NEW WONDER TUBE
(See Page 3)

July 8

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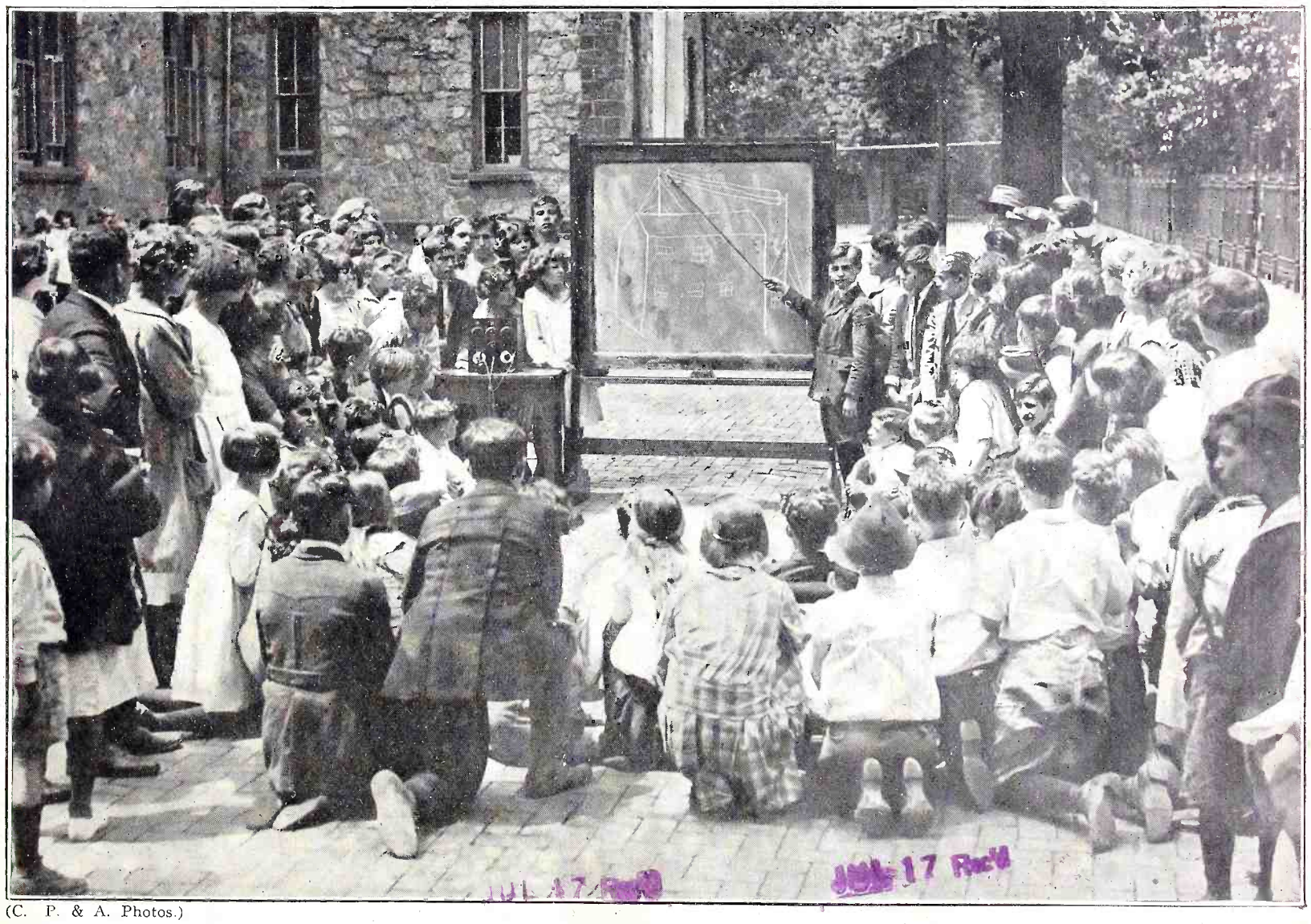
52 numbers

RADIO WORLD

Entered as second-class matter, March 28, 1922, at the post office at New York, New York, under the act of March 3, 1879

ILLUSTRATED

William N. Allen, Youngest Radio Expert and His Class



(C. P. & A. Photos.)

He is only eleven years old, lives in Philadelphia, and has held a government license for over two years. He holds the chair of professor of radio in a public school. He handles wireless messages at the rate of ninety words a minute. There he is standing by his blackboard.

Armstrong's New Super Amplifier

Fully Explained with Diagram, Page 6

Another Use for Radio

RADIO has been used by the larger power and lighting companies of New York for a number of years, says "The Evening Mail Radio Review." Those who are not familiar with the work of the special receiving instrument used would have a hard time guessing what it does.

The special receiver gives storm warnings. It tellst he operators of the station when heavy electrical storms are approaching so that they may have time to raise steam pressure in their boilers and prepare to supply the great flood of power that is necessary for a suddenly darkened city. Of course, the storm warning is important only in the day time when the station is not prepared to supply its full quota of power.

The special receiver used is mounted in a small box on the wall. It picks up the heavy static charges that precede the storms, and the action of these charges causes a bell to ring.

We Stand Corrected

TELEGRAM

The National City Company
Cleveland, Ohio: June 22, 1922.

Editor: Radio World, New York—Note you misprinted or was misinformed as to code for letter "G" in your article headed: "How to Learn the Code"; should be dash, dash, dot, not dash, dash, dot, dot, as you have it. Usually first impressions are the ones that stick, so would be best to make correction as early as possible. Your magazine is F. B.* but how about some more hook-ups? 73.—A. J. Royce.

*** Meaning, in radio, "Fine Business."**

RADIO WORLD

A Weekly Journal, Published Every Wednesday and Dated Saturday, By Radio World Company, from Publication Office, 1493 Broadway, New York, N. Y. Telephone: Bryant 4796

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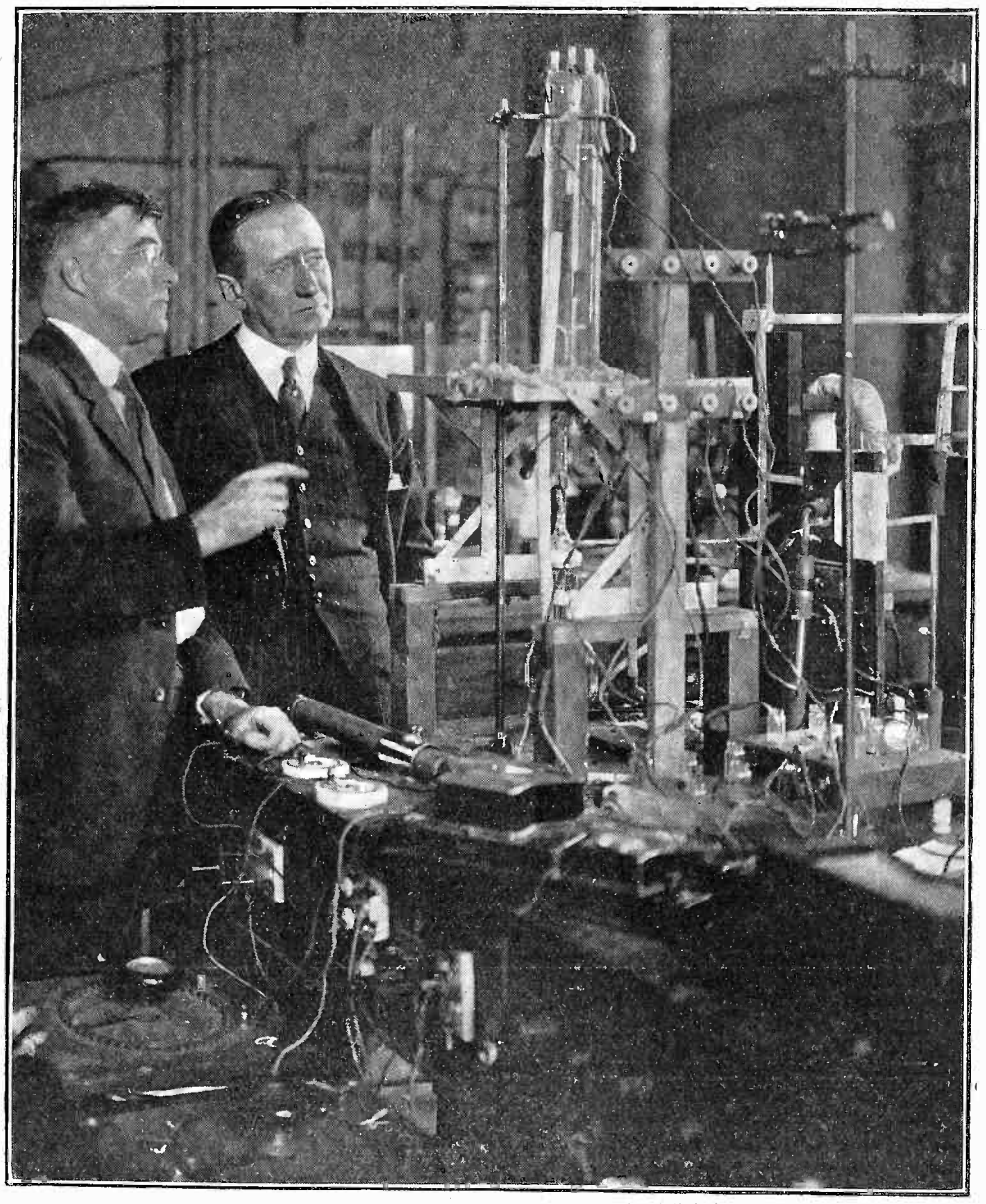
Tiny Radio Sender Will Save Space and Scrap Huge Plants



(C. P. and A. Photos.)

Senatore Guglielmo Marconi and Dr. Irving Langmuir (left) in Dr. Langmuir's experimental laboratory at the General Electric Plant, Schenectady, New York. Marconi is being shown the machinery that tests out the wonderful new tube, about eighteen inches long and about two inches in diameter which radio experts think will revolutionize long distance communication and cause the scrapping of millions of dollars worth of equipment in wireless stations all over the world. This small contrivance of glass and wires, or some further development of it, is expected to take the place of alternators of several hundred times its size, so that the long distance radio transmission plant of a short time hence may be much smaller and more compact. It will also be virtually noiseless, except for the dynamos generating the power, as the clattering apparatus which now hurls the electric wave into the ether will be gone forever. It opens up a further possibility. If power for the operation of a transatlantic wireless transmission station is wired into this tube from some distant point a set hurling messages across thousands of miles of ocean, or around the world, may be placed in a room no larger than ten feet square.

A NEW device—a tiny tube compared with some of the massive apparatus used in connection with radio—is being developed in the research laboratory of the General Electric Company, by Dr. Irving Langmuir, who predicted that the next revolutionary step in radio would be a tube of this kind.

By this apparatus direct current flows into the tube through a complicated wire system, and high-frequency current is generated which flashes signals through the ether in electric waves that travel with the speed of light to distant stations.

The tube is an advancement over the Anderson alternator just as that was an advancement over the old Goldsmith alternator—which was designed in Germany—and over the first spark sets designed by Marconi for cross-ocean radio transmission.

Dr. Langmuir's tube is 50 kilowatts and develops 12 horsepower within its narrow walls of glass. He has been working on the tube for several months.

It is predicted that it will take the place of the massive alternators of the Anderson type. What Mr. Marconi saw when the photographer made the accompanying illustration was this:

One of the new high-frequency generator tubes has been connected with an apparatus carrying 15,000 volts in direct current. A small blue flame shot through the tube without creating any noise, but releasing the electrical impulse that may be hurled thousands of miles. This darting blue flame in walls of clear glass takes the place of the immense alternator now in all wireless plants and the long metal arms which now create the electrical wave with great noise and sparking. The broken impulse from the great electrical generators behind the tube is shot along to the antenna noiselessly in the dots and dashes of the international code through a space not much larger than a stick of dynamite, but infinitely more powerful.

E. J. Nally, President of the Radio Corporation of America, which, with five wireless circuits operating across the Atlantic and one across the Pacific, is the largest commercial radio business in the world, said that the tube would scrap every big plant in existence when it is fully developed.

Radio's Place in the Phenomena of Nature

By E. L. Bragdon

THE recent statement by William Marconi that he had intercepted ether waves having the extraordinary length of 150,000 meters, coupled with the fact that the superregenerative hook-up of Major Armstrong will permit the amplification of signals of 100 meters or less, brings up this interesting question: *"What is the top limit of wave production, and what constitutes the bottom limit?"* The answer is the exact status of radio in the phenomena of nature.

If a triangular shaped piece of glass is held in the path of a sunbeam, a rainbow of color will be thrown on the wall or screen beyond the glass prism. The white light of the sun has been broken up into the primary colors. Scientists show that this break-up is due to the difference in the wave lengths of the various colors which, combining, produce a white light.

The real difference in the wave length is small when figured in inches; but the amount, if great enough, will cause complete diffusion. Beginning with the violet, which is seen at one extreme end of the spectrum and continuing down through to the deepest red, the waves vary in length from .000018 inches to .00003 inches.

Just what lies between the wave of .00003 inches and the shortest radio wave has not been settled to the satisfaction of all physicists. A radio wave of 100 meters has a length of 393 feet. The tremendous wave of Marconi, which the great radio-engineer indicated as a signal from Mars was nearly a hundred miles in length.

It is said that the United States government bureaus and the research laboratories of leading manufacturers have successfully transmitted and received radio waves of less than 50-meter length. But when one stops to consider that the frequency of the wave with which the engineers are working at 50 meters is 6,000,000 a second, the difficulties are readily appreciated. The shortest Herzian wave on record was produced experimentally and was about 150th of a meter in length. If apparatus can be perfected by which amateurs may utilize the band of waves between the present 200-meters limit and the microscopically small wave just mentioned, there will be no further need for legislation to prevent interference.

A discussion of the subject of wave motion brings out the fact that there are other waves than radio waves that

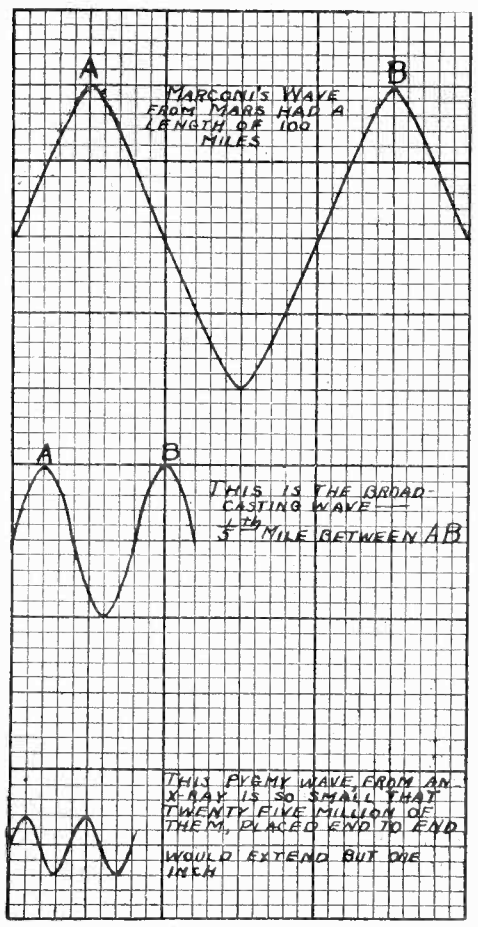


Diagram illustrating the difference in wave lengths. The difference between the largest and smallest wave is so great that it cannot be drawn to the same scale and be recognizable. Drawn by E. L. Bragdon.

are shorter and longer than the waves we are using to transmit intelligence by air. The waves of light which produce various colors, as described, are separated from radio waves by the infra-red or heat waves, and still further down the scale toward the minute waves are the X-rays with their lengths around .000000004 inch.

As waves go, the longer radio waves do not have so many competitors. Perhaps the best example of the extremely long waves are those of our common alternating current. A 60-cycle alternating wave — the type constantly passing through the incandescent lamp —has a length of 5,000,000 meters. If this last figure is considered in connection with the 360-meter wave used for broadcasting, it is not so difficult to understand how broadcasting can be carried out over the ordinary light wires. The two waves are so far separated in magnitude that there would be little danger of their ever becoming tangled and twisted.

Over 20,000 Now Send Radio

TOTAL transmitting stations licensed by the Radio Section of the Department of Commerce now number 20,265. Of this number, 3,572 are ship and commercial land stations; eleven transoceanic; 558 special land stations, including experimental and technical stations; 348 broadcasting stations and 15,776 amateur stations.

The amateurs licensed to transmit messages, are grouped as follows in the 9 districts:

1—Headquarters, Boston. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.—2490.

2—Headquarters, New York City. New York (County of New York, Staten Island, Long Island, and counties on the Hudson River to and including Schenectady, Albany, and Rensselaer,) and New Jersey (Counties of Bergen, Passaic, Essex, Union, Middlesex, Monmouth, Hudson, and Ocean).—2336.

3—Headquarters, Baltimore. New Jersey (all counties not included in second district), Pennsylvania (counties of Philadelphia, Delaware, all counties south of the Blue Mountains, and Franklin County), Delaware, Maryland, Virginia, District of Columbia.—1863.

4—Headquarters, Savannah, Georgia. (Baltimore, Md.) North Carolina, South Carolina, Georgia, Florida, Porto Rico.—342.

5—Headquarters, New Orleans, Louisiana. Alabama, Mississippi, Louisiana, Texas, Tennessee, Arkansas, Oklahoma, New Mexico.—740.

6—Headquarters, San Francisco, California. California, Hawaii, Nevada, Utah, Arizona.—1676.

7—Headquarters, Seattle, Washington. Oregon, Washington, Alaska, Idaho, Montana, Wyoming.—732.

8—Headquarters, Detroit. New York (all counties not included in second district), Pennsylvania (all counties not included in third district), West Virginia, Ohio, Michigan (lower peninsula).—2567.

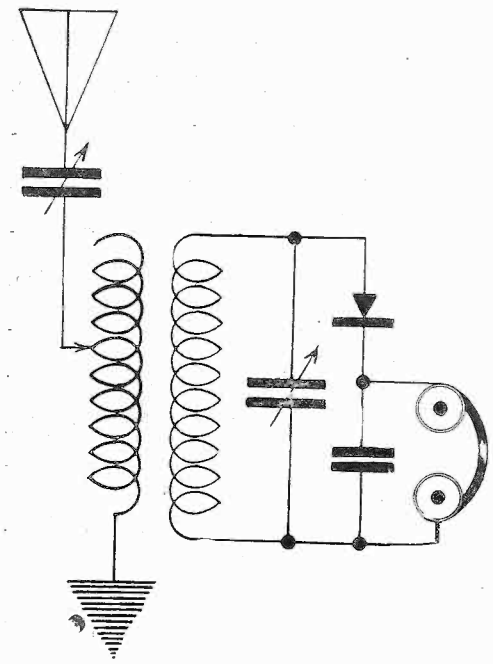
9—Headquarters, Chicago. Indiana, Illinois, Wisconsin, Michigan (upper peninsula), Minnesota, Kentucky, Missouri, Kansas, Colorado, Iowa, Nebraska, South Dakota, North Dakota.—1030.

Broadcasting stations, to-day, total 348, representing all but six States. This number is over five times the total broadcasters listed by the Department of Commerce three months ago. Yet some people ask if radio is going to last?

The Function of the Loose Coupler

By Charles H. Plath

THE loose coupler is one of the essential elements that make a receiving set possible. It consists of two coils of wire, wound on fiber or cardboard cylinders, one of which is movable and the other stationary. The stationary coil is generally made up on a three- or four-inch cardboard tubing. This tubing should be properly shellaced and left to dry. This makes the tube hard so that no sagging or warping will occur. After it has become dry, it is then wound with an even layer of No. 24 single cotton-covered copper wire in such a manner that the windings are alongside of each other, close and tight. Usually sufficient wire is used to depend upon the wave length desired. For short reception, 80 turns are generally used. This stationary coil is called the primary coil. The next coil, which is movable, is called the secondary. The tube is smaller in diameter, so that it can be placed on a shaft in order that it can slide in and out of the primary.



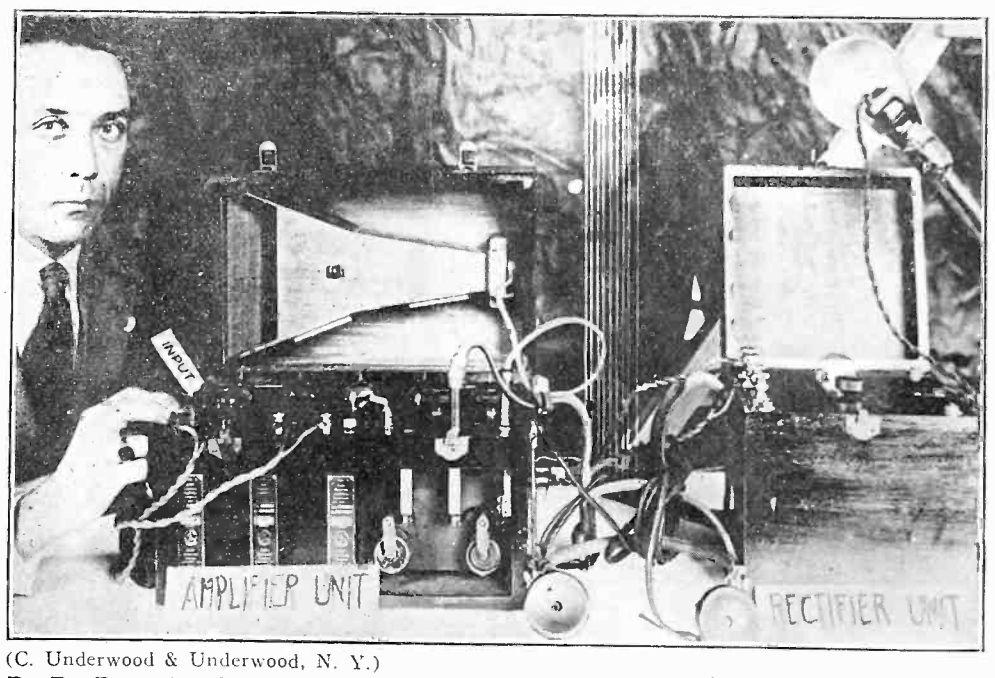
Schematic diagram of a crystal receiver, showing the loose coupler in a circuit. This method of coupling is termed inductive coupling. It has many advantages over the conductive or single circuit receiver. Suggested by Charles H. Plath. Drawn by S. Newman.

This tube is made in the same manner as the coil with the exception that No. 30 wire is used. When completed, it is called a loose coupler. The coils are now primary and secondary, but the secondary sliding in and out of the primary. Its purpose is to transfer the electro magnetic induction from one circuit to another, whereas the method used to transfer the energy from one circuit to another is known as coupling.

Both coils are either equipped with taps or sliders that enable the operator to vary the number of turns in use on either of the coils. By turning the knob over the taps, and manipulating the secondary inside of the primary, a point will be attained where the signals come in the strongest. In case of interference, this coupling, as I have explained, will have to be altered again, in order that interference may be eliminated. One thing must be borne in mind: if the coupling should happen to be jammed in and signals should be the loudest, at that point, don't imagine that the set is working its best, because it is not. With this tight coupling, the receiver will pick up all sorts of other signals from other stations and, also, interference. In case this interference takes place, the coupling will have to be altered—that is, varied. This is done by pulling out the secondary from the primary until this interference is eliminated; but you will discover that a decrease in signals will occur when attempting to tune out interference.

There is a type of detector that is best for use with this machine. Of course, the crystal still remains the favorite among some fans for short-wave reception. Many amateurs are using the crystal detectors with an inefficient hook-up. The sketch shows a correct wiring-diagram for connecting up the receiver. An aerial for this set should be, at least, 100 feet long and in one stretch. The lead-in should connect at one end, forming an inverted L. The end that takes in the connection from the lead-in will be the direction of the greatest receiving-strength from that direction; therefore, erect and connect your aerial in the direction of the broadcasting station you wish to hear. Keep the aerial free and clear from all metallic structures. Also be sure to get a good, perfect ground. If a water pipe is used as a ground, be certain to scrape and clean off the pipe good before soldering on your ground wire.

New Amplifier Eliminates Battery



(C. Underwood & Underwood, N. Y.)

P. D. Powell, of the Bureau of Standards, Department of Commerce, has evolved a radio receiving-set in which the usual batteries are eliminated and connection made, instead, to an ordinary electric-lamp socket. This has been a long-sought invention. With it, care in operation is no longer to be met. The illustration shows Mr. Powell with his new apparatus in which he employs radio and audio frequency units. The amplifier unit consists of radio frequency, while the rectifying unit consists of audio frequency. Using this type apparatus, any antenna may be used; but a loop aerial has preference, due to the fact that radio frequency is being employed. Mr. Powell, recognizing the drawbacks in the storage battery to the general use of radio sets, developed this new radio-amplifier in which the filament and plate batteries are eliminated. Just think of placing a plug in the lamp socket and, after lighting the tubes, listen in without weakening the storage battery.

Armstrong's Superregenerative Amplifier Fully Explained

By John Kent

OWING to the unusual interest in the new superregenerative amplifier, the remarkable radio invention of Major Edwin H. Armstrong—an interest that is attested by the scores of letters RADIO WORLD has received since the publication of its first article on the subject in its issue No. 13, dated June 24—we present here a full and simple explanation of the manner in which the Armstrong device works. Any amateur who follows the explanation and schematic diagram here given should be able to get full results.—The Editors.

MAJOR ARMSTRONG'S invention is a very important step in the development of radio. Better known as the "superregenerative receiver," his system answers some of the much-mooted discussions and complex problems in radiotelephony.

It eliminates the reception of spark signals entirely, while listening to the radio concerts. Its amplification is enormous—amplifying a set 100,000 times its signal strength.

In RADIO WORLD, No. 13, dated June 24, the diagram of this circuit was published. We print it again, with the various values requested, so that any amateur may make up this set at a reasonable cost.

K-1 and K-2 are variable condensers, having a capacity of .001 mfd. each. L-1 and L-2 are honeycomb coils which form part of the low-frequency superaudible circuit, and which will not vary with the changes in the regenerative set. Coils L-1 and L-2 are shown, being D L 1500 and D L 1250, respectively.

These coils have been found to have a suitable range for broadcasting stations with a range of 360 meters. The condensers have the advantage of controlling the frequencies of the two circuits.

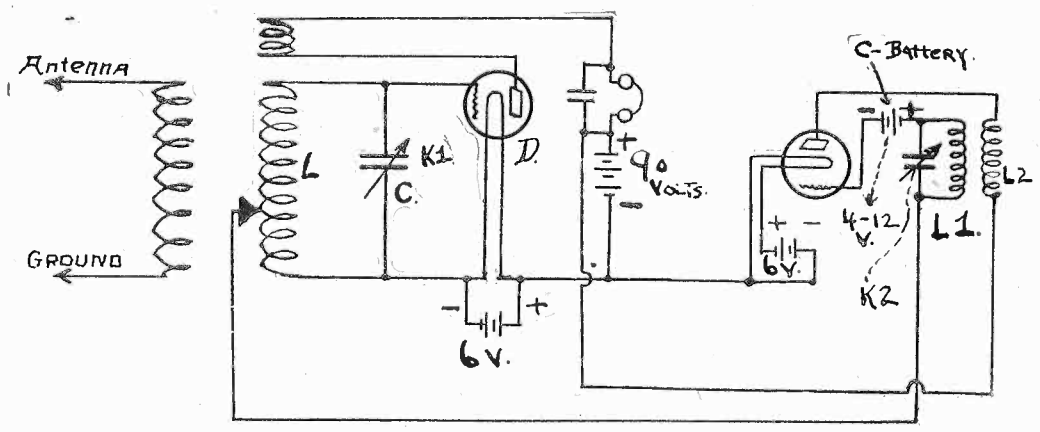
K-1 is the wave-length control.

C battery is connected in series with the grid and has a voltage of from 4 to 12 volts.

The tubes used are U. V. 201 for the detector and U. V. 202 for the second tube, although the oxide filament tubes of the Western Electric Company give better results.

This type set is best adapted for the loop aerial having the marked advantage of reducing static interference. Although the outside antenna may be used to play a commanding feature in balancing interference.

This is accomplished by tuning in the desired signal on the loop aerial and then tuning out the undesired signal on the outside aerial. This is the result of varying the coupling at L until the undesired signal is balanced out. It is recommended that the tubes mentioned above be used, as the plates must stand high-plate potential. In the drawing 90 volts is shown. Note all the polarites in the drawing. They are very important.



"A brief way to describe the superregenerative circuit," says Major Armstrong in "Radio World," dated June 24, "is that one vacuum tube is made to do the work formerly done by three. It has been shown for several years that the limit of amplification is reached when the negative charge in the tube approaches the positive. In experimenting I found that it is possible to increase the negative charge temporarily, for about one twenty-thousandths of a second, far above the positive, and still keep the average down. It is the possibility of increase which permits the enormous amplification which I have demonstrated and enables me to eliminate two tubes from the circuit. Another practical result of this circuit will be the ability to detect wave-lengths under two hundred meters with ordinary amateur-sets."

13 More to Broadcast

THE Department of Commerce issued 13 more broadcasting licenses during the past week, including one to a radio school in Porto Rico and one to a radio shop in Charleston, South Carolina. These are the first stations in Porto Rico and South Carolina. This leaves but five states without one or more broadcasting stations.

The thirteen new stations licensed, bring the total list of broadcasters in the United States and territories to 361.

Call Station

WFAY—Daniels Radio Supply Co., Independence, Kan.

KFAC—Glendale Daily Press, Glendale, Cal.

WFAX—Arthur L. Kent, Binghamton, N. Y.

WFAU—Edwin C. Lewis, Inc., Boston, Mass.

WFAW—Miami Daily Metropolis, Miami, Florida.

WFAZ—South Carolina Radio Shop, Charleston, S. C.

WFAV—University of Nebraska, Lincoln, Neb.

WGAF—Goller Radio Service, Tulsa, Okla.

WAAB—Valdemar Jensen, New Orleans, La.

KFAD — McArthur Bros., Mercantile Co., Phoenix, Ariz.

WGAC—Orpheum Radio Stores Co., Brooklyn, N. Y.

WGAD—Spanish American School of Radio Telegraphy, Ensenada, P. R.

KFAE—State College of Washington, Pullman, Washington.

The Dual Detector Is an Asset

THE dual detector, though not generally in use, is an asset to any set that employs a crystal for detection in that should one crystal fail, and they often do, in the middle of a program, a quick shift of the switch, brings the other into play.

The base for the crystals is a single pole double throw switch. The two contacts are spread slightly so that they will be large enough to receive the crystals. In the experimental set upon which this article is based silicon was used in one contact and galena in the other.

On each edge of the blade a cat's whisker is soldered, the cat's whisker being a piece of brass wire about 24 gauge with filed points. The point of the cat's whisker, touched to the crystal at a sensitive spot, detects that which is to be received.

Connections are then made from either contact to the center of the switch.

Radio World's Hall of Fame

(C. Harris & Ewing, Washington. From Paul Thompson, N. Y.)

DR. J. H. DELLINGER

Chief of the Radio Laboratory of the United States Bureau of Standards. Author of thirty-six books and special articles on radio and electrical subjects, including "Radio Handbook," by J. H. Dellinger and L. E. Wittemore. One of the big minds of the day in explaining the mysteries of the world's greatest science.

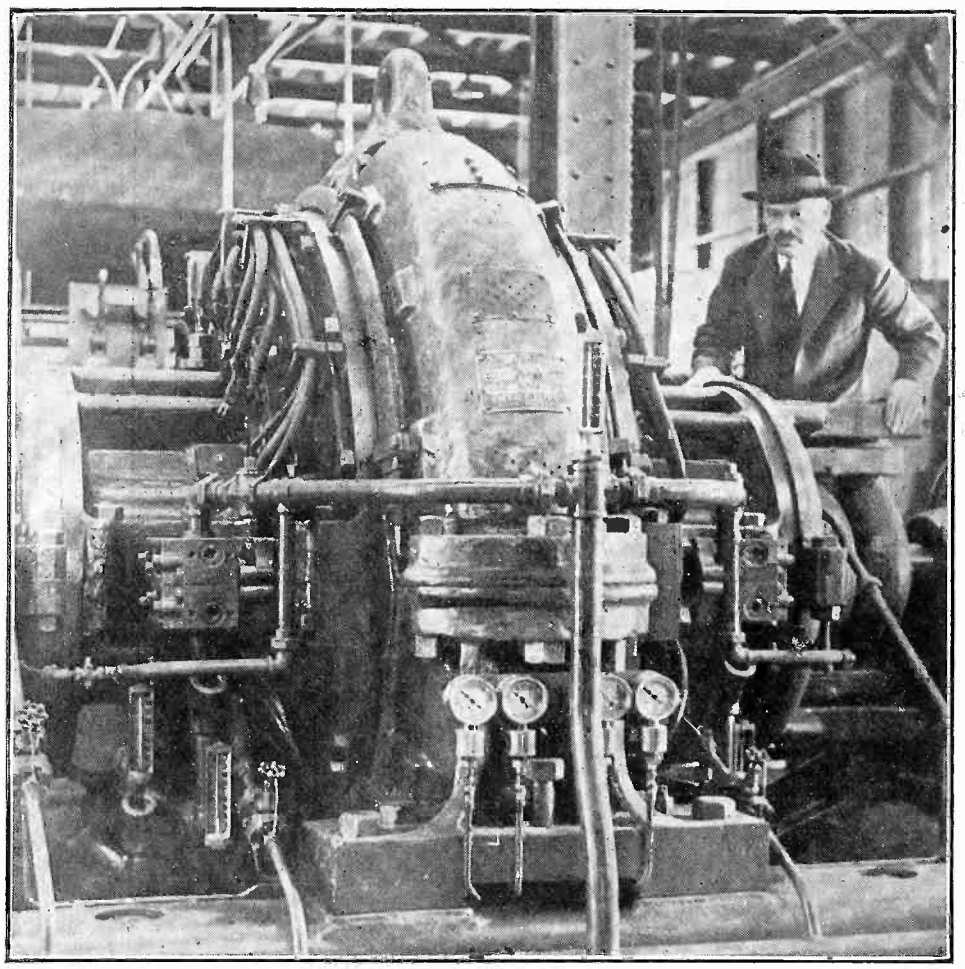
51 Stations Broadcast Market Reports

SINCE the first national broadcasting of official agricultural news by radiotelephone in December, 1920, the national crop and market reports of the Department of Agriculture have covered more and more territory and increased in value to the farmer as well as the public in general, until today there are 45 Governmental and private broadcasting stations handling this form of news. Six applications, one each in Fort Worth, Nashville, Jacksonville, Cincinnati, St. Louis, and Hutchinson, Minn., for broadcasting crop and market reports have just been approved, bringing the total stations to 51, while 29 other applications in several states are awaiting action.

The Bureau of Markets has official market stations at Boston, New York, Philadelphia, Pittsburgh, Cincinnati, Chicago, Minneapolis, St. Louis, Kansas City and Omaha, as well as 73 branch offices in 46 large market centers, 16 of which are directly connected with the Washington office by direct wire; all securing vital agricultural news. At least 15,000 individuals, firms, and railroads cooperate in gathering data on fruits, vegetables, grain, and live stock for daily use.

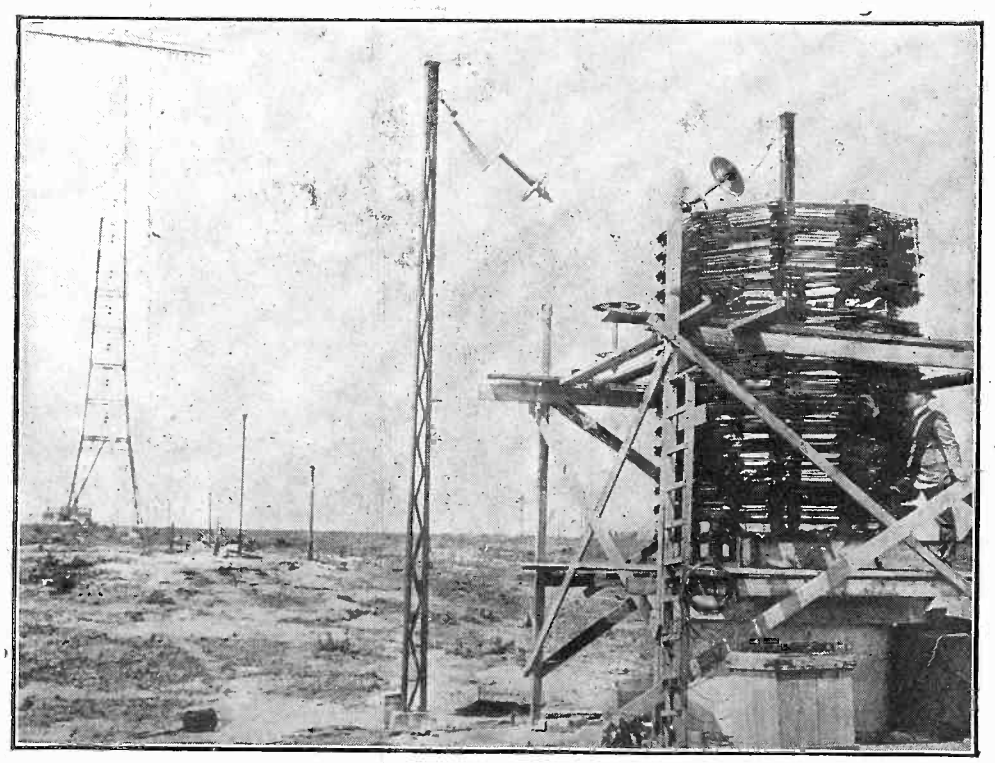
Operating a Transatlantic Station

By Fred. Chas. Ehlert



(C. Underwood & Underwood, N. Y.)

Massive high-frequency alternator in one of the large stations at Rocky Point, Long Island. The photograph shows E. F. W. Alexanderson watching the operation of his own invention. This is the machine that makes transoceanic wireless possible. It is not used by other large transoceanic stations. These machines are specially built by the General Electric Company, Schenectady, New York



(C. Underwood & Underwood, N. Y.)

Large multiple tuning-coil, the invention of E. F. W. Alexanderson, is plainly shown in the above photograph. This tuning-coil is at the central station, Rocky Point, Long Island. The large towers show what the transmitting aerials are like, also their immense length and height

THE leading nations of the world have fully realized the value of radio as the best means of long distance communication. The world war indicated that cables and telegraph lines can be destroyed, but the radio can not be interrupted. The nation with powerful radio stations is always assured of communication with the outside world. If one realizes that, only a few years ago, when a steamship left a certain port, it was completely cut off from the world. Today, a ship on the high seas is in the same position as a first-class hotel so far as communication is concerned. Radio Central is the name given to the high-power wireless installation erected by the Radio Corporation of America. The station is situated near Port Jefferson, Long Island, New York, about seventy miles from the heart of New York City. The station was designed to supplement the existing communication facilities from the United States, and to provide direct radio-service with Great Britain, France, Norway and other European countries, as well as South America. This important station occupies some 640 acres. The station, eventually will consist of a number of separate antenna systems, each provided with the necessary transmitting plant for simultaneous radio communication over a number of different routes. The large receiving antenna at Rocky Point, is shown in one of the accompanying photographs.

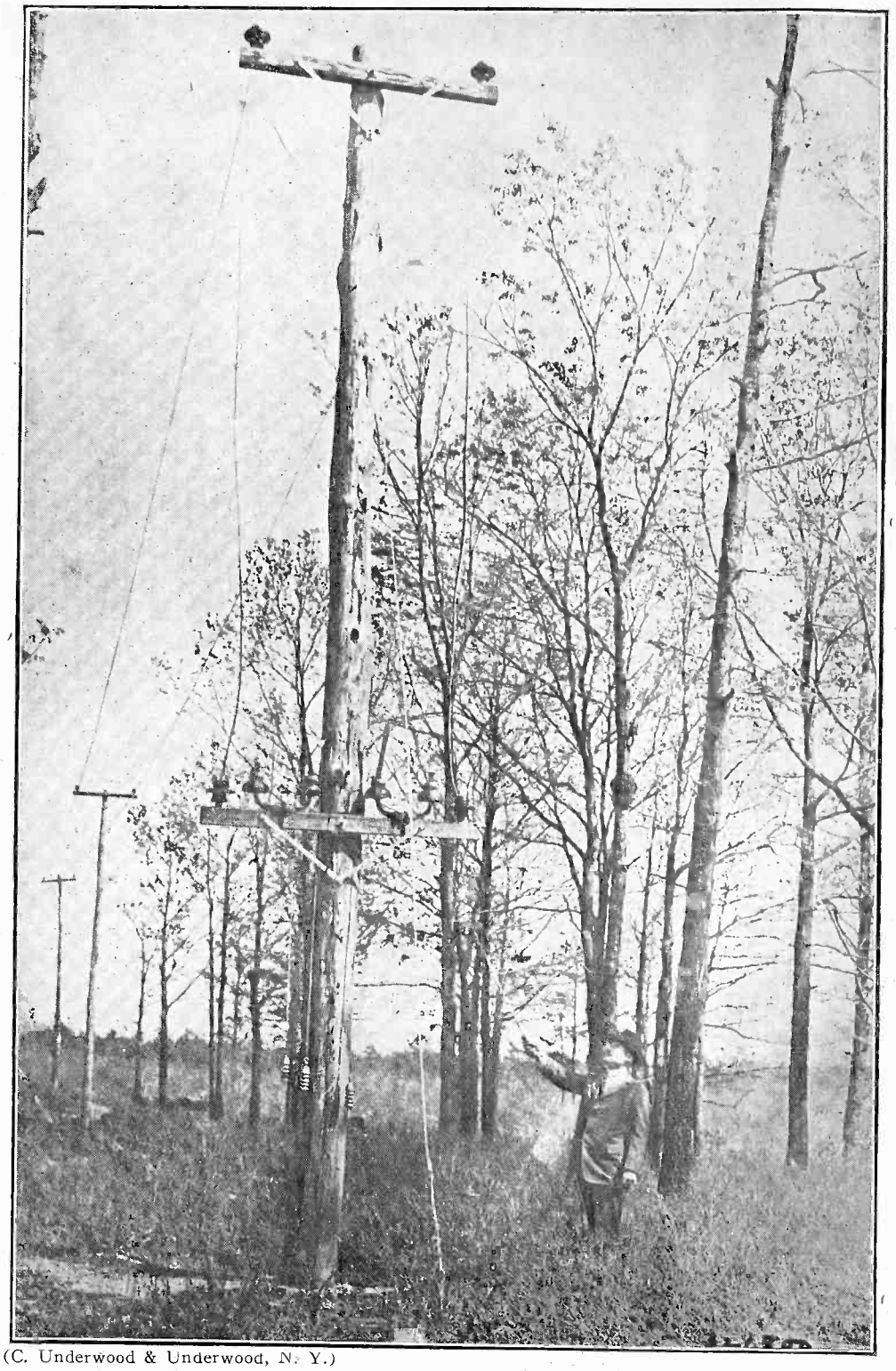
Some doubt may have been entertained by engineers as to the traffic-carrying capacity of the ether, for long-distance communication. The figures for long-distance telegraphy may be estimated. Let us assume continuous wave transmission, with an appropriate form of key modulation in sending the dots and dashes,—and without any tone modulation whatever. Under these conditions, and taking into account both side bands produced as the result of actual transmission, it has been determined that a speed of 100 words a minute corresponds to the occupation of a band of frequencies in the ether, roughly, 100 cycles wide.

This is on the basis that the radio-frequency generator maintains its frequency constant during transmission. An illustration herewith shows this high frequency generator, or alternator, designed by E. F. W. Alexanderson and built by the General Electric Company. Mr. Alexanderson is seen alongside his own invention, which made transoceanic wireless possible. This machine is automatically controlled by a central control-operator by

(*Continued from preceding page*)

which the dots and dashes are sent to the antenna for transmission. Each antenna is of the Alexanderson multiple tuned-type. It is provided with several earth connections along its length, each connection including a tuning coil. As may be seen from the photograph these coils are set up in the open air.

The final installation will include ten Alexanderson alternators, which, when operating, will give a total output of 2000 K. W.



(C. Underwood & Underwood, N. Y.)

The above illustration shows E. F. W. Alexanderson, chief engineer of the Radio Corporation of America, throwing the ground switch on the receiving antenna at the Riverhead Station, New York, which receives all radio messages from Europe. The aerial is only thirty feet high, but it is nine miles long. The height is not essential as the aerial would work just as well on the ground and is elevated only as a matter of protection. Nine miles is the approximate length of the radio waves from European stations.

Grid Leaks

Tiny-Tube Paragraphic Comment on Regenerative Radio Topics of the Week

By Thomas Marion

BIG things in radio happened during the past two weeks. One of them was Major E. H. Armstrong's demonstration of his super-regenerative receiver. But it is only one of the steps toward bigger things to follow. Radio is making the world look like a golf ball.

* * *

I have received many letters from readers anxiously inquiring if they should discard their present apparatus in view of the major's invention. Emphatically, NO! It is a revolutionary invention, to be sure; but time must be taken for standardization, manufacturing, and merchandising.

* * *

When such matters puzzle you, remember that it is best to reflect.

* * *

Other readers want to know if the Armstrong system and apparatus will be made public. The editors of RADIO WORLD assure me that they will publish all such matter as fast as circumstances permit.

* * *

Another big thing was Marconi's demontration of flashing radio waves to a chosen point—just as sun rays are flashed back by a mirror. Easy enough! Since old Chris Columbus stood his egg on end, many of his descendants have performed more wonderful stunts.

* * *

I hear that the old-timers' dinner is to be a fact this fall. Some of the pioneers were willing to make it a summer event; but we all know what it means to doll up in a suit with a southern exposure and a collar like the rear wall of a battery cabinet, when the temperature is trying to ooze out of the thermometer.

* * *

George W. May tells us, in RADIO WORLD, No. 14, that the crystal detector is limited to about twenty miles range. I have often wondered what might be the range limit of my colleague, Miss Crystal D. Tector, who keeps us posted on what women are doing to radio. She seems to be a vacuum-tube detector of some voltage.

* * *

Herbert R. Hoover is to be the czar of American radio. His job will not be a sinecure. No doubt he will be needed to keep us all in order; for we are fast beginning to crowd one another in our enthusiasm.

* * *

And, in the face of this, they tell me, radio has not even scratched the surface of the country—meaning by that, it has yet to be adopted by millions. Outside the larger cities, it has many fields to conques. A good sign—taking into account the vast business in radio equipment that is being handled.

* * *

I was tuned in when Dr. Copeland, New York City's health commissioner, gave some pointed chatter on keeping your body clean as well as your mind. The advice was good but what pleased me most was the doctor's fine clear radio voice. They say that a "movie" actor "screens well." Let me say that Doc Copeland "radios well."

* * *

"The spirit world may be reached by wireless." Right here we have a hunch. Let Washington put Conan Doyle, Hereward Carrington, and Thomas Edison in charge of the prohibition enforcement, so as to locate the spirits of the bootleggers. Whether all the spirits would tune in or not we can't say.

* * *

Watch for big news in radio! Things are moving fast.

United States Now First *in* Radio Work

By Carl Hawes Butman

WASHINGTON, D. C.—The United States practically has complete freedom from foreign control of radio communication between this country and others, and, furthermore, American commercial and naval services are exercising an almost predominant influence in world-radio communication. This was the statement of Rear-Admiral J. K. Robison, chief of the Bureau of Engineering of the United States Navy, in a recent interview with a RADIO WORLD representative.

"This has been brought about to no small extent by the cooperation and assistance of the Navy Department," he declared, pointing out that, ever since 1902, the Navy has used radio as a medium of rapid communication; and that, since 1904, when President Roosevelt put all shore radio stations except land military stations under its direction the Navy had controlled all Governmental stations.

The Naval Communications Service has been developed rapidly, but as many stations as possible have been transferred or closed, including twenty-three since the close of the war. The naval stations on the Great Lakes would be transferred if someone else could be found to operate them, he said, stating that these stations were all institutions for the saving of life and property on the Lakes and could not be abandoned.

Navy Asks $3,828,460 for Radio

"I have estimated the cost of maintaining the Navy's 214 coastal stations for the fiscal year 1923 at $2,822,360, over $100,000 less than was appropriated last year," said Admiral Robinson, "and have asked Congress for that amount, as well as $1,006,100 for new radio and sound equipment and its maintenance on board ships." He continued: "It now looks as if the Congress would cut the total sum by about one million, necessitating great economies in our program."

"The operation of the shore stations pays a dividend into the Treasury of over 100 per cent than the amount of its expenses, every year," he stated. Going further into details, the head of the Navy's radio research and maintenance department explained that the shore stations did not interfere with other government or commercial services, and that they were necessary to the safety of merchant and war ships, both in times of peace and war.

To-day the Navy has 214 shore communication stations, including 90 on the coasts, 46 on lightvessels, 54 radio compass stations, 3 radio laboratories, 10 carrier-pigeon stations, and 11 super-power trans-Atlantic stations, all of which practically pay for themselves besides being essential in the interests of the country.

Earns $23,000 a Month

For the first six months of the current year, Naval radio stations earned the sum of $144,659, an average of $23,000 per month. In 1921 the number of words carried decreased by 24,946,657, due to the discontinuing of many war-time activities, the reduction of Shipping Board operations, and the elimination of much telegraph and radio traffic in the interests of economy. Therefore, the earnings or "savings" decreased in 1921 some 2 million dollars over what they were the year previous, being only $3,509,386, a sizable saving nevertheless, it was pointed out.

"It is worthy of note," the admiral interjected, "that the interests of the United States Navy in radio communication has resulted in the United States commercial interests becoming predominant in world radio communication."

The Navy's net is almost world-wide, and connects all the Government's outlying possessions with the United States, furnishing as well a medium of rapid communication with our fleets of war and merchant marine.

Replying to a question as to what the Navy had done specifically to develop the art of radiotelegraphy and telephony, Admiral Robison stated that a few of them included improvements in facilities for secret communication; increased the range of aircraft radio sets from 50 to 500 miles, and reduced the weight materially, making long-range spotting possible; developed a pilot cable for harbors and aircraft landing fields, increasing the safety of both water and aerial navigation; made possible the sending and receipt of five simultaneous messages; increased long-distance speed from 10 to 60 words per minute; and made possible automatic transmission and reception. Other work includes the development of the kite aerial for transmitting from a seaplane on the water; radio compass improvements making radio applicable as a direction indicator and position finder; the elimination of static and "mush"; an advance in the radio controlled torpedo and vessels; and the introduction of the arc transmitter and uniwave system of signalling.

Navy Radio Developments

Under ship-radio equipment, Admiral Robison said: "There remains to be accomplished for the next fiscal year the installation of new equipment on vessels in active service on which there has been no opportunity to do work. The use of vacuum-tube transmitters is becoming general, and this requires the conversion of the present Navy spark-sets now installed on all ships. This applies especially to submarines. By using a tube set the radio range of submarines will be increased about five times, or from 75 to 400 miles. Submarines are being equipped with aerials and receivers of such type that receiving under water will be practicable and transmitting without coming fully to the surface will be possible.

"One effort in the past two years has been to develop and test a standard type of listening device equipment for each type of naval vessels for detecting the presence of submarines, which proved most necessary during the World War. The bureau is now ready to install this apparatus, which is of a confidential nature, on several destroyers and a few battleships," he concluded.

He Turns Theory Into Practice

(C. Kadel & Herbert News Photos.)

A "close-up" of Senatore Guglielmo Marconi, master of radio, now visiting America, whose keen mind is ever planning the practical things to which this new science—which means more, perhaps, to mankind than any other science—may be put. This photograph was taken while Senatore Marconi was inspecting the radio equipment of the Atlantic liner "America."

Radio and the Woman

By Crystal D. Tector

THEY tell me—and by they, I mean the women I meet at the various afternoon places where the up-to-snuff ones congregate for their daily chatter—that if the Congress of the United States made Herbert Hoover the "big noise" in the radio workings of the country, he is to give women a chance whenever he has any offices to fill. This is not only fair, but in the best interests of the new science. Mr. Hoover has been given to understand that we—whom man has been pleased to call "the gentler sex," are moving into the front ranks of the people who are "doing things." Woman is to have her chance in the field of radio as a worker.

* * *

Take Mrs. Marconi, as an instance. I am glad to be able to present so good a likeness of her as that accompanying my department of RADIO WORLD. A smart, intelligent woman who accompanies her husband on all his tours of investigation and is of the greatest help to him in his laboratory work. If you could have seen her as she walked beside him on his tour of inspection of the Radio Corporation of America's big plant at New Brunswick, New Jersey, the other day! Certainly she did not impress one as a disinterested female who tugged along simply because it was her husband's business and she felt that she must do her duty. No! Mrs. Marconi took an individual interest in everything. And it is surprising what she knows about radio. I'll wager that a radio talk by her would be worth listening to.

* * *

And a little bird also whispers that Mrs. Harding is another untiring radio fan—that she is, to a large extent, responsible for the report that the White House is to be equipped with one of the best radio sets purchasable. One can't blame Mrs. Harding; for a recent visit to the wonderful city of Washington convinced me that most everyone there is quite alive to the importance of being acquainted with radio—and to a greater extent than being a mere listener-in—if one really wants to be in vogue. Most people you meet there buzz about radio. As one Senator's wife said to me: "I spoke to Mrs. B. the other day about my set and mentioned 'static interference.' Well, Mrs. B. looked at me as if I had committed a crime. 'Why, don't you know that *static is interference,*' she remarked, stunned, with an emphasis on the last three words that only a woman can employ. I just crept into my shell. I must have looked just as foolish as a two-step amplifier without a grid leak."

* * *

The other night, at Forty-second Street and Broadway, New York, a marvelous soprano voice was coming from somewhere, and the melody of "My Old Kentucky Home" filled the early summer twilight with heart-touching wizardry. I looked up at a window and read the word: "RADIO." Then I knew. The most marvelous—most wonderful part of it was that this beautiful voice should come from the ether so loudly and yet so sweetly. Though it could be heard at quite some distance, the most delicate of the phrasing was as distinct as if the singer had confined her efforts to a specially acousticoned hall. I wonder who the singer was.

* * *

Let me quote from a few of the letters I have received from women readers, since the last RADIO WORLD went to press:

From Mrs. K., Pawtucket, R. I.—"My two sons picked up a ship at sea the other night. I wish you might have seen the joy on their faces. 'Mother! mother!' they called. I ran out and adjusted the head set. I heard a voice say: 'We will arrive Sunday night.' I am not exaggerating when I say that it gave me the thrill of my life."

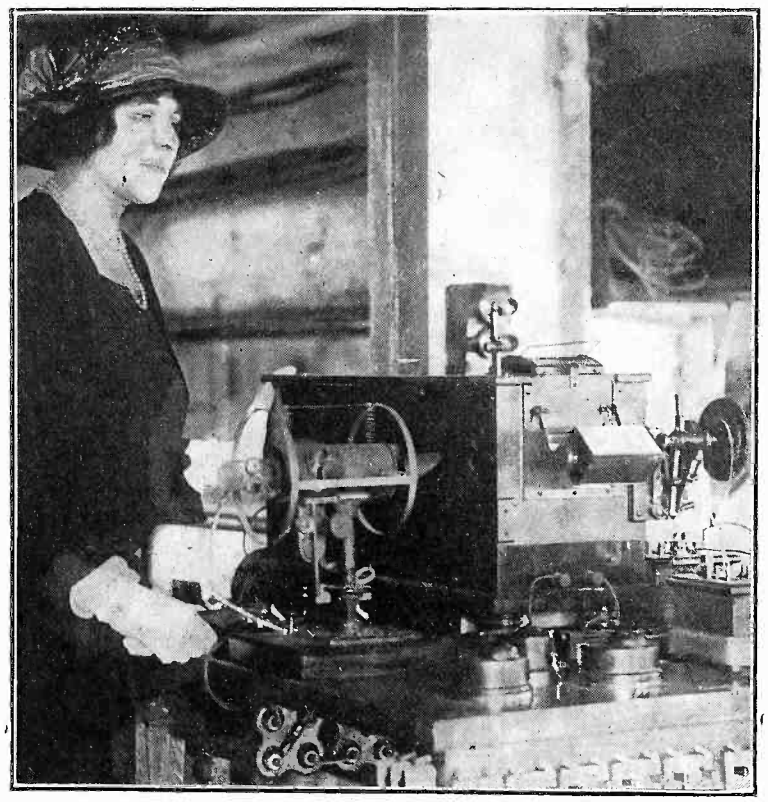
From Minnie B., Oklahoma City, Okla.—"Radio is fast becoming a part of our daily lives. At first we all thought that it was only a passing fad; but those who put in sets soon had us all going. Don't be surprised if I write you that we women have organized a radio workers' club."

Miss L., Rome, N. Y.—"I have just purchased from my brother his regenerative set. He didn't tire of it; he was obliged to go to New York to take a position. I am not thoroughly able to run it; but I intend to read RADIO WORLD and learn."

Mrs. H. B. M., Roanoke, Va.—"Why don't you publish the photograph of a woman in your Hall of Fame?" To which I reply: The editors of RADIO WORLD feel that the day will come when women will be eligible to radio's Hall of Fame; but in radio, as in all things, the Argonauts have been men.

(C. Underwood & Underwood, N. Y.)

Dr. Hereward Carrington who, since the death of Professor Hyslop, is considered the leader in psychical research, has begun the interesting attempt to discover the mechanical end of mental telepathy. To conduct his experiments, Dr. Carrington uses radio. He has adapted the radiophone to detect the dynamic action of thought waves. Superinduced by a high-tension coil, the thought waves are caught by a radio detector and transmitted to the phones. The subject's head is placed in a "directional aerial." Dr. Carrington finds women make the best subjects in his new work.



(C. Underwood & Underwood, N. Y.)

Signora Marconi, wife of the famous radio wizard, receiving a photograph by radio at the oscillograph at the New Brunswick, New Jersey, station of the Radio Corporation of America.

How Daily Programs Are Broadcast from KDKA

By Peter Kerr

THERE are thousands of radio fans with well-equipped receiving sets who would like to know just how the daily programs are sent forth from a big broadcasting station. KDKA, the Westinghouse station at Pittsburgh, which has been broadcasting since 1920, is presumed to be one of the most thorough stations in the world. The path of a speaker's voice from its studio to your receiving set is an interesting journey. When everything is set and ready, the engineer in carge of the station tests all filament and plate batteries before each program. He then starts the transmitting set and checks the wave length by means of a wave meter. He then lights the signal light in the studio notifying the announcer that the transmitter is in operation. The announcer turns on the studio amplifier which lights the signal light in the operating room notifying the engineer that the audio circuits are in operation. He then watches the modulation meter and adjusts the amplification of the speech amplifier to give the desired amount of modulation. A loud speaker in the operating room serves as a check on the quality of the transmission.

Figure No. 1, shows in diagrammatical form the path of the speaker's voice from the studio to the receiving station. A voice picked up by the transmitter in the studio, theater or church is amplified and transmitted by means of a telephone line to the radio station where it is further amplified and used to control the output of the radio transmitter. The radio transmittting set is supplied with power directly from the work's power plant, through a step down transformer for the vacuum-tube filaments and through a special motor-generator set which changes the 220 volts D. C. to 2,000 volts D. C. for the tube plates. The radio transmitter changes this power from 2,000 volts D. C. to alternating current power at a frequency of 833,000 cycles per second (360 meters wave length) which is supplied to the radiating system consisting of antenna and counterpoise. This high-frequency power in the antenna system sets up waves in the ether which travel outward in all directions and, intercepting the receiving antennae set up voltage and currents which operated the receiving set.

Figure 2 shows the circuit diagram. For convenience in studying the circuits

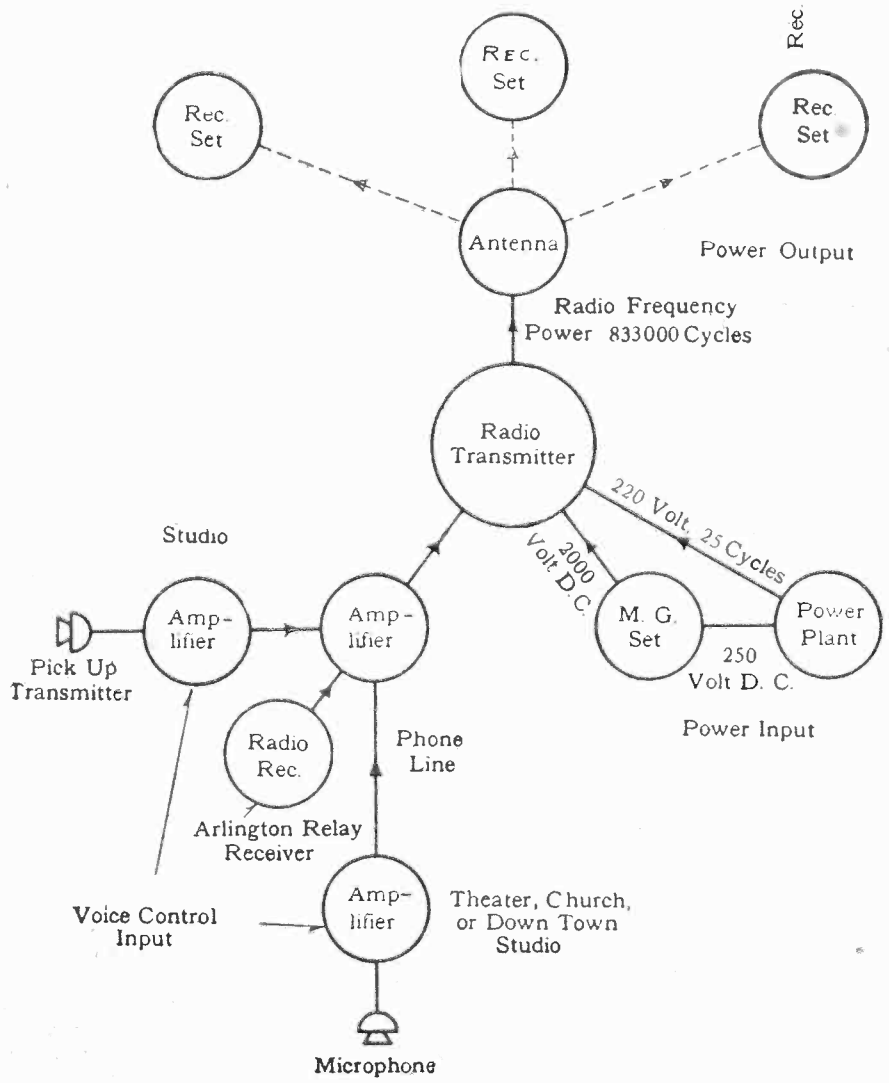


Figure 1. Diagrammatical form of the path of the speaker's voice from the studio to the receiving station. A voice picked up by the transmitter in the studio, theater, or church, is amplified and transmitted by means of a telephone line to the radio station, where it is further amplified and used to control the output of the radio transmitter.

represented by Figure 2, which carry a wide variety of frequency, this diagram has been divided into four sections by means of the dotted lines at right; the lower section, which may be considered as the power supply, carries only direct current at 2,000 volts and low voltage alternating current at 25 cycles. This 25-cycle current is used only for heating the filament. To prevent any of the 25-cycle voltage being impressed on the grid filament and plate filament circuit, the return of the grid circuits and of the 2,000 volts circuit is connected to the mid-point of the resistor which is shunted across the filament, each half of the resistor being shunted by a condenser for by passing the radio and audio frequency.

In the next section of Figure 2, in addition to the power circuits described, audio-frequency voltage is impressed upon the grids of the modulator tubes varying the potential of these grids with respect to their filaments according to the voice waves, by means of the pick-up transmitter and amplifiers.

The four 250-watt power tubes in the upper part of the set are the oscillators, which, in conjunction with the condensers and oscillation transformer, change the 2,000-volt direct-current power into alternating-current power at 833,000 cycles (360 meters) generating the so-called carrier wave, which is pressed on the antennae through a remote controlled double throw switch, which allows the same antennae to be used for receiving when the station is not broadcasting. The amplitude of the radio frequency wave thus generated is constant so long as the plate voltage on the oscillator tubes remain constant, and fluctuates with the plate voltage when the latter is varied. Thus the upper section of Figure 2 carries only modulated radio-frequency waves, while the third section carries both radio frequency and audio frequencies, in addition to the 2,000 volt direct-current and the 25-cycle alternating-current power circuits.

The function of the five modulating tubes, also rated at 250 watts each, is to vary the voltage on the plates of the oscillator tubes according to the voice frequency impressed upon their grids by the speech amplifiers.

This system of modulation is known as constant current or power modulation and is accomplished, by means of the constant-current choke coil in series with the positive lead of the modulator and oscillator tube plates. The modulator tube grids are held at a static potential of 60 volts negative with respect to their filaments by means of a battery. The audio frequency voltage from the speech amplifier then adds to or subtracts from this 60 volts grid potential. At an instant when the modulator tube grids have impressed upon them by the amplifier a small negative or zero, potential with respect to their filaments, the tube impedances from plate to filament are low and a large plate-current flows from the 2,000 volt direct current circuit to the modulator tube plates. Because of the large inductance (50 henrys) of the audio frequency choke coils in series with the plate supply, the total generator current can change very little in a brief interval of time. Hence part of the generator voltage occurs across the choke coils, thus lowering the voltage impressed on the oscillator tube plates and

He Forgot to Shut Down!

An original radio cartoon
Drawn specially for "Radio World"
By Doc Rankin

(*Continued from preceding page*)
hence the radio frequency output of the set.

The next instant when the modulator tube grids have a high-negative potential with respect to their filaments the plate impedance is high and little or no current flows through the modulator tubes. The choke coils tending always to keep the total generator current constant creates a voltage which adds to the generator voltage and this forces most of the current into the oscillator tubes which increases the radio frequency or antenna output accordingly. In this way the audio frequency choke coils cause the voltage applied to the oscillator tube plates to fluctuate in proportion to the speech voltage impressed on the grids of the modulator tubes by the speech amplifier. As the amplitude of current in the antenna varies directly with the plate voltage on the oscillator tubes and as this voltage varies from nearly zero to 4,000 volts the antenna current varies accordingly.

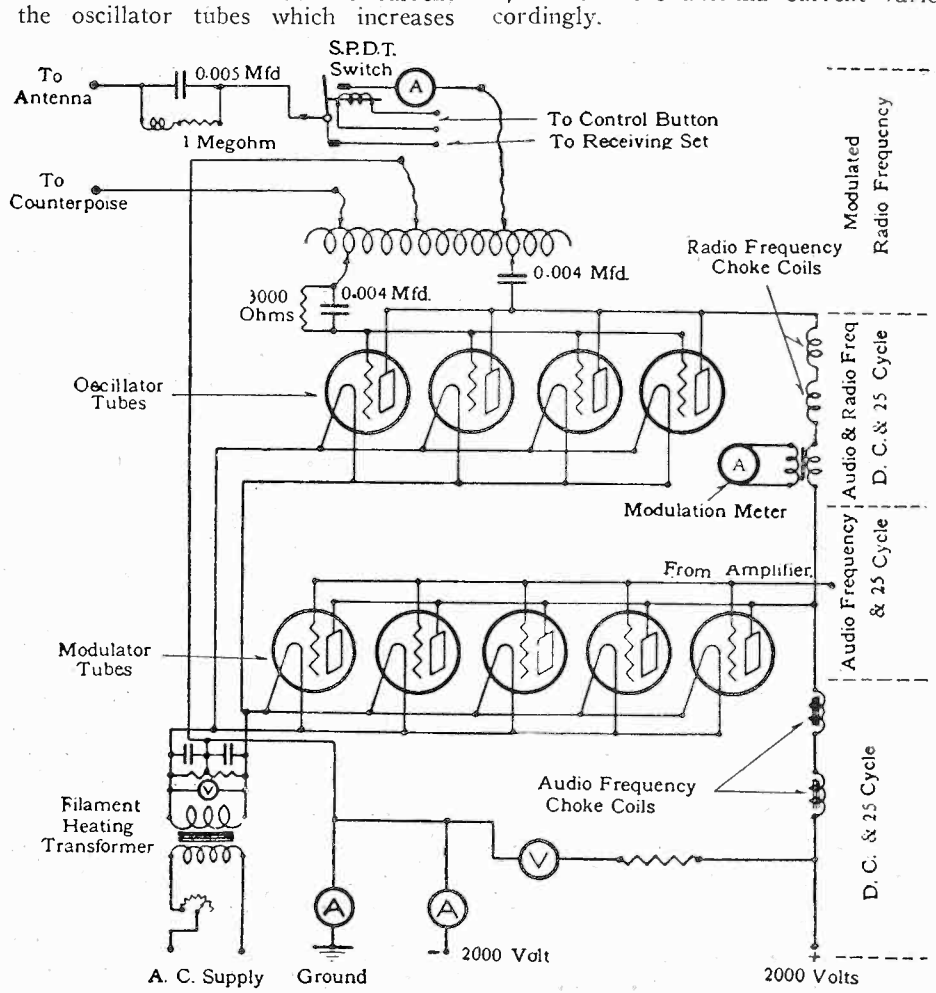


Figure 2. The circuit diagram. For convenience in studying the circuits represented by this schematic diagram—which carry a wide variety of frequency—it has been divided into four sections, indicated by the dotted lines at right. These four sections provide an interesting study for the [illegible]

Radio Terms Stump Court

THE first radio litigation to come before the Boston courts went on trial before Judge O'Connell and a jury in the Suffolk superior court, says *The Tribune*, New York and aroused, first interest and then bewilderment, when highly technical terms were broadcast about the courtroom.

The suit was brought by Lloyd Green, of Everett, against the Radio Time Service, Inc., of Boston, for recovery of $726 for work done. Green stated he was contracted with by the defendant to devise and develop loop antennae and other apparatus for the receipt of time signals from the Arlington, Va., government station without the use of outdoor antennae.

On the stand, Mr. Green plunged into a mass of radio phraseology which puzzled judge, jury and counsel to the extent that the court requested Mr. Green to explain just what was meant by antennae of both the plain and loop variety, radio-activity, ether and the like. Four o'clock came before the messages were decoded, and Judge O'Connell ordered a postponement until Monday to give the jury a chance to study radio technicalities.

A Homemade Grid

THE grid leak is a small filament of carbon in a glass tube; but the equivalent of this device, so important to radio, may be constructed at home very easily. How this is done is described by the *Sunday Call*, Newark:

Cut a piece of cardboard about two inches long and about half an inch wide, or just the size of the grid condensor. If the grid condenser is used, make the cardboard just as long as the condenser so that the two binding-posts will pass through the holes in the condenser and hold down the cardboard. Under each binding-post rub off some of the pencil carbon so that when the binding-posts are tightened down some of the pencil mark will show around the edge of the post.

Do this on both ends of the cardboard so that there will be contact enough for a pencil mark across the cardboard between the two binding-posts.

Turn on the tube filament and adjust the set. If a point is reached where the adjustment will cause a loud howling, or the signal tuned in is not clear, start rubbing the pencil back and forth between the binding-posts until the howling just stops or the signal is made clear.

If there is too much pencil carbon and the set appears dead, simply erase the marks and start all over again until the proper resistance is reached. The grid leak resistance need not be changed unless a different tube is inserted in the socket. Sometimes the grid leak made in this manner may be covered in hot paraffin so as to exclude moisture and it will remain in permanent adjustment.

Another method of making a grid leak is to soak a small piece of blotting-paper in drawing ink and dry it thoroughly. Then pass two binding-posts through the ends as with the other type mentioned above. A blotter inked in this manner cut down to ½ inch wide and 2 inches long will save a resistance of approximately one megohm, and is suited for the majority of tubes. However, the adjustable leak is to be preferred, for critical and efficient adjustment.

The Radio Primer

The beginner who follows regularly this department in RADIO WORLD will secure a liberal education in the applied principles of radio science

Radio World's Revised Radio Dictionary

By Fred. Chas. Ehlert

D. W.—Damped waves, the amplitude of which decreases as it travels.

Damped oscillations—This practically the same thing as damped waves.

Decrement, Logarithmic—This is the Napierian logarithm of the ratio in the amplitude of one oscillation to that of the next oscillation in the same direction in a damped wave-train.

Decremeter.—An instrument used to measure the logarithmic decrement of a circuit of electromagnetic waves.

Detector.—Any apparatus which transforms the oscillations received by the antenna into visible or audible sounds.

Diaphragm.—A thin iron-disc in a telephone receiver, which sets up audible sound-waves from vibrations which are caused by periodic attractions of the magnets in the telephone.

Dielectric.—The insulator between the metallic plates of a condenser. Every insulator is a dielectric.

Direct current.—An electric current flowing continuously in one direction.

Discharge.—To dissipate electric energy from a condenser, cell, battery or any other charged body.

E. M. F.—Electromotive Force; or termed electrical pressure or potential, the unit of which is the volt.

Eddy currents.—Currents in the pole pieces, armature, magnetic core, or other masses of metals which are rendered useless.

Electrons.—Ultimate particle of negative electricity. It is the fundamental pact in the constitution of matter as well as in the electric current. Ordinary currents are in some way an electronic phenomenon.

Electrical oscillations.—An alternating current of high frequency; usually 10,000 cycles or more.

Electromagnetic Lines of Force—Those lines of force that act about an electromagnet, poles of a permanent magnet, or a wire carrying electric current.

Exciter.—Used to excite magnetic fields of small-type generators.

Electromagnetic waves are waves in some electromagnetic disturbance traveling through space.

The Beginner's Catechism

By Edward Linwood

WHAT would be the least number of pieces of apparatus that we could receive with?

All that is necessary is a crystal detector and a pair of telephones. The crystal detector is connected in, as a series circuit, with proper aerial and ground.

* * *

With such equipment, could I hear all the nearby broadcasting stations, also long-distance stations?

This cannot be accomplished with merely a detector. An oscillation transformer, such as a loose coupler or variocoupler, must be used. This, with the aid of detector and phones, would enable you to receive stations on short-wave lengths.

* * *

Would this enable me to tune—that is, weed out the undesired stations?

Yes. Either of the above instruments would enable you to weed out most of the undesired stations; but it must be remembered that no matter what apparatus you may have—even within, say, five miles of some high-power commercial station—the weeding out of that particular station is impossible. Forced induction from such a station cannot be very well tuned out.

* * *

What size battery would be needed to light the filament of the tube? What size battery for the plate current?

When purchasing a battery for filament lighting a good six-volt battery with long amperage-hour life, should be purchased. This will keep you from placing it on charge so often. The B battery may be either a variable or a fixed 22½-volt battery. However, a variable is recommended.

* * *

Is galena the only crystal that can be used to hear broadcasting?

Among minerals there are others such as, carborundum, perikon, cerusite, iron pyrites, molbydenite, silicon, ferron, and, of course, the vacuum tube, which is not a crystal.

* * *

Do any of the above mineral detectors need any battery current?

Some crystal detectors, such as carborundum, need an applied battery-current for sensitive operation. A device, termed a potentiometer, is used to regulate the flow of battery current across the crystal.

* * *

Can a tube detector be placed in the same set and the crystal removed?

Yes. This may be accomplished easily. RADIO WORLD will always keep you posted on the uses of the vacuum tube.

The Radio Primer has been published regularly in RADIO WORLD since issue No. 1, and will be a regular department in order to instruct and aid the many thousands of amateurs who are joining the ranks of radio enthusiasts every week.

Tips on Telephone Cords

TELEPHONE head-sets, at the terminal wires, have an extra piece of woven fabric which has been a puzzle to many. Some people don't know what to do with this little pig-tailed cord so they cut it off. However, this extra cord terminal has an important part to play.

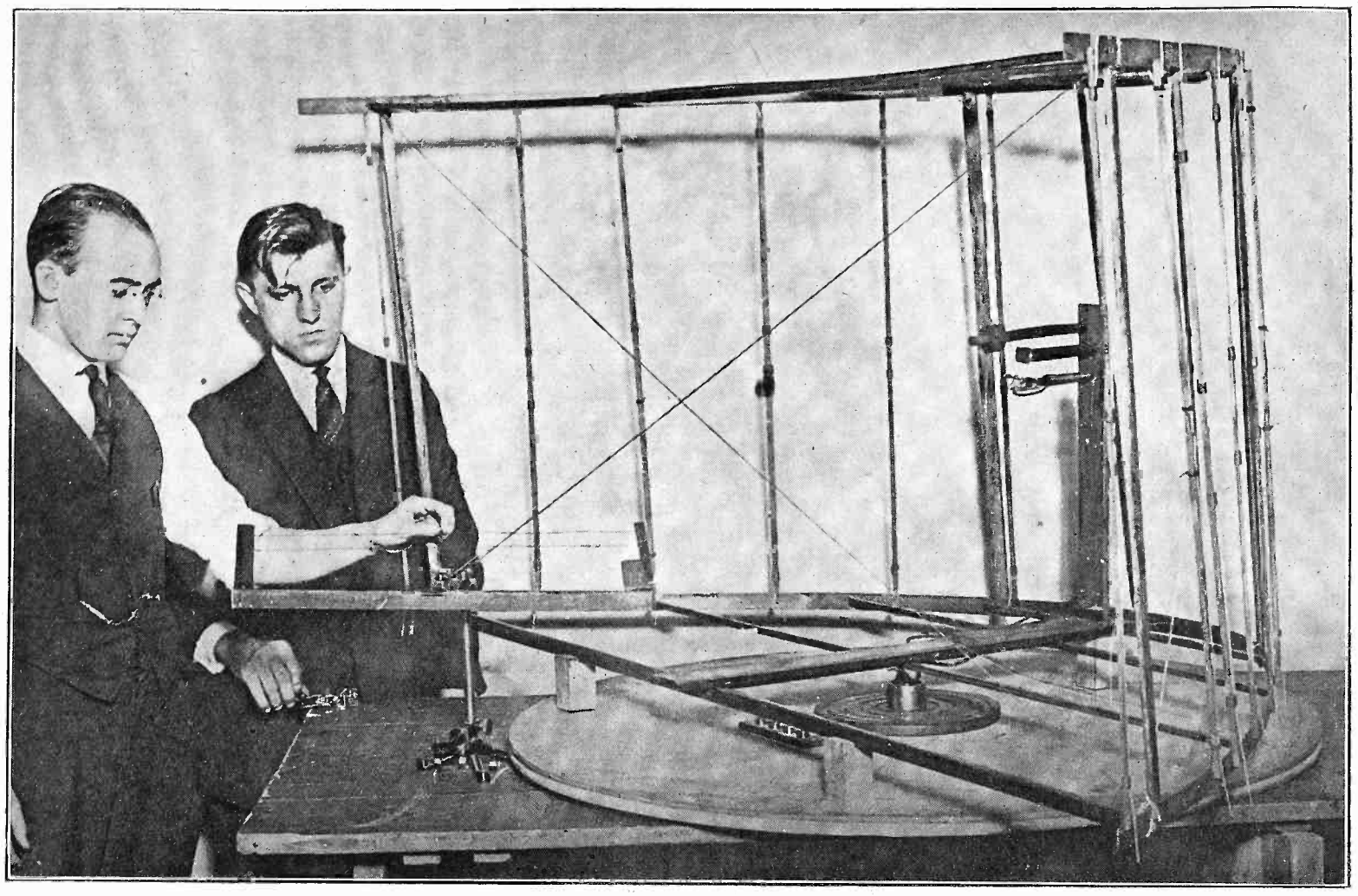
It should be fastened to the binding post in such a manner that when the receiver terminals are pulled, the tension will be on the short end of the cord and not on the wire. This will prevent the tips from pulling off, something that happens frequently when the terminals are given a sudden yank.

Electric Currents

ELECTRIC currents are produced in several ways, the two most important being by electromagnetic induction, as in the dynamo; the other by chemical action. Electric currents are moving electrons. These electrons move along a wire, thus producing the current with which we are most familiar. They also move unattached through space from one point to another. This is what happens when a flash of lightning occurs. It is what goes on in the X-ray bulb and in the vacuum tubes used in radio-telegraphy and radio-telephony.

It is possible that electric currents may move through liquid, or gas, and carry parts of this liquid, or gas, with them.

Marconi's Invention to Guide Radio



Radio and navigation experts are busy discussing Senatore Guglielmo Marconi's latest invention, the "radio searchlight," by means of which wireless waves may be focussed in a given direction in a beam, instead of being scattered broadcast. This means that Marconi's invention guides radio in a chosen direction. The photograph shows the new invention with an operator getting the wave length by a wave meter. The waves are directed by means of a reflector which throws a radio wave in about the same manner that a mirror reflects a ray of light. The set shown above is a practical model. It can throw signals a distance of twenty feet. Radio waves have been thrown by reflectors from London to Birmingham, England, a distance of ninety miles.

Reducing Strays *and* Statics

By Fred Chas. Ehlert

A GREAT deal has been accomplished by radio engineers and scientists in their effort to reduce the interfering noises caused by static and strays. At important government and commercial stations certain devices and methods are in use by means of which strays are considerably reduced.

The apparatus and methods now employed at such stations are usually too elaborate to be used at the ordinary amateur stations. One method which the amateur will find helpful in reducing certain strays is the use of a coil antenna—instead of the usual elevated antenna—and a more sensitive receiving set.

A suitable coil may be constructed by winding a number of turns of wire, with suitable spacing, on a square wooden frame about 4 feet square. Certain types of strays seem to come from a particular section, or direction. Many strays, however, have no directional properties, including those due to local electrical storms. The coil antenna has the property of receiving a stronger signal when pointed in the direction from which the signal is approaching; and of receiving only a weak signal when pointed at right angles to that direction. Thus by rotating a coil antenna to the proper position, the directional type of strays may be greatly reduced and a better ratio of signals to strays will be obtained.

The ordinary elevated antenna does not possess marked directional properties and, therefore, cannot be used like the coil antenna for stray elimination. However, the strength of the signal picked up by a coil antenna is much smaller than that picked up by an elevated antenna. Satisfactory results cannot be expected from a coil antenna unless three or more stages of amplification are used.

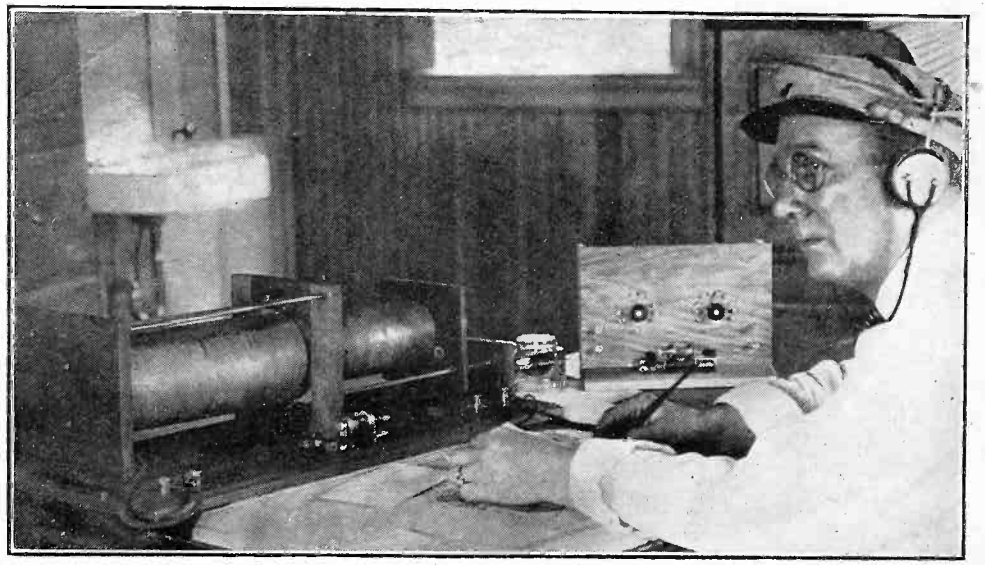
Some relief may be obtained by persons having good amplifiers by using the ground antenna. This is a long insulated-wire run in a shallow trench or on the surface of the ground. The ground wire should be run in the direction of the station from which the greater number of signals are to be received, and preferably should be several hundred feet long. Through strays of given intensity, better results may be obtained in receiving strong signals than in receiving weak signals.

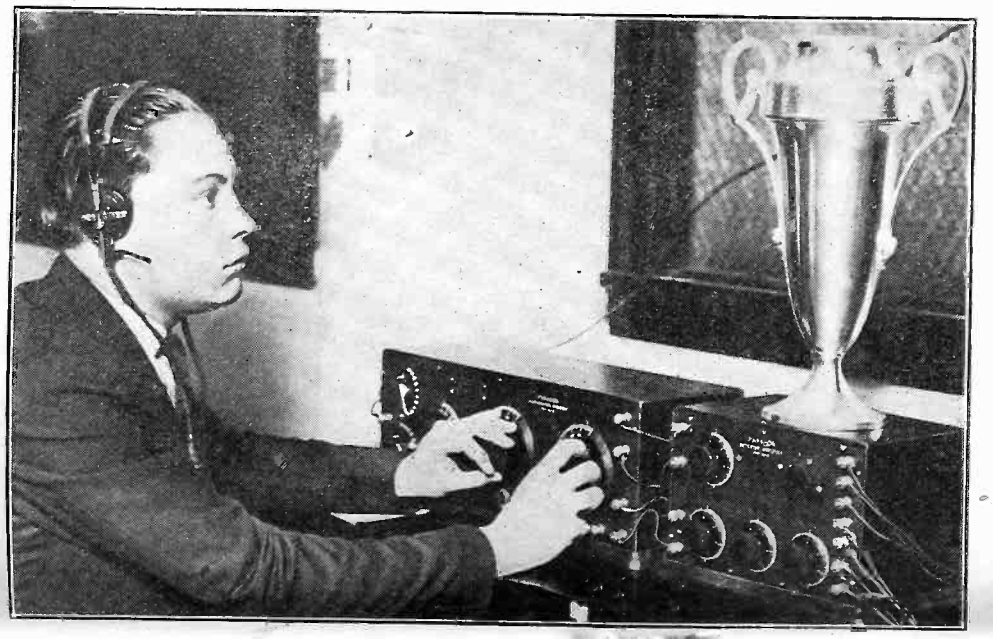
In summer, one must be content with weaker signals and should use less amplification than in the winter. If considerable amplification is used disturbances will produce noises.

Radio World's Weekly Story of the Progress of Radio as Reported by Photographers

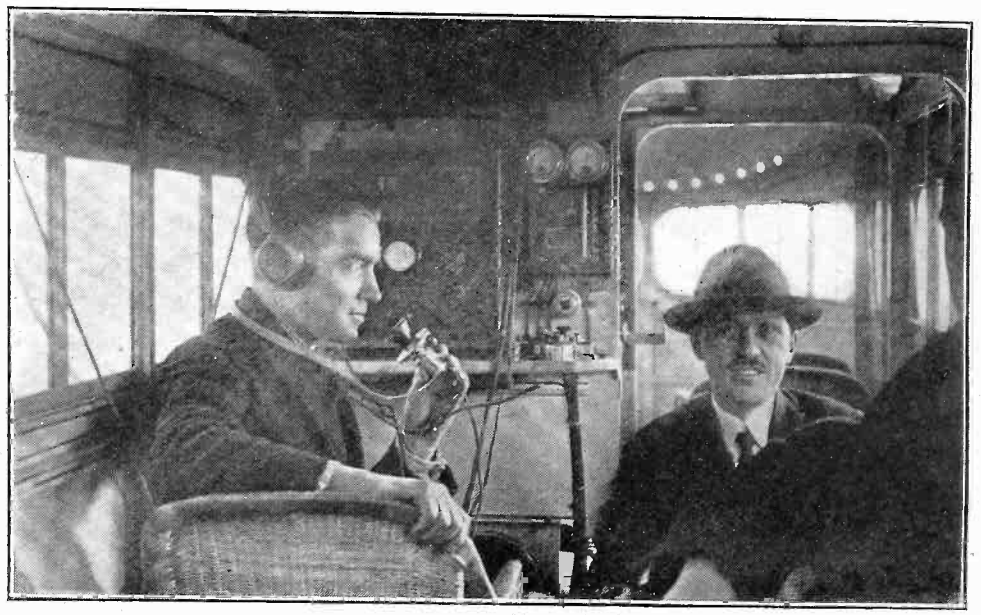
(Left): Miss Katherine G. Rice, market editor of the U. S. Department of Agriculture, photographed with the simple set she uses to check up broadcast reports.
(C. International)

(Right): George Cadwallader, New Jersey business man, and the home-made radio set he built in his spare moments. It has picked up Pittsburgh and Cleveland.
(C. Kadel & Herbert)

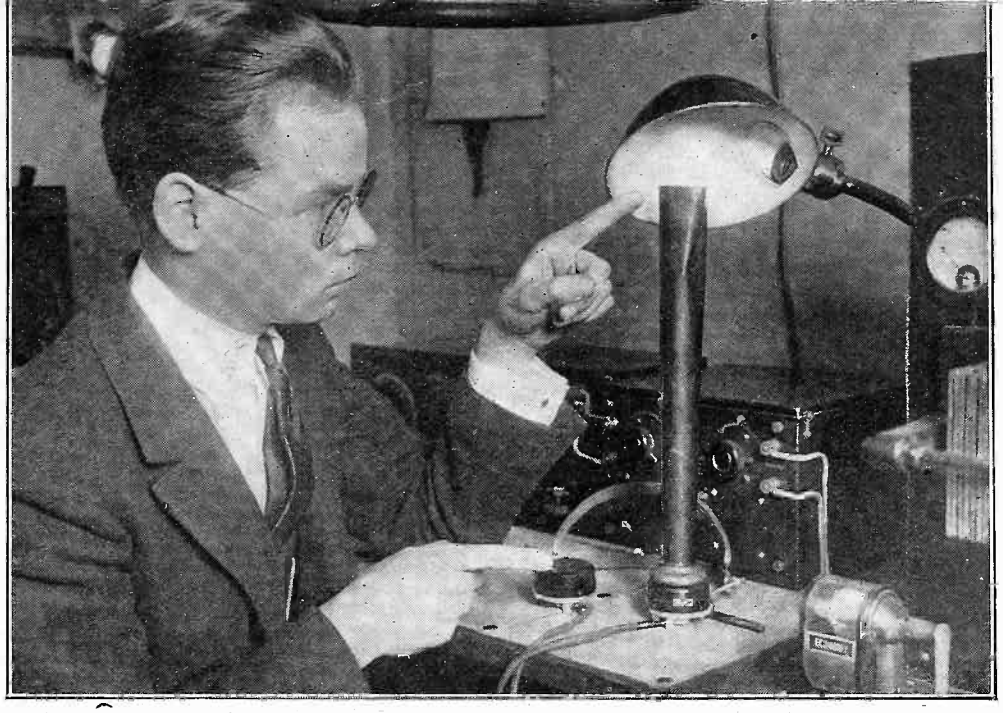




George Frost, President, Lane Technical Radio Class, and the prize-winning set he made.
(C. Underwood & Underwood)



Interior of a Farnum Airplane equipped with radio for passenger service.
(C. Keystone)



(C. Kadel & Herbert)

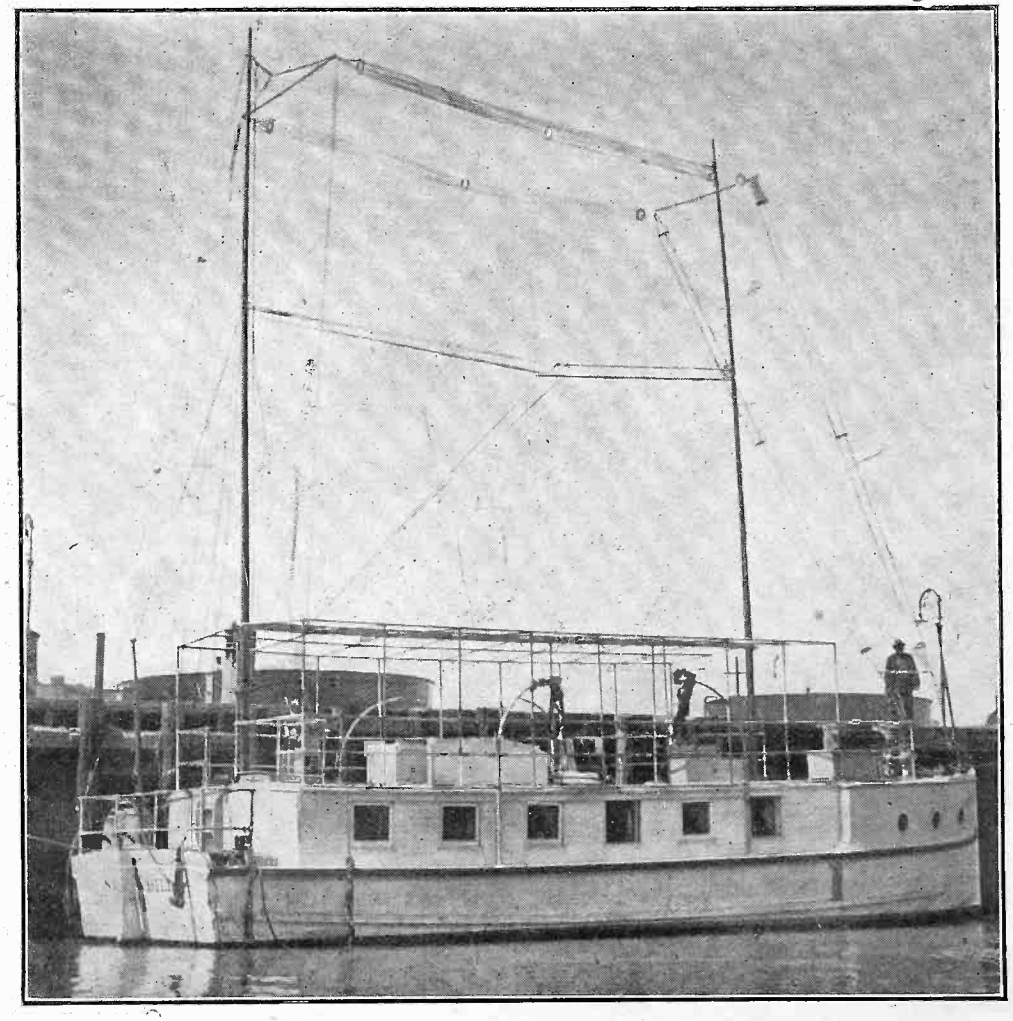
(Above): A simple yet thoroughly effective home-made loud speaker. Lay one of the receivers of your head-set on a table, face up. On top of this place anything in the shape of a toy tin horn, but hollow throughout. Unscrew the electric-light bulb from your table light and place the reflector over the horn or tin cylinder. Then tune in and listen.

(C. Underwood & Underwood, N. Y.)

Commander Stanford C. Hooper, U. S. N., is one of the chief radio authorities of the United States. Officially, he is head of the radio division of the Navy Department. When radio was in its infancy he was one of the men who boosted it as the big thing of the future.

Members of the Amateur Radio Reserve, at Bedloe's Island, N. Y. (Left to right): E. H. Felix, G. E. Burghard, Secretary Chas. J. McBrearty. In rear: Grant Layng and E. I. O'Mara.

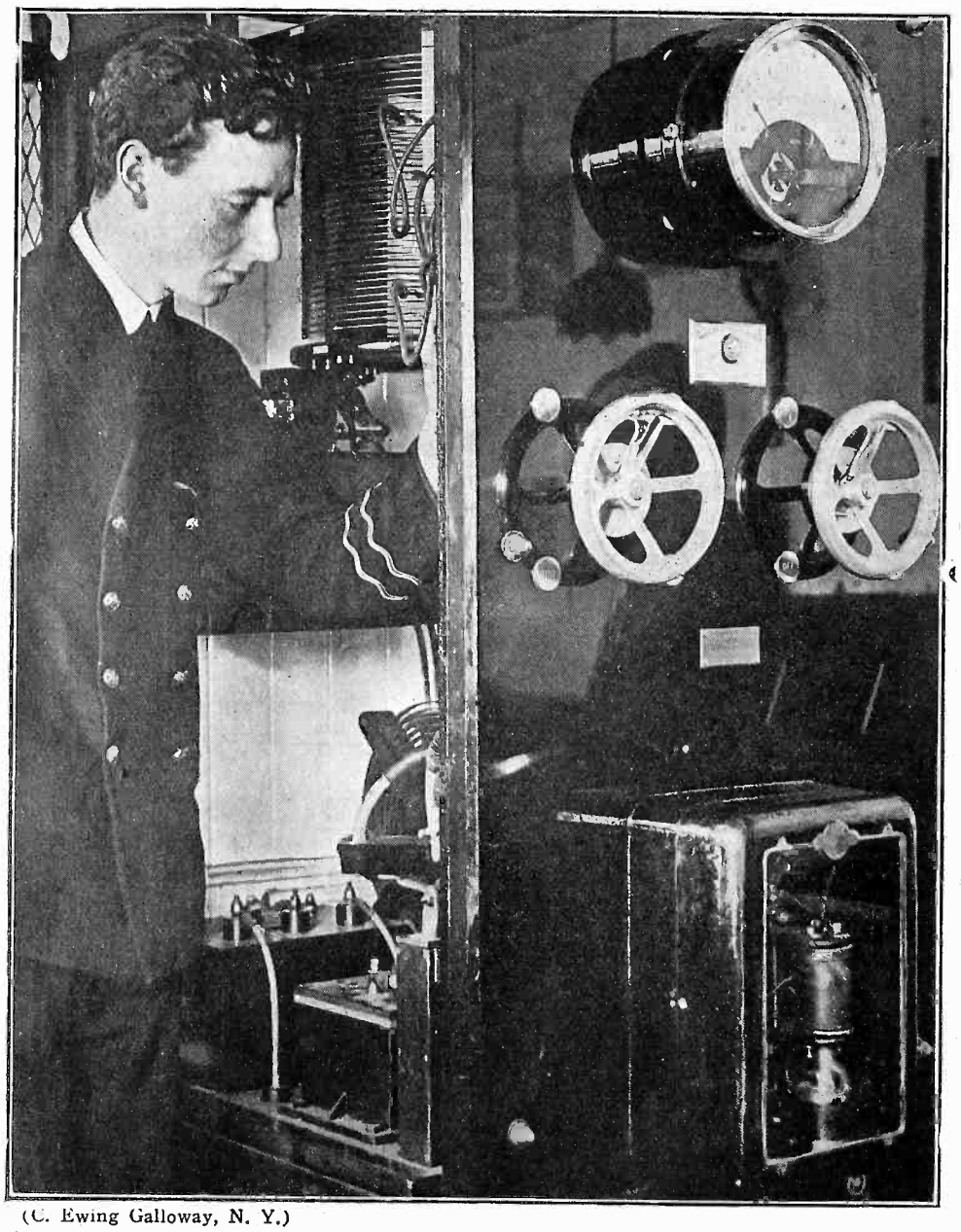
(C. Keystone)



(C. International)

Mr. Alan N. Cormack's motor-launch "Spoonbill." The above photograph shows the "Spoonbill" in San Francisco Bay, radio-equipped. With the cage aerials shown Mr. Cormack may keep in touch with all the latest news when cruising.

This Radio Compass Guided Steamer Three Days Through Dense Fog



(C. Ewing Galloway, N. Y.)

Transmitting apparatus on the liner "Orizaba," of the Royal Mail Steam Packet Company. This transmitter, along with the ship's radio compass, kept in touch constantly with shore stations of the United States Navy during three days of dense fog during a return voyage from Hamburg to New York. The transmitter has a sending radius of 1,500 miles, and the receiving outfit 4,000 miles. This equipment was put in by the Radio Communication Company, Ltd., of London. The "Orizaba" was steered through a fog that, much of the time, was so dense the navigator could not see a ship's length ahead. The liner passed many ships outside New York that were afraid to try to make port. D. McLellan, chief radio operator, is in this picture. Mr. McLellan, Third Operator E. Carmilo and Senior Second Officer R. V. Rutley did most of the work in the steering of the "Orizaba" during the three days of fog.

Talked 1200 Miles by Wireless in 1920

A. L. W. MAC CALLUM, manager of the Marconi Wireless Telegraph Co. of Canada, Ltd., in reviewing the history of wireless telegraphy, the utilities and conveniences it has provided as aids to navigation, commercial intercourse, and in the dissemination of press dispatches, states that the most sanguine supporters of Marconi did not dream that wireless telegraphy would develop to the extent it has during the past twenty years. The usefulness and value of the new system of communication were soon apparent and wireless telegraphy was at once applied by the British Admiralty and Lloyds. The advancement of the science insofar as it has affected shipping was great, and today no vessel of any size was without wireless equipment.

While holding the view that the question of safety at sea was the paramount benefit conferred by wireless telegraphy, other considerations, such as the facilities given for commercial and personal communication, and the means provided for keeping passengers informed of world events, were of such vast importance that the conditions of ocean travel had been revolutionized during the past two decades. Long-distance wireless had now been so perfected that high-powered circuits linked up every civilized country in the world. It is interesting to note that signals had been received at Melbourne, Australia, from the Marconi station at Carnarvon, in Wales, practically half way round the globe.

Wireless telephony was a natural development of the wireless telegraph, according to Mr. MacCallum, and bids fair to equal the latter in importance and usefulness. Although in its childhood, it had already made its voice heard 3,000 miles. The most notable demonstration was that specially arranged for the members of the Imperial Press Party on their voyage across the Atlantic on the Canadian Pacific "Victorian" in July, 1920. For 700 miles, direct communication was kept up with Chelmsford, near London, and when the "Victorian" was 1,200 miles from Newfoundland wireless telephone communication was established.

Our Own Broadcasting Station

OUCH for week beginning
July 3, 1922
By Robert Mackay

7:01—Cradle stories for grandparents.

7:14—"How to Have Your Thumbs Manicured," by William Pinkerton. What every payroll bandit should know.

7:22—Song: Gasoline, My Gasoline!" Words and music by the Standard Oil Company.

7.25—Trombone solos and how to cure them.

7:50—Drinking Song from "The Eighteenth Amendment."

8:02—Jack Dempsey posing for a photograph of himself.

8:16—Violin solo by the one-armed paper hanger.

8:27—What Babe Ruth said when Urban Shocker struck him out.

8:27½—Board of Aldermen distributing permits to eminent citizens to wear white socks.

8:30—New Jersey constable reading State's speeding laws to a New York automobilist.

9:30—Anti-Saloon League Quartette: (a) "Have One More With Me," Brewer; (b) "The Land Where the Wurtzburger Glows," Beer.

9:46—Smile on face of Mr. Average Citizen while reading this headline: "Your Winter Suit Will Soar in Price!"

10:00—"When I Threw Cocoanuts at Darwin," by William Jennings Bryan.

10:14—"How to Play Tiddlewinks," by Thomas A. Edison.

10:30—Beauty Talks to Deep Sea Stokers League.

10:45—Reading the current issue of the "Congressional Record," by Senator Watson of Georgia.

How to Solder Connections

(C. Ewing Galloway, N. Y.)

It is very important to know something about the simple but very necessary art of soldering when one starts to make a radio-receiving outfit. When soldering a joint these four points must be remembered:

First, the surfaces of the parts to be joined must be cleaned and polished.
Second, The surfaces should be treated with a soldering flux.
Third, The temperature of the soldering iron should be kept at the right heat.
Fourth, The metal parts should be heated with the iron, and just sufficient solder applied to cover the parts neatly.

Follow these precautions, and every joint will be a real joint. Your apparatus, connected with this care, will operate in a quiet and clear manner. In the photograph Mr. R. E. Leppert, Jr., of Harrison, N. Y., is soldering the parts of a two-stage amplifier, indicating how to apply the iron.

Radio Waves May Travel Around Earth

THE question as to whether it is possible to transmit radio signals around the world is one which has always fascinated me," said Guglielmo Marconi in his recent address before the joint meeting of the Institute of Radio Engineers and the American Institute of Electrical Engineers. Mr. Marconi discovered that "there is something in the idea of the wireless waves traveling around the earth in various ways and reuniting at the Antipodes." Sometimes these radio waves traveling around the earth in different ways re-enforce each other at the receiver, sometimes they interefere with one another. Tuning, however, overcomes the interference. The station built by the Radio Corporation of America at Port Jefferson, Long Island, Marconi found, sent waves which "preferred to travel three-quarters of the way around the earth rather than come the shortest way round."

Static, a subject to which the research engineers of the Radio Corporation of America have devoted much study in this country, was also discussed by Mr. Marconi at this meeting. He told his hearers that there are particularly violent types of static over Africa and South America, but that static did not interfere very seriously in transoceanic communication in temperate zones.

"No, I am not surprised. Radio is only a natural growth—an essential in the progress of man. It will increase in value to him as time passes.—Edison.

Radiograms

Latest Important News of Radio Garnered from the World Over, and Reduced to Short Wave-Lengths for the Busy Reader.

A CURE for cancer by the use of radio currents was announced before the meeting of the American Institute of Homeopathy, at its seventy-eighth annual session, at the Drake Hotel, Chicago. Dr. T. Howard Plank, Chicago, has performed the first treatments. He has the only machine in existence. "I use an electric scalpel—a departure in bloodless surgery," he said. "The current is the same as that used in sending radio messages. I have performed the operations with the radio current. The patient is out of bed in four or five days, and on the street in a week or ten days. Cancer operations with the knife, heretofore, have required two or three weeks in a hospital and two or three months before the patient was restored to normal condition."

* * *

Radio now lights the street lamps. "Carrier current," which travels at the speed of radio waves, and is an offshoot of the new science, has been used in Nahant, Massachusetts, to control its street-lighting system. Radio engineers proved that the street lights, four miles from the power station, could be turned on and off again by the mere pushing of a button.

* * *

Congress is about to enact new radio laws. A modified bill, presented by Representative Wallace H. White, Jr., of Maine, gives Herbert R. Hoover, Secretary of Commerce, a wide range of power to meet the changing situation until the art has been stabilized.

* * *

Freedom of the air is to be protected by a radio broadcasting society which seems to have the interests of the art at heart. This new organization, national in scope, is the Radio Broadcasting Society of America. The present headquarters are the offices of Charles Pope Caldwell, counsel of the society, 50 Church Street, New York City. The principles and bylaws of the Radio Broadcasting Society provides for the protection of the amateur, the listener in, and all others interested in radio. Its purpose is to prevent the control of patents to such an extent that progress is retarded, at the same time protecting the best interests of inventors and dealers.

* * *

Even Marconi is awed by the future of radio. He predicts that the equipment of today will be obsolete in another ten years. It was only ten years ago that Mr. Marconi selected New Brunswick, New Jersey, as a unit for his wireless company—and the event didn't create much excitement at that!

* * *

Radio has speeded up about ten per cent since them. Mr. Marconi says that it is beyond the power of the human mind to predict what man will be doing with radio ten years from now, to say nothing of a century.

* * *

Gaston Mathieu, Belgian wireless expert, is in America, the guest of Marconi. He says that America is leading the world in radio, but predicts that Europe will not be slow in taking advantage of all that this country is developing.

* * *

The broadcast program of WJZ (Newark) recently was picked up 300 miles at sea and furnished the entertainment aboard the yacht of a New York millionaire. It is reported that the sea was so calm, the owner's guests were able to dance to the music that came over the ether.

* * *

Many leading radio engineers of the world are now in America. They are here to study the advancement being made in the new science. They are a modest set of men, keenly interested in their mission.

* * *

Those who are devoting their lives to the blind hope that the radiotelephone will give every blind person the touch of companionship which their more wealthy fellow-sufferers enjoy. It is hoped that, at some hour each night, several chapters of the best books of the day may be broadcast, leading articles from the daily press read, and other instructive matter furnished through the air to those who have not the use of their eyes.

* * *

Davella, Martin County, Kentucky, has made an appeal for radio funds that it may hear broadcast sermons on Sunday mornings. Parnell Crum, treasurer of the Davella Community Organization, has made the appeal through "The World," New York. He says that the 300 human beings who live about Davella are so cut off from the outside world that a number of them believe there is no such thing as radio. Mr. Crum has raised $25. He needs about $250 more. The people are poor farmers. The village is in a mountainous district, far from a railroad, and the poor roads prevent itinerant preachers from reaching it more than three times a year. It has no church.

* * *

Weather reports for the states east of the Mississippi River are now being broadcast. Weather reports are sent by telegraph code, using 5920 arc wave-length, at 10 o'clock in the morning and at 10 o'clock at night, using a 2650 spark. The forecasts will be those for New England, New York, Pennsylvania, New Jersey, Maryland, District of Columbia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky, West Virginia and Ohio. It is expected the radio forecasts will be picked up by amateurs and other operators for rebroadcasting by radiophone.

* * *

Radiotelephone communication between New York and London is only a matter of a few years. Marconi says that the accomplishment of this feat depends wholly on scientific investigation, the demand for such a service, and development of electric power strong enough to hurl the spoken word across the Atlantic.

* * *

A ninety-per-cent efficient radio connection is in operation between Berlin and New York. The gigantic stations—able to receive and send at the same time—work twenty-four hours a day. Each word sent out travels 3,000 miles through the air in the fraction of a minute.

* * *

It would cost over $5,000,000,000 to send a radio message to Mars. And it would require 1,500,000 kw. on a 20,000-meter wave length. The message would travel the distance in less than four minutes. These highly interesting observations are based on information from Commander S. C. Hooper, in charge or radio communications of the United States Navy.

* * *

Two new radiophone ideas were introduced in Pittsburgh last week. (1) Radio music was used for the first time in a dancing academy. (2) Moving-picture houses flashed a simplified course entitled, "How to Make a Homemade Radio Set."

* * *

Paging guests by radio has been tried in a Boston hotel. Manager McCarthy, of The Essex, claims that the radio method gives more efficient service. Instead of the absolutely incomprehensible pronunciation of the "bellhop," the nomenclature of the desired patron is uttered in clear and distinct tones through a radio device attached to the hotel switchboard.

* * *

Radio apprehended a California crook trying to make his getaway aboard the outward-bound liner "America" last week. The police boat, "John F. Hylan," rushed after the speeding steamer, her radio call announcing her mission. Despite the tide, the big steamer slowed down while the police boat steamed alongside. Sleuths ran up the ladder. The culprit was located and brought back to face his accusers. Thus radio and retribution go hand in hand.

* * *

For the benefit of its 500 inmates, the New Jersey State Reformatory for Boys will install a complete radio-receiving outfit. "Good conduct" boys only will be permitted to attend.

* * *

A radiogram startled Mr. William Johnson, popularly known as "Pussyfoot" Johnson, prohibition plenipotentiary to the world, in his cabin aboard the Europe-bound steamer, "Scythia," last week. Before his departure, Mr. Johnson told a reporter for "The World," that he was not absolutely opposed to light wines and beer, and that he liked a glass of rye as well as anyone else. Ransom H. Gillett, general counsel for the Association Against the Prohibition Amendment, radioed Mr. Johnson congratulations and invited him to join the association in its work. Mr. Johnson declined by radio.

* * *

One of the twelve Pullmans carrying the Mystic Shriners, of Cincinnati, to the convention in Los Angeles, was equipped with radio. Aerials, 160 feet long, were swung eight inches above the car's roof. Broadcasting was heard daily, and the long-distance record was made at Santa Barbara, California, when the radioman picked up messages from the United States station at Annapolis, 3,000 miles away.

New York Radio Pilot Cable Found O. K.

A RECENT test of the radio piloting-cable in Ambrose Channel, New York Harbor, showed that the mass of a large steel ship does not materially affect the audibility of the signals picked up from the cable, and that greater power in the cable is not necessary.

By means of underwater sound-detecting devices, a ship is enabled to keep practically over the submerged cable from which signals are constantly sent out through the water. There is a receiver on each side of the ship's bottom, and when one signal is weaker than the other the course is changed slightly until they are equal in intensity. In this manner a ship can proceed up the Sound even in dense fog.

As only tests with comparatively small steel vessels and tugs had been conducted by the Navy Department heretofore, it was feared that the mass of a large steel ship would absorb the magnetic field set up by the cable with the result that no signals would be picked up by the ship's receiving coils. The experiments, which were conducted by Naval officers from New York on the U. S. S. "Manchuria," also demonstrated that in the case of two ships passing each other, the absorption of the second ship would not reduce the strength of the signals received by the first.

Marconi Explains His "Talks with Mars"

NO doubt the public will always associate Senatore Guglielmo Marconi's famous radio-equipped yacht, "Electra," with the reports sent out that he was endeavoring to communicate with the planet Mars, because of the great power of his instruments. This is due to the remarks which Marconi jokingly made while discussing the subject with a newspaper man, in Europe, who was not acquainted with radio.

At the time, Marconi announced that he had succeeded in recording electromagnetic waves 150,000 meters in length while his yacht was in Mediterranean waters. Waves of this length had never before been recorded, and special apparatus was necessary to get them.

In discussing the matter, recently, Mr. Marconi said: "I was only joking when I said in amplification of this was: 'These My little joke was taken seriously. What I said in amplification of this was: "These very long waves are entirely different in their characteristics to any that are produced on the earth.' I was quite convinced that they came from outside the world. Just what they were I have no idea. They might be the result of some vast electrical disturbance in the planets, or from the sun."

Radio Merchandising

Let "Radio World" Test Your Goods

If They Are Right, Our Endorsement Will Help You Sell Them

MANY buyers of radio goods have been "STUNG." Have at some time bought something that was not right or would not work.

Inexperienced manufacturers have rushed into the manufacture of radio goods in the past six months while the public in its eagerness to buy has been willing to take almost anything. Buyers are now twice shy and cautious. They want to KNOW the goods are right before parting with their money.

Our seventy thousand radio buyers who read RADIO WORLD each week, have faith in it. They know that RADIO WORLD does no merchandising, has nothing to sell, that its opinions cannot be bought. Therefore, RADIO WORLD'S endorsement means something.

Manufacturers, send a sample of your goods to our Technical Editor, Fred Charles Ehlert, 9006 Pleasant Street, Queens, Long Island, N. Y. It will be carefully tested and returned. If your goods satisfy our experts, RADIO WORLD'S endorsement will be published in our merchandise department without charge or obligation of any kind on your part.

Radio at Business Conventions

A NOVEL feature will be added to two conventions of business men on July 11 and 12, if the present plans of the Department of Commerce carry. The New England Shoe and Leather Association Exposition and an import and export exposition, are to be furnished by radio with the latest news of foreign markets and trade opportunities, through the Arlington Radio Station. This information, received from abroad by the Department of Commerce, will be broadcast from Arlington (NAA), July 11 and 12, at 8 p. m., on a wave length of 2650 meters.

Is Radio "Hardware?"

JUST how does this radio wave affect the retail hardware merchant? Just how far should the progressive merchant go in his effort to get his share of the tremendous radio business now and hereafter? Is radio logically within the province of the hardware merchant?

On the fact of it, it seems obvious that radio apparatus and equipment should come under the general heading of "hardware." In the smaller outfits, where no electrical current is used, this is easily seen. In te larger radio sets, where batteries are necessary for best results, these outfits might be termed "electric supplies." But "electrical supplies" and "hardware" are accepted as within the same general category. Further, most hardware men find it practical as well as profitable to carry both classes of goods —Alex Eisemann, treasurer, Freed-Eisemann Corp.

To Whom It May Concern

EDITOR, RADIO WORLD:—We have received a letter and circular describing a Permanent Radio Exposition, a Radio Dance Hall, and a Radio Theatre, and stating that these will occupy an entire floor of Grand Central Palace.

This was sent out by Aubrey Kennedy, of 516 Fifth Avenue. He calls it a "Radio Rendezvous." He further states that 30 per cent. of the space is already optioned by equipment manufacturers.

No lease has been made with Aubrey Kennedy, nor has any application been made by him or by anyone else for a permanent Radio Exposition, or Radio Dance Hall, or Radio Theatre in Grand Central Palace.

We are informed he has sent similar letters and circulars to radio dealers.

The above information is being sent to you in order that you may advise your readers and advertisers who manufacture or deal in radio equipment, of the facts.

We have, however, leased the Grand Central Palace to the America Radio Exposition Company for a large International Radio Exposition, to be held December 21 to 30, 1922.—(Signed) Robt. M. Catts, president.

Spark Sets for Sale

THE Shipping Board is offering for sale 78 complete radio spark sets formerly used on its wooden war fleet, and estimated at a total valuation of $250,000. The sets are ½, 1 and 2 Rw. sets and include transmitters, batteries, and generators. They are located at Norfolk, Virginia, and may be examined by applying to B. N. Rock, 1025 Water Street.

New Firms and Corporations

Notices in this department are considered as purely interesting trade news and published without compensation to us. We welcome trade news of this nature. All notices having an advertising angle are referred to our Advertising Department, and are placed under Classified Advertising at 5 cents a word, or as Display Advertising at $5 an inch.

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

The Gopher Radio Corporation, a $50,000 organization for the manufacture of radio products, filed its records at St. Paul, Minn., on May 26, 1922. Henry E. Horowitz, 915 Merchants Bank Building, St. Paul, Minnesota.

Electrad Corp. of America, Manhattan, general merchandise, $10,000; M. H. Cooley, S. V. Shoule, L. O'Connor. (Attorney, J. L. Pinks, 233 Broadway, N. Y.)

Duplex Radio Phonograph Co., New York, instruments, $500,000. (Registrar and Transfer Co.)

Radio Magazine Corp., Manhattan, $50,000; F. Ciapetti, L. Benedette, D. Seals. (Attorney, S. J. Isaacson, 59 Wall St., N. Y.)

Intercity Radio Telegraph Co., New York, has increased its capital from $1,000,000 to $5,000,000.

Standard Wireless Instrument Co., 617 North Goodman St., Rochester, N. Y. R. T. Searing, president and manager.

A. C. Lopez & Co., 334 Fifth Ave., New York, N. Y. "Started recently as a radio contractor and purchasing agent, and going good," writes Mr. Lopez.

The Chicago Radio Laboratory, 332 South Michigan Ave., Chicago, manufacturers complete radio receiving sets. "We are the only manufacturers in the Middle West licensed to manufacture under the Armstrong patents. Our present output is more than 300 receiving instruments per day. Every set as shipped by us is complete, including batteries, headphones, tubes, etc.," writes Mr. P. A. Riley, of the company.

Jones Radio Corp., Brooklyn, $50,.00; R. A. MacLean, F. H. Butethorn, J. L. Watson (attorney, F. J. Knorr, Albany, N. Y.).

Independent Radio Manufacturers, New York, information in the radio art, $5,000. (U. S. Corporation Co.)

Radio in the "Movies"

RADIO Films, Inc., 6381 Hollywood Boulevard, Los Angeles, California, is producing a series of two-reel educational comedies based on the science of radio. Each picture will teach a direct lesson as to the construction and operation of various kinds of receiving and transmitting radio-apparatus.

In the first three series, the Hatton boys are featured in the main roles; and the pictures, in addition to portraying an interesting story with educational value, have a question-and-answer department, in which Radio Films shows, by actual operation and animation, the answers to knotty problems that confront the embroyo radio fan. The radio apparatus used in the pictures actually works and is not props, the instructive sub-titles spoken are correct.

Otto K. Oleson, vice-president of the company, is an electrical engineer, and is manufacturing radio apparatus and all instruments are constructed under his direct supervision.

Trade Notes

IT has recently been estimated that radio business will reach the $70,000,000 mark this year. Inasmuch as government officials look for many times as much business next year, the enormity of radiotelephony's importance can be grasped at once.

* * *

Jacob Loving, of 610 Broadway, New York City, was high bidder for the 30,000 surplus vacuum transmitting tubes offered for sale by the Navy department at Brooklyn. He bid $4.0069 each, for all or none. The lowest bid was 10 cents each, made by L. M. Alexander, of Cincinnati.

Answers to Readers

WHERE may I buy a radio-frequency transformer capable of handling waves from 150 meters to 25,000 meters? Should a panel be wired with bare or insulated wire? Which do you consider the best vacuum tube—radiotrons or A-P tubes?—Maxwell Murphy, Eastport, Maine.

Radio frequency, being in a stage of experiment, is one of the important problems fazing the radio experts of the country. At present, there is no radio-frequency transformer made that will cover the band of wave lengths you state. These transformers differ. One transformer will operate on a certain wave of 360 meters, while others operate on 400 and 500 meters. Radio-frequency transformers have not yet been developed to respond to a wide band of wave lengths.

A panel will work and appear much better if the wiring is insulated and run through spaghetti tubing.

Regarding the tubes now on the market, it seems to be a hard debate which is the better of the two. In some recent letters received, the radiotron was used with amazing results; while, on the other hand, preference was given the A-P tube.

I believe if either tube is used correctly, satisfactory results should be obtained.

* * *

I have a 65-foot aerial wire, a tuning coil, crystal detector, fixed condenser and telephone. The only thing I hear is a humming noise, similar to a telephone hum. What is this? What should I do to hear music or, at least, code?—William C. Utz, Westminster, Md.

Your diagram is not drawn clearly. I refer you to RADIO WORLD, No. 13, dated June 24. Read the article, "How the Crystal Detector Is Used to the Best Advantage," by C. J. Williams. Be sure you do not connect your ground on the same ground with telephone wires.

* * *

I have a crystal set consisting of a loose coupler which I built myself. The primary is 8 inches long and 5 inches in diameter; the secondary is 7 inches long and 4½ inches in diameter. I have fixed condenser, crystal detector, and 2000-ohm phones. How is that I hear WJZ (Newark, N. J.), but not WVP., Fort Wood, N. Y.?—William Oetjen, Ingleside, N. Y.

Fort Wood operates on a wave length of 1450 meters, and you should seek this wave length. Evidently our aerial is short, or you are not tuning sharply enough. We suggest using a 23-plate variable condenser in shunt to primary and secondary.

* * *

Why is it that I cannot hear Newark, N. J., with the following equipment: 40-foot aerial, 2-slide tuning-coil, variable condenser, 2 fixed condensers, crystal detector, and 2200 phones.—Donald Mershrad

Evidently you have wrong circuit. See RADIO WORLD, dated June 10, No. 11, in which George W. May describes the single- and double-slide tuning coils.

* * *

What is the wave length of my set. Primary, 8 inches long by 3 inches in diameter; secondary, 8 inches by 2½ inches? No. 24 wire was used on the primary, and No. 28 on the secondary.—Joseph Murck, Philadelphia, Pa.

The wave length of this set should enable you to receive up to about 2000 meters. This would cover all the broadcasting stations using high wave lengths.

* * *

Would a two-wire aerial, 60 feet long work better if connected at both ends? What would be the advantage?—Harold Farasch, Poughkeepsie, N. Y.

An aerial of this type will work well either for receiving or transmitting; but preference is shown for transmitting. For receiving a long-wire aerial is far superior.

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.

ANNUAL SHOW OF THE ST. LOUIS RADIO ASSOCIATION, St. Louis, Mo., October 4 to 7, inclusive.

CHICAGO RADIO SHOW, Coliseum, Chicago, Ill., October 14 to 22. U. J. Hermann, managing director, 549 McCormick Building.

INTERNATIONAL RADIO EXPOSITION, Grand Central Palace, New York City, December 21 to 30.

KANSAS RADIO EXPOSITION will be held at the Kansas State Fair, Hutchinson, Kansas, September 16 to 22 inc. A. L. Sponsler, secretary.

MERCHANTS' COOPERATIVE ADVERTISING AGENCY RADIO SHOW, Robert Treat Hotel, Newark, N. J. Date not set. Will be held late this year.

"RADIO DAY," Pittsburgh, Westview Park, August 24. Under auspices of Radio Engineering Society. C. E. Urban, secretary.

RADIO CLUB OF AMERICA. First autumn meeting will be held the last Friday in September. Renville H. McCann, secretary, Columbia University, New York.

Navigating the Directed Wave

SO many Americans are interested in radio broadcasting that, in describing before a group of engineers his new apparatus for directing radio waves, says *The World,* New York, Mr. Marconi addressed through press reports an unusually large non-scientific audience capable of catching the possibilities of the device.

Broadcasting Mr. Marconi compares to diffused sunlight; directing radio waves to the searchlight, concentrated in intensity and thrown far in a pencil of radio-activity by the reflector. A system "to a very large degree secret" which can thus direct the waves should succeed in reducing the danger of jamming the air by conflicting currents of similar wave length sent broadcast. In navigation the directed waves, repeated from the receiver, could be made to reveal the exact bearing of a lighthouse in case of fog, and even its distance from a ship at sea.

In the opinion of specialists, the astonishing development of air communication since the war is only at its beginning. It seems probable that the most useful developments of the immediate future will be aimed rather at precision than power; rather at means of preventing clashes in the use of the air than at sensational and exceptional feats of girdling the earth. Decidedly the pencil-radio idea has possibilities.

Ripples vs. Billows in Radio

IN wireless, electric energy is flashed into space in waves. The distance from one wave crest to another is called "the wave length." It is usually expressed in meters. In these days, when radio is attracting millions, the wave length may be anything from 200 to 20,000 meters. In other words, the ether of space is shaken into terrific billows compared with which the mightiest upheavals of the ocean are mere ripples. As far back as 1895 and 1896, Marconi obtained some promising results with waves not more than a few inches long. He has returned to his original idea of using short waves for further experimenting.

Resonance Wave-Coils

DESCRIBING the device known as resonance wave-coils, Dr. Louis Cohn, consulting engineer of the United States War Department, said that it is practically, a long coil, the length of the wire used being comparable to the length of the wave which is being received. The coil which stands vertical is enclosed with short metal tubes which slide up and down the coil, and are grounded through certain circuit arrangements which act like a drain for the static currents but permit the signals desired to be received to pass through to the detecting instrument. The device can be used either with a lighting circuit used as a receiving antenna as described by Major-General George O. Squier, U. S. A., or in connection with a regular receiving aerial. A great future is seen by experts for the recently developed static eliminator, as by grounding the noisy static, which has interfered with the reception of radio signals for years, the incoming signals are left clear and distinct.

First 14 Numbers of Radio World

If you did not get copies of Radio World No. 1 to No. 14 send us $1.80 and we will send you this paper for one year, ($6.00 for 52 issues) and start it with our first issue, which will be mailed you as soon as possible after receipt of order.

Do Motor-Cars Interfere with Radio?

MARCONI has made the claim that, when very short waves are used, disturbances caused by static can be said to be almost non-existent and the only interference comes from the ignition apparatus of automobiles and motor-boats. "The day will come when we will have to screen our ignition systems or carry a government license for transmitting," he says.

Marconi's Radio Lighthouse

MARCONI claims that a revolving transmitter and reflector will act as a kind of wireless lighthouse, or beacon. "By means of the revolving beam," he says. "it is possible for ships to ascertain in thick weather the bearing and position of the lighthouse."

A Family Radio Success

WE inspected a combination radio and wireless receiving and sending station in the home of a Lincoln resident recently," said the editor of *The Nebraska Farmer*. "The two boys in the family, with the help of their father, have installed the apparatus, and with the key, that is the telegraph code, they have been able to communicate with every State in the Union. Through the radiophone they have heard clearly concerts from Detroit, and Pennsylvania cities, and other distant points. On one occasion their voices were heard at a point nearly 1,000 miles away."

Latest broadcasting map, 15c. That is, a complete broadcasting map appeared in RADIO WORLD, No. 8, dated May 20. Mailed on receipt of 15c. Radio World Company, 1493 Broadway, New York City.

National Radio Club Organizing

PITTSBURGH—A club that seems destined to play a big part in the future of radio is being organized here. While one of its fundamental purposes is to promote and finance the installation of radio equipment in hospitals, it will also use its influence to keep the broadcasting art on its present high plane; enlarge musical and educational radio programs; keep all members informed regarding developments, improvements and news of interest regarding radio; answer, without charge, all technical questions asked by members; receive and file articles written by members for reference; lend the moral support and influence of the club to those agencies endeavoring to eliminate the confusion of signals; promote fraternity and good fellowship among members with the aid of a distinctive official button and card of membership. It is to be called the National Radio Club. It proposes to weld the nation's army of radio enthusiasts into one compact body.

The organization committee includes Harold B. Coe, New York City; Charles W. Payne, Philadelphia; F. R. McCray, Los Angeles; Otto J. Palm, Cincinnati; R. Gordon Craig, Ray Mansmann, and Francis G. Albertson, Pittsburgh; radio enthusiasts who are sparing no effort to promote the interest of radio transmission.

Although the club has been assured the hearty co-operation of large manufacturers it will maintain a strictly neutral attitude in all matters of equipment. Its officers and directors will be selected from radio enthusiasts not engaged in making or selling radio apparatus.

A nominal membership fee of $2 will be asked. Applicants should address Francis G. Albertson, secretary, 419 Fulton Building, Pittsburgh, Pennsylvania.

First Radio Waves Produced in U. S. in 1871!

TWELVE years before Heinrich Hertz announced his radio discoveries, Professor Elihu Thomson, a professor of chemistry in a Philadelphia high school, produced and operated the first apparatus to transmit electro-magnetic waves through space without wires.

This statement is made by Professor L. M. Knoll, now head of the physics department of the Central High School, Philadelphia. According to Professor Knoll, it was Professor Thomson, now director of the Thomson Research Laboratory of the General Electric Company, in Lynn, Massachusetts, who successfully demonstrated that electrical impulses may be transmitted without the use of wires, at least twelve years before the announcement by the German scientist, Heinrich Hertz, of the University of Bonn. Hertz, in 1887, informed the scientific world of his discovery that electro-magnetic waves sent out by induction coils or other suitable apparatus may be caught by a receiving apparatus without the use of wires.

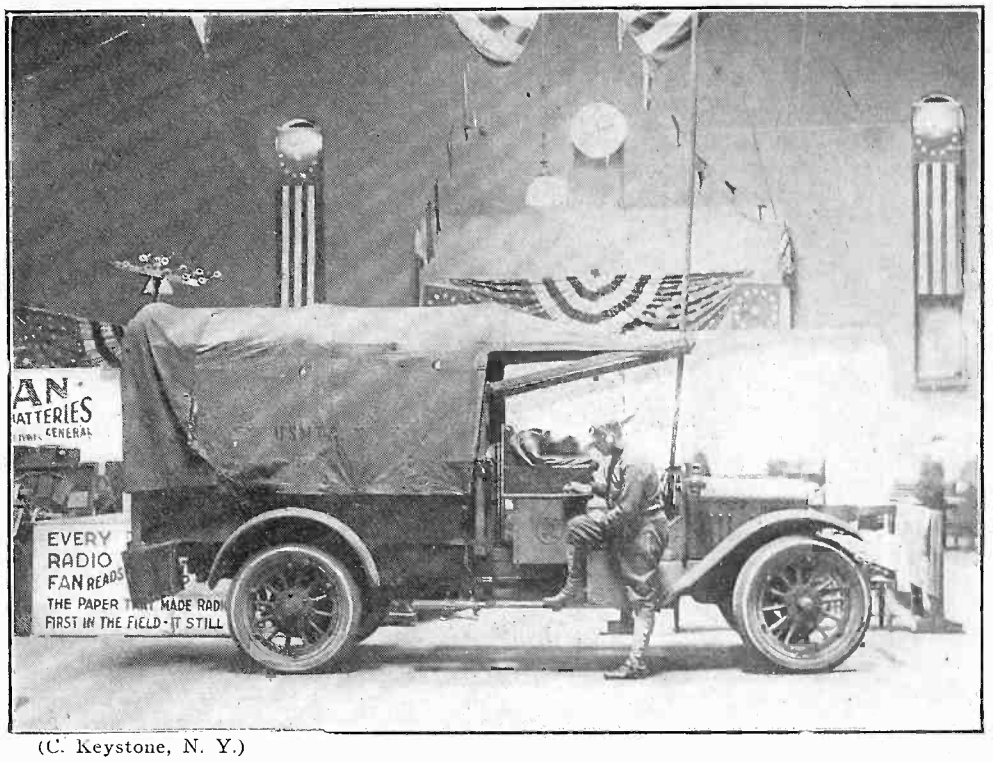
Following up the experiments of Hertz, Senatore Marconi produced the first practical wireless apparatus and adapted it to commercial use. Professor Thomson, according to Professor Knoll, made no practical application of his work, but conducted it solely as an experiment.

In "The General Electric Review," May, 1915, Professor Thomson describes his experiments with the first radio set. His statements are corroborated in an article in the issue, dated March 20, of the same publication, by Professor Monroe B. Snyder, a former instructor in a Pennsylvania high-school.

In the early issues of the *Journal of the Franklin Institute,* for 1876, appear articles by Professor Thomson describing radio experiments begun as far back as 1871. Credit is given by Professor Thomson to his colleague, E. J. Houston.

Fifty-two issues for $6.00. Sub. Department, Radio World, 1493 Broadway, N. Y. C.

Army Truck Radio Equipped



(C. Keystone, N. Y.)

At a recent radio show in Greater New York an object of interest was an army truck radio-equipped. The mast, as shown in the photograph, is erected in front of the wheel. It rests on, and is fastened to, the motor foot-boards. The aerial is aloft and degrades down to the post, well-insulated, at the rear of the truck. With this arrangement signals can be received while en route.

Broadcast Bill's Radio-lays

By William E. Douglass

(Copyright, 1922, Westinghouse Electric & Manufacturing Co.)

THE other day I read about a certain brand of milk, the kind you buy in cans, you know; they said 'twas fine as silk. Their reason wuz, "Contented Cows." I couldn't quite decide just where they got their argument, 'cause I've always tried to give ours lots of pasture, and a special brand of feed; an' that's as much as any self-respectin' cow should need. I had the barn rebuilt

an' got it fixed up purty nice; I'll get a patent milker, too, when I can stand the price. The house an' barn an' all th' sheds are wired for 'lectric light; it's dern near like a city when they're all lit up at night. I figgered an' I figgered what could that "contented" mean, then all at once an idee percolated through my bean. They say that Tommy Edison don't ever sleep a wink when workin' on a big idee, stays up all night to think. Well, mebby so, but just the same, I'll bet a new straw hat, he sleeps straight through fer 'bout a week to get caught up at that. I come to the conclusion since their place to eat an' live seemed satisfactory all right 'twuz up to me to give my cows some entertainment. Now you see the reason why I got my set hooked up to give my radio a try. I fixed a pair of earmugs so they'd fit on bossy's head; in evenin's now, at milkin' time out yonder in the shed, ol' boss an' me we "listen in" to singin' er a band. My cows are as "contented" now as any in the land. A few of my good neighbors wondered what results would be by milkin' a la radio, but you can plainly see that all the time they're listnin' they are standin' purty still an' fer a week er more I haven't had a spill. I don't mind milkin' and more since I can sit an' listen to stuff that's bein' broadcast I'd otherwise be missin'.

Radio Puts Over Real-Estate Deal

Unable to dispose of a good, but not modern, house in Dallas, Texas, notwithstanding alluring offers which brought no bidders, an enterprising real-estate operator equipped the old mansion with the very latest radio receiving set and so advertised in the leading paper. Replies came immediately and from dozens of offers he was able to dispose of the house with a good profit.

RADIO WORLD

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Add $1.00 a year extra for postage to Canada and foreign countries.

Receipt by new subscribers of the first copy of RADIO WORLD mailed to them after sending in their order, is automatic acknowledgment of their subscription order.

Advertising rates on request.

Entered as second-class matter, March 28, 1922, at the Post Office at New York, New York, under the act of March 3, 1879.

The Lure of Radiotelegraphy

The novice is now beginning to realize that the wireless telegraph stations, after all, have a definite mission to perform, and, moreover, he is becoming very interested in the nature of this mission, says a writer in *The Tribune*, New York.

As a matter of fact, these telegraph stations are themselves engaged in broadcasting also, and the material they send out is particularly interesting. In a great many cases is consists of the very latest news which is being sent broadcast for the benefit of ships at sea, and this news matter is several hours ahead of the news sent out by the radiophone broadcast stations. It would be of extreme value to the rural dweller, and also interesting to the city resident. Of course, the news is only in bulletin form, but it carries a little more detail than does the radiophone broadcast.

In addition to this there is the lure of listening to European wireless stations. Unless the novice can read the Continental telegraph code he cannot tell what station he is listening to, and there are plenty of times that he may be actually listening to a European station without knowing it.

The European stations, and, also, the American stations which are engaged in trans-Atlantic work, use very long wave lengths, ranging up to 15,000 meters, but these wave lengths are not beyond the receiving apparatus of some novices. There is another class of station operating on much lower wave lengths, which also send out news. These are stations similar to the navy yard stations, which operate on waves up to 2,000 meters. Arlington, which can transmit across the Atlantic, for instance, operates on 2,500 meters, sending out general information to ships at sea.

Latest broadcasting map, 15c. That is, a complete broadcasting map appeared in RADIO WORLD, No. 8, dated May 20. Mailed on receipt of 15c. Radio World Company, 1493 Broadway, New York City.

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Radio Patents

Just Issued

JOHN R. CARSON, New York City, has invented a translating circuit for signaling systems. It provides for a translating arrangement for modulating high-frequency oscillations, the modulating means comprising a two-element vacuum tube, or other equivalent device, having unilateral conductivity. Another object of the invention is to provide an arrangement of this character capable of use either as a modulator of high-frequency oscillations in accordance with signal waves, or as a modulating detector for detecting, in accordance with the

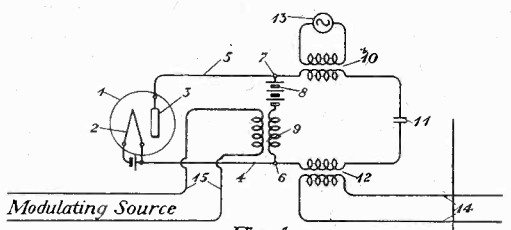

Fig. 1

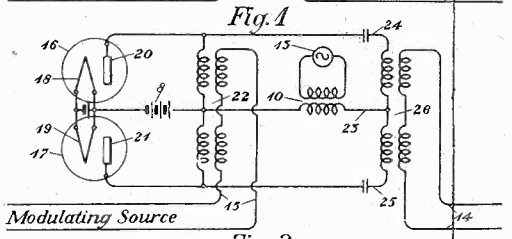

Fig. 2

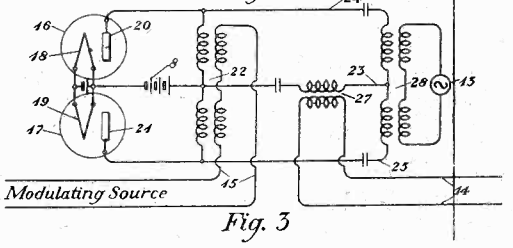

Fig. 3

Schematic diagram of the Carson translating circuit for modulating high-frequency oscillations.

homodyne or heterodyne system of receiving modulated high-frequency oscillations transmitted from a distant station. Still another object of the invention has reference to the provision of a translating arrangement of the character just described in which the unmodulated oscillations are ineffective upon the outgoing transmission circuit when the variable modulating source is inactive, so that when the arrangement is used as a modulator, the amplitude of the transmitted oscillations will be directly proportional to the amplitude of the modulating waves.

Let Your Bed Springs Be Your Harp

IT is not at all necessary to be dsicouraged if you live in the kind of apartment house where the landlord is unalterably opposed to have antennae hung up on the roof. The old, and generally serviceable trick, is to rig your receiving set to your bed-spring, using that as an antenna. If you have a fairly efficient set, or even one of the very small detector outfits, satisfactory results from this hoo-up may be expected. If your bed-spring is not available, you can still use your fire-escape as an antenna—only first be sure that you scrape the paint clean from the point where you connect your detector.—*Hardware Dealers' Magazine.*

Subscribe for RADIO WORLD. $6.00 a year, $3.00 six months, $1.50 three months.

RADIO WORLD'S QUICK-ACTION CLASSIFIED ADS

This department is intended for everybody who wants quick action on short announcements covering the buying, selling, exchanging or general merchandising in the radio field. Readers of RADIO WORLD will find that it pays to read these columns every week. Advertisers will get a ten-day service here—that is, copy received for this department will appear in RADIO WORLD on the news-stands ten days after copy reaching us.

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 standing classified advs., if copy is received at this office before 4 P. M. on any second Tuesday preceding date of publication. RADIO WORLD CO., 1493 Broadway, N. Y. C. (Phone, Bryant 4796.)

Exchange jolly interesting letters through our Club! Stamp appreciated. Betty Lee, 4254 Broadway, New York City.

Manufacturers of Rogers Radio Receivers and Rogers Receiving Radiometers. Rogers Radio Company, 5133 Woodworth Street, Pittsburgh, Pa.

High Grade Antenna Wire. Best quality 7 strand No. 22, tinned copper, non-corrosive antenna wire. Only 1c. per foot. The Kehler Radio Laboratories, Dept. W., Abilene, Kans.

Crystal Set That Gets Radio Concerts. Build it right, boys. Plans and full instructions for building at low cost, high grade fine adjustable Crystal Receiving Set, fifty cents postpaid. Dept. R. D., Shaw Mfg. Co., Galesburg, Kans.

RADIO CABINETS—With all good tone chambers, with or without phonograph combination. Any quantity in stock sizes or in order. Columbia Mantel Co., 175 Powers Street, Brooklyn, N. Y. Tel. Stagg 2726.

WRITE for catalog showing complete line of Elmco Shielded Radio Apparatus, tuners, detectors, amplifiers, transformers and sockets. Electric Machine Corporation, Indianapolis, Indiana.

AGENTS WANTED in every city and town to sell standard radio apparatus. Attractive discounts given. If interested, write at once, stating age and radio experience. Wilmington Electrical Specialty Co., Inc., 912 Orange Street, Wilmington, Delaware.

TYPE R-3 MAGNAVOX TYPE R-2
We can make immediate delivery on a limited supply of Type R-3 Magnavox, $45.00, 14" Horn, and Type R-2, 18" Horn, $85.00. Dealers and agents, discount 10% on 1, 15% on 2 or more. C. O. D. or cash with order. THE KEHLER RADIO LABORATORIES, Abilene, Kansas, Dept. W.

DEALERS and JOBBERS
Write for our attractive proposition. Shipments and satisfaction—not disappointments. Service unexcelled. Complete line. G. S. NYCUM, Manufacturer NYCO Radio Supplies, 507 Penwood Ave., Wilkinsburg, Pa.

$1.00 COMBINATIONS—BY MAIL, $1.05
No. 1—100 ft. No. 14 antenna wire; 20 ft. No. 14 insulated ground wire, 1 ground clamp (solid copper); 1 single pole double throw lightning switch. No. 2—1 8 by 3½ inch insulated tube, wound with enameled wire; 2 slides and 2 brass rods to fit; 4 nickelplated brass binding posts. No. 3—2 60c. switch-levers (1½ inch); 20 contact points with nuts; 4 stops, 4 binding posts, 1 detector stand (unmounted). No. 4—1 set of 4 radio tubes, 8 inches long by 3-3½—4-4½ dia.; one spool No. 24 cotton covered wire, 375 feet; one wood rotor. Enclose Money Order or Checks, but no stamps. Brilliantone Radio Products, 874 Columbus Ave., at 103rd St., New York.

Men, Over 17, Wanted—Steady work. Commence $135 month. Government Railway Mail Clerks. Common education. List positions free. Write today. Franklin Institute, Dept. G-151, Rochester, N. Y.

New Westinghouse Senior, complete, regular $75.00 at $60.00; less antenna, $50.00. Murdock phones, new, $4.25. Write for other specials. D. G. Fox 20 Fernwood Ave., Haverhill, Mass.

Six Different Samples of Radio-frequency loop aerial sets for sale. Made up amongst others for the Radio Guild's line and not adopted because of slight panel design error. Radio Guild, 256 W. 34th St., New York City.

Amateurs, Attention! A. P. Detector Tube, $5.00. DeForest Socket, $1.00. 23 plate .0005 Moulded Top V. C., $4.00. Arkay Horn, $5.00. Central Radio Co., Valley Falls, Kansas.

FOR SALE—New VACTUPHONE. Recent invention by Earl C. Hanson for those of subnormal hearing. Will sell at 33 1/3 per cent. discount. Address J. W. Demler, 121 Sherman Ave., New York City.

SELL ½ K. W. Packard Transformer mounted, with four power taps, 13,200-V secondary, for 110-V 60 cycle, $20. Quenched gap, ½ K. W., $10; OT bakelite mounted, $5. Shortwave regenerative, V. T. controls on same panel, $20. Or, trade for 500-V motor-generator, or cw set (need not work), with tubes. Apparatus guaranteed. Port Arthur Radio Laboratory, S-H Dept., Port Arthur, Tex.

MOULDED V. T. sockets of standard type and good quality given free with each detector tube purchased at $5. Sockets guaranteed and only 50c. each. Order now to avoid delay. An introduction to our service. Port Arthur Radio Laboratory, Port Arthur, Tex.

SELL OR TRADE—Westinghouse RC, for Grebe CR9. RADIO, 8 South Ohio Ave., Atlantic City, N. J.

IS YOUR HOOK-UP RIGHT?
Fifty complete vacuum tube hook-ups, both transmitting and receiving, thoroughly illustrated and described. Only best circuits used. Send 50c. today. Westboard Radio Engineers, 309 Canal Street, New York City.

FOR SALE—Complete crystal set, $12.50. Audiotron, two filaments, $5.50. Langley, 34 Shores St., Taunton, Mass.

FOR SALE QUICK—6-60 storage battery, fully charged, $12.00; 5-dial omnigraph, $15.00; "NAA" receiving transformer, $6.00; 3-foot eagle kite, $1.50. All nearly new. Sell separately or all four for $30.00. Albert Brown, R. 4, Greenwich, N. Y.

100-24,000 Meter Regenerative Tuner for $80.00. Prepaid Zone One. Write for particulars. Robert Brown, Box 176, New Brunswick, N. J.

CONCERTS—Loud and clear during summer. One drop of "CRYSTALITE" does it. Makes Crystal extremely sensitive. Year's supply by mail, $1.50. Valuable booklet free, "RADIO KINKS AND HOW TO ELIMINATE STATIC." Radio Mail Order Supply Service, 900 Chestnut St., Philadelphia.

RADIO MAN—Ten years' technical and practical experience, studied latest developments, expert phone transmitters and latest type receivers, wants permanent connection. Go anywhere. Write. Evans, SORS, 80 Washington St., New York City.

No. 5 Omnigraph, complete, with fifteen dials, $15.00. Leroy Nice, Souderton, Pa.

My Regenerative Receiver and two-step amplifier for sale. Set was made to order. Workmanship and performance unsurpassed. Price, without batteries or tubes, $75.00. First check takes it. Receiver guaranteed. C. H. Glick, 5 Sheridan Square, New York City.

30% Discount on Standard Radio Sets and Parts to everyone. New material only. Bargain price list of everything Radio, 25c. Refund on first order. Immediate deliveries. Radio Instrument Co., York, Pa.

SPECIALS—Kellog Phones, $9.00. Murdock No. 56 3,000-ohm Phone, $5.50. A $1.00 "Radio Directory" free with Radiotron Amp. Tube, $6.50. C. CHAMBERLAIN, Berea, Ohio.

BUILD YOUR OWN Electrolytic Storage Battery Charger. Plates and Complete Instructions, $1.00. Descriptive Circular Free. PEERLESS ELECTRICAL PARTS CO., 105 Harris Street, Rochester, N. Y.

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VARIABLE CONDENSERS—23 Aluminum Plate, $3 kind, $1.65; 43 Plate, $4 kind, $2.25. WAGNER NOVELTY CO., Dept. R, Delphos, O.

Subscribe direct or through your news dealer. $6.00 a year, $3.00 six months, $1.50 three months. Radio World, 1493 Broadway, N. Y. C.

Old Orator Quails When Speaking by Radio

J. H. TREGOE, secretary-treasurer of the National Association of Credit Men, travels throughout the country, addressing audiences of financial executives. His usual subject is economics or credits, and he talks to audiences of any size with equanimity. Yet the experience of addressing by radio those invisible thousands whose instruments were tuned to pick up the WJZ waves was an ordeal for this experienced speaker. In commenting upon it, he said to a representative of *The Evening Telegram*, New York:

"The novice in public speaking finds it difficult to control his knees or to keep his ideas from evaporating into space when appearing before his first audience. If at all sympathetic, the audience will steady the speaker, give him confidence, raise his courage and annihilate his fears.

"But in this case I could see no audience. I placed myself in the hands of the young man in charge of the proceedings. He indicated a low straw chair which was so comfortable that for a moment I forgot my embarrassment. He then adjusted the cone so that it hung in front of my face and leaning over said in deliberate tones, 'Station WJZ, Mr. J. H. Tregoe, secretary-treasurer of the National Association of Credit Men will now address the radio audience. We introduce Mr. J. H. Tregoe.'

"My time had come! Instead of a ripple of polite applause I was struck by a wave of silence. Instead of several hundred business men fixing their eyes upon me, I saw only framed photographs and a large vase of flowers.

"Try it yourself. Step up to a broadcasting machine and essay to speak to an unseen audience. First comes a trickle of fear, followed by a sensation of coldness, with a climax reached in a deep seated impression that you are making a big fool of yourself. A three minutes' address in such a situation seems like an eternity and would take the nerve out of the best trained man when he tries it for the first time. Imagination goes careening everywhere. When trying to look composed and speak coherently, you are wondering all the time what people are hearing you, and if perhaps some friend will not say, 'I know that fellow.'"

BACK NUMBERS AND NEW RADIO WORLD READERS!

The publisher has reserved a limited supply of the first fourteen issues of RADIO WORLD for the benefit of new readers who want to become subscribers and have their files complete from the first issue. The first fourteen copies will be mailed postpaid on receipt of $1.80; or better still, subscribe now for six months ($3.00), or twelve months ($6.00 for 52 issues) and have your subscription start with No. 1. Radio World Co., 1493 Broadway, New York City.

First Radio Written Music Is Sung on New York Stage

RUDOLPH FRIML, the composer, sailed from New York City for Europe on June 17, on the steamer "Majestic." Florenz Ziegfeld, Jr., producer of "The Follies," also was a passenger. While at sea, Mr. Friml wrote a fox-trot number and dedicated it to Miss Mary Eaton of the cast of "The Follies." The music was sent by radio from mid-ocean. This is the first record of a radioed song being wafted from a steamer on the briny deep and, a few hours later, sung from a stage. Following is the code by which Mr. Samuel F. Kingston, Mr. Ziegfeld's manager, received the score:

3 NYU 60 RADIO COUNTED
SS MAJESTIC VIA LUISBURG
JUNE 21, 1922
KINGSTON
NEWAMSTERDAM THEATRE
NEWYORKCITY....
FIRST SONG COMPOSITION TRANSMITTED BY MARCONIGRAM SONG ESPECIALLY COMPOSED BY RUDOLPH FRIML ABOARD THE MAJESTIC FOR F ZIEGFELD TO SUNG ZIEGFELD FOLLIES MIREDO REMISOL LADORE DOLADO SIZOLSI LASOLMI SOLFASOL MIREDO REMISOL LADOMI RESHARP SI DOSHARP SI DOSHARP SI SOLSHARP LASILA SOLSHARP FASHARP SILASIRE DOSOLMI RESHARPMISILA SOLSHARP LADOLA FAMI SIDOSOL MIREDO REMISOL LADORE DOREMI REDOLA SOLMIDO
FRIML.

Beginning with the word "miredo"—a telegraphic condensation of the three musical terms, "me," "re," and "do," it is not a difficult matter to follow Mr. Friml's melody. In fact, you can try it on your own piano. It was not difficult to transcribe the words in the radiogram to a sheet of music paper, and engage a skilled musician to make the orchestration. Mr. Friml had taken the words of the song with him, and a duplicate copy was in New York.

Why Radio Is Clearer at Night

IT is a fact often observed that it is possible to work radio communication over much greater distances at night than in the daytime. This may be explained by the effect of the sun upon the air, which causes ionization of it, and is most active in the daytime, and practically absent at night. The sun seems to be responsible without question, in view of the fact that very erratic results in long distance receptions are always noticed at sunrise and sunset.—A. F. Van Dyck, R.E., G.E., in *The Tribune*, New York.

Mr. Hoover's Radio Power

THE consensus of the authority which Congress may vest in Herbert R. Hoover, Secretary of Commerce, may be summed up as follows:

1. Classification of licensed stations and operators along with official registration with the Government.
2. Authority to prescribe the nature of services various stations may render.
3. Power to assign wave lengths and determine locations.
4. Control of kinds of instruments or apparatus with respect to "outside effects."
5. Regulation of times and methods of operating.

RADIO WORLD, 1493 Broadway, New York City

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RADIO WORLD CO., 1493 Broadway, New York City

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"THE RECEIVER WITH THE LIVING VOICE"

Patents Pending

Price Complete $400.

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The Radio Guild Vox Humana, model A, is for use in the home. Nothing has been spared to make it the most perfect and refined instrument on the market. Sombre and quiet in appearance, there is nothing freakish or sensational in its design or construction.

Everything necessary for reception of music, concerts, etc., is contained in the cabinet. There are no outside connections. The music and voice are reproduced in pure and natural tones. There is no hissing, howling, or crackling noise in this model—disagreeable sounds produced by static, and interference from Radio Telegraph stations, common to receivers which require an outside antenna, are also eliminated.

The Vox Humana, model B, is similar in design and appearance to model A except that means are provided for much greater amplification. This model is therefore particularly adapted for use in Hotels, Restaurants, Theatres and other public places, where large volume is necessary.

Armstrong's Super Regenerative Receiver

How to Construct and Operate It.
Complete with Diagrams and Photographs.
By
KENNETH HARKNESS

PRICE, 35c.

Special Price in Quantities

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256 West 34th Street New York City

SPECIAL PROPOSITION TO DEALERS AND DISTRIBUTORS

Our line of receivers, each the acme of perfection in its class, priced from **$35.00** up, now ready for distribution.

Our Type A 201 VACUUM TUBE TUNER and DETECTOR, Complete with Phones, Antenna, Lightning Arrester, etc., sells for **$35.00.**

Our Type A 211, Complete, as above, with all wave range—150 to 3,000 meters, **$45.00.**

The Radio Guild, Inc.

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NEW YORK CITY