit permits interchangeable operation of radio sets and other electronic devices from the ordinary 110 volt house-lighting circuit, regardless of whether alternating or direct current is supplied. It has the further advantage of doing away with bulky and expensive power-supply and filament transformers.

Many of Mr. Cisin's technical and constructional articles have appeared in this publication.

The 5-40-400 Transmitter

(*Continued from page 291*)

one mistake in handling it. Radio frequency burns are very disagreeable things, even when they result from transmitters which are designed for operation on much less power. The burn which would result from contacting the high power section of this transmitter would render one a hospital case, if it did not kill him outright. It is very much better to work up to such power gradually.

Design is Compact

Like the majority of hams, we live in a reasonably small house. While the family is generous enough to permit us the use of an entire room for our radio activity, it is, after all, a small room and it must house a great deal of equipment other than the particular transmitter and receiver we happen to be using for our five meter work. Therefore, we have done what we could do to conserve space occupied by our power equipment without bringing about the trouble which would come from heat or from electrical leakage and feed-back, if the components were placed too close together. Then, too we have given some thought to the distribution of the weight. There are two real reasons for this. First, the concentration of all the equipment, in a single relay rack, for instance, would mean that it would be practically impossible to move it from one part of the room to another, without at least partially dismantling it. And, secondly, space is provided on the tops of the cabinets for the temporary parking of those pieces of "occasional" equipment, without which no home station is complete.

That is the principal reason for building our transmitter in four distinct units. Our radio frequency unit was described in August. One of the accompanying pictures will indicate that it rests upon the top of the metal cabinet, which houses its power supply. The modulator is in another cabinet, of exactly the same size and the speech amplifier is housed in a cabinet of similar dimensions, but only half as high. Any one of these units will give you a tussle, if you try to lift it and two of them together are just too much. Where the station is to be of a permanent nature, the entire assembly may be made to have the appearance of a single cabinet assembly, by placing one cabinet directly above the other.

In our case, we have found it more convenient to use the units, as they are shown and one very desirable improvement which was brought about by placing the speech amplifier on the operating table, instead of stacking it in the general assembly, was a great reduction in feed-back, resulting from radio frequency energy getting into the grid circuit of the first tube in the speech amplifier. Such stray fields have little or no effect on the modulator stage. Since the output of the speech amplifier is fed to grids of the modulator tubes through a pair of suitable transformers and a five hundred ohm line, the distance between these two units may be anything, up to several hundred feet, before any loss, or other undesirable effect would be noted.

Uses Parts All Commercially Available

It is not suggested that we have hit upon the "ultimate" form of equipment and there may be those who would prefer setting it up in the more usual type of relay rack assembly. That may be done with a minimum of effort, if the units are assembled on the sub-bases, as we have shown them and the sub-bases are fastened to the regular angle brackets which have been designed for that purpose and which are commercially available. In fact, the entire transmitter, with the exception of the rod section in the plate circuit of the final r.f. stage, is made up of commercially available parts.

A long discussion of the reasons for the selection of this or that portion of the entire job seems pointless. A definite goal was established and the present arrangement seems to reach that goal with very little fuss and with plenty of increased power available, if it is ever necessary to use it. To the engineer who is familiar with the subject, it will be obvious that the tubes are being run very much below their capabilities. Two distinct advantages result. The life of the tubes is greatly extended and the generation of harmonics is reduced to a minimum, so that the vast majority of the available power, in the final stage is being used to "get out," rather than in generating a lot of useless heat, to say nothing of the possibility of causing interference on other bands.

What we have, in the final analysis, is just this. A Radio frequency power supply, designed for continuous operation on four hundred watts, but capable of delivering a full five hundred watts to the final r.f. stage, along with the necessary power for the other portions of the r.f. section of the transmitter, all mounted on a steel sub-panel, 13" x 17" x 3". This entire assembly will slip right into a standard metal cabinet, designed to carry two standard panels 8¾" high. The heavy components and the tubes are found on the upper surface of the sub-panel, while the condensers and resistors are mounted below.

Another steel cabinet, of the same size, is used to house the modulator. In this case, however, it is not desirable to attach everything to the sub-panel. The filament, power and class B output transformers and the tube sockets, as well as the high voltage output terminals are mounted on the sub-panel. The resistors and condensers are mounted on the under side. A pair of National type GS-9 feed-through bushings, fitted with jacks are mounted on the front

A Page From the Log of W2DKJ

Input power to last stage, 300 watts. Frequency 57,960 kc. (5 meters) Type of emission A-3

		Station Heard or Worked	Nat. 1-10	*If QSO Resulted*		
Date Time	Station Called	R S T	Rec. Dial Readings	My Sigs. R S T	QSO Time Ending	Remarks, Changes, etc.
July 19						
11.02P	W3DQO, I.C.W.	4 6 8	436	5 8 9	11:30	Millville, N. J., 120 miles. (He used a transceiver.)
July 21						
11.25P	W2GAH	5 7 8	412	5 9† 9	11:35	West Hampton Beach, L. I., 55 miles
11.57P	W2IKD	4 7 8	430	5 8 9	12:10A	Toms River, N. J., 70 miles (Mobile)
July 22						
12.15A	W1IJ	4 7 8	420	5 9 9	12:25	Madison, Conn., 65 miles
July 23						
11.00P	W1ZE	5 9 9	437	5 9 9	11:05	Mattapoisett, Mass., 170 miles
11.12P	W1GDJ	5 7 9	445	5 7 9	11:17	Fall River, Mass., 150 miles
11.26P	W3AFJ	5 7 9	416	.....		Bristol, Pa., 70 miles
11.45P	W1IYS	5 7 8	416	5 7 9	11:46	Fall River, Mass., 150 miles
July 24						
12.01A	W1IJ	5 8 9	418	5 9 9	12:02	Madison, Conn., 65 miles

A—A.M. P—P.M.

Are you a member of the Short Wave League? See Page 332.

side of the sub-panel, so that the modulation meter may be set permanently in the lower front panel and connected in circuit, by the use of a short pair of leads, fitted with banana-type plugs.

The input transformer as well as the entire smoothing circuit for the modulator are mounted on the upper, front panel, as is a four prong socket. A four prong plug is attached to a short piece of four wire cable, which is used to connect the secondary of the input transformer, to the four prong socket.

It will be observed that there is little possibility for the accumulation of heat, inside the cabinet, because, under normal load, the transformers run cool and the heat from the tubes is dissipated, through the louvres, at the side of the metal cabinet. A jack, mounted at one side of the upper panel, is provided for the connection for the plug, from the output of the speech amplifier. Need we mention that Lynch *Giant-Killer* cable is used for all of the high voltage connections? May we be permitted to say that we have been using it for a number of years for this kind of work and have never had a break down in service.

The Speech Amplifier

So now we come to the speech amplifier. It is all built up on the sub-panel which is supplied with the National C-NC100 steel cabinet into which it has been built. Although we leave the plate voltage of the speech amplifier on all the time, there is no reason why a switch can not be placed in the line, which will leave only the filaments on, as indicated in the diagram. As a matter of fact, now that we have mentioned it, there is no real reason we can think of why it should not be done that way. There is little use in saying any more about this unit, because the fellow who needs more information about it should not be thinking of building any such transmitter.

So, there, in a nutshell, to say nothing of the accompanying diagrams and parts lists, you have the entire story, as far as our own particular job is concerned.

A Combination 300-Watt Power, Speech and Modulator Unit, 27 Inches High

And, from there we go right on to make your choice of the job you will want to build a little more difficult by telling you of the wonders which have been performed with the combination r.f. power supply and speech amplifier and modulator, which has been doing such remarkable work at W2FPB. To be sure, it will not pack the wallop to be had from our own job, but 300 watts input is still something. And, again, we must tell you that the fellows who designed and built the job were Ed Ruth and Harry Lawson, who also built ours.

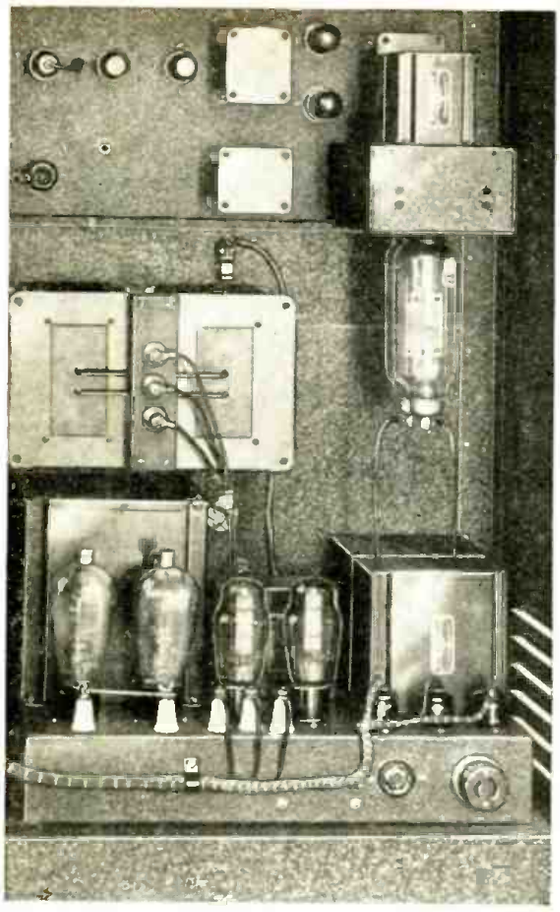
Essentially, the difference between the two, is really a matter of power to be used and the size of the ultimate job, rather than any other consideration. There is not much difference in cost. A good look at the parts lists will indicate that nothing but good components have been used, in both instances.

By direct comparison, we have the following: In my transmitter we have 400 watts, under normal load, with the possibility of running it up to more than 500, if suitably urged. In the other unit, we have about 300 watts, as the operating rating, with about 350 available for "ultra" service.

In our transmitter, we use the equivalent of five 8¾" panels of rack space, for the r.f. power supply, the modulator and the speech amplifier, along with their power equipment.

The 300 watt job may be made up in a single metal cabinet which will take but three of the standard 8¾" panels and will, at the same time give us the whole works, as far as power for the r.f., speech and the modulator is concerned.

We feel quite sure that if you were to ask W2FPB about it he would be able to convince you that you would be foolish to consider anything more powerful than the arrangement he is using.



This is the complete R.F. power supply, modulator and speech amplifier with their power-supply which was built by W2GYL and W2IER for W2FPB. It will do a swell job on the 5-40-100 transmitter, where 300 watt output is desired. The tube line-up and the parts list are given and most of the mechanical details are obvious from this picture.

No doubt, one of his most convincing arguments would center about the fact that, with the power we have available, we still do not use more than his 300 watts and that all of his power, speech amplifier and modulator equipment could be housed in a metal cabinet which is not much larger than the cabinet necessary for our r.f. power supply or our modulator alone. And we must admit there is something to be said for his side of the argument. The full information concerning the design and construction of his unit may be had from the accompanying illustrations circuit diagram and parts list. We are absolutely impartial in this matter and make no further comment than to say "Let your conscience be your guide."

Even if you do go to the lower powered set-up it will not be necessary to make any revisions in the design of the R.F. section because automatic bias is employed.

Parts List for 400 to 500 Watt Unit

I.R.C.

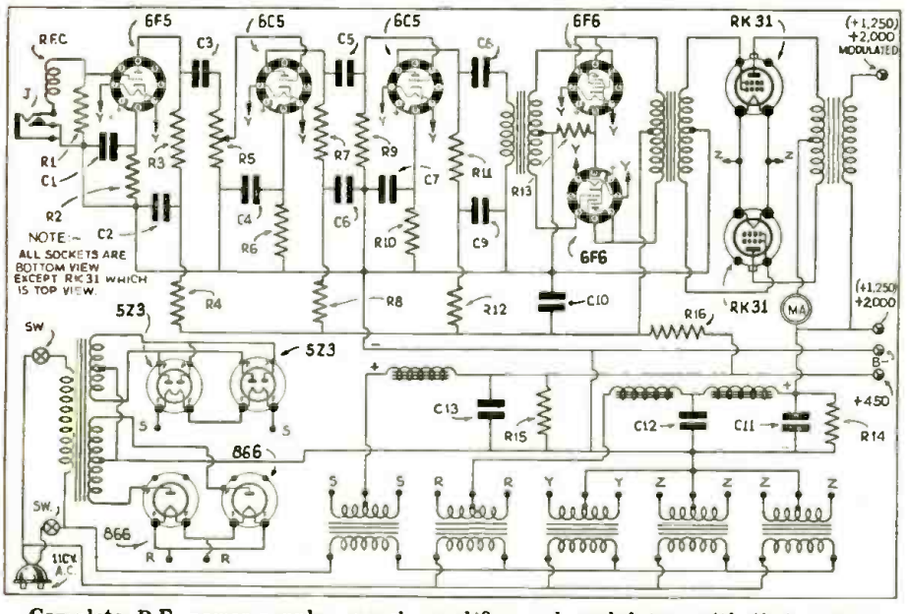
R1—5 meg. ½ watt resistor
2—3,000 ohm 1 watt resistor
3—1 meg. 1 watt resistor
4—250,000 ohms 1 watt resistor
5—10,000 ohms 1 watt resistor
6—500,000 ohms volume control with A.C. switch
7—1,000 ohms 1 watt resistor
8—10,000 ohms 1 watt resistor
9—150 ohms 20 watt resistor
10—350 ohms 50 watt resistor
11—25,000 ohms 100 watt resistor adjustable
12—100,000 ohms 100 watt resistor
13—50,000 ohms 50 watt resistor
14—100,000 ohms 100 watt resistor

CORNELL-DUBILIER

C1—10 mf. 25 volt electrolytic condenser
2 } —dual 8 mf. 400 volt electro-
3 } lytic condensers
4—.01 mf. 600 V. paper tubing condenser
5—10 mf. 25 V. electrolytic condenser
6—.01 mf. 600 V. paper tubular condenser
7—.01 mf. 600 V. paper tubular condenser
8 } —dual 8 mf. paper 600 V. con-
9 } densers
10—2 mf. 1,500 V. Dykanol condenser
11—2 mf. 1,500 V. Dykanol condenser
12—2 mf. 1,000 V. Dykanol condenser
13—2 mf. 2,000 V. Dykanol condenser
14—2 mf. 2,000 V. Dykanol condenser

NATIONAL

2—Octal sockets
5—4 prong Isolantite sockets
2—Type GS-9 insulators with jacks
1—6 prong Isolantite socket
1—7 prong Isolantite socket
1—Type 58 tube shield for 6C6
1—Type R100 choke
1—Type HRO knob (audio gain)
1—Size C chart frame
4—XS-1 Steatite feed-through insulators
2—Type 12 } Grid-Grips
2—Type 24 }



Complete R.F. power-supply, speech amplifier and modulator, with their power supplies, as used by Harry Tunstall, W2FPB.

All about the SHORT WAVE LEAGUE

A FEW WORDS AS TO THE PURPOSE OF THE LEAGUE

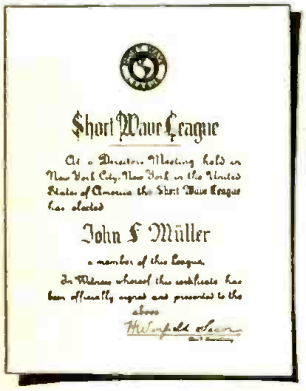
The SHORT WAVE LEAGUE was founded in 1930. Honorary Directors are as follows: **Dr. Lee de Forest, John L. Reinartz, D. E. Replogle, Hollis Baird, E. T. Somerset, Baron Manfred von Ardenne, Hugo Gernsback. Executive Secretary.**

The SHORT WAVE LEAGUE is a scientific membership organization for the promotion of the short wave art. There are no dues, no fees, no initiations, in connection with the LEAGUE. No one makes any money from it; no one derives any salary. The only income which the LEAGUE has is from its short wave essentials. **A pamphlet setting forth the LEAGUE'S numerous aspirations and purposes will be sent to anyone on receipt of a 3c stamp to cover postage.**

FREE MEMBERSHIP CERTIFICATE

As soon as you are enrolled as a member, a beautiful certificate with the LEAGUE'S seal will be sent to you, providing 10c in stamps or coin is sent for mailing charges.

Members are entitled to preferential discounts when buying radio merchandise from numerous firms who have agreed to allow lower prices to all SHORT WAVE LEAGUE members.



If you wish your name engraved on the Free membership certificate, as illustrated above, please send 25c to cover cost.

SHORT WAVE ESSENTIALS LISTED IN OPPOSITE COLUMN SOLD ONLY TO SHORT WAVE LEAGUE MEMBERS

They cannot be bought by anyone unless he has already enrolled as one of the members of the SHORT WAVE LEAGUE or signs the blank below (which automatically enrolls him as a member, always provided that he is a short wave experimenter, a short wave fan, radio engineer, radio student, etc.).

Inasmuch as the LEAGUE is international, it makes no difference whether you are a citizen of the United States or any other country. The LEAGUE is open to all.

Application for Membership SHORT WAVE LEAGUE

SHORT WAVE LEAGUE 10-37
99-101 Hudson Street, New York, N. Y.

I, the undersigned, herewith desire to apply for membership in the SHORT WAVE LEAGUE. In joining the LEAGUE I understand that I am not assessed for membership and that there are no dues and no fees of any kind. I pledge myself to abide by all the rules and regulations of the SHORT WAVE LEAGUE, which rules you are to send to me on receipt of this application.

I consider myself belonging to the following class (put an X in correct space): Short Wave Experimenter ☐ Short Wave Fan ☐ Radio Engineer ☐ Student ☐

I own the following radio equipment:

Transmitting .....

Call Letters .....

Receiving .....

Name .....

Address .....

City and State .....

Country .....

I enclose 10c for postage and handling for my Membership Certificate.

1—4 prong connecting plug
1—Type C-NC-100 metal cabinet (for speech amplifier)

PAR-METAL
2—Cabinets for two 8¾"x19" panels
4—8¾"x19" panels
2—13"x17"x3" heavy duty sub-panels

TRIPLETT
1—0-300 mil. 3" sq. meter

RAYTHEON
1—6C6 Tube
2—6A6 Tubes
2—6L6 Tubes
2—RK31 Tubes
2—5Z3 Tubes
4—866 Tubes

THORDARSON

T1—7547
T2—5740
T3—8458
T4—6265
T5—6435
T6—6423
T7—6411
T8—6433
T9—6878
T10—7046
T11—6283
} Transformers

CH1—7549
CH2—6408
CH3—6315
CH4—7549
CH5—6403
CH6—6315
} Chokes

Parts List for 300 Watt Unit

I.R.C.
R1—5 meg. ½ watt resistor
2—2,500 ohm ½ watt resistor
3—250,000 ohm ½ watt resistor
4—50,000 ohm ½ watt resistor
5—½ meg. volume control resistor
6—2,500 ohms ½ watt resistor
7—100,000 ohm ½ watt resistor
8—50,000 ohm ½ watt resistor
9—100,000 ohm ½ watt resistor
10—2,500 ohm ½ watt resistor
11—50,000 ohm 1 watt resistor
12—25,000 ohm 1 watt resistor
13—750 ohm 10 watt resistor
14—50,000 ohm 100 watt resistor
15—50,000 ohm 100 watt resistor
16—5,000 ohm 50 watt resistor

PAR-METAL
1—5"x10"x3" chassis
1—8"x17"x2" chassis
1—13"x17"x3" (heavy duty)
1—Cabinet, steel
3—panels, steel, 8¾"x17"

RAYTHEON
1—6F5 Tube
2—6C5 Tubes
2—6F6 Tubes
2—RK31 Tubes
2—5Z3 Tubes
2—66 Tubes

CORNELL-DUBILIER
C1—10 mfd. 25 V. electro condenser
2—.25 mfd. 400 V. tubular condenser
3—.05 mfd. tubular 400 V. condenser
4—10 mfd. 25 V. electro condenser
5—.05 mfd. 400 V. tubular condenser
6—.25 mfd. 400 V. tubular condenser
7—10 mfd. 25 V. electro condenser
8—.05 mfd. 400 V. tubular condenser
9—.25 mfd. 400 V. tubular condenser
10—16 mfd. 500 V. electro condenser
11—4 mfd. 1500 V. Dykanol condenser
12—2 mfd. 1500 V. Dykanol condenser
13—8 mfd. 600 V. Dykanol condenser

KENYON
T1—T-660 Transformer
2—T-365 Transformer
3—T-360 Transformer
4—T-351 Transformer
5—T-353 Transformer
6—T-353 Transformer
7—T-460 Transformer
8—T-258 Transformer
9—T-58 Transformer
CH1—T-164 Choke
2—T-521 Choke
3—T-177 Choke

NATIONAL
2—type XM10 sockets
4—4 prong Isolantite sockets
5—8 prong Isolantite sockets
4—XS1—feed-through insulators

Accessories for Members of the SHORT WAVE LEAGUE

Every member of the SHORT WAVE LEAGUE wants to identify himself in some way. For your convenience the League directors have prepared suitable letterheads, lapel buttons, stickers, etc. In addition there are many short-wave accessories, such as maps, globes, etc., which the League offers only to members at special prices. Take your choice from this advertisement. **THESE ESSENTIALS ARE SOLD ONLY TO LEAGUE MEMBERS.**

A—50c per 100

LEAGUE LETTERHEADS

A beautiful, official letterhead has been designed for members' correspondence. The letterhead is invaluable when it becomes necessary to deal with the radio industry, mail order houses and radio manufacturers, as many houses offer members of the LEAGUE preferential discount. The letterhead is also absolutely essential when writing for verification to radio stations either here or abroad. It automatically gives you a professional standing.

A—SHORT WAVE LEAGUE letterheads, per 100 ..... **50c**

WORLD GLOBE

This important essential is an ornament for every den or study. It is a globe, 6 in. in diameter, printed in fifteen colors, glazed in such a way that it can be washed. This globe helps you to intelligently log foreign stations. The base is of solid walnut, and the semi-meridian of a nickel-like metal. Entire device substantially made, and will give an attractive appearance to every station, emphasizing the long-distance work of the operator.

D—Globe of the World ..... Prepaid **89c**

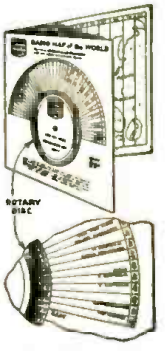
D—89c each

SHORT WAVE MAP OF THE WORLD

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

F—SHORT WAVE Map of the World ..... Prepaid **25c**

WORLD RADIO MAP AND STATION FINDER



The finest device of its kind published. The world's map on heavy board is divided into 23 sections, while the rotary disc shows you immediately the exact time in any foreign country. Invaluable in logging foreign stations. Also gives call letters assigned to all nations. Size 11"x22".

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

C—25c each

LEAGUE LAPEL BUTTON

E—35c each

This beautiful button is made in hard enamel in four colors, red, white, blue and gold. It measures three quarters of an inch in diameter. By wearing this button, other members will recognize you and it will give you a professional air. Made in bronze, gold filled, **not plated.** Must be seen to be appreciated.

E—SHORT WAVE LEAGUE lapel button ..... Prepaid **35c**

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

LEAGUE SEALS

G—15c for 25

These seals or stickers are executed in three colors and measure 1¼ in. in diameter, and are gummed on one side. They are used by members to affix to stationery, letterheads, envelopes, postal cards and the like. The seal signifies that you are a member of the SHORT WAVE LEAGUE. Sold in 25 lots or multiples only.

G—SHORT WAVE LEAGUE seals, per 25, ... Prepaid **15c**

SHORT WAVE LEAGUE
99-101 Hudson St.,
New York, N.Y.

SHORT WAVE LEAGUE, 10-37
99-101 Hudson Street, New York, N. Y.
Gentlemen.
☐ I am a member in the SHORT WAVE LEAGUE
☐ Please send me application for membership in the SHORT WAVE LEAGUE
Please send me the following short wave essentials as listed in this advertisement:

.....
.....
.....
.....
.....

for which I enclose $..... herewith.
Name .....
Address .....
City and State .....
Country .....
(The LEAGUE accepts money order, cash or new U. S. Stamps in any denomination. Register cash and stamps.)

Book Review

SERVICING WITH SET ANALYZERS, by H. G. McEntee. Size 6" x 9"; stiff paper covers; 64 pages, profusely illustrated. Published by Radcraft Publications, New York City.

A new book which tells you in an easily assimilated style just how to test radio receivers with set analyzers.

The busy serviceman and those contemplating taking up service work, will find this book very valuable. The diagrams are large and clear, and the information given is concise and to the point, and not cluttered up with a lot of unnecessary theory. The first chapter deals with a description of the fundamentals of set-analyzers and illustrates with diagrams the operating principles, so that anyone can understand it. The simplest steps in the use of a set-analyzer is taken up, with elementary diagrams, and then a description is given of the vacuum tube voltmeter and how it works; also test oscillators, output meters, and oscilloscopes. Complete wiring diagram of the RCA frequency modulated oscillator, as well as other standard models of analyzers both large and small.

The use of multi-scale instruments it discussed, also wobbulators. The latest type oscilloscopes using cathode ray tubes are described.

NOTES ON AMATEUR RADIO TRANSMITTER DESIGN, by James Millen. Size 6½"x9½"; 124 pages; profusely illustrated, with paper covers. Published by James Millen, Inc., Malden, Mass.

This book on transmitter design contains a wealth of material covering the construction of efficient radio transmitters of the amateur type. Various units are shown and considerable mechanical construction is given in detail. The first 60 pages of the book are devoted to circuits of transmitters with well over 100 illustrations. The remainder of the book, consisting of over 64 pages, is devoted to a complete discussion and analysis of National receiving equipment. Many diagrams and charts and worthwhile information is given here. Amongst these 64 pages is also the National catalog. Briefly some of the contents of the book are, exciters, final stages, complete transmitters, modulators, power supplies, antennae.

SHORT WAVE DIATHERMY, by Dr. Tibor de Cholnoky. Cloth covers; size 6½" x 9½"; 310 pages; illustrated; published by the Columbia University Press, New York City. (In Great Britain and Europe, Oxford University Press, London, England).

This very timely work comes from the pen of Dr. Cholnoky, associate in Surgery, New York Post-Graduate Medical School, Columbia University, and will undoubtedly soon find its way to the library table of every electro-therapeutist, as well as all serious students of radio physics. The treatment of the subject is technical to the point that the material is intended for practitioners, but, at the same time, the general student of the subject can readily understand the details as presented.

The opening chapter deals with physical aspects of short-wave diathermy and explains the fundamental operating principle of the machines used for this purpose. The author then takes up the subject of "Experiments on Bacteria and Other Organisms," etc., "Experimentation on Animals"—including the action of different wavelengths on tissue; the effects of short-wave on blood and serum.

One chapter is devoted to "Wavelength for Short Wave Diathermy"—and then comes a section on the *technic of short wave diathermy* in which the proper arrangement of electrodes is discussed, including the surgical application of short waves. The description of short-wave treatments for the following ailments is very valuable and interesting:—"Infections," "Ailments of the Respiratory Tracts," "The Gastro-Intestinal Tract," "The Genito-Urinary Tract," "The Circulatory and Locomotor Systems" and the "Nervous System."

(Continued on next page)

11-Tube All-Wave Receiver Features Mirro-Dial

(Continued from page 297)

cable, extra large cadmium plated chassis. 10 watt output.

The following tubes are used: One 6K6G oscillator, one 6A8G modulator, one 6U7G first I-F amplifier, one 6U7G second I-F amplifier, one 6C5G detector, one 6C5G automatic volume control, one 6K5G first audio amplifier, two 6K6G push-pull output, one 6G5 iris tuning indicator, one 5Y3G rectifier.

This article has been prepared from data supplied by courtesy of The Crosley Radio Corporation.

Book Review

FUNDAMENTALS OF VACUUM TUBES, by Austin V. Eastman. Stiff cloth cover; size 6 by 9 inches; 438 pages; illustrated. Published by the McGraw Hill Book Company, New York City, New York.

There are twelve chapters to this book covering every type of tube together with nearly every conceivable use to which they may be applied. From Two-Element Vacuum Tubes to X-Ray tubes, including such special types as Cathode Ray, Electron Ray, Magnetron, Current Measuring tubes and Low Resistance tubes.

This book is a complete treatise on vacuum tubes and applications, simply written in terms the average student will easily understand, and is profusely illustrated with diagrams and photos.

From the title one might gather that the book had to do with tube designs, rather it is most complete in the application of the various tube designs in that nearly every possible use, for any particular type of tube, is completely discussed in simple language and also investigated mathematically. All amateurs should be interested in this book for the simple reason that almost every possible condition which might arise during the operation of an "amateur station," either at the transmitting or receiving end, can be found simply and completely discussed in its many pages of technical information.—G.W.S.

* * *

HANDBOOK ON INTERIOR WIRING DESIGN. Flexible paper cover; size 8½ by 11 inches; illustrated; published by the Industry Committee on Interior Wiring Design, New York City.

There has been a considerable demand for a good up-to-date treatise on interior wiring plans, and the computation of lighting requirements, etc., in residences and other buildings. This book covers the latest ideas on the subject and includes the important element of "Radio Wiring."

This book also explains the details for proper wiring of radio utilities in a modern home, antenna considerations, etc. The handbook contains diagrams showing how to calculate the proper degree of lighting and includes a simple specification for a typical house, including floor and wiring plans. Valuable charts are given showing the current-carrying capacity of various size wires and the voltage drop for single phase, as well as three phase 60 cycle circuits, and from which the proper size of wire can be read directly. A chart for direct current circuits is also given.—H. W. S.

TELEVISION RECEPTION by Manfred Von Ardenne, translated by O. S. Puckle; cloth covers; size 5¾" x 8¾"; 122 pages, profusely illustrated; published by D. Van Nostrand Company, N. Y.

This is a very valuable work indeed, and should be in the hands of every student of radio and television. The great value of this work lies in the fact that for the first time complete details, diagrams and circuit data—with values of the various condensers and resistors are given, so that you can build a cathode ray televisor.

The author first describes some of the technical problems to be met with in modern cathode ray or high-frequency television and briefly outlines, with diagrams and technical data, the English system of broadcasting television—including the Marconi E. M. I., and the Baird systems. Next the general principles and the circuit functions for cathode ray tube receivers are described and the action of the "time-base" or sweep circuits. The cathode ray television tube and its method of operation is then discussed and pictures of typical apparatus shown. In a later chapter a description of an A.C. operated cathode ray receiver is presented, first the circuit and then the detail parts list are given with the exact specifications of the resistors, condensers, etc. Another chapter deals with the sweep or "time-base" circuits. Synchronization is also dealt with and circuits are given for complete double thyratron "time-base" circuits, with full list of specifications as to the values of the resistors and condensers used.

Later chapters deal with an amplitude filter for separation of the synchronizing impulses, the function of the detector, the U. S. W. picture superhet receiver, with values of all their resistors and condensers, etc. The book has a valuable bibliography.

More "Short Waves and Long Raves"

(*Continued from page* 284)

Likes Our Diagrams!

Editor, SHORT WAVE & TELEVISION:

I wish to take this opportunity to congratulate you on the fine work you are doing through *Short Wave & Television* in promoting the short-wave art, with the comprehensive information in the above magazine.

Your magazine has been one of my most interesting books for many years past, and I have had a great deal of enjoyment in experimenting with and building many of the circuits which you have so ably explained, and pictured in such a manner that the *uninitiated* in the technics of the craft can easily understand.

It is quite different building up one of your many circuits and getting real results, to that of the old "catch as catch can" days with the old Ford Spark coil, when your signals would spread from zero to who knows where!

Therefore, I again wish to compliment you on your fine work and success in its continuance. I am, one of your many well wishers and fans.

(Name not signed)

"Tinymite" is Great!

Editor, SHORT WAVE & TELEVISION:

I'm writing this letter to thank you for putting out such a "swell" magazine. I am especially writing you about that great little receiver—the Hoover "*Tinymite*"! I revised it a bit, mainly using a 27 instead of the Acorn tube. I am also using a 27 as audio amplifier, but I can't use full power on head phones; it's just too loud! I added another 30 amplifier and can get old DJB and D. on a dynamic speaker, so that I can hear them downstairs. I am going strong and my "log" so far is as follows:

W6XKG	GSI	GSD	2RO
W2XE	TPA2	CJRX	HJ1ABP
GSH	DJB	TPA4	W3XAU
GAW	RW96	SM5SX	GSC
GSG	GSF	COCX	W1XK
W3XAL	CGA3	HIN	W2XAF
PHI	DJO	EAQ	HJ4ABH
W2XAD	W1XAL	COCQ	COCH
W2XE	DJD		

I had "logged" these and also many amateur's, including about six W6's and just this morning I got a station near Honolulu. It is a very inexpensive set, using the 27.

An enthusiastic S-W "Fan."
Robert Light,
483 Grand Avenue,
Leonia, New Jersey.

Spanish Speakers—Attention!

Editor, SHORT WAVE & TELEVISION:

We request that all Spanish-speaking S-W broadcasting stations make English announcements of their call letters, location and frequency *S-L-O-W-L-Y* and *more frequently*, so that listeners on short waves may identify and "log" their stations correctly. This could easily be done by recordings in English on phonograph records. I am sure that many others besides the members of this club would appreciate any co-operation the Spanish stations may give us.

Roy E. Chisholm, President
Jackson Short-Wave League
616 Fourth St.,
Jackson, Michigan.

(You said a "mouthful," Roy! And we hope some of those South American S-W station managers read your request. Actually, the Editor has heard some of the calls given in English so rapidly that it was practically impossible to distinguish the letters, especially where double letters occur, such as BB.—Editor.)

Attention . . . Are You Guilty?

● We have heard that some of the "hams" have become rather forgetful of late in a little matter concerning QSL cards. One of our English readers, Mr. H. MacLean, Jr., 134 Lincoln Rd., Peterborough Northants, England, has written to us in regard to this matter. He states that the "fans" in England like to *log* you boys (and girls) on the 20 meter fone band and give you reports. But—when they enclose an International Reply Coupon, they would like to receive your QSL's! The VE boys are very prompt, but the W stations have been behaving rather badly and have not sent him one QSL card since last October! Well, "Hams," what about it? Are you going to vindicate yourselves?

"Jackson Short Wave League" News

● John L. De Wolfe was elected Vice President and Mr. Anthony Calolesone, business secretary of the Jackson Short Wave League at our last meeting.

Our meetings are held every two weeks during summer. We think that it would be a good idea to sell stock form QSL cards to SWL members in hundred lots.

We started on January 7, 1937, with twenty members and today we number 75, and range in ages from 14 to 60 years. We pledge our services to the local American Red Cross Chapter, and also are trying to clear the city of *interference* and educating the public to further their knowledge of short-waves. Our meetings are held in local radio station WIBM, who give us wonderful cooperation.

We have started the fad of exchanging SWL cards with other SWL's, which is spreading throughout the country.

ROY E. CHISHOLM, President,
Jackson "Short Wave League,"
Jackson, Michigan.

The Editors Want

articles describing in detail television receivers on which short-wave experimenters may pick up the television images being broadcast by the RCA Station, in New York City, on about 5 meters, and also those being broadcast in Los Angeles and Philadelphia. All articles accepted and published will be paid for at regular space rates. Send outline of article and what diagrams available to: The Editor, Short Wave and Television, 99 Hudson St., New York, N.Y.

PLEASE VOTE!

● THE Editors are always anxious to please the readers of *Short Wave & Television*, and in order to ascertain just what subjects the readers are most interested in, we ask you to vote in the accompanying ballot. If you do not wish to cut this page, you may copy the ballot. It may be either rewritten or pasted on the back of a postcard.

SUBJECT Check—→	More	Less	As Is
Short Wave (S-W) News Articles			
S-W New Factory-Built Sets—Descriptions			
Aviation S-W News			
Television—General News			
Television—Constructional Articles			
Television Course			
Interviews With Radio and Television Experts			
Construction S-W 1-Tube Sets			
Construction S-W 2- and 3-Tube Sets			
Construction S-W 4- to 6-Tube Sets			
Construction S-W Battery Opr. Receivers			
"Ham" Transmitters—Small			
"Ham" Transmitters—Large			
"Ham" Receivers			
S-W Antennas			
"World-Wide S-W Review"			
"Short Wave Scout Trophy Contest"			
"Short Wave Kinks"			
"Short Waves and Long Raves" Dept.			
"What's New in S-W Apparatus"			
"Radio Amateur," Conducted by Geo. W. Shuart			
"Let's 'Listen In' With Joe Miller"			
The "World S-W Station List"			
"Short Wave Question Box"			
"Short Wave League"			
"When To Listen In," By M. H. Gernsback			
Book Review			
"C. Q."			
"Swappers"			
News Items of "Technical Bulletins" Available			
Editorials—"Guest"			
Educational—Advice on Schools and Courses, etc.			

(Check) ↓

Name..... Ham or Fan?

Street..... City..... State.....

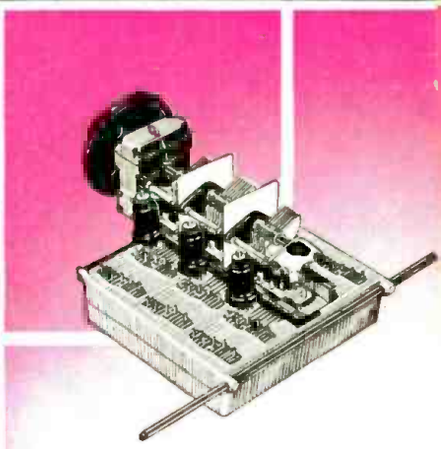
Index to Advertisers

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

KABLE BROS. CO., PRINTERS

No need to flatter the NC-100 in rosy terms on *this* page! Short Wave & Television readers know its advanced design and brilliant performance. They have proved its uncanny ability to pull weak signals into the clear under even the most adverse conditions. And they have appraised its dollar value and found it a wise investment.

NATIONAL NC-100X



NATIONAL COMPANY, INC.
MALDEN, MASS.

We didn't write this page—

OTHER COMMUNICATIONS RECEIVERS OF THE FAMOUS HALLICRAFTERS FAMILY . . .

THE SKY CHALLENGER

A 9-Tube Superheterodyne that has everything! Covers entire spectrum from 38MC to 535 KC (7.9 to 540 meters), everything from the increasingly popular new 10 meter band to the top of the broadcast band without a skip. Easy tuning with a smooth electrical band spread and 5 Band 338° Dial. Will outperform any receiver in its price class and many costing much more.

THE ULTRA SKYRIDER

A definite advance in Ultra High Frequency Reception. Tunes in 5 Meter stations with no more trouble than you'd find on lower frequencies. Tuning Range 5.65 to 79.5 MC (3.75 to 53 meters). 4 Band 338° Dial. 10 Tubes. Built in Noise Silencer, Electro-Mechanical Band Spread. Iron Core I.F. Transformers.

THE SKYRIDER COMMERCIAL

A "professional" type receiver covering the frequencies of 100 KC to 11.5 MC (3000 to 26.1 meters) on 5 bands with splendid sensitivity and selectivity. 1600 KC. Iron Core I. F. Transformers. Direct-Calibrated 338° Main Tuning Dial. Electric-Mechanical Band Spread. With the Ultra it provides complete coverage of the radio spectrum.

THE SKY CHIEF

A complete 7-Tube communications receiver with every control needed for efficient short wave reception, covers all frequencies from 18 MC to 540 KC. Amazing sensitivity and selectivity for a receiver in this low price bracket. Built-in Speaker and Hum-Free Power Supply.

THE SKY BUDDY

Junior Model Communications receiver that's ideal for the beginner and Short Wave Listener. Tunes from 545 to 18.1 MC (16.6 to 555 meters) in 3 Bands. A 5-Tube Superheterodyne with sensitivity and selectivity that's comparable to that of much higher priced receivers. 36 to 1 Mechanical Band Spread. Built-in Speaker and Hum-Free Power Supply.

Owners* of the New 1938 SUPER SKYRIDER did it for us!

● **Says W5APM** "I cannot help but congratulate you on this most wonderful communications receiver: The photos and descriptions of it do not do it full justice: In my opinion it represents the very best value obtainable at any price." ● **W1HWZ** and **W1DFS** add "The audio quality surpasses anything we have ever heard. The band spreading is the best ever. We heard about 15 Five Meter Stations and could read most of them on the 'broad' IF position." ● W9ARA contributes "I have just received the SX-16 and it is everything I expected it to be. You are going to sell a great many of them." ● From W3GWP "Vy. fb. Like it very much 73." ● From the 6th District, J. C. Heath, Salt Lake City, sends this "Think your bandspread a remarkable device and the entire set is built like a precision instrument". ● W2BTP adds this "Am very pleased with the receiver".

*These are but a few of the unsolicited comments on the New 1938 SUPER SKYRIDER.

OTHER PROMINENT AMATEURS NOW OPERATING 1938 SUPER SKYRIDERS

W9UZ	W8MNX	W8PNN	VE1KY	W4DLK	W1GCD
W7BJS	W5FCI	W9MSH	VE1CA	W9UHZ	W9BLI
W9SJV	W2AQV	W5FZS	W8PLD	W1SXT	W7CJR

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