The Vice-President Talks by Radio

ONE of the most notable radio events of recent date was the broadcasting of three important speeches to the people, by Calvin Coolidge, Vice-President of the United States; John S. Weeks, Secretary of War, and Edwin Denby, Secretary of the Navy. This was the first time that the spoken words of three of the nation's leading executives reached all corners of the country in one day. The broadcasting was done by WGY, of the General Electric Company, Schenectady, New York. This fact was made possible by use of the pallophotophone, a new device for photographing the voice and, later reproducing it with perfect clearness. The machine was set up in a hotel in Washington ten days prior to the speech-making. The Vice-President and the War and Navy Secretaries spoke into a small recording-horn. As they did, their voices caused a small diaphragm to vibrate to which is attached a tiny mirror, scarcely smaller than the head of a pin. This oscillation, or flickering, of the mirror reflected a beam of light upon a moving photographic film thus recording the human voice accurately with the overtones, the delicate shadings of speech and other characteristics which make one voice sound different from another. The film was taken to Schenectady and was broadcast twice from the WGY studio, the first time at 7:30 P.M. and again at 10:30 P.M. for radio fans in the Western States. In reproducing, the film is passed before a strong ray of light and the zig-zag markings on it which the sound waves photograph, create electric waves which pass through an arrangement of vacuum tubes.
THE reasons for presenting the workshop plans for a single-blade vernier condenser are many. In the first place, some amateurs may prefer such an instrument over an additional swinging blade on the regular variable, as suggested in a previous article. The present instrument has the advantage of being entirely independent and may be shifted about from circuit to circuit as needed. It has appeared in this form on the market. I have made one for myself and am satisfied that vernier control is necessary for sharp and efficient tuning.

Incidentally, I was curious to determine whether or not the vernier being separate from the main instrument made any difference. Some local amateurs were loud in their insistence that the distributed effect would be greater than the tuned-capacity effect; but I found out that, if such was the case, it was in no way noticeable.

The unit, as it is shown here, is a convenient and well-designed affair. Special pains were taken to make it as simple as possible. All the work may be done with the ordinary tool chest, vise and bench. When finished, the vernier condenser mounts on a panel with the other parts of the receiving set. Mine cost 54 cents, not counting the spare washers and pieces of brass found in my scrap heap.

The stator was made first. I took a piece of brass sheeting (although aluminum or copper will do) about 1/16 of an inch thick and marked it as shown in Figure 1. Owing to the semicircular lugs it was impossible to economize on brass. I cut out the two stator triangles with hack-saw and drill, then smoothed the edges and rounded off the corners with a file. When sawing plate brass, put the brass deep into the vise so as to prevent chattering. Protect the brass with wooden blocks, so the teeth of the vise will not sink into the surface.

The two stator blades were then put in the vise together and drilled in the center with a 3/8-inch hole, and at the corners with 1/8-inch holes, as shown in Figure 1. Since I was designing the instrument for a panel, I cut three short lengths of brass tubing, 3/8 of an inch long, and large enough in inside diameter to take an 8-32 brass bolt with a flat head. In my case, with a panel ⅜ of an inch thick, these bolts were ⅛ inches long. Then I took three aluminum washers (although brass or copper would serve just as well) ⅛ of an inch in thickness; and with these accessories, I put the stator together temporarily, as shown in Figure 2.

The rotor blade I cut out of thin brass with shears. It is semicircular, with a radius of ⅜ inches. A ⅜-inch hole is bored in the exact center of the blade, so that it will fit over the reduced diameter of the shaft, which is a ⅜-inch brass rod turned down to ⅝ of an inch at one end and threaded with the popular 8-32 die. The making of this shaft, by the way, is one of the jobs of the instrument. There are three in all; the other two are the making of the fiber space-washers. Everybody isn’t lucky enough to have access to a high-speed lathe, but that needn’t discourage anyone. The shaft may be built without a lathe in this manner.

Take a short length of brass tubing, instead of brass rod, and tap one end for about ⅙ of an inch down. Then get hold of the ever-needed 8-32 bolt and screw it in until it is solid. Then saw off the head at the required length from the tubing, and presto! the job is done! See Figure 3.

Now, the two fiber washers, or bushings, are problems. It is too bad they cannot be dispensed with entirely; but unfortunately, they are vital parts of the instrument. The rotor must be insulated from the stator. Fiber, or hard rubber, or composition of some other kind are the only materials suitable for making the bushings as shown in Figure 3. I worked many hours to redesign the instrument so that these washers could be omitted. Although I succeeded, I always returned to the washer idea as the easiest way in the end.

I rummaged around in my “odd bits” box and finally came across some old fiber-washers which could be patiently filed until they had something that resembled a shoulder on them. If I remember rightly, it took me two hours to fit those fiber bushings the way I wanted them—to drill them so No. 1 would slide over the ⅛-inch part of the shaft and No. 2 over the ⅜-inch diameter.

The other details, such as the connecting lugs, explain themselves. The assembly was very simple. The washers go in place as shown in Figure 4, and the rest of the parts placed in the one and only way a variable condenser may be put together. Then it is mounted on the panel as shown. A graduated dial,
Radio-Wire Tables

By Frederick J. Rumford, E.E., R.E.

No. 5—Double Silk-Covered Wire

Showing the Number of Feet in a Pound and Fractions of a Pound

The following tables have already been published:
No. 1—Enamel Wire, Radio World, No. 34, dated November 18.
No. 3—Double Cotton-Covered Wire, Radio World, No. 36, dated December 2.
No. 4—Single Silk-Covered Wire, Radio World, No. 38, dated December 16.

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The following tables have been added:
APPENDED is the fifth of a series of five tables of radio wires which the amateur will find useful for many purposes.

The following tables have already been published:
No. 1—Enameled Magnet Wire, Radio World, No. 34, dated November 18.
No. 3—Double Cotton-Covered Wire, Radio World, No. 36, dated December 2.
No. 4—Single Silk-Covered Wire, Radio World, No. 38, dated December 16.

The following tables have already been published:
No. 1—Enamel Wire, Radio World, No. 34, dated November 18.
No. 3—Double Cotton-Covered Wire, Radio World, No. 36, dated December 2.
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Prize Set Built on Kitchen Table

By John Kent

Panel made of special hard fibre. Original anticapacity switch controlling, independently, the detector and each amplifier without the use of jacks and plugs.

Specially wound honeycomb coils for reception on 360 to 400 meters, 600 to 800 meters, and so on.

Flexibility by the use of series parallel switches.

In the rear view of the set may be seen the special anticapacity switch, located right over the transformer. It is constructed in such a manner that the detector is connected at all times while the amplifiers are thrown in or out as desired. All leads are materially shortened by use of this switch. It is an enormous help in short-wave work.

All the variable condensers are equipped with clips which allow small fixed-condensers to be placed in parallel with them. This allows a fixed increase in capacity which, the builder has found, helps considerably in short-wave work.

This set won a prize at the Evening Telegram Radio Show, held in the 71st Regiment Armory, New York City, last May, before it was...
Construction of a 1½-volt Wet Cell

By Robert L. Dougherty

In the past few months, the 1½-volt tube has come into general use. One of the great drawbacks in using a dry cell in connection with this tube is its short and uncertain life. You may operate your set, to-night, on the dry cell and suddenly find that your battery is going "dead," and you will miss a fine concert just because you have no other battery on hand—and all the stores are closed.

While the wet cell has its drawbacks, if it is placed in a conspicuous place it is not as attractive as a manufactured dry-cell with its nicely printed outside cover, but it has the advantage of being fairly constant. If care is taken to remove the elements after using the cell, and washing them in water—which is an easy matter—it will last many hours longer than any other dry cell. Its elements can be easily and cheaply replaced.

There are two kinds of batteries that will lend more readily to home construction than some of the others—salamoniac and sulphuric-acid cells.

In the salamoniac cell there is not the danger generally attributed to the sulphuric-acid cell, although the elements used in the construction of both cells are identical.

The necessary materials are 2 carbon rods, about 5 inches long and ½ inch in diameter; 1 standard wet-battery zinc; a small fruit jar, or large tumbler; a few ounces of salamoniac, and a piece of wood.

Drill the wood in the same manner as shown in Figure 1, and put the three elements in the two carbon rods on the outside and the zinc in the center. It is best that the carbon rods be held in place by a couple of wood screws, as this will make it easier to connect them. The carbons may be connected by a narrow metal-strip. Fill the jar about three-quarters full of water, and add the salamoniac until no more will dissolve. The completed element is then immersed in the solution and the battery is ready to connect up. Such a cell will furnish 1½ volts. Where it is advisable to make a neater-looking job, the wood may be cut in circular shape, the exact fit of the jar.

The second battery uses a sulphuric-acid solution, in connection with an element made identical to the one above. Sulphuric acid is a dangerous material if not handled carefully. If spilled on anything, it will eat in quickly. In case of such an accident, wash immediately with ammonia. Be sure that you don't mix any of the ammonia with the solution in the battery.

The solution should be made up as follows:

One part bichromate of potash, 1 part sulphuric acid (10 per cent solution) to four parts of water.

Fill the jar about ⅓ full with this solution. Put in the elements and the cell is ready for use.

Always be certain to pour the acid into the water, otherwise the acid will spatter due to the heat generated in the chemical action.

The only replacements are occasionally a zinc and a carbon element, and a few drops of water as the solution evaporates.

Any number of these cells may be hooked up in series for any voltage wanted.

(Continued from preceding page)

completed. It won on points of construction alone, as it was not completely wired when exhibited and could not be operated.

The panel is supported by upright brass standards fastened to the baseboard and running completely around the outside of the panel.

It took over three months to construct this set, Mr. Pina working from 7 until 10:30 every evening. This will give the reader some idea regarding the pains taken in order to perfect it. Every article used is of the finest make.

"Any amateur," said Mr. Pina to the writer, "with a little time and trouble, can construct apparatus. The only thing necessary is ability to handle tools and patience to do a good job thoroughly."

B. of S. New Radio Work

directive radio-transmission tried on a wave length of ten meters

The enormous increase in the use of radiotelegraphy and telephony during the past two years has created a demand for apparatus capable of being operated with a minimum of interference. Wherever the need is not for broadcasting but for point-to-point communication the case seems hopeless, unless directive transmission can make it possible. Directional transmission on very short wave lengths (below 20 meters) may offer a solution to this problem.

Recent reports by Marconi, Franklin, and others show that interesting and valuable data have been obtained on directive radio transmission using wave lengths below 20 meters. The Bureau of Standards has a series of similar experiments, the preliminary results of which confirm the work of these investigators. The experiments conducted at the Bureau of Standards were made with a parabolic reflector (cylindrical type), which was designed for a 10-meter wave length. It was made by constructing a parabolic wooden frame with an aperture of one wave length. This frame was suspended in the air and 40 wires spaced 1 foot apart were suspended from it. The source, located at the focus, consisted of a 50-watt electron tube. The output from this tube was coupled to an antenna, which was a linear oscillator of the Hertzian type, which was tuned to a wave length of 10 meters. The complete reflector system was arranged so that it could be rotated.

Numerous polar curves were obtained by rotating the reflector and taking readings of the received current at every 10° position of the reflector. The receiving apparatus was located 170 feet from the reflector in most of the work and consisted of a loop antenna (single turn) with a thermoelement in the loop circuit. A portable galvanometer was connected to the thermoelement.

With all adjustments correctly made at the reflector, good directional transmission was obtained. With the reflector turned 20 degrees from the direct line to the receiver, the received current dropped off to one-half of what it was with the reflector directed to the receiver. There was practically no radiation over an angle of 270 degrees, while the majority of the radiated power was confined to an angle of 30 degrees.

Subcribe for RADIO WORLD. $6.00 a year. $3.00 six months, $1.50 three months.
98 Stations Now Send Weather News
United States Government Radios 8,000 Words Daily of this Important Information. One Great Lakes Station Handled 150,000 Words from June to December

By W. R. Service

In order to get an idea of the immensity of the weather broadcasting carried on daily, an estimate of the number of words transmitted daily by the Governmental stations is fixed at 8,000. A reduction is made on Sundays, when approximately 6,000 words are handled. At the Naval station at Altena, Illinois, approximately 150,000 words are handled during the Lake shipping season between April 15 and December 15. This is one of the largest traffic schedules of the whole system of 98 stations.

Radiotelegraphy, although an invaluable factor for several years in receiving and sending data on weather to and from ships, was not recognized until recently as a medium for the general dissemination of forecasts, according to Professor C. F. Marvin, chief of the United States Weather Bureau, in his report to Secretary of Agriculture Wallace.

The use of radio by the bureau, throughout the country, was limited because of the necessity of using code, he explains. "With the introduction of radiotelephony, which makes it possible for anyone to receive the messages in spoken words, the broadcasting of information over the interior has increased enormously," he declares. A year ago, the daily forecasts of the Weather Bureau were broadcasted from twelve stations in seven States, principally by radiotelegraphy; whereas, on July 1, 1922, ninety-eight stations in thirty-five States were carrying daily weather forecasts and warnings chiefly by radiotelephone.

Government and Private Stations Used

All broadcasts are sent out from governmental, commercial, and private stations, without expense to the Bureau. A special wave of 485 meters has been assigned by the Department of Commerce, and to avoid interference and duplication, only two stations in a city are licensed to transmit weather information, although many others would gladly cooperate. It is estimated that, at the end of the year, 25 per cent. of the licensed broadcasting stations were engaged in distributing this valuable meteorological information. The broadcasts are supplied to the radio stations from neighboring meteorological stations by telephone. Undoubtedly the service could be placed on a more efficient basis and materially extended, the Chief of the Bureau states, if funds were available for telegraphing information to radio stations not now included in the system, and engaging more employees.

The value of radiotelegraphy in this special service has been demonstrated, Professor Marvin declares, pointing out that its future usefulness "cannot be estimated." Hundreds of farmers who do not get a forecast service by the telegraph, or through the daily press, and for whom code broadcasting was of little use have installed receiving sets during the year. They now obtain the weather forecasts and warnings, so important in their occupations, as promptly as do business interests in urban communities. A great future increase in rural receiving stations is inevitable, the weather officials believe.

Another important accomplishment in radio work during the past year, was the inauguration of a program of broadcasting the twice-daily forecasts, cold wave, frost, and other warnings and information issued for the States lying in the Chicago and Washington forecasts districts. From April to November, a summary of weather conditions as they affect the crops during the week preceding is also included. This service began in June, 1922. Radiotelegraphy and high wave-lengths are utilized, as telegraphy is more reliable for long-range transmission. The radio-receiving stations, equipped for high-wave reception, receive a direct service thereby, and local radiophone stations are enabled to broadcast for their districts. Material extensions were also made during the year in the radio-bulletin service for the benefit of marine and aviation interests. The chief of the Weather Bureau is gracious in his thanks to the officials of the Naval Communications Service.

Congressman Fess Makes Radio Speech

(C. National Photo and Wide World Photos)
Congressman Simeon D. Fess, of Ohio, about to make a speech by radio, is the House of Representatives. At the right is the microphone to catch his remarks. This is not to be a regular Congressional "stunt." It was simply a "try-out." And it worked.
Peanut-Tube Hook-Ups I Have Used Successfully

By P. F. Metzler

MANY diagrams have been published of hook-ups employing standard makes of vacuum tubes—both detector and amplifying tubes. I will describe a few hook-ups employing the Welsh relay radion or "peanut" tube. The more I experiment with this little tube, the better results I have secured, especially using it as a detector tube.

The construction and arrangement of the coils used in these hook-ups were fully described in my article in RADIO WORLD, No. 26, dated September 23.

In Figure 1 accompanying this article, you will note that the end of the primary and the end of the secondary connect to the filament. I might suggest that a switch be placed here so as to disconnect the primary and the secondary at will, as with the connections shown it is more difficult to tune as it is much sharper. While the spark stations are not operative let this connection remain loose; but when one starts up, make this connection which practically cuts them out. Note that no grid leak is used with this hook-up.

In Figure 2 either a vario-coupler or a loose coupler, may be used. A variable condenser also may be used in the primary circuit to great advantage. You will note that this is a little different from the other hook-ups using two variometers. The one in the filament end of the secondary makes it much more selective and also helps to make the circuit oscillate more powerfully.

In Figure 3 the grid leak leads to the filament and does not shunt the condenser. This arrangement was found most satisfactory. In both Figures 2 and 3, there are but 18 volts used on the amplifying tube for the plate voltage. This is, of course, operated with Welsh radion relay.

I have been successful with all of these hook-ups. For instance, on the night of November 29, I heard WZY, KDKA, WJZ, WBAP, WHK, WHAS, WMH, WGM, 2XC, WOC, 2XY, WSB, WFAT, WIGR, WJAH, and WMAB.
WASHINGTON, D. C.—Radio development advanced several lengthy strides during the past year through broadcasting, technical research, and the application of advanced design to military communications, according to the annual report of Major-General George O. Squier, Chief Signal Officer of the United States Army.

Through the operation of the Army radio net, established in May, and numbering 60 stations on November 30, the Signal Corps saved the Government $14,357 in the transmission of official communications, over what they would have cost at commercial rates. These radio stations established in Corps Areas in Continental United States and in their subdivisions handled a total of 48,194 messages in the seven months of operation, cooperating with Naval coastal radio-stations in some instances.

Broadcasting Outstanding Feature of Past Year

The Army radio stations at Nome, St. Michaels, Holy Cross, and Iditarod, Alaska, have been rehabilitated. New and powerful sets with a range of about 150 miles have been installed at Nulato and Wrangell. Signal Corps installers were working at the Noorvik, McGrath and Bethel stations, and equipment was en route to Fort Egbert and Ruby, at the end of the fiscal year. Equipment for the Craig station was also available, leaving only three stations in the territory awaiting new apparatus.

"The outstanding feature of the year in signal communication undoubtedly has been the phenomenal development known as 'broadcasting,'" says General Squier. The suddeness of this development, he believes, has no parallel in the application of science to everyday life. "In the educational field alone," he states, "we are on the threshold of a new era which will probably affect our modes of life." Pointing out the importance of radio communication in both peace and war, the chief signal officer explains that the Signal Corps is endeavoring to keep abreast of all developments with a view of utilizing and assimilating them for Army purposes. The experiments, conducted in his office, in broadcast over electric-light lines in an effort to reduce the interference in the ether, and with the "superphone," a method of secret line-radio communication, are cited as examples of practical experiments undertaken recently.

Radio Research and Development

Although handicapped by both a reduction of funds and personnel, the division of the Signal Corps entrusted with communication, research and development, completed 78 new specifications of radio sets and apparatus, together with 300 drawings during the year. Among the accomplishments in radio engineering was the perfection of a new radiotelegraph set for infantry battalions communicating with regimental and corps headquarters. This set has a five-mile radius and employs waves between 75 and 77 meters, but is capable of ten settings, or different notes, between its extreme waves. One of its advantages is a portable square loop, about 9 feet, which may be folded. It also has directional features. These sets are now in production for the United States Infantry Corps. Another set, designed especially for division and corps headquarters, employs six 250-watt tubes in transmitting. This gives a telephone range of about 100 miles and a telegraph range of practically 600 miles. The set is portable in that it may be mounted in tractors for field transportation. A tube set was developed for use in permanent stations with two 50-watt tubes operated from storage batteries for both telegraph and telephone transmission. The sending and receiving units are separate and the range is about 150 miles.

Progress of Aircraft Radio Work

For the Air Service, two 100-mile range telephone and telegraph sets were especially developed, one for large airplanes like the Martin bombers and the other for use at ground or beach stations. The ground-station apparatus uses two 250-watt tubes in place of ten 50-watt tubes. Since June 30, contracts for the development of both these designs have been let to commercial electrical companies for completion. The perfection of a 5-mile range set for interplane communication employing the Armstrong receiving system and intended to be used on pursuit planes in formation flying, has been also placed in the hands of manufacturers, due to lack of Signal Corps personnel.

Contracts have been awarded for the production of a number of new airplane radio sets with a 30-mile range, using two 50-watt tubes. The apparatus is split up into several units which are distributed in the plane and controlled from the dashboard by the pilot. Work on a radio telephone mule pack for use in mountain artillery was also underway, but uncompleted at the close of the fiscal year. Considerable progress in the design and testing of a radiotelephone set for use in Army tanks was accomplished. The development and test of a 5-station interphone set for use in the Martin bombers is also progressing.

Other developments included work on a field-telephone repeater for use in coupling line and radio communication, especially in balloon communication; the perfection of a direction finder for the Coast Artillery Corps, and tests with the resonance wave-coil antenna for the elimination of static, revealed that where large antenna cannot be erected, on portable sets, this apparatus may be of great advantage.
The Radio Primer

For Thousands of Beginners Who Are Coming into Radio Circles

Weekly A B C of Radio Facts and Principles Fully and Tersely Explained

By Lynn Brooks

What is an ohm?
An ohm is the unit of resistance. The international ohm is measured by the resistance offered to the flow of an unvarying electric current through a column of mercury 106.3 centimeters long, weighing 14,452 grams, at a temperature of 32 degrees (F.).

* * *

What is Ohm’s law?
The strength of the current in amperes in any given circuit is directly proportional to the E. M. F. and inversely proportional to the resistance, as in the equation

\[ \text{Amperes (I)} = \frac{\text{volts (E)}}{\text{resistance (R)}} \]

which is generally written as follows:

\[ I = \frac{E}{R} \]

Illustrated by problem:
Voltage in circuit 12 volts
Resistance—2 ohms
Applying the same principle where the resistance and amperage is known. Thus, where \( E = I \times R \).

Problem: Amperage is 4; resistance is 3 ohms. Find voltage.
Amperes 4
Resistance \( \times 3 \)
\[ \text{Voltage} = \frac{12}{2} = 6 \text{ volts} \]

Apply same when voltage and amperage are known, to find resistance.

\[ E = I \times R \]

Where \( R = \frac{E}{I} \)

Problem: Voltage is 110, amperage is 5. Find resistance in line.
Voltage is 110 ÷ 5 amperes = 22 ohms

* * *

Explain three ways in which batteries may be connected and show a diagram?

In series; in parallel; in series-parallel.

Worth Knowing

When an amateur is constructing a set, he frequently runs into difficulties when he is mounting his condensers. If he does not remove one of the end plates to get the plates straight, he is apt to get his screws drilled out of alignment. The result is that the condenser is generally held to the panel by one screw instead of three. A little trick that will remove the objection when the end plate is removed—which generally means over an hour’s work when the plates get out of alignment—is to get a fairly stiff piece of cardboard and make a hole for the shaft. Then with the drill find the holes that the screws fit into and puncture the cardboard in the direct center of each hole. You will then have a temporary template that, while not as exact as one made of metal, will be, if carefully done, sufficient for all needs.

* * *

Use Double Pulleys

When the average amateur is putting up an aerial from 100 to 150 feet, he generally is unable to pull it in tight enough to get it absolutely level. The result is that it is generally slack, due to the weight of the wire. A good plan is to use two double-pulleys. When these are used, it will enable anyone to exert an enormous pull on the wire. Approximately four times the pull may be exerted on the wire than if a single pulley is used. One pulley should be attached to the pole and the other to the insulator.

(ampere) is that of one cell multiplied by the number of cells in the circuit. Therefore: with two cells in parallel, the voltage of each cell 1.5, and the total voltage is 1.5. Assuming that the circuit is capable of delivering 20 amperes, the total amperage is 40. By connecting cells in parallel, we increase the amperage, but not the voltage.

In figure 3 the cells are connected in series-parallel. When the cells are thus connected, the total E. M. F. is that of the cells connected in series, and the amperage is that of the number of cells connected in parallel. Therefore: with six cells connected in three groups of two each in series, with three groups in parallel, the total voltage is that of the cells connected in series and the current is that of the groups connected in parallel. Voltage of each cell, 1.5; voltage in circuit, 3. Assuming that the cells are capable of delivering 20 amperes, the amperage is the total of the three groups of cells, 60.

Figure 1 shows the cells connected in series. When the cells are connected the total E. M. F. (voltage) is the sum total of one cell multiplied by the number of cells in the circuit. But the strength of the current (ampere) will not exceed that of one cell and will probably be less because of the internal resistance of the cells themselves. Therefore: with two cells in series, the voltage of each cell is 1.5, and the voltage is 3. Assuming that the circuit is capable of delivering 20 amperes, the total sum total amperage of the cells in the circuit is only 20. By connecting cells in series, therefore, we increase the voltage, but not the amperage.

Figure 2 shows cells connected in parallel. When the cells are connected in parallel, the total E. M. F. (voltage) is not more than that of a single cell itself; but the current...
Latest Device to Send Speech by Radio

By S. R. Winters

Speech modulation of radio-frequency currents is responsible for radiotelephony and its fascinating applications. The vibrations of speech are complex and the task of any form of telephony is to faithfully copy, or reproduce, electrically, at the receiving point the sound wave voiced at the transmitting station. The telegraph key, used in the transmission of dots and dashes, is the visible difference between radiotelegraphy and radiotelephony. In the latter mode of communication, the telegraph key is displaced by means capable of varying the antenna current employed in transmission to harmonize with the sound waves of the voice. A carbon microphone is the device commonly employed for this purpose.

Credit for a new invention belongs to Lewis M. Hull of the Radio-Communication Section of the Bureau of Standards, United States Department of Commerce. The apparatus has been vested with such structural features as to command attention in three particulars: The possibility of operating an electron-tube transmitter from the exclusive sustaining strength of an alternating electric-current source which compares favorably in efficiency with similar sending apparatus utilizing direct current; the requirement of a high-voltage generator or battery is obviated; and, finally, it has the additional virtue over a continuous-wave transmitter in that the communications transmitted thereby may be received over a limited distance by use of a non-oscillating detector. The application of this apparatus in fog signalling and direction finding experiments held at the Bureau of Standards have proved the above claims.

This transmitter employs a type-P pliotron tube. The plates, as well as the filament, are fashioned of tungsten and the former are stamped with rings having a common center, to avoid twisting or bending when subjected to excessive heat. A companion unit of the type-P pliotron tube, in the operation of this transmitter, is a 500-cycle, 150-volt alternator. The power output of this storage-house of electric energy exceeds 200 watts in an antenna having from 8 to 15 ohms resistance and a natural wave-length below 200 meters. The adjustable wave-length range extends from 500 to 1,000 meters. The result is the ability to radiate completely modulated electromagnetic waves, rendering feasible their reception by means of crystal detectors. The original experimental unit was designed to operate at short wave-lengths.

The compensating winding of the filament-circuit transformer, illustrated in one of the photographs, consists of 100 turns of No. 16 wire, with a tap every dozen turns from 30 to 100. The filament rheostat lends itself to service in adjusting the filament electrical-impulses for any steady value of primary voltage on the transformer. The series compensating winding also makes it practical to adjust the transformer to the source of electric supply in the circuit so that the filament strength may attain a safe maximum when the load is thrown on. The inventor of this transmitter suggests that if ample power is available from the generator it is advisable to overcompensate the transformer, thereby rendering it possible to heat the filament at curtailed electric consumption except when the key is pressed. The incorporation of the series compensating winding in the filament transformer was considered
Radio’s Benefits for All Classes of Humanity

By J. Andrew White
Chairman of National Radio Week Executive Committee

SINCE broadcasting started, I have received thousands of letters from radio fans and, quite naturally, I am in position to know what radio means to the average person.

Take the blind, for instance, it has injected new hope into their lives; it has become a bright spot in the darkness that is their lot; it brings to the sightless the newspaper, the book, the theater, opera, concert, and lecture platform, which, in the ordinary routine of their lives, is denied them. True they may be led through the streets, but how much better it is to bring to them the things denied by others. A blind person must be unusually gifted, insensitive to public pity or annoyance and amply financed if he or she is to take advantage of the resources of modern society. Only the newest of these resources, radio, brings easily within the ken of the blind all that may be represented by the unseen world of sound.

When we realize that there are nearly 53,000 blind persons in the United States, we can understand that radio means a great deal to them.

Take the case of Carlos Escalante, which came to my attention some time ago. He had been an active business man and had traveled widely. In 1920, he was attacked by a sudden illness and his eyes failed. For a year and a half, he sat in darkness with memory as his only muse. In the home where he once strove confidently, he could but stumble uncertainly with outstretched arms. Last Christmas, one of his old friends gave him a radio set. It was a godsend to the man. Those of us who rush about daily can only dimly appreciate the joy that radio brought to him.

Take the shut-ins. Only those of us who have gone through a long siege of sickness can understand what the radiophone means to those confined to their beds day after day. It actually hastens recovery, since it tends to relieve the mind of worry. The mind has a powerful influence on the body, and often the patient’s own mental condition is the chief obstacle in the way of an early recovery.

Dr. W. E. Jacobs, medical superintendent of the Cumberland Hospital, Brooklyn, New York, recently commented on this subject: “Radio,” he said, “deserves to be ranked with the best mental therapeutic agencies. In fact, for hundreds of cases the radiophone can be prescribed as one of the best treatments.”

Broadcasting has brought the mountain to Mohammed; the bedridden may now enjoy the opera, the drama, and the lecture. Little sufferers may now be lulled to dreamland and relief from pain by the calming influence of lullabies and bedtime stories.

In considering radio we must not forget its place in prison reform. Only recently was radio placed in Sing Sing. Warden Lawes made the following statement: “What the future will hold is difficult to predict. The radiophone cannot be an instrument for anything but good; for that reason, if no other, every effort will be made to find a permanent place for it in prison life. I believe its greatest value will lie along mass educational lines. The men hearing a celebrated or prominent persons in many parts of the country will gain invaluable instruction.”

(Continued from preceding page)
Radiograms

The Latest Important Radio News Briefly Told for the Growing Army of Radio Fans

The "Missouri Broadcasters' Association" has been organized, seeking to eliminate radio interference in the interest of transmitting stations and owners of receiving sets. Their reorganization of broadcast schedules eliminates practically all of the troublesome interferences which have been increasing for the past three months among Missouri broadcasting stations. This reorganization of radio programs doubles the value and service of the average receiving set, and marks a new boost resulting in increased demand for complete sets as well as for the assembling of home built receivers. The officers of the Missouri Broadcasters' Association are Jedell Mayes, president; Leo Fitzpatrick of Kansas City, secretary.

Radio will carry the inaugural address of Governor-elect Alfred E. Smith throughout New York State on January 1. Transmitting apparatus will be placed in the Assembly Chamber, where the ceremonies will be held, amplifiers in the Senate Chamber and on the Capitol steps will transmit the address to the assembled crowds, while thousands of private radio stations will receive the message broadcast.

A cable was sent recently to the amateurs in England to tune in their radio instruments on the 360 meter wave length to listen to H. Gordon Selfridge, jr., who broadcast from the Radio Corporation—Westhouseing Station WJZ at Newark, New Jersey. Mr. Selfridge, jr., assistant manager of the Merchandising Division of the Great London Store, is on a three months' tour in the United States investigating the methods of the American department stores. His father, Harry Gordon Selfridge, is a post-graduate of Marshall Field & Company, Chicago. Mr. Selfridge, jr., on his return trip from the Pacific Coast heard a concert from WJZ while he was in Kansas City. He hopes that this experiment will result in establishing really satisfactory reception of an American station in the British Isles.

Slackers in church contributions are not going to be able to hide behind the radio set. According to the size of a check received by a New York church after the broadcasting of one of its services the radio audience is more deeply touched than the church audience. From one little family which listened in on the church service came a check for $11.35. Multiplying this amount by the number of families to whom the radio church service has become an establishment it is seen that the total result was more money than is taken in by all the churches combined in a year's time.

President Scripps of the United Press, has started out on a two years' cruise of the world, accompanied by radio. He will make the voyage on his 152-foot yacht, "Ohio," which has a cruising radius of some 9,000 miles. The first stop will be Jacksonville, Florida. A 2-kilowatt spark transmitter and a complete receiving equipment have been installed on board and are in charge of J. L. O'Connell, operator. Mr. Scripps wants to keep in touch with the world.

A young lady singer participating in a broadcast concert at Anacostia, Montana, has been heard by relatives at Alert Bay, 2,000 miles away. They were greatly surprised when, listening in, they heard her voice for the first time in five years.

Radio operators on ships in the Pacific are using the Honolulu station for the midnight time-signals to their station receivers. A quick adjustment catch the noon time-signals from Nauen, Germany.

The Public Health Service wishes to learn the extent of its radio audience through an appeal to all who "tune in" on its broadcasting programs to communicate by post card to the Surgeon General, Public Health Service, Washington, D. C. Officials of the service declare that they believe theirs is the greatest radio audience in the world, as health programs are regularly broadcast from ten different stations scattered from coast to coast, but they desire to back up their belief with facts.

A musical program, broadcast from WGY, Schenectady, New York, was plainly heard at Cherbourg, France, by the chief radio-operator and others on the steamer "America" while the ship was at dock in that port. Dr. W. R. Whitney, director of the General Electric Company's research laboratory, who is traveling abroad, talked with Chief Operator Black of the "America" and learned for the first time that WGY had successfully bridged the Atlantic. According to Dr. Whitney, Operator Black stated that a concert from the Schenectady station had come in so well that when he removed the telephones from his ears and laid them on the table in his room the music was plainly audible to those nearby. Cherbourg is 3,100 miles from Schenectady. This feat establishes a WGY record for transatlantic transmission to the east only. A station has been heard in Hilo, Territory of Hawaii, which is 5,200 miles from Schenectady by direct air-line.

KGB, the Tacoma, Washington "Ledger"-William A. Mullins Electric Company radio broadcasting station, is inaugurating a novel feature. It is planned to broadcast weekly reviews of the current leading radio periodicals and books, published in the interim, reading these reviews over the radiophone on a regularly assigned day each week. The reviews will be prepared with care by a staff of three—two radio experts to digest the material and a newspaper writer to write the reviews.

Radio added luster to the "Tree of Light," the huge Christmas tree annually given a place in Madison Square, New York City. The Radio Corporation of America installed a set in the branches, with several powerful projectors. The special program from WJZ was given, and thousands heard radio for the first time.

The present laws governing radio transmission in England and France prohibit their amateurs from using more than ten watts, which limits their range, but on December 21, when they began transmitting their signals to American amateurs, they were permitted by the government to use 100 watts, which will enable them to participate in the tests involving two continents. The French amateurs transmitted on wave lengths between 180 and 300 meters.

As Cousé Might Say:—
"Week by week, in every way, Radio World is getting better and better."

The Beginning of a "Bug"

By R. L. D.
(With Apologies to K. C. B.)

JUST THE OTHER night,
I MET a friend—a mine
I HAVEN'T seen in years;
AND, OF COURSE, we talked each other
JUST how much,
WE THOUGHT each had changed.
AND HE invited me
UP TO his house
AND I accepted the invitation.
I was introduced
TO his wife
AND his son
AND LITTLE daughter.
AND HIS RADIO SET—
HE TRIED to get me
INTERESTED in
IT but I couldn't
SEE how any man
COULD SIT at a table
LIKE he did.

AND FOOL with a lot of knobs
AND FIDDLE with levers
UNTIL I heard a man
TALKING, and he said:
"THE NEXT selection played
BY MISS SMITH will
BE 'MEDITATION' from 'Thais.'"
AND THAT IS my favorite
PIECE of music.
AND IT WAS
WONDERFULLY clear and
NICE that when
MISS SMITH finished
I APPLAUDED loudly,
AND THEY laughed at
ME!
AND, anyway, next
WEEK I'm going
TO BUY a BIG one
FOR MYSELF.
Radio and the Woman  

By Crystal D. Tector

Radio Adds Joy to Her Home

A FRIEND dropped in the other day. Spying my radio set, she made a wry face and said: "Oh, mercy! Has your husband one of those things, too?" My Joe bought one about two months ago, and since it is working, he comes home, rushes through his supper and then goes and puts those phonograph-phones on—and he doesn't budge until about twelve o'clock. It's as talkative as a stone; and every time I start to say something, he either shushes me or else looks with that far-away look. It's simply terrible! It's worse than living with a mummy." I wonder what she would say if he didn't have the radio "bug" and went out every night. She should be glad that she has something to keep him home.

WELL, who would have thought of it but a woman? I went visiting the other afternoon. It was raining and my shoes had a sore foot. No one had thought to bring knitting. Do you know what we did? We got out her son's buzzer-practice set and sat there all afternoon and learnt the call. And we formed a little club and intend to practice every Tuesday afternoon until we are all able to copy twenty words a minute. Then we are going down and get first-class licenses.

I THINK it is just terrible! I refer to the way the average radio salesman imposes on the average customer. I was listening to a young man who thought he knew more than is good for him, talking to a poor little confused woman who had the perfectly good intention of buying her cousin a set for his Christmas. Something like this took place:

"Well, madam, you see if your antenna hasn't sufficient length, you will have to add inductance into the primary circuit. Then again if—" and so on for about fifteen minutes until the poor woman was so confused that I interrupted and said:

"Then here, young man! You aren't talking to Professor Steinmetz. Tell this young woman just what she'll need in order to set up a simple set.

He looked at me and blushed. Later, when in the subway to make a dinner engagement, I saw the same young man closely studying a book. It was a well-known volume on making radio simpler for the laymen.

I RECENTLY bought a fairly large map of the United States, in order to keep a record of broadcasting stations, but found that putting ink and pencil marks on it didn't bring out its appearance any. So I went out and bought a number of large colored thumb-tacks and printed the call letters of the stations on them. Then I took a piece of string and pasted small pieces of paper on it to represent distance. When I hear a new station, I apply another thumb-tack. I have a ready reference both as to stations received and the actual distance they are located from my town.

FRIEND HUSBAND and myself went visiting last week—and we didn't enjoy ourselves one bit. Sonny had a nice radio set and there was a good program on; but he kept switching around all the time to see if he "couldn't get it in louder." The result was that it sounded like a Chinese cabaret.

I VISITED the editor of Radio World last week to wish him Merry Christmas. I never knew that one man could keep so busy. I remained in his sanctum about ten minutes and then just had to get out. I made me ashamed of myself for loafing. He blamed it all on National Radio Week. I believe him. I think that National Radio Week has done more to stimulate radio than any one thing that has happened since Marconi became a "bug."

EVER since amateur radio communication has been established between France and the United States, Friend Husband has seriously considered "scraping" the set. He is worried over the fact that the French stations might start broadcasting the latest fashions, and, he says, when they start doing so the American husband owning a radio set will be kept broke buying new clothes. How good of him to think of others!

HE was a neighbor of ours for about a week. Friend Husband met him on the train, and invited him to drop in and listen to a radio concert. During the intermission, like a lot of other "hams," I began to cut loose in all the latest radioese. I kicked it up for about fifteen minutes—and all the time he was smiling sort of funny. Finally he and Friend Husband got to talking about business. F. H. confessed to being a lawyer, and then the subject sprang the surprise of my young life.

"I'm consulting engineer for one of the largest radio companies in the country," he glibly uttered.

Friend Husband is still alive. But he'll laugh himself sick if he isn't careful.
News-Photos 1923

Captions
By Patrick Nichols

(Right) If you want to make your loud-speaker more powerful, try the stunt shown here. It is a well-known fact in scientific circles that parabolic-shaped objects will throw sound waves or heat or light waves better than conical-shaped objects. For that reason, all powerful searchlights have parabolic reflectors. This is just what an object like the heater in the illustration will do if you place a loud-speaking horn before it. You will have to experiment as to the proper distance that the horn must be placed from the center, as the acoustic properties of the objects surrounding it will have a great effect on it. This experiment has the same effect as if you lengthened the horn of the loud-speaker. If you don't happen to have a heater handy use a tin dishpan or a large bowl, which is even better than the pan.

(Right) Where research is testing out a new meter which allows the operator to see the circuit. Two tubes are used—one oscillator and one modulator.

(Lefl) The world’s smallest radiophone transmitting set—the smallest radiophone set in use. Despite its small size, it is said to be very efficient and is used as plate voltage for the electric circuit. Two tubes are used—one oscillator and one modulator.

(Above) Huge inductance used at the College of the City of New York Radio Laboratories on the powerful transoceanic transmitter. This instrument was specially built by the students of City College for the circuits used. The tickler may be seen just inside the small coil.

(Above) The world’s smallest radiophone transmitting set—the smallest radiophone set in use. Despite its small size, it is said to be very efficient and is in use at station 9 CEX. It has a range of 75 miles. Note the small generator-set which is used to supply the necessary high voltage for the plate circuit. Two tubes are used—one oscillator and one modulator.

(C.W.) Step right up, ladies and gentlemen! Absolutely the only one! No, we are not referring to the radio receiving set here. We are referring to the scientific equipment. Here he is shown wearing the scarf pin. C. Saunders, Beech claims to have invented the set. Here he is shown wearing the scarf pin. This is the result of years of experimentation.

(Above) The world’s smallest radiophone transmitting set—the smallest radiophone set in use. Despite its small size, it is said to be very efficient and is in use at station 9 CEX. It has a range of 75 miles. Note the small generator-set which is used to supply the necessary high voltage for the plate circuit. Two tubes are used—one oscillator and one modulator.
now Radio Starting Plenty of Pep

(Above) Not every dog in the world is privileged to have his own Rolls-Royce and listen to radiophone music. But "Duke," pet of a Boston bull, being of the canine aristocracy, is not to be confounded with other dogs. In a special interview granted the photographer, this peer of dogdom remarked that he would rather listen to KDKA than gnaw a nice juicy steak-bone. But, of course, all dogs are not so well educated as "Duke," and their thoughts run to more mundane matters.

(C. Kadel & Herbert) Not every dog in the world is privileged to have his own Rolls-Royce and listen to radiophone music. But "Duke," pet of a Boston bull, being of the canine aristocracy, is not to be confounded with other dogs. In a special interview granted the photographer, this peer of dogdom remarked that he would rather listen to KDKA than gnaw a nice juicy steak-bone. But, of course, all dogs are not so well educated as "Duke," and their thoughts run to more mundane matters.

(C. Kadel & Herbert) The ideal set for the outdoor man. The set is absolutely water and weather proof. It was constructed by Wendell Kilmer to withstand any kind of weather. The set proper is regenerative, employing both radio- and audio-frequency. Excellent results have been accomplished using a barbed-wire fence as an aerial—and that in a pouring rain! At the photograph shows, the entire cabinet is shielded so that no capacity effect will be felt.

(Below) The first American amateur station to be heard in France during the official American Radio Relay League tests. Fred H. Schnell, at left, is the traffic manager of the league; at the right, is Perry Briggs, owner of the station. The photograph shows them testing out the automatic sender with which they called France. This was used so as to enable the operator to keep a constant watch on the apparatus. These radioists are to be heartily congratulated for being the first to actually get into communication with Great Britain and France.
A Canadian's Fine Work
From Clifford Daves, 162 Patterson Avenue, Chatham, Ontario, Canada

I HAVE read in Radio World a number of letters from different owners of receiving sets who claim to be "busted" a few records in receiving. If Mr. Weis is proud of his home-made set, I should be tickled pink with mine. I have a single-plate home-made set with some type of audio-amplification. Vario-coupler, 11-plate variable condenser, grid leak, and condenser, phone condenser, point switch, dials, and panel are all home-made. It isn't very elaborate or imposing in appearance, but it sure works! I am inclosing a list of long-range stations I made last night, just as I heard them. I had a friend with me, with another set of phones, so the list may be proved.

I have a letter of verification from KHJ, Los Angeles, as I heard him first on November 13: KHJ, KGN, CJCG, CFCN, CGC, WOAC, WAC, DGE, WHB, WDAF, WBT, PKX, WBA, WSB, also 6XB, and 687 in San Francisco. These last two carry off the long-range championship for this locality. I have to share the honors with Mr. Collins, owner of the radio shop here, who, as well as myself, has heard all the above stations, using a Grebe CR 9.

You United States boys have it all over us in Canada on the transmitting end, but we'll make you stop and keep a record on us on the receiving end. I never dog a new station simply by the call letters, but wait until the name of the company or the town and State is given. I find this the only accurate way.

The equipment of my set is as follows: English (Muldrad) tube used as a detector, and Meyers R. A. C., No. 3, with Chelsea transformer as amplifier. I find either Brandes 2000-ohm or Sterling (English) 8000-ohm phones give almost equal good results, though my favorite is the Sterling set.

My aerial is a single wire, 80 feet long, 13 feet high at one end, and 16 feet high at the other end, where a 4-foot lead-in is connected which runs through a window to my set. My ground lead is about 12 feet long and is attached to the water pipes.

My set isn't a freak in any way. I use a standard hook-up and have built one for my sister and one for a friend. The three sets work just about the same. The secret is in the value of the grid leak and grid condenser, also the phone condenser. I don't know what value they are, as I just experimented till they worked right. I wish to thank W. W. J. for the help he unknowingly gave me in adjusting my set.

I hope this may find space in our paper.

* * *

Aerial 200 Feet Long
From M. P. Bailey, Moscow, Idaho

I NOTICE a letter in Radio World No. 35, dated November 25, from Mr. Frank E. Smith, Birmingham, Alabama, regarding the number of stations he has been able to hear and which he claims is a record. I believe that I have been there, but do not consider that I have made a record as yet.

Not counting our local broadcasting station, the nearest station that I have picked up is at Portland, Oregon, about 400 miles away, while the farthest station heard is Atlanta, Georgia, about 2,000 miles. However, I counted the stations on my log about two weeks ago, and had 59. Since that time, I have picked up several more. My long-distance ones include WOC, Davenport, Iowa; WHB, Kansas City, Missouri; KSD, St. Louis; Dallas, Texas; Fort Worth, Texas; Winnepeg, Manitoba; Minneapolis; Louisville, Kentucky.

My set is a home-made single circuit with two stages of audio and no radio amplification. I have a single-wire aerial about 200 feet long and use a water pipe as a ground. The aerial is about 20 feet high. I do not count any station that I cannot understand through the Magnavox.

I have on file replies from most of the stations heard, as I usually write them of the reception. I was able to pick up St. Louis several nights ago broadcasting a dance program from the Hotel Statler. They were so loud that we could have danced by it. This is about 1,500 miles.

Responds to the Hooting
From Norman Peterson, Concord, Contra Costa County, California

HEARING the Hoot! Hoot! of the night owls, I respectfully submit what I think is a record. "Maybe they are and maybe they ain't!" Here we go: WHB, Kansas City, Missouri, 1,300 miles; WBA, Fort Worth, Texas, 1,400 miles; CFBN, Calgary, Canada, 1,400 miles. Detector tube, vario-coupler, variable condenser—that's all!

* * *

With Detector Tube Only
From Perkins Bogen, 427 Poplar Avenue, Bellingham, Washington

SINCE everybody else seems to be doing it, I have decided to tell my receiving record. I have heard about 70 different stations, and usually get about 20 each night. My best record for 4 hours is 21 stations; 5 hours, 23; 6 hours, 26. The stations come in loud and clear each evening range from KHJ, KFI and KWH, Los Angeles; KDPT, San Diego; KFAF, KFZ, KFBF, Los Angeles; KCH, KDL, Salt Lake; KFC, Seattle; KG, KGW, KYG, Portlaid, to KUO, KFD, KDN, San Francisco.

I count my DX WOC, Davenport, Iowa, 1,600 miles; PWX, Havana, 2,500 miles; KSD, St. Louis, 1,600 miles; WDAF and KFYX, Chicago, 1,800 miles; WSB, Atlantic, 4,000 miles. That's a pretty good record for one night's work!

On December 2, I heard all the above stations. I don't have such luck every evening, but nights similar to that are not so rare. I won't say that these stations came in loud enough to be heard all over the house; but they do come in fairly loud. PWX came in very QSA.

My set consists of a detector tube only, I use a vario-coupler and variable condenser for tuning. My aerial is about 40 feet high.

* * *

Accepts Mr. Smith's Challenge
From Jack Cowan, 512 Cotton Avenue, West End, Birmingham, Alabama

IN Radio World, No. 35, dated November 25, the letter from Mr. Smith. It so happens that we are located in the same city but so far have not had the pleasure of meeting. However, I accept his challenge, so here goes to "get my feet wet."

I have a home-made set, also, with two stages of audio-frequency, aerial 125 feet long, but as high as it may be, about 100 feet, with a 4-foot lead-in. I have decided to tell my receiving record. I have heard about 70 different stations, and usually get about 20 each night. My best record for 4 hours is 21 stations; 5 hours, 23; 6 hours, 26.

The stations come in loud and clear each evening range from KHJ, KFI and KWH, Los Angeles; KDPT, San Diego; KFAF, KFZ, KFBF, Los Angeles; KCH, KDL, Salt Lake; KFC, Seattle; KG, KGW, KYG, Portland, to KUO, KFD, KDN, San Francisco.

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My set consists of a detector tube only, I use a vario-coupler and variable condenser for tuning. My aerial is about 40 feet high.

* * *

In One Year!

From Joseph Monahan, 25 East 90th Street, New York City, N. Y.

I NOTICED an article in one of the papers the other day entitled, Does it Pay to Assemble One’s Own Set? My answer is, "Yes!" I knew nothing about radio until about a year ago. I bought parts of a crystal set and assembled it myself, getting as good results as many who expected to spend dollars. But the results did not satisfy my wishes. Later I bought a blue print of a "long and short-wave home set" and assembled it myself. I completed the set about three months ago. It took me two weeks to assemble the set as I took my time with it, making sure that all connections were made right and properly soldered. I have two cabinets, one for the receiver and the other for the 2-step amplifier. For
With the DX Nite Owls

(Continued from preceding page)

loud-speaker, I am using a single Bald-
win phone, type C, which brings in the
music of the nearby stations clear and
loud enough to dance by. Furthermore,
it remains ten o'clock in time on one of
the different stations on this set, as I do
not experience the hissing and buzzing sounds
that so many complain of when they put
their hands close to the set. In appear-
ance and operation this set is as good if
not better than some of the higher-priced
sets on the market to-day. Following is
a list of radio amateurs stations I have re-
cieved to date with a wire connected to
the fire escape as aerial. The landlord
would not permit me to put an aerial on
the roof.

WJZ, WHN, WWZ, WOR, WAAM,
WEAF, WOO, WBS, WGY, WHAS,
WOZ, WKR, WOE, WHAZ, WWJ,
WOC, KDKA, WIP, WFT, WAB,
WBAN, WNAI, GKI, KYW, WDP,
WKB, WJAX, WAAC, WMAK, WGR,
WSB, WAPB, KSD, WMAS, WAA,
and XAB.

I have letters and post cards from most
of the stations confirming my statements;
and, furthermore, I keep a record of the
times I receive the stations. All the above-
named stations were re-
ceived by using 2 D-L 50 and 1 D-L 75
coils, including station WVP, I would
like to know what results I would get by
using an aerial 150 to 200 feet long.

This is another instance where it is not
necessary to have an aerial in order to
do good work. It is quite possible that
if the writer were to put up an aerial such
as large ones in his letter, his results
would be improved. Landlords must be
landlords, and, evidently, the poor radio
amateur is never appreciated until it is
too late.—The Editor.

Mr. Miller Adds to His Set

From W. Miller, Box 22, Southern Methodist Uni-
versity, Dallas, Texas

LAST night (December 13) being a
quiet night for Dallas, I was afforded
the opportunity to do a little stepping
with my one-tube contraption. At vari-
ous intervals between the hours of 6
o'clock and 11 o'clock I received stations
WPA, WWJ, WOAI, WDP, WGM,
WOC, WBAP, WHB, WOS, KSD,
WNAV, KPAF, PXW, KDKA, WGY,
KLZ, WCI, KLW, WSB, KZI, KHE,
WDJ, WDA, and KDFT, and enjoyed opera
from KYW. I submit this information as
one night's results—not claiming a record.
This performance would prove satisfactory
to any "night owl!"

My circuit is as set forth in RADIO
WORLD, No. 30, dated October 21, with
several minor changes.

Since adding these improvements, I
have added six more States to my log,
which now totals 33, besides Havana,
Cuba; Tampico, Mexico; and several
Canadian stations. Not so bad for a
novice!

Without Any Grid Leak

A Suggestion to Increase the Range of

Mr. W. Miller's Circuit

REGARDING the hook-up of Mr. W. Miller,
published in RADIO WORLD,
No. 30, dated October 21, which has at-
tracted unusual attention among ama-
teurs throughout States and
Canada, Radio World has received the fol-
lowing interesting suggestion from Dr.
Willis L. Hale, 47 North Washington
Street, North Attleboro Massachusetts.

Dr. Hale writes:

"Increase value of Miller circuit 100
per cent by leaving out all grid leak and
use receiver with no grid leak; it is a dandy! Good
for 1,000 miles any night."

R.2 Magnavox Radio with 18-inch horn—this instru-
ment is intended for those
who wish the utmost in amplifying power, for large
audiences, dance halls,
etc. . . . . . $85.00

R.3 Magnavox Radio with 14-
inch horn: the ideal instru-
ment for use in homes, of-
fices, amateur stations,
etc. . . . . . . $45.00

Model C Magnavox Power
Amplifier insures getting the
largest possible power
input for your Magnavox Radio.
2 Stage AC2-C . . . . $80.00
3 Stage AC3-C . . . $110.00

When you purchase a Mag-
navox product you possess an instru-
ment of the highest
quality and service.

Magnavox products can be had
of good dealers everywhere.
Write us for copy of new
illustrated booklet.

THE MAGNAVOX CO.
Oakland, California
N. Y. Office: 350 Seventh Ave.

RADIO WORLD

Transatlantic Tests

Successful

FranceCopies Signals of American Ama-
teurs for First Time, December 13

FIRST reports on the transatlantic tests
between the Radio Relay League,
received at the league headquarters,
Hartford, Connecticut, on Wednesday,
December 13, show that twenty-five American amateurs
were heard in England and thirteen
in France. For the first time in the history of
amateur radio the French were successful
in copying the signals from American
amateurs. December 12 marked the start
of the tests, and they will continue until
December 31.

The following were heard in England:

Robert C. Briggs, 52 Girard
drive, Hartford; 1-YK, Polytechnic Institution, Worcester, Mass.; 2-ZZ, A. G. Kasten-
day, Schenectady, N. Y.; 2-NZ, E. R.
Raguse, Tottenville, N. Y.; 2-AK, Rensselaer Poly-
technic Institute, Troy, N. Y.; 2-ZK, George C. Cannon, New

Rochelle, N. Y.; 2-ZL, J. O. Smith, Valley
Stream, L. I.; 3-ZW, Walter A. Parks,
Washington, D. C.; 8-AOQ, C. P. Meredith,
Cazenovia, N. Y.; 8-AWP, S. Woodworth,
Syracuse, N. Y.; 2-EL, H. H. Carman,
Freeport, N. Y.; 2-BML, H. H. Beverage,
Riverhead, L. I.; 2-LY, C. A. Wood, Port
Richmond, N. Y.; 3-IC, C. S. Risley,
Atlantic City, N. J.; 3-IIC, G. L. Diechem,
Baltimore, Md.; 3-ZY, L. A. Dunham,
Washington, D. C.; 4-IB, A. Bush, St.
Athens, Ga.; 4-PI, L. Reashan, San Juan,
Porto Rico; 7-PO, G. E. Kensey, Seattle,
Wash.; 8-GQ, R. Moore, Columbus, Ohio;
2-ZS, C. R. Runyon, Jr., Yonkers, N. Y.; 3-SC,
New Haven, Conn.; 4-BX, G. S. Smith, Wilmington, Del.
The following stations were heard in France:

8-AOQ, C. B. Meredith, Caze-

Nowotny, N. Y.; 1-YK, Polytechnic Institution, Worcester, Mass.; 1-BGF, P. O.
Briggs, Hartford; 1-BGC, Minton Cronk-
hite, Greenwich; 2-XA, Rensselaer Poly-
technic Institute, Troy, N. Y.; 2-ZK, George
C. Cannon, New Rochelle, N. Y.; 3-HG,
G. K. Diechem, Baltimore, and others.

To make your receiving set
really complete, equip it with a
Magnavox Radio—the Repro-
ducer Supreme.

The electrodynamic principle
involved in its construction
makes the Magnavox Radio a
most efficient converter of elec-
trical energy into sound waves.

With either size Magnavox
Radio the hook-up is as simple
as connecting the ordinary
head receivers.

Model C Magnavox Power
Amplifier insures getting the
largest possible power
input for your Magnavox Radio.
2 Stage AC2-C . . . . $80.00
3 Stage AC3-C . . . $110.00

When you purchase a Mag-
navox product you possess an instru-
ment of the highest
quality and service.

Magnavox products can be had
of good dealers everywhere.
Write us for copy of new
illustrated booklet.

THE MAGNAVOX CO.
Oakland, California
N. Y. Office: 350 Seventh Ave.

MAGNAVOX
Radio
The Reproducer Supreme
New System Applied to Coupling Apparatus

The object of my invention, says Mr. Nowlan, in his transcript, "is to provide a radio-receiving apparatus of high selectivity whereby signals transmitted on adjacent wave lengths may be received and isolated for reproduction without undue interference. Another object is to provide a circuit arrangement in a radio-receiving apparatus for securing extreme accuracy in the coupling of the tuned circuits of the receiving apparatus; and to provide circuit connections and an arrangement of parts whereby...

Combination of a primary circuit including a primary winding, and a secondary circuit comprising a pair of windings connected in series and each cumulatively coupled to the primary winding, the secondary circuit beginning at one of the ends of a grid of conductors and ending in a single direction through other secondary winding to the end. These ends form the pole terminals of the secondary circuit for direct connection with the radio receiving apparatus.

By simplicity in adjustment, compactness and selectivity in the different parts of the receiver circuits is secured, with means on a receiver panel whereby the apparatus may be protected against heavy surges and electrostatic charges, and may also be protected when not in use by direct connection of the antenna with ground.

The radio-receiving apparatus of this invention comprises an insulated panel carrying the radio equipment supported on the rear thereof and housed within a cabinet. The apparatus includes a radio-frequency oscillating circuit which may be an antenna ground-circuit, a coil-coupled circuit or a grid circuit adjustable against a free ended extended conductor. The oscillating circuit includes a primary inductance having several ends points to switch contacts whereby the desired amount of inductance may be included in the oscillating circuit.

**Coming Events**

The editors of RADIO WORLD will gladly publish news items of all contemplated radio shows and expositions. Keep us posted by mailing full information.

SECOND NATIONAL RADIO EXPOSITION. Direction International Trade Exposition Co., Chicago, January 13 to 20, inclusive, 1922. George A. King, director, publicity, 417 South Dearborn Street, Chicago, Ill.

PERMANENT RADIO PAIR FOR BUYERS. Hotel Imperial, New York City. Open from September, 1922, to May, 1923.

AMERICAN RADIO EXPOSITION, Grand Central Palace, New York City, November 29, 30, December 1, 2, 3, 1922.

SECOND DISTRICT RADIO CONVENTION, Hotel Pennsylvania, New York City, March 4, and 5, 1922.

FIRST UNIVERSAL EXPOSITION OF INVENTIONS AND PATENTS, Grand Central Palace, New York City, February 17 to 21, inclusive, 1922.
NAA to Be Chief Government Broadcaster
Takes Place of NOF, Which Will Resume Its Experimental Work

NAA, the great Naval Radio Station at Radio, Virginia, near Arlington, D. C., becomes the United States Gov-
ernment's chief broadcasting station for
official information on January 3, 1923. On
that date, all regular broadcasting previously handled by NOF, the radio experimental station of the Navy at Anacostia, will be transferred. Thereafter NAA will resume its experimental and research work, which may include the broadcasting of the Navy and Marine Band music in the interest of modulation tests.

A special wave length of 710 meters from the Government and public broadcast-
ing station was assigned to NAA by Herbert Hoover, Secretary of Commerce, on December 15, in recognition of the Interdepartmental Radio Committee. This was done in order that the several regular circuits of the Army and Navy located there may be operated simultane-
ously without interference which occurred when phone broadcasting was undertaken on the lower governmental wave lengths from the main antenna.

The new radiophone transmitting set was especially made for NAA at the Naval Radio Laboratory at Anacostia. It is based on the master-oscillator, power-amplifier system, and employs six 250-watt tubes, giving an output of 1/2 kilowatts. The apparatus is arranged so
that the waves from 400 to 2,200 meters may be used in transmitting, and the power is derived from a 2-kilowatt generator. When transmitting on 710 met-
ers, a special single-wire antenna, stretched from the top of one of the 400-foot towers, is used. This new cir-
cuit does not interfere with any of the other circuits, although used simultane-
ously. The height of the antenna gives practically the same efficiency as the multi-
ple-tuned antenna used at Anacostia. When transmitting on the high-wave length, 2200

Six New Broadcasters

LICENSES issued to broadcasting sta-
tions on 360 meters during the week
ending December 16 include the follow-
ing:

WQAL—Cole County Tel. and Tel.
Co., Mattoon, Ill.

WPAK—North Dakota Agricultural
College, Fargo, N. D.

WPAT—St. Patrick's Cathedral, El
Paso, Tex.

WPAH—Wisconsin Department of
 Markets, Wausau, Wis.

WOAY—John W. Wilder, Birming-
ham, Ala.

KFHD—University of Arizona, Tucson,
Ariz.

Radio Entertainment for Hire

A NEW phase of the radio game is
being seen. Recently a number of enter-
tainment service furn
ished on call, just like an orchestra service. If you wish radio entertainment, a number of young men are offering guarantees that it will bring a set, install it and guarantee entertainment from the ether during a social evening, "or no charge."

Subscribe direct or through your news dealer, $1.50 per year, $3.00 six months, $1.50 three months. Radio
World, 1483 Broadway, N. Y. C.
New Wonders of Radio Seen at Big New York Exposition

The American Radio Exposition, at the Grand Central Palace, New York City, opened at 2:15 p.m., on Thursday, December 21, and closed at midnight, December 30, 1922. It was, undoubtedly, the most successful radio exhibition to date, and will become an annual event.

The United States Senate-elect Royall S. Copeland made the opening address. His subject was, "Radio as it Concerns Everybody and Folk."

He was followed by Colonel A. H. Griswold of the American Tel. and Tel. Company, who spoke on "Radio Broadcasts." The famous screen actor, Rudolph Valentino, gave a nervous talk on "The Truth About Myself." All of these and other speeches were successful.

All addresses and songs were broadcast from WEAF through speech amplifiers which were located on a truck in the middle of the exhibition floor.

Through the agency of these amplifiers, it was possible to hear all speakers clearly. The loud-speakers made it possible to hear everywhere in the large exhibition grounds.

Some striking features of the exhibition were:

A regenerative set so large that an ordinary-sized man must stand on a step-ladder to work it. The controls had to be grasped with both hands.

A set made of imitation ivory (ivory pyralin) with solid gold controls. This set was designed for use in a Fifth Avenue boudoir.

By Edwin H. Armstrong working his famous heterodyne circuit. In order to do this he worked in a large glass-cage to cut capacity effects.

Next week's issue of Radio World (published January 3, 1923, dated January 6, 1923) will contain a special article, fully illustrated, describing the American Radio Exposition now at the Grand Central Palace, New York City.

A New Adapter
Manufactured by Industrial Sales & Engineering Co., Newark, N. J.

The Radiophone Adapter manufactured by Industrial Sales Engineering Co., Newark, N. J., is a device that may be applied to phonographs and reproducing radio telephone circuits. It is nonresonant material, and when used with a fairly sensitive phone and at least one stage of amplification, it will give results. It fits on the tone arm of an ordinary phonograph. Due to the fact that it is made of heavy insulating compound instead of metal, there is an absence of vibration. It is, however, an expensive device and even then worth the price, and it is worth the price, and it is worth the price, and it is worth the price, and it is worth the price, and it is worth the price.

New Firms and Corporations

(The firms and corporations mentioned in these columns can be reached by communi
cations, or by the attorneys, whose addresses are given whenever possible.)

Kendall Electric Co., 511 West 7th St., Des Moines, Iowa.

Wayne Radio Co., 1204 Calhoun St., Fort Wayne, Ind.

Altec Electrical Supply Co., Brooklyn, $10,000; B. Levy, F. Alexander, J. Sanders. (Attorney, N. F. Finkelstein, 51 Chambers St., New York.)

Lake Crystal Electric Co., Lake Crystal, Minnesota.

The Electric Shop, North Xanas Ave., Marcella, Mo.

S. O. S. Radio Corporation, Rochester, N. Y.

Globe Electric Co., 202 East Long St., Columbus, O.


Jack Sign Co., Wilmington, Del., electrical signs, $5,000. (Corporation Service Co.)


CAPITAL INCREASE

Holmey Electric Co., Manhattan, $700,000 to $1,500,000.

Heard at Radio Counter

A Conversation Between Customer and Radio Clerk

"Folks, I recently heard that the prices have been increased by five cents. I was wondering how much it would cost to get the set up.

"Well, that's true, but you wouldn't spend any more money in an initial investment, than necessary. This is merely an experiment on our part. If it works satisfactorily, I intend to purchase the set up on the market.

"That would be good, but, then, I am under the impression that a cheap one might not function as well in the beginning as a good one. You would then lay the blame on the circuit, forgetting that probably the instrument was the cause of the trouble.

"That is very true. Do you consider the best the best?

"Well, I think that this one, right here, is the best on the market. Of course, it is slightly more expensive, but it is well constructed and will stand up better.

"All right, I shall purchase that one on your recommendation. Please have it wrapped up.

"Correct, sir. Just one moment—and I will have your change."

(Teased continued.)
Radio Books Reviewed


What the novice in radio needs is a book in which he can get all the information he wants to understand telephony and radiotelegraphy, to make or buy a receiving set suitable to his means, to know how to operate his set after he has an understanding of the radio art, information that will enable him to advance and get the most out of his outfit. All this must ordinarily be dug out of books, pamphlets and government publications, but the aim of "Radio for All," by H. Gernsback, is to have all the data and information that the beginner will need from the time that he takes up radio. It is a permanent, comprehensive reference book for the dyed-in-the-wool amateur.

The values of the book are:

What radio is. What instruments to use and how to operate them, shown by drawing diagrams. How to read diagrams. How to make or buy receiving instruments. Miscellaneous radio information, with lists of all broadcasting stations in the United States and Canada, and the Radio Act of 1912, a map of United States and foreign broadcasting stations suitable for hanging in radio room.

Other features are:
The theory of radio carefully explained with drawings. Description and instructions for operating instruments of receiving and sending sets, with all picture diagrams of the wiring of the apparatus. How to make or buy receiving sets costing from $3 to $50. How to read diagrams. For every diagram there is a corresponding technical diagram using symbols instead of drawings. How to tune sharply and eliminate interference from other stations. How to protect your set from lightning. Explanation of time and wave signals. How to use a practical vacuum-tube detector, two-stage amplifier set costing less than $50. How the radio compass works. Underground aerials. How to make or buy aerials. Formulae for finding wave length; miscellaneous formulae for finding capacity of condenser and other instruments. Tables of wire resistances, wave lengths and their corresponding frequencies and approximate wave lengths for different aerials.


It is a fact that a great deal of money may be saved by making one's own set. Also, the fun to be had in building radio apparatus is not to be overlooked, as it is with pride that one looks at the thing he has produced himself. Unfortunately a great number of people have not as yet learned to read with ease diagrams in which symbols are used to represent the various parts of apparatus. So far we have seen only a few really practical plans for building apparatus with standard parts, but we have noticed recently the tendency toward simplifying the diagram in order to bring them so to speak, within reach of the layman.

Among the practical plans which we have seen may be mentioned those published by S. Newman & Co., 74 Dy Street, New York. This firm also publishes a small booklet containing data for the construction of receivers and amplifiers of various types, presented so as to appear as if seen from above. All connections are shown as clearly as possible, and enable even an inexperienced person to attach the wires between the proper binding posts on each apparatus constituting the set. In the plans, which are of large size, a perspective view of the completed outfit is given, showing how the unit will look when completed. Among these plans are some giving directions for the construction of regenerative receiver, radio-frequency, amplifiers and other apparatus.

"The Radio Constructor" is published in a compact size and is profusely illustrated with hook-ups.


M. Sleeper's new volume contains valuable information for the advanced radioist who wishes a wealth of data and information that will help him build better and more efficient radio receivers, with a "how-to-do-it and how-to-make-it" book from cover to cover. A great deal of information and facts are given on the construction of inductance coils for various wave lengths. Tables are included which make the winding of coils for any particular purpose easy for the novice. The construction of various testing and laboratory instruments is also included. A chapter is devoted to the various methods of hooping tickler coils. This will be of value to the radio workers who anticipate the best results with their home-made regenerative outfits.

Overheard in the Subway

FIRST FLAPPER--"Oh, yes; I find that by shutting a double-o-five condenser in the front of my set amplifying transformer I don't get that howl. Why don't you try it?"

FLAP No. 2--"I will, later. I am experimenting with resistance coupling just now, and I am getting some good results out of it."

FIRST FLAP--"Well, good luck. O. W. Seventy-three, C. U. L., this is my station."

Old Lady to Radio Operator--"And where is that station STATIC that I hear my grandson talking about?"

Man listening in for the first time--"I didn't know that the zoo had a station."

"WHERE ARE YOU?"

M. l. i. f. t.--"Sure--don't you hear the birds singing?"

Operator--"0000000000000000000000!"

VARIABLE CONDENSER


E. J. ROBE
620 W. Monroe St.
CHICAGO, ILL.

SAVE MONEY
ON HIGH GRADE
Variable Condensers
Direct from Manufacturers

Take the middleman's profit and selling costs for yourself. We sell you direct. These extremely accurate instruments made by experienced condenser people are minus the decorative frills that add to cost. Price reduced to rock bottom without sacrificing quality in the least. Satisfaction or your money back. Write today for very interesting circular.

PRICES:

21 Plate $2.55
48 Plate $2.85
Complete with Dial and "ms" in each condenser
Your Order Filled by Return Mail.

No checks or money orders needed. Pay personal checks or money order for cash on delivery or prepaid (O. D. O. if preferred).

MANUFACTURERS RADIO ASSOCIATION
90 East Kinney St.
Newark, N. J.

SPOKO REAL CABINET LOUD SPEAKER

NOT JUST THE USUAL HORN ENCLOSED IN A CABINET
Beautiful-Compact-TONE COMPARABLE ONLY TO THE FINEST CABINET PHONOGRAPH.

Nothing adds so much to the enjoyment of a telephone as a high-grade loud speaker. We make a complete line of the most direct construction through our SPOKO DUPLEX, and a new line of SPORILA DUPLEX. Our new line is guaranteed to equal in volume and for superiority in tone and clearness up to twice as much as any other.

SPORILA DUPLEX—for use with any handset. SEPARATE TUNING for each phone. Distinct interlocking between phones. Black finish, nickel plated fittings. (Model 99)

Oak (00) or mahogany (OM) finish, burred throat and stitches. $8.25

SPORILA BIPLEX—for one with Baldwin or other unit. Black (88), oak (88) and mahogany (OM) finish, same price as DUPLEX.

SPORILA BIPLEX—complements with built-in unit and cord. Oak (00) and mahogany (OM) finish, burred throat. $12.50

L. H. DONNELL MFG. CO., DEPT S, BOX 76, ANN ARBOR, MICH.
RADIO PANELS
High Electric Resistance.
6"x6" - $1.00
8"x8" - $1.50
12"x12" - $2.75
Manufactured special sizes available.
PAIGES COMPANY
Box 60, Warburton Station, St. Louis, Mo.

SPECIAL OFFER
For a limited time only.
Paragon RA-11...008 Grobe CR-...070
Paragon DA-11...006 Grobe BORK...06
Pries F.S.B Red Bank, N. J.
A. V. GREGORY
63 Broadway
Red Bank, N. J.

Do You Like Clear Tone—Sharp and Distinct? If so try
MARSH'S
Vernier Variable Condenser
AT LAST
Made In Three Styles, Dial Knob and Lever, 25-Plate and 50-Plate.
1 Plate $3.50 2 Plate $4.15 11 Plate $4.45
Mail orders promptly filled.
F. P. Marsh, 145 Nicol St.
NEW HAVEN, CONN.

The Goodman
PATENT PENDING

The Niftiest Short Wave Tuner on the Market
Only $25 & PP 10 lb. Send for pamphlet.
L. W. GOODMAN
DREXEL HILL, PA.

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I offer a comprehensive, experienced, efficient service for his prompt, legal protection, and the development of his proposition.
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Booklet of valuable information, and form for properly describing your idea, free on request.
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RICHARD B. OWEN Patent Lawyer
33 Gove Building, Washington, D. C.
2517-P Washworth Bldg, New York City

Fifty-two issues for $6.00 Sub. Department, Radio, 624, 1403 Broadway, N. Y. C.
KDKA Breaks Its Record
Its Music Picked Up by Steamer in South Pacific Ocean, 5,000 Miles Away

BROADCASTING a concert 5,000 miles is the proud record of KDKA, the radiophone broadcasting station of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania.

This latest achievement of KDKA, which first started operating November 2, 1920, was brought to the attention of the Westinghouse broadcasting officials on the receipt of a postal card from E. G. Osterhoudt, radio operator of the steamer "J. A. Moffet," in which he tells of hearing KDKA while off the coast of Peru, a distance of, approximately, 5,000 miles.

The card, which was mailed in San Pedro, California, contained the following:

KDKA

Gentlemen:
At 9:30 p.m. (local time), on October 5, while off the Peruvian coast, 3,453 south of San Pedro, California, I heard your phone on 360 meters, playing "Stumbling." The ORN was quite heavy but I am positive that it was your phone.

I am using a honeycomb set with an audion detector (Audiotron). Please verify this, if possible, and oblige.

Very truly yours,
E. G. Osterhoudt, Opr.


This request has been verified by a glimpse into the back programs of KDKA with the result that this station has broken its own broadcasting record which was set last spring when a ship in the port of Iquique, Chile, heard an entire concert. The distance of the ship from the broadcasting was approximately 4,200 miles, so that the new record beats the old by 800 miles.

DELCATE SOLDERING
Both the manufacturers' and amateurs' problem on all fine work is readily solved by the instrument constructed for this particular purpose.

THE POST SOLDERING IRON
Platinum Heating Unit—Interchangeable Tip—Universal Current

One Half Actual Size

$6.00

From Your Dealer or Write
Awarded Certificate of Excellence, N. Y. Evening Mail Radio Institute
POST ELECTRIC COMPANY, (Div. 509) 30 E. 42nd St., New York

Something Brand New
in Antenna Wire

$1.50

PER HUNDRED FEET

That will at once appeal to you. It is different and better than any makeshifts to date, being hard drawn from the finest copper having a corrugated surface with 10 collecting points on its circumference. This gives a greater collective and gathering surface. The result is extreme sensitivity, and an increase in the range and clearness of any set from the simplest crystal type to the Front V. T. Receiver.

Packed in most cartons of 100 feet, 200 feet and 500 feet.

UTICA, NEW YORK

Representative Wanted
Only Spare Time Needed

NEWS

In every city Radio World wants a representative to give us the local radio news. Especially of the activities of the local Radio Clubs, new radio inventions, etc.

SUBSCRIPTIONS

Radio World now has 70,000 readers. We are making a drive for a hundred thousand before the end of the year. Ninety per cent of our readers renew their subscriptions. A marvelously high average.

ADVERTISING

Radio World, the national radio illustrated weekly, is the oldest radio weekly, having the largest circulation.

COMPENSATION

The work is entirely in your spare time. We pay a liberal commission. Previous experience not needed as we give our representatives full detail instructions and every possible assistance and help. Write telling us all about yourself-age, education, business experience—and we will immediately give you full details. Telling you will help you materially increase your income. DO IT NOW.
Broadcast Bill's Radiolays

By William E. Douglas

HAD some snow out here last week, first we've had this year, reckon that's to let us know winter's gettin' near. 'Course winer has advantages, there's nothin' much to do, no corn to plow, er cultivate, but there's a cow in two that every mornin', hot or cold, to milk out in the shed, while all you city folkies are tucked in yer fluffy bed. With winter there comes Christmas time with all its joy an' cheer, which after all, I reckon, is the best time of the year. With snow and sleddin' and roamin' an' a lot of bob sled rides an' when the creek is frozen we kin skate a bit besides. I've noticed, too, in winter, radio "comes in" the best, which true I 'scope I should forget about the rest of winter's inconveniences like thinin' out the pump, with weather down to zero, when yer swing yer arms an' jump to keep up circulation. Gosh! I hate to do the chores when its as cold inside the barn as it is out of doors. When I get up these mornins' it's as dark as pitch outside an' 'fore I get the chores done I am almost froze inside. Last week I caught an awful cold, worst one I've had for years. My nose wuz like an eight-day clock, an' eyes chissick full of tears; my back ached an' my head ached, I felt ninety-four years old. I wish some doc could find out how such things could be controlled. I soaked my dainty feet in mustard baths till they were pink—I'd hate to tell you how much lemonade Min made me drink. All wrapped up in a comforter there's nothin' I could do but listen to my Radio an' I wuz feelin' blue because on every Tuesday night they broadcast singin' lessons which helps me find an outlet for my musical expressions. While I don't need no lessons still it keeps me up to date on how to tell the other boys who ain't so fortunate. But Tuesday I wuz feelin' bad, it kinda got my goat—all stuffed up with that cold of mine I couldn't sing a note.

We Want Your Name

We want your name on a special card. We want you to get the name of any friend of RADIO WORLD and send us his name, and address in the United States, Canada, or Mexico, and we will extend a membership to your friend, no matter where in the world he may be, for as little as 50 cents. The card will be in the name of your friend, and he will be connected with other members of the club. We will expect you to send us the card and address it to GIFT DEPT., RADIO WORLD, 1403 Broadway, N. Y.

AFTER XMAS

Needs Can Be Supplied By Us At Special Price

Complete One Tube Outfit
Guaranteed Special Type for Broadcasting with Bulb, Batteries, Aerial... $7.75

Double Slide Tuner Set

Complete with $2.00 Phones, Crystal Detector, Fixed Condenser, Aerial Guaranteed... $18.50

Federal Crystal Sets

Complete with Phones, Aerial... $15.00

Loud Speaker Horns

Just Attach One Phone, Wonderful Tone... $3.75

Vacuum Tubes for $1.00

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Radio Romance

By Dr. Frank Crane

FEW of us realize the romance of radio.

To very many it seems to be merely another form of amusement, another mechanical device, addition to talking machines and pianolas.

There is a very large number of people, however, to whom radio opens up a new world.

If you will take into our imagination the picture of the many who are shut in and have little communication with the outside world we begin to see in radio wider possibilities for enriching life.

Hospital patients can redeem their hours of loneliness by listening in. The concerts and lectures and stories broadcast from central stations, affairs which may not be alluring to those of us who are vigorous and well, are to these people a godsend.

Henry Smith Williams calls our attention to the remote workers on the frontiers of civilization. "Imagine yourself," he says, "a lumberjack working month in and month out in a northern logging camp, which you leave at most twice in the year, on Christmas and on the Fourth of July. For months together you are shut out from all physical contact with what we ordinarily speak of as the world. No newspapers, no letters, no rumors even of what is going on a hundred miles away."

Then, with a simple radio outfit the lonely man may take his place at the world's table and resume his touch with humanity.

Then let your imagination call up these things:

The lonely lighthouse or lighthorse, with men live for months in solitude.

The explorer, far from civilization in the forests of Canada or the jungles of Java, being able to keep constantly in touch with those at home.

The Desert of Sahara, which is already dotted with radio stations from which French garrisons receive instructions.

Alaska. Recently the first station was established at Fairbanks.

The Boy Scouts. Especially in England, the boys are using radio. With a radio outfit there is no excuse for getting lost.

The detection of crime. William J. Flynn, former Secret Service chief, says that radio is especially valuable in broadcasting descriptions of criminals.

The use of radio on ships in remote parts of the sea and on air vessels.

The influence of radio in unifying humanity. Dean Schwebel, the University of Cincinnati, says: "What perhaps appealed to me more than any other phase of the possibilities of the radio telephone is its potent influence in bringing together all peoples of the world, in cementing human relationships, in doing away with discord and promoting international understanding and sympathy."

Finally, think of how radio could be used by Arctic explorers.

Every one of these items is intriguing to the imagination. -From "The Globe," N. Y.

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That Armstrong Circuit

So much interest has been displayed in the special article, "TESTED INVENTION. OR DIRECT MOUNTING ON EITHER VACUUM OR TUBE TYPE," by John Kent, that appearing in the AUGUST 28, 1924, issue of "RADIO TIMES," by John Kent, that apparently interested the publishers of ALL ARMSTRONG AMPLIFIERS set out to put aside a number of copies for those who were not able to get this issue when pub-lished. Copies of 5c, or 50c in price will be chosen at random, on receipt of $1.00, $5.00 for six months, or $10.00 for a year 62 for each month will be started with the "Armstrong Broad"
Garden Hose Saves Day

Radio Manufacturer Does Quick Thinking When Returns Fall Doctor Listening in to World Series

When the radio returns of the World Series baseball games were being broadcast at least one unique turn was given this event. As is generally known, the voice of the broadcast was transmitted from the Polo Grounds, New York City, to Newark, New Jersey, where the broadcasting was done.

One of the directors of the Freed-Eisemann Radio Corporation of New York was giving a "radio baseball party" at his home in Far Rockaway, Long Island, when the telephone-bell rang. It appears that Dr. Richard H. Hoffman, a New York physician and one of the director's friends, had also been "listening in" to the radio returns at his own home. But in the middle of a very exciting play his storage battery ran down.

In haste he hurried to phone his friend to inquire what to do. The radio corporation director offered to assist him, and this is how it was done:

Instead of continuing to "listen in" on one loud-speaker horn a second was connected in series. Then the gardener brought his own hose, which saved the day. One end of the hose was stuffed down the throat of the loud-speaker and the other fastened to a mouth-piece of the land-telephone. "Central" set the connection to the doctor's home telephone, and Dr. Hoffman, listening to the receiver of his land-telephone, was able to hear every play. Thus the plays were transmitted from the Polo Grounds by land-hose to Newark to Far Rockaway, by garden hose to a land-telephone, and by land-telephone to the elated doctor, whose own set had broken down at an inopportune moment!

Attention! Fans and Amateurs!

Have you built your own receiver?
Are you experimenting with any particular circuit?
Are you improving your set?
Are you doing any interesting constructive work in radio?
We must picture you receiving sets with descriptions of how you overcome some difficult stages and any additional parts that you have added to obtain better results. These are the things that, probably, the other fellow is looking for. Send in your information; pictures or whatever you have done to improve the set.

Address Technical Editor

Radio World, 1493 Broadway, New York City, N. Y.

Remember the beginner is looking for these results.

We intend to print in this paper, every month, pictures and descriptions of your radio amators. If you have reached new news or better way of doing anything, don't keep the secret to yourself; tell it to your thousands of brother fans.

Send in a photograph of your set with or without amateur hits and descriptions and measurements. State whether you figure in the picture with or without any expense whatsoever to you we will make an effort to publish it. Be sure to write your name and address plainly on photographs.

Send in your pictures at once, or if you have not made a set or done anything new in making radio material, tell the beginner what you have done to improve the set.

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The rate for this RADIO WORLD QUICK-ACTION CLASSIFIED AD. DEPT. is 5c. per word (minimum of 10 words, including address), 10% discount for 4 consecutive insertions, 15% for 13 consecutive insertions (3 months). Changes will be made in stated add, if copy is received at this office ten days before publication. RADIO WORLD CO., 1493 Broadway, N. Y. C. (Phone, Bryant 4796).

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Did you get the XMAS RADIO WORLD? This was our attractive issue of December 8. Mail out the club—join and subscribe and have your subscription begin with XMAS number. RADIO WORLD, 1493 Broadway, New York.

WE NEED RADIO WORLD, dated April 22 and August 5. If you have copies you don't re- quire, mail to this office and current issues will be sent for them. RADIO WORLD, 1493 Broadway, New York.

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Radio Club News

The Radio Experimenters League announces on its letterheads that it is "Run for amateurs by amateurs." If interested in this activity, write William Guild, 147 Avenue B, New York City, at 7:45 p.m., sharp, has room for new members, with a little knowledge of radio. The club members have donated two buzz-set sets for code practice. The members are making progress under the leadership of Manuel Smith, of Plainfield, New Jersey. The Princeton Radio Club announces that messages will be transmitted free for undergraduates to any part of the United States or Canada. Its members have agreement with other amateur radio clubs for the relaying of messages for points beyond the range of its 50-watt set. With this set, however, the members operate for profit. Unfortunately in touch with amateurs in England three weeks ago, establishing a record for sets of that power, it is believed. The club has twenty-five members.

The Eighth Ward Radio Club, which meets every Tuesday at the Christodora House, 147 Avenue B, New York City, at 7:45 p.m., sharp, has room for new members, with a little knowledge of radio. The club members have donated two buzz-set sets for code practice. The members are making progress under the leadership of Manuel Smith, of Plainfield, New Jersey. It is desired to have only boys who reside in the neighborhood of Tompkins Square, between Fifth and Fourteenth streets. Applications for membership may be filed with Martin Remnek, secretary. Eighth Ward Radio Club, 250 Avenue B, New York.

The Young Men's Hebrew Association, 92nd Street and Lexington Avenue, New York City, has installed a large radio receiving-set which will be used for a number of purposes. The educational department will give a course in radiophone operation and construction which will be open to mem- bers of the association. The concerts which are held from time to time will get the benefit of the concerts and other num- bers which are broadcast.

RADIO WORLD as a Holiday Gift

Have You a Friend Who Is Interested in Radio as an Amateur or a Fan?

If so, you must know that such a friend would welcome a yearly subscription for RADIO WORLD from you. Send us $6.00 and we will place the name of your friend on our mailing list for the coming year, and also we will send a special notification to your friend to the effect that RADIO WORLD will be sent for 52 weeks to his address with your compliments. Send in a yearly order, so that the first copy and our acknowledgment of your courtesy to your friend will be received before Christmas.

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1493 Broadway, New York, N. Y.

Enclosed find $6.00 for which send Radio World ($2 numbers) for the coming year, 1923, to the following address:

Name

Address

City and State

If you wish to send more information, write each subscription, write each address separately. If not, please give name, address, and city and state.
Answers to Readers

1 - Is it possible to use 110-V. A.C. with a step-down transformer and potentiometer to light filament?  
2 - What are they called?  
3 - Can W.D. 11 tubes be used for amplifying as well as for detection?  
4 - Would several turns of insulated wire strung around any room be of any use as an aerial for a powerful regenerative set?  
5 - Are the W.D. 11 tubes as good as the r.c.a. 11-b 6-vols.—L. L. Hamilton, Topham, Maine.

1 - While this can be done, you will be troubled with a constant 60-cycle hum in your set. This is especially noticeable with the regenerative circuit. A filter circuit may be built for this use, but it is less trouble to use the particular A battery, and better results will be obtained.  
2 - Potentiometers may be purchased in any store handling radio goods.  
3 - These tubes have been used successfully both as detector and amplifier.  
4 - You would probably be doing in this way if you used about 150 feet of wire, but an outside aerial is advisable wherever possible.  
5 - It is impossible to discuss the merits of various competitive radio tubes in these columns.

* * *

I am constructing a 2-step tuner according to enclosed sketch. Give me a hook-up for this. —George Cole, Sandusky, O.

If you will look in Radio World, No. 11, dated June 10, you will find an article and several hook-ups, "How to Construct One and Two-step Tuners" by George W. May. You mention using a flat board for your windings. This is all right, but why not stick to the standard way and wind it on a round tube or core?

* * *

What size windings should be used in the regenerative set described by Harold Day in Radio World, No. 30, dated October 21. —Scott Weekby, Kansas City, Kansas.

You should use No. 20 wire wound in the following manner: eight turns with taps taken off, then eight groups of eight turns apiece. This will permit you to get what is known as single-turn tuning. The rotor should be wound full with the same size wire.

Can a step-down transformer be used to light bulbs? We have D.C. current.—John Spielker, New York City.

A step-down transformer cannot be used on D.C. It will only work on A.C.

* * *

Enclosed find diagram of superheterodyne with 5 tubes. When hooked up, as shown in diagram, I get nothing but hums. What is the matter? —William Charlton, Pottsville, Pa.

Your diagram is correct. A superheterodyne is a very hard circuit to manipulate. We suggest that you consult anyone of the following back numbers of Radio World in order to learn the correct manipulation of this circuit: June 24, July 8, July 15, August 5, September 16. If you are not familiar with working sets of this type, it is better to construct a simpler set as this is an extremely hard circuit unless you understand it thoroughly, which very few people do.

* * *

I recently purchased a Potsdam regenerative set and have had wonderful results. Kinston, N.C., is a broadcasting station at a distance, like Atlanta and Chicago, seem to go in and out. I sometimes lose them entirely. —Robert Steinberg, Rockaway Park, N. Y.

The trouble you are experiencing is com-

mon and is known as "fading." This cannot be helped. It is not the fault of your set.

1 - Can I use a radiator pipe for a ground?  
2 - Is an outside aerial necessary?  
3 - Can I use more than one set of phones with a crystal set?  
4 - If so, will I have to use two condensers across them? —Inquirer, Youngstown, Pa.

1 - A radiator pipe is all right for a ground. A cold-water pipe is better.  
2 - No. Reception can be accomplished with wire strung around the room, but it will not function as well as an outside aerial.  
3 - Yes. It will cut down the strength of the signals, but not enough to trouble you.  
4 - No. One condenser across the phones is all that is necessary.

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"VAC-SHIELDED" bring in DX.

This new invention enables you to eliminate any possibility of linking up the magnetic field between tubes and does away with inter-stage coupling and unnecessary noises, thus overcoming stray capacity effects that are always so troublesome and make it so difficult to tune in distant stations.

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The only fixed radio detector requiring no adjustment. Used in place of crystal or vacuum tube detector. Gives excellent quality of sound without distortion, battery or tube noises. Detects telegraph signals at several thousand miles. Detects broadcast more clearly than vacuum tube detector, and requires no amplification where the incoming signal has sufficient strength to actuate the sensitive phones. Ideal for regeneration circuits. Handsome, substantial, suitable for assembly in the finest radio equipment. Guaranteed against imperfection or faulty operation. List each .... $3.50

The De Luxe U. S. Navy Type Radio Receiver

List $595.00 FOR IMMEDIATE DELIVERY

Best of its type—must not be confused with instruments selling for from $200 to $300. Highly selective. Will pick up messages, music, lectures, etc., that lower priced instruments will not hear. This receiver is equipped with binding posts which are normally short circuited for 300 to 6,000 meters by which wave lengths up to 25,000 meters may be received by the attachment of loading coils. Capacities of proper loading coils for above are: Primary 80; Secondary 80; Tichler 80 millihenries. While the receiver is provided with a “standby” or untuned circuit, it also has an unusual degree of selectivity. Although primarily designed for the more advanced fields of radio work, or the laboratory, the simplicity of arrangement and beauty of finish make it unusually desirable for the radio club or for the individual who desire the finest equipment obtainable for his home or office. In the receiver, Bakelite tubes, threaded, provide the forms on which inductance coils of high frequency cable are baked. After assembling, the coils are impregnated with an insulating compound, in vacuum, and thoroughly baked. The inductance switch controls a mechanism whereby the different sections may be connected, completely disconnected and opened, or completely disconnected and individually short circuited. This arrangement is important for by it, each coil has a natural period when connected which is less than the shortest wave length in the receiver’s range. The reception of parasitic signals is overcome, the absorption of desired signals by the coils is minimized, more energy is forced to the detector and on all wave lengths the interference is reduced.

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