

Get This Magazine Every Week for Complete Broadcasting Programs

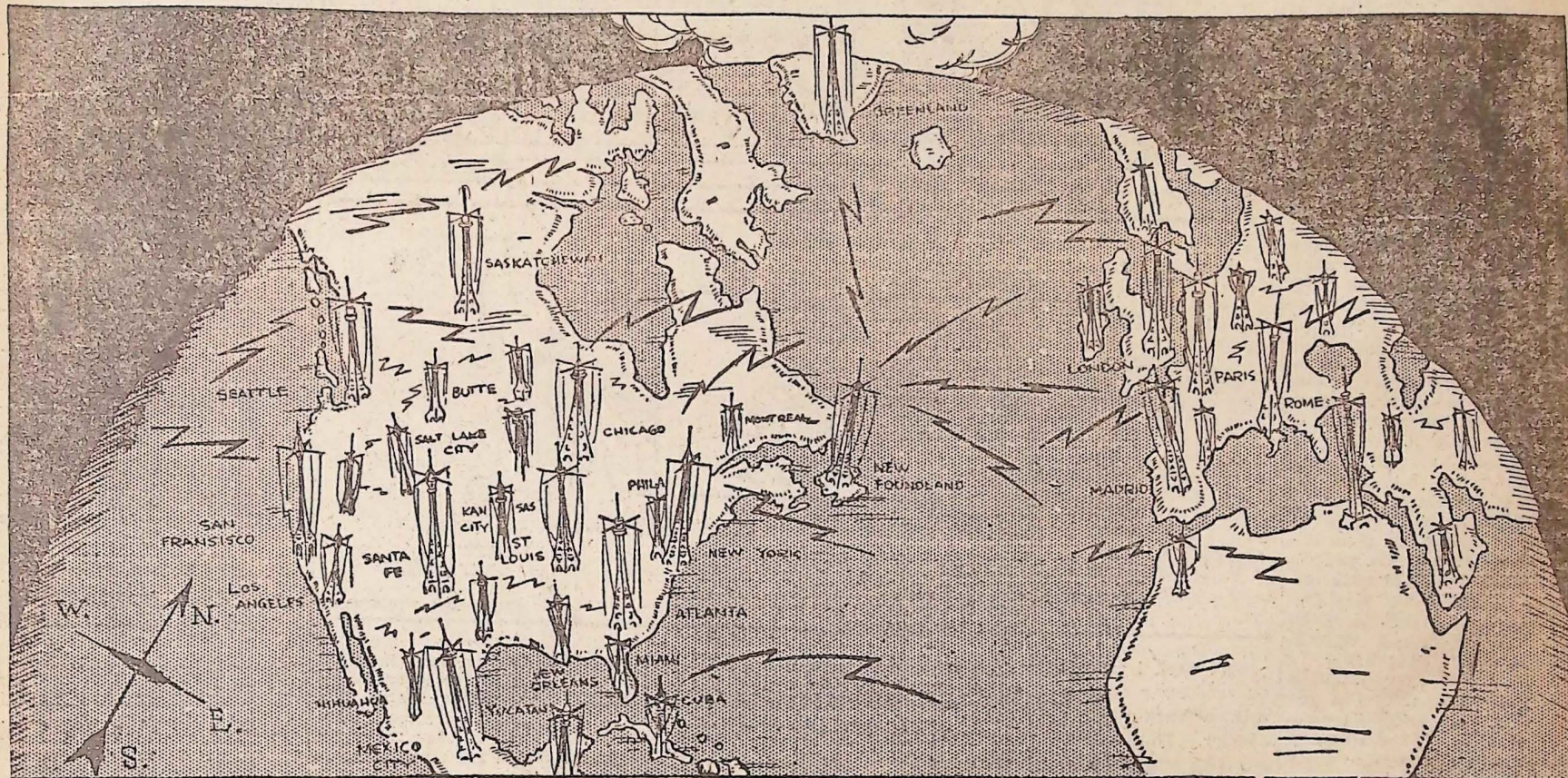
RADIO
MAGAZINE

The Daily News

EVERY
MONDAY

SAN, FRANCISCO, MONDAY, MAY 5, 1924

WAVES ARE TO CIRCLE GLOBE



In the not too far distant future American listeners will be hearing broadcasts from all the world capitals, interspersed with their favorite home talent, by means of high power relays and minor distributing stations.

NEW YORK, May 5.—In an interview today H. P. Davis, vice president of the Westinghouse Electric & Manufacturing Co., made public a plan for world-wide programs combining all the modern engineering achievements of radio, transmitting and forecasting the marvelous development radio will make in the next few years.

The plan proposed makes use of radio repeating, eliminates interference possibilities and shows how, in the near future, the radio listener will be enabled to hear programs from London, Paris, Tokyo—in fact, any part of the globe—with the same ease as programs from local stations are now heard.

The plan in detail follows: "In the past few months the public has heard much regarding radio repeating without realizing, perhaps, just what this extraordinary achievement of radio engineering means to the future of radio.

"Radio repeating is the 'open sesame' to worldwide wireless and will make possible the receiving of programs from any part of the globe with the same ease with which we now hear programs from stations located only a few miles from the radio receiver.

"Naturally, before worldwide wireless is a reality there will have to be installed special stations in various parts of the globe, and these stations must be located advantageously.

"Radio repeating, when it was first successfully accomplished by the Westinghouse Co., was the outcome of the development of short wave transmitting. Short wave transmitting means the sending of radio signals on a wave length of 100 meters or lower. Because this wave length is so low it is not heard on the ordinary receiver, and we shall, therefore, call it the inaudible wave. The ordinary broadcasting wave length band from 250 meters to 600 meters is heard, of course, with the ordinary receiver, and we shall term it the audible wave. Inaudible wave transmitting forecasts the following radio development:

"Certain well designed central stations will be located at the world centers. These stations will be equipped to transmit on the audible or inaudible wave length, or both, as desired. The audible wave transmitter need not have excessive power, so that its operation will not inter-

fere with distant tuning by adjacent receivers, if desired. These transmitters will not need any more power than have the leading stations of the United States today. The inaudible transmitters, however, may be high powered to give them the ability, when necessary, to maintain a constant range. As their signals will be transmitted on the inaudible wave length, the power used will not cause interference with receivers.

"There will be located, at advantageous points, inaudible wave length repeating stations whose sole duty it will be to receive these inaudible waves from the central stations and pass them along. These repeating stations will act as 'booster' stations to amplify over and over again the inaudible signals.

"Certain other stations, and there may be as many of these as desired, will be equipped with short wave receivers with which it is possible to pick up the

short wave signals and repeat them on a low-power audible wave. These stations, which are to serve local districts only, will merely repeat the signals caught on the low wave length and re-broadcast it for the benefit of the listeners in their immediate vicinity. These local broadcasters, therefore, need only a small amount of power. This interconnected international system will have a dispatching organization to direct how and when the various programs of the central stations will be sent and what stations should stand by to handle the program circuits.

Programs of World Interest "Such a system will also need a world-wide and very efficient program collecting organization. This program organization will be operated somewhat in the manner of the great news agencies of today, and will continually be on the search for interesting programs from every point of the world.

"A famous statesman—a world-wide figure of interest—is speaking in Paris. He faces the microphone which leads to the station located at one of the central broadcasters. This central station sends out his speech and the audible wave, which can be heard on the ordinary receiver operated in the district surrounding Paris. Then, if desired, the inaudible wave transmitter also sends out the speech for world-wide transmitting.

"The dispatchers have selected the route for transmitting the 'booster' stations, which, by prearrangement, pick up the inaudible wave coming from Paris. These stations will then 'boost' the inaudible Paris wave so that anywhere in the world, as has previously been determined, it may be received on the short wave receivers of the local broadcasting stations.

"In Pittsburgh, KDKA, being equipped with a short wave receiver, could pick up these re-

peated short wave Paris signals and repeat them through its own transmitter, with the result that every one within the range of KDKA's signals could hear the Paris speech with receiving apparatus no more sensitive than is required to pick up the broadcasts originating in KDKA's studio.

"Perhaps an event of world-wide importance takes place in Pittsburgh; KDKA could duplicate the inaudible and audible wave length transmitting, the dispatcher instruct the 'booster' station to send along only KDKA's inaudible wave length signals—thus this station's program would be the one which would be repeated by repeating stations located at any prearranged points on the globe, and the signals could be received in Shanghai, San Francisco, London and Sydney, Australia, with the same intensity as signals are now received when transmitted by stations located at these points.

"This system means world-wide radio and it also means less interference to the radio listener, for, with a selective receiver, he could still hear long distance stations even though the local station should be repeating a London program picked up from the inaudible wave source.

"The Westinghouse Co. has made a good start in the development of the necessary apparatus for the operation of such short wave transmitters and 'booster' stations. KDKA, the world's pioneer broadcaster at East Pittsburgh, Pa., already has an inaudible wave transmitter and is furnishing programs to another Westinghouse station located at Hastings, Neb., on the inaudible wave length, and this station, in turn, repeating these programs on the audible wave length for the benefit of its radio listeners. KDKA is also furnishing programs to the stations of the British company in England on the inaudible wave lengths, which are picked up by special receivers and the signals repeated on the audible wave lengths for the listeners of Great Britain and continental Europe.

"The plan is practical, therefore; in fact, it is partly in effect. With proper encouragement the further development will come in time."

HEAR PRW BROADCASTING!

BY P. R. W.

"PRW broadcasting. Stand by for one minute."

You won't find PRW on your radio map. PRW is "Poor Radio Wife," and the radio fan doesn't even know she exists—especially when the set is working right. Whenever the poor woman starts to broadcast her complaints the husband adjusts his ear phones and tunes in on another station.

Whenever there's a radio in a home, there's a radio wife or widow. And statistics show are more than 3,000,000 radio sets in this country.

The radio widow is more pathetic than the golf widow or the business man's widow. Golf can be played only in the daytime. Directors' meetings can be called only a couple of nights a week, but—

The husband of the radio widow is at his radio set every time any one is broadcasting, and the air is always full of wonderful things you ought to hear. (See all radio ads.)

Having married a husband and a radio not so long ago, I've tuned in on the wives of other

radio fans. Here are some of the complaints they've been wanting to broadcast:

"All household duties must cease each evening while the head of the house listens carefully to learn if it's station KGO or KPO sending out the program.

"Many a San Francisco wife is halted with her hands full of supper dishes while her husband listens to a far away after dinner speech on 'Efficiency.'"

The radio is supposed to be the cure-all, and the provider of any amusement you might wish. Says a San Francisco wife:

"Recently a famous woman singer appeared in the city. I was anxious to hear her and my husband promised to take me. He forgot to get the tickets. When I was fighting back the tears on the night of the concert, the husband tuned in on a squeaky soprano from Spokane and said:

"There now, honey, you've got your singer, and here you are comfortable in your home instead of in a concert hall, where you'd take cold."

Another woman said that ev-

ery time she suggests attending a dance, her husband wants to invite a few friends and dance by radio instead.

In the place of Halstead's orchestra or Seiger's band she must listen to the Chiropractors' concert at Los Angeles or the Boy Scouts' band at Fort Worth, Tex.

"You'll just be listening to a dandy piece on the radio, and compliment your husband," says one PRW. "He gets so excited that he tries to tune in better, and all you get thereafter is a lot of hideous sounds for the rest of the evening."

Sometimes the PRW is driven to seeking some amusement in radio. In this way she learns to prefer certain announcers to others.

One woman insists that her husband tune in KFI, so she can hear the announcer. Another says the only time she finds radio interesting is when KLL is speaking.

"And I suppose some mean husband will sue for divorce some of these days, naming a radio announcer as co-respondent because the wife liked his voice," a PRW protests.

WORLD FAMOUS ARTISTS TO GO ON AIR SOON

Through an agreement recently signed between the Radio Corporation of America and the Brunswick-Balke-Collender Co., phonograph manufacturers, radio fans throughout the country will receive for the first time operatic and musical programs rendered by famous artists, according to an announcement made by David Sarnoff, vice president and general manager of the Radio Corporation of America.

Under the contract the phonograph company gains the right to install radiola receiving sets in combination with Brunswick phonographs. In turn, the phonograph company will add its share to the public service now rendered by the principal broadcasting stations and aid the development of free broadcasting to the public by permitting the stations of the Radio Corporation of America and those of its manufacturing associates to broadcast from the laboratories of the Brunswick Co. during the periods when its artists are recording for phonograph reproductions, and to encourage these artists to aid the programs at other times as well.

The areas that will benefit particularly by this new arrangement are those served by the broadcasting stations of the Radio Corporation of America, the General Electric Co. and the Western Electric & Manufacturing Co. in New York, Washington, Hastings, Springfield, Schenectady, Pittsburg and Oakland, Cal., the latter being KGO.

Another interesting provision in the contract places at the disposal of the Radio Corporation the technical and research facilities developed by the phonograph company, so that the experience of both industries may be available in the development of the art in the future.

Opera Replaces Jazz

Jazz is losing ground regularly throughout the country. Station WJAX, Cleveland, for instance, is planning a program of operatic music to replace its regular jazz evening, on May 13. And others are doing likewise.

Jazz in Background

Jazz got back stage in a recent poll conducted by WBAX, Columbus, O. Among the songs favored by its fans, WBAX found the sentimental old-timers won hands down against modern jazz.

After the Criminals

Larchmont, N. J., has followed in the trail of New York, Detroit and Philadelphia in chasing criminals by radio. The station is planned to work in conjunction with that of the New York police.

Ice Patrol for Ships

Radio is helping ships in the Gulf of St. Lawrence and beyond to keep clear of ice. An ice patrol is maintained there, by which daily reports of ice conditions are sent out to navigators.

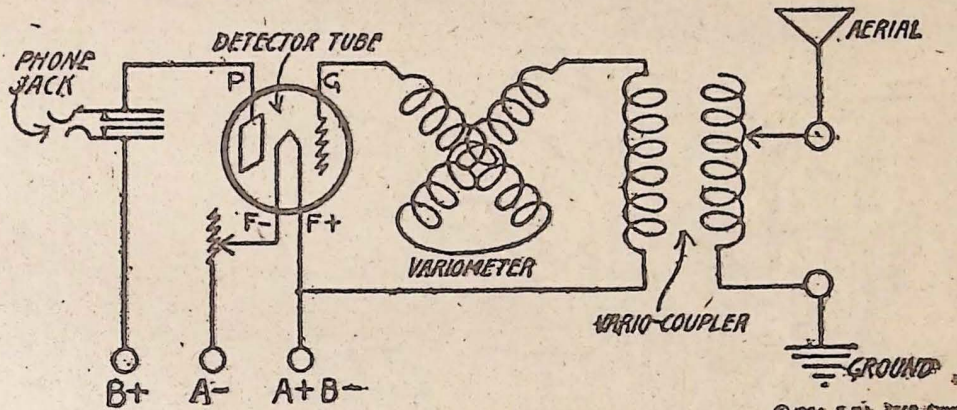
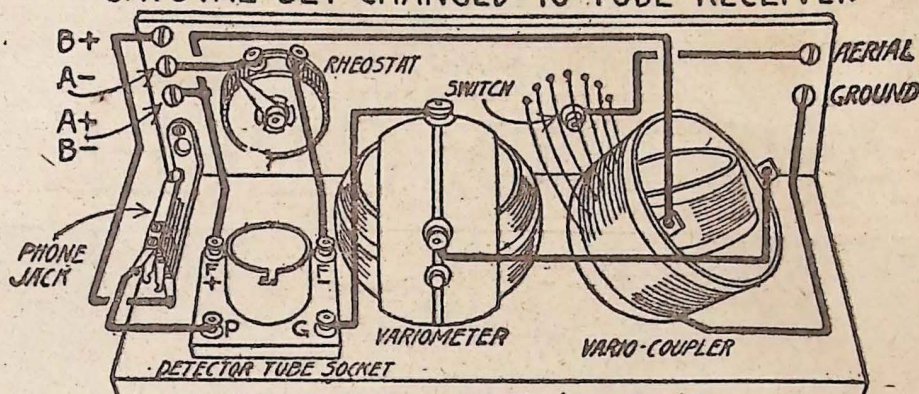
It is a good idea to try condensers of different capacity across the phones, when the hookup calls for one. The one that works best should of course be used.

SERMONS TO CROSS U. S.

Rev. James E. Freeman, famous Episcopalian bishop of Washington, has been working on a plan to broadcast sermons by eminent clergymen and laymen all the way across the country from the National Cathedral at Washington. Dr. Freeman has been conferring with Marconi, Lee De Forest, William Jennings Bryan and others on this plan. He believes radio some day may be the means of bringing about something like spiritual unity in this land of many creeds.

PREFER TUBE TO CRYSTAL?

CRYSTAL SET CHANGED TO TUBE RECEIVER



Last week I presented a crystal receiving set constructed with a variometer and vario-coupler. This receiver is very selective and sharp tuning for a crystal receiver, and will give satisfaction if properly constructed.

After a few weeks you will probably wish to add something to your receiver that will enable you to hear the local concerts with more volume and to occasionally pick up an out-of-town station. While it is possible and entirely practical to add a stage of audio frequency amplification to your crystal receiver, it will be best to convert your set over to the use of a vacuum tube detector.

The reason for this is that the vacuum tube receiver is much more stable in operation and adjustment, and can receive signals from a further distance than the crystal. If local stations are all that you wish to listen to, and you merely wish more volume, then the addition of a stage of audio frequency will be the thing to undertake.

Tube Detector Preferred

An additional argument for the discarding of the crystal in favor of the vacuum tube as a detector is that while you are going to the inconvenience of using batteries, both A and B, you may as well use them for the detector as for the amplifier.

If you are well satisfied with your crystal set at the present time and do not wish to take advantage of the above method of changing your set into a tube receiver it might be well to clip

this article for future reference. It is improbable that you will cease your radio activities with a crystal set and sooner or later you will wish to make use of this diagram.

Additional Apparatus

The same apparatus that you are now using in your crystal set can be used in constructing the tube receiver, the only article that must be discarded is the crystal. In addition a few more items must be purchased to complete the parts necessary to construct the set.

If you did not build up the crystal set and wish to buy the list of parts to construct the above receiver you will need the following: One variometer, one vario-coupler, both may be of the moulded type, a vacuum tube socket and rheostat for the type of tube you are going to use. If you are going to use the UV199 or C299 a special type of socket will be necessary together with a 30 or 40 ohm rheostat.

If you desire to use the WD 12, UV 200, or C 300 tube a standard socket and a six ohm rheostat will be necessary. You will also need a .00025 M. F. fixed grid condenser and a variable grid leak.

Will Not Reradiate

You may feel disappointed in the performance of this tube set in comparison to your crystal set as it is not regenerative. The variometer is in the grid circuit and not in the plate circuit, and no provisions are made for the transfer of energy from the plate to the grid or aerial circuit.

The reason for this is that any type of regenerative circuit will

reradiate energy back into the antenna and cause interference with neighboring receiving sets. This paper has discontinued showing the ordinary regenerative feedback receivers for this reason.

Tuning will be very selective and you will receive well through interference with this receiver due to the fact that a coupled circuit is used in place of the usual single circuit principle. Also the grid circuit is tuned with an additional inductance, the variometer.

How to Operate

After constructing your receiver carefully check over all connections with the picture diagram and the wiring diagram to make sure that all connections are correct. Be especially careful in the wiring of the battery leads to avoid the possibility of burning out your tube due to a wrong connection.

Connect up the A battery first and then turn on your rheostat at least three-quarters of the way. With the tube lit now connect the negative and positive B battery leads. If there is a short circuit at some place in your connections you will see quite a spark when the positive lead is attached and your tube will burn a little brighter. If this happens, disconnect the B battery leads and check over the connections to find out what is wrong. The tube will not burn out if the rheostat is turned on and the B battery is shorted across the filament leads as the B battery current will take the lower resistance path through the storage battery.

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Radio in Germany

About 160 firms are manufacturing radio apparatus in Germany, reports Kurt Hildesheimer, clerk to the American commercial attache in Berlin. Two broadcasting stations, one in Berlin and the other in Leipzig, are operating. Others are planned for Hamburg, Munich, Stuttgart, Frankfurt, Nuremberg, Breslau and Koenigsberg.

Regular Programs

British broadcast listeners will be enabled to listen in on programs from this country every two weeks. American programs will be received on short wave lengths and will be retransmitted by the London station on the wave lengths to which the British listeners are accustomed.

At the first sign of trouble, check over all the connections, some of them may have come loose.

LET'S SWAP

These "Swap" advertisements will be published free of cost until further notice in the Monday Radio Magazine of The Daily News. The article to be traded must be radio equipment. Keep the wording concise.

TO SWAP—Columbia variometer, new, for phonograph loud speaker attachment, or something of equal value. C. H. GENEKE, 1000 Ashbury-st, Apt. 3.

TO SWAP—Willard rechargeable "A" battery, type CTR15, for WD11-12 tubes, 3 volts. For something of equal value.—M. Finnegan, 120 Eugene-av, San Francisco.

TO SWAP—Flowell receiving set, mahogany cabinet. Fine for distance. For one r. a. loop or something of equal value.—J. B. Vannalio, 676 Pennsylvania-av, San Francisco.

TO SWAP—Loose coupler crystal set, complete except for headphones. Will exchange for other radio equipment. P. S. Jones, 1610 Milvia-st, Berkeley.

More in Orient

The Orient is going to get two more wireless broadcasting stations, with the erection of these soon in Sumatra, by the Netherlands Indies government. There is only one high-powered station there at present.

To South America

One of the regular innovations by KDKA, Pittsburg, is an all-Spanish program, transmitted for the particular benefit of fans in South American countries.

Radio Sets That Kick All Sets At All Prices

Let Us Put a THOMPSON NEUTRODYNE in your home and you will never have to kick, for the Thompson is the set with the real kick. Distant stations sound like local. Hear the set speak for itself. See it at 479 Sutter St. Ask for J. H. Bruce, Radioman LIBERTY ELECTRIC CO. 479 Sutter St.

BIG EXHIBIT OF RADIOS IS OPENED TODAY

To give the public an idea of the advancement made by radio during the last year and of the joys to the motoring vacationist offered by portable sets, an exposition and demonstration of radio will be held by the Pacific Coast Radio Trade Ass'n every afternoon and evening for a week, starting today at the Chester N. Weaver Studebaker show rooms at Van Ness and Bush.

The latest and newest in radio equipment, camping equipment and motor cars for the touring vacationist will be displayed and demonstrated. There will be radio sets or parts, and other prizes, given away every night. The Pacific Radio Publishing Co. has donated 100 subscriptions to Radio Magazine and the popular Broadcast Program for distribution during the week.

The Weaver show rooms will be converted by local florists into a beautiful out-of-doors setting and several camping scenes with touring automobiles, camping equipment and radio sets will be shown. Some of them have never had public exhibition before. The Chester N. Weaver Studebaker Hawaiian orchestra will entertain nightly during the show.

WAVELETS

About 100 receiving sets are in use in Tampico, Mex.

Fourteen new high-power stations are being planned for this country.

The U. S. government buys about 135,000 dry batteries a year.

A pig is mascot for station KFNF, Shenandoah, Pa.

Canada imported \$160,000 worth of radio apparatus from the United States during January.

Radio apparatus exported during January amounted to 134,965 pounds, valued at \$331,849.

The United States liner Leviathan boasts of having the finest radio equipment afloat.

Mexico permits operation of radio sets up to 20 watts capacity for a fee of \$2.50 a year.

Radio station at Nauhen, Germany, transmits time signals twice daily on a wave length of 18,000 meters.

Japanese government has introduced a bill regulating broadcasting, transmitting and receiving stations.

One Chicago factory is planning the production of 600,000 horns and 90,000 complete loud speakers in 1924.

Marquette University, at Milwaukee, Wis., will have a special course in radio construction and operation.

Weather and hydrographic information is broadcast twice daily out of Cleveland for the benefit of lake shipping.

Bishop Thomas Nicholson of the Methodist Episcopal Church, with headquarters at Chicago, urges establishment of church radio stations.

Battery Recharging Service

\$1.00

Called for and Delivered

"A" Batteries for Your Radio

100-amp., 6-volt\$12.50
200-amp., 6-volt\$18.50

New York Pacific Battery Co.

987 Post St.
Prospect 4150

SUBMARINE TO USE RADIO AS SPEEDOMETER

COLUMBUS, O., May 5.—George Lewis, Cincinnati radio engineer, described a new method of determining distance at sea as well as direction by the use of radio at today's meeting of Associated Academy of Science.

The apparatus described by Lewis combines a submarine signaling system which sends the sound of a bell through the water with a radio set which sends out a series of dots one second apart.

"It takes the submarine signal one second to travel a half mile through the water," Lewis explained.

"Radio signals for all practical purposes can be considered as traveling instantaneously."

"Consequently when a ship nears the lighthouse which is sending out the signals, the ship's radio operator listens in on a pair of receivers, one of which is connected to the radio receiving set and the other to the submarine signal receiving set."

"Consequently he only has to count the number of radio dots he hears before he hears the submarine bell. Each dot he hears means a half mile between the ship and the lighthouse."

"Direction, of course, is found in the usual way with a directional loop aerial."

Help Hints

Always remember beauty comes after efficiency. If your set doesn't look well, but works good, let it be.

Do not use oil or polish on nicked parts or connections of your set. A piece of chamois is recommended for polishing the nicked parts of a set, as the application of oil causes dust to collect on the surface to which it is applied.

Do not try to knock screws or small bolts from the panel with a hammer and center punch, if you break them off. The best method to take in getting them out of the panel is to drill them out.

If you are building a vacation set, it is a good hunch to coat the coils with collodion. This will eliminate chances for their becoming wet. Shellac should not be used under any circumstances.

Dry "B" batteries should be discarded after the voltage has dropped 40 per cent of the original. At this point they become noisy, and the all around efficiency of the set they are used with will be greatly impaired.

Clean the contacts on the base of the vacuum tubes at least once a week. The solder which is used for the contact becomes dirty, and causes noise in the circuit, which is easily mistaken for static.

If your single circuit receiver fails to function on the high wave lengths, but works well on the low ones, it is a sure sign that your aerial condenser is too high a capacity. To remedy this fault try a lower capacity condenser. Those using five plates will serve well in some cases.

Stations to Tame Savage

Radio may be used to civilize the African native, reports Trade Commissioner Richard A. May of Alexandria, Egypt, to the Department of Commerce.

A former Kenya colony official is dicker for three or four broadcasting stations and a loud speaker in every African village, whereby instructions in agriculture, besides music, news and other matter, will be given the natives direct. Messengers are now conveying this information.

THREE PROGRAMS ON ONE WIRE!

NEA Service

STATEN ISLAND, N. Y., May 5.—Radio programs will be switched on and off like electric lights in millions of American homes within the next few years. So promise engineers who are working here on wired wireless.

For four months last winter, an engineering staff under the direction of R. D. Duncan Jr. gave Staten Island a daily radio program over the city electric lighting system loaned to them for their experiments by the light company. Only one program could be sent at a time.

Now they have perfected apparatus enabling them to send two programs simultaneously, and before long they expect to transmit three simultaneous programs over the same wires without in any way interfering with the ordinary light and power current on those wires!

The plan is based on the discoveries of Maj. Gen. George O. Squire and others that high frequency radio current can be superimposed without interference on wires carrying the low frequency current for lighting and power.

Works Easily
"Some 12,000,000 American homes are wired for electricity,"



Three-year-old Murray Dusk of Staten Island, enjoying an experimental program through a wired radio set.

says C. W. Hough, who is in charge of the experiments. "These wires furnish a pathway

terminating at every lighting socket.

"Suppose we cause songs, lectures, news dispatches, orchestra music and other features to run along this path. To release the radio waves, all the lighting customer needs is a small receiving set which he plugs into a light socket the same as a fan or a toaster."

"He requires no aeriels, no special wiring, no batteries; nothing, in fact, but a neat little case with a single dial. Once the dial is placed in position, no further attention is necessary."

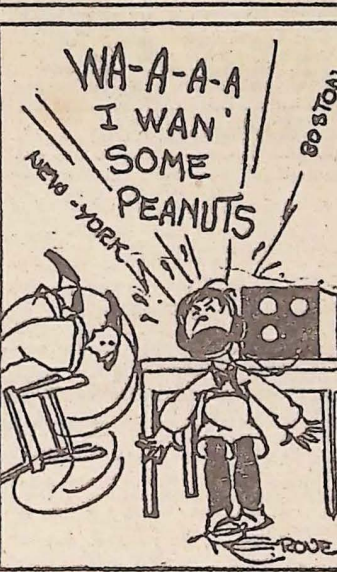
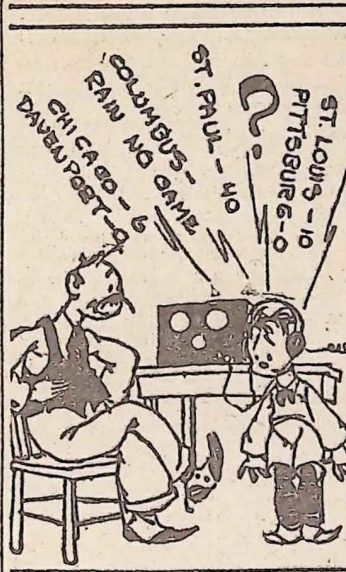
Because wired radio is still in the experimental stage, the cost to the consumer has not yet been determined. Hough believes, however, that a three-program service can be supplied for a monthly rental of about two dollars.

"Wired radio offers the solution to the broadcasting station puzzle," says he. "When we get into actual commercial operation, the artists and musicians will not be asked to work for nothing. They will be paid."

"If the public demand turns out to be as large as we hope, the income from monthly subscribers should be large enough to permit us to engage the foremost stars."

BUGS

By Roy Grove



KPO'S New Organ Big Hit With Fans

Two of the most popular nights in radioland are Monday and Tuesday nights, when Theodore J. Irwin broadcasts organ recitals on the new KPO Wurlitzer Organ.

Theodore John Irwin, Hale Bros. official organist, has been a deep student of music all his life. In early life he studied with Best, the great English

organist. After coming to America, Irwin graduated as solo pianist from the New England Conservatory of Music, Boston.

The recital hours on the Wurlitzer organ at Hale Bros. appeal to him, as they afford many opportunities for constructive work, and radio fans look forward with assurance to hearing the best in music, interspersed with the more popular things.

Why U-Boats Failed

German U-boats failed to locate American ships because of their talkativeness, according to Commander D. C. Bingham, assistant director of the naval communication division of the Department of Commerce. Talking to one another by radio, the U-boats disclosed their positions by means of direction finders controlled by the allies. So the troop ships were routed around the submarines.

Radio in Army

Radio sets in the next war will be carried by all advanced infantry units, tanks and airplanes, besides forming part of the equipment of all grades of headquarters and artillery brigades.

Always remember a loud speaker is not an amplifier. Before one can be used, a one or two-stage amplifier must be added to a detector unit.

ANSWERS

Questions addressed to this department will be answered by L. E. Day of the Day Radio Laboratory, 693 Mission-st. No hookups will be printed.

Floyd H. Vincent, 2262 Courtland-av, Oakland, asks:

What is the best method used to test out transformers?

Use dry cell and pair of headphones in series with primary winding of transformer. If a click is heard in headphones, the transformer is "o. k." The same method if used for the secondaries.

S. E. Schooley, 350 Cough-st, asks:

(1) What size wire is used for primary and secondaries of neutroformers? (2) How many turns on each? (3) What size are the tubes that it is wound on?

(1) Use No. 26 double cotton or double silk wire. (2) Sixty-five turns on the secondary; six turns for the same size wire, spaced one-quarter of an inch apart for primary. (3) The size tubes used is 2 1/4-inch o. d. for primary and 3-inch o. d. for secondary.

C. T. Thompson, 133 Jersey-st, San Francisco, asks:

(1) What is the best size wire for an improved coil? (2) How far apart should the 20-turn coil be from the 50-turn coil? (3) When the aerial alone is used, the natural wave length is from 250 to 340 meters. How can I increase the wave length of this aerial? (4) How can I do away with body capacity in the circuit? (5) How many ohms are Brandes Superior phones? (6) My set tunes too sharp. Would a Vernier condenser help? (7) Is the standard two-stop amplifier the best circuit to go with my hookup?

(1) Use No. 24 double cotton wire. (2) From one-quarter to three-eighths inch is enough space between primary and secondary coil. (3) Suggest increasing the length of aerial 85 feet. Should you be unable to make a single wire, have under use two wires 50 feet long with 3-foot spreader. (4) Place a shield between the condenser and panel. The shield is grounded to plates. Put the stator plates of the condenser in the grid-circuit. (5) 2000 ohms. (6) Place smaller condenser in your circuit or use a Vernier condenser. (7) Yes.

Vincent Blag, 1961 Lombard-st, asks:

Am enclosing diagram of crystal set. Would like to know how to get distance on it. (2) Can I use a loop aerial with crystal set? (3) Can I use an 11-plate condenser on crystal set? Where shall I connect it?

(1) The average reception of a crystal set is 25 miles. (2) It is impractical to use a loop aerial on crystal set. (3) An 11-plate condenser may be used in series with the antennae.

If the set is gradually growing dead, have batteries tested. They may be run down.

RADIO SPECIALS

Crystal Detector, with crystal... 59c
Knock-Down Crystal Detector... 25c
Swedish-American Head Phones, formerly priced at \$8.00... \$3.35

I. S. COHEN'S SONS

1015 Market St., near 6th
Phone Market 9658

OCEAN LINERS WILL DO OWN BROADCASTING

Ocean liners are adopting the idea of broadcasting concerts and other programs to its passengers.

The French line announces this innovation on the Paris and the France, to start some time in May.

The plan is to broadcast the concerts given in the first-class concert halls to the second and third-class passengers. A microphone and transmitter are to send out the music from the first-class concerts, and receivers will pick it up and send it out through loud speakers for the benefit of the other passengers.

Efficient Loop Lengths Found

The use of radio frequency amplification permits the use of a loop antenna and at the same time makes it possible to receive distant broadcast stations.

The average fan, in building a loop, generally has to guess at the wave length of the loop he is building or spend considerable time gathering data and figuring it out.

The following table will be found useful when constructing the loop antenna:

Wave length range of loop antenna four feet square, wires spaced one-half inch apart.

| Turns | Best W. Leng. | Eff. Rgn. |
|-------|---------------|-----------|
| 3 | 240 | 120-325 |
| 4 | 300 | 250-375 |
| 5 | 350 | 290-500 |
| 6 | 400 | 325-500 |
| 8 | 450 | 375-1000 |
| 10 | 500 | 500-1800 |

As compared with the outdoor antenna, the loop eliminates many stray sounds and other interferences usually found in the outside antenna.

Baby Christened From Station KGO

The first christening over the radio was performed Thursday, over station KPO at 3:30, when the little daughter of Mme. Dorothy Regan Talbot, well known soprano, was baptized Dorothy Genevieve. Ada Morgan O'Brien, studio program director, was the godmother, and Dr. James L. Gordon conducted the ceremonies. Mme. Talbot sang two lullabies to her baby, which were broadcast over the radio.

Austria to Broadcast

The Austrian government has turned down two applications to erect broadcasting stations and is planning to erect one herself.

LONDON MAY HEAR L. A.

Relaying broadcast programs by radio is going to take another step forward, when plans for listening in on Los Angeles from London are completed.

The Los Angeles station will begin speaking, and its speech will be relayed by a New York station to London.

After this, an attempt may be made to connect London with Australia by the relay system.

Neutrodyne

Five tubes, custom built; A batteries, B batteries, Gottschalk loud speaker and solid mahogany cabinet... \$150

Beautiful Console Type

Three-tube set, will receive up to 1500 miles on loud speaker; complete with speaker... \$95

including installation and service. Easy terms if desired! We sell all standard brands of sets, parts and supplies.

Crystal Set, complete, installed in your home... \$10

GOTTSCHALK ELECTRIC & MFG. Co.
1035 Polk St. Ph. Franklin 257

The Radio Column

BY CARLETON E. BUTLER
Radio Engineer

A great deal has been said for and against different types of solder and flux for radio work. To really find out which type of solder and which type of flux was really best I made up a number of sets each with a different type of solder and flux.

In the test I used rosin core solder, acid core solder and plain solder with a paste form of flux. Two types of liquid flux were also used. One was composed of dissolving a lump of rosin in a bottle of cleaning fluid. The other was a manufactured liquid flux.

The acid flux was by far the easiest to work with. When two wires were heated with the tip of the iron and the end of the acid core solder touched to the two wires, the solder spread quickly over the wires and formed a good joint.

The objection to acid core solder is that the acid is liable to splatter when the iron is applied. Also the acid forms a conductor and must be carefully cleaned off from each joint to prevent leakage. If this is not done there is a corrosive action set up by the acid that will ruin the connection in a short time. Also the acid will rapidly eat away the tip of the iron.

The rosin core solder was a trifle harder to work with as a good connection cannot be made unless the iron is quite hot and the connection is heated up so that the solder will flow in between the wires and displace the rosin. The main trouble with this type of flux is that you are liable to have a connection held together by rosin and not by

Thus far we have considered what is known as "direct" current—current which flows along steadily in one direction. Such current is that produced by dry and storage batteries having positive and negative terminals. There is another kind of current, however, which is perhaps more widely used and which we shall employ most extensively in radio. This other kind of current does not proceed steadily in one direction, but reverses itself many times in every second—first flowing one way and then the other.

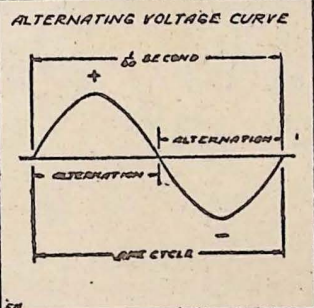
Suppose we have a cylinder full of water and having a piston at its center. Then let us provide an outlet type at each end of the cylinder, the outlets running to opposite ends of another cylinder in which there is a gate or vane hinged at one side. Now, if the piston is pulled forward it will force water out of the right-hand outlet pipe, around the pipe system and in at the pipe on the other end of the large cylinder. The direction of the flow of water is shown by the deflection of the gate. But when the piston comes to the end and

solder. The surplus rosin forms an insulator and you will not need to clean the joint when through.

The paste form of flux worked excellently. This form of flux contains grease and acid and the connection must be carefully cleaned afterward. The liquid forms of flux were both excellent. A little of the liquid applied to the connection with a brush was sufficient and the connection did not require cleaning afterwards.

(Copyright, 1924, by the S. N. L. Technical Syndicate.)

is then pushed the other way, the movement of the water is in the other direction. Thus a back-and-forth motion of the pis-



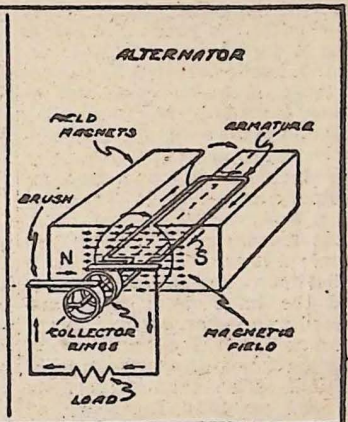
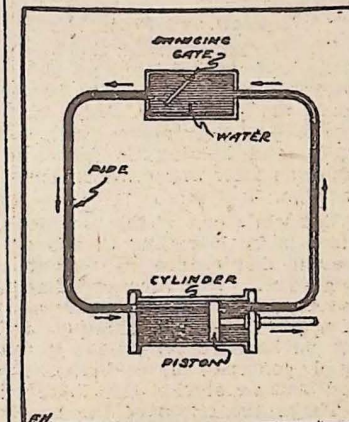
ton causes the water to oscillate back and forth in time with it.

A. C. Generator

Alternating current is always generated by some device which "pushes and pulls" the current by a reversal of its voltage. In the alternating current generator the positive pole becomes the negative pole, and the negative the positive, perhaps 100

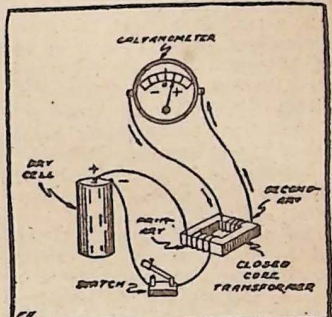
times in every second. The current, therefore, must change its direction 100 times per second, too. The vacuum tube is another device for producing alternating current, and we shall consider it later.

Essentially, the alternating current generator, or "alternator," consists of a coil of wire revolving between the poles of a powerful magnet. The ends of the coil are connected to two "collector rings" from which the current "brushes" convey the current. The alternator may be turned by steam power or by an electric motor. The principle of the A. C. generator may be more easily understood by examining first, a simple alternator consisting of a magnet and a single turn or loop of wire rotating between the poles of the magnet. As the loop rotates, one side goes up in passing the north pole, while the other side goes down in passing the south pole. Therefore the current induced in one side will be in the same direction as that induced in



the other. But when the loop has turned around the currents in both sides are reversed. Therefore, the current passing to the "load" outside the alternator must also reverse.

To a complete rotation (circle) of the loop of wire the current increases from zero to its



maximum value in one direction, decreasing to zero again and starts off in the other direction, dropping to zero the second time. This complete rotation is called a "cycle," and comprises two "alternations" of current. Commercial alternating current changes its direction 120 times per second—60 cycles.

Voltage Curve

Various "curves" representing changing conditions in radio circuits appear with technical articles, and some acquaintance with them is often valuable. The voltage changes in the alternator curve given herewith shows the just described through one cycle. To produce 60 cycle current, the simple machine would have to turn over 60 times per second, and the curve shows the rise, fall, reversal and reversed rise and fall during one revolution. In practice the alternator is made with many loops of wire (Continued on Page 7, Column 1)

WEEK'S AIR PROGRAMS, CONTINUED

(Continued from Page Four)

forecast and market reports.
8 P M—Accordian solos by Johnny Sylvester.

8:15 P M—Studio program of dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland; Herman Kenin, director.
10 P M—Dance music by George Olsen's Metropolitan Orchestra of the Hotel Portland. Intermission solos by Naomi Miller, soprano.
KFSG—Angelus Temple, Los Angeles (278 Meters)

8 TO 9 P M—Splashing waters; baptismal service and message.
9 TO 10 P M—Gray Studio program, furnished by William Butts Music Co., featuring Carl Edward Hatch, violinist, and associates: "A Song of David."

KJS—Bible Institute, Los Angeles (360 Meters)

8 TO 9 P M—Dorothy Dech, contralto; Mrs. Evelyn Pierce, reader; Charles W. English, tenor, accompanied on autoharp by Mrs. Charles W. English. Selections on four-hand bells by Charles English.

Friday, May 9

KPO—Hale Bros., Inc., San Francisco (423 Meters)

12 NOON—Time signals; reading of the Scripture.
12:45 P M—Talk broadcast from the Commonwealth Club luncheon at the Palace Hotel.

1 TO 2 P M—Rudy Seiger's Fairmont Hotel orchestra.
2:30 TO 3:30 P M—Organ recital by Theodore J. Irwin, official KPO organist.

Fox trot, Some Day You'll Know; Waltz, Beautiful Lady, from "Pink Lady"; operatic selection, Il Trovatore; Entr'acte; song melody, Sunshine of Your Smile; Polonaise, A Major; Song of Love, from "Blossom Time"; Gavotte, Stephanie; Serenade; fox trot, Kokomo.

4:30 TO 5:30 P M—Rudy Seiger's Fairmont Hotel orchestra.
KGO—General Electric Co., Oakland (312 Meters)

1:30 P M—New York Stock Exchange and United States weather bureau reports.

3 P M—Short musical program. A discussion of art.

4 TO 5:30 P M—Concert orchestra of the St. Francis Hotel, San Francisco, Fernin Cardona conducting.
6:45 P M—Final reading, stock exchange and weather reports and news items.

KLX—Oakland Tribune (500 Meters)
3 TO 5 P M—Baseball scores, all leagues.

7 TO 7:30 P M—News items, United States weather bureau report, market and financial summary.
7:30 TO 10 P M—Broadcast of Mills College alumni banquet and events at Hotel Oakland over private leased wires through KLX.

7:30 P M—Music by Mills College Trio.

Songs by Luther Marchant.
Banquet events.
Toastmistress, Dr. Alice Luce (five minutes).

Greetings from Russia by Varla Leachilova.
Greetings from France by Suzanne Vitry.

Greetings from the Orient by Esther Wong.
(Given in foreign languages.)
Class speakers (three minutes each).

Freshmen, represented by Margaret Bentley, "The Student Friendship Movement."

Sophomores, represented by Marianne Strohn, "Internationalism in Literature."

Juniata, represented by Elinor Rana, "Internationalism in the Curriculum."

Seniors, represented by Catherine Easterling, "The Youth Movement."

Faculty speakers (five minutes each):
Mlle. Cecile Reau, "The French Teacher in America."
William Day Hancock, "Student Alma."

Amy Cryan, "The International student."
Principal speakers (20 minutes each):

Dr. John Adams, "The International Professor."
Aurelia Henry Reinhardt, president of Mills College, "The Contribution of the American Association of University Women to Student Scholarship."

10 P M—Music by the American Theater orchestra, Owen Sweeten, director, and from the American Theater organ, Clement Barker, organist, broadcast over private leased wires from the theater.

DISTANT STATIONS

KHJ—Los Angeles Times (395 Meters)
12:30 TO 1:15 P M—Program of music and news items.

2:30 TO 3:30 P M—Program presented through the courtesy of Barker Bros.

7 TO 7:15 P M—Organ recital from the First Methodist Episcopal Church; Arthur Blakeley, organist.

7:15 TO 7:30 P M—Children's program, with Richard Headrick. Bedtime story by Uncle John.

8 TO 10 P M—Appreciation program through the courtesy of Ray F. Chesley, Ford dealer at Bell.

WBAP—Star-Telegram, Fort Worth Tex. (476 Meters)

7:30 TO 8:30 P M—Concert by Clare Drey's Choral Club of Brownwood, Tex. (E. L. O. announcing.)

9:30 TO 10:45 P M—Monthly program by artists of the College of Industrial Arts, Denton. (G. C. A. announcing.)

CFAC—Calgary (Can.) Herald (430 Meters)

12 NOON—Latest news items, grain and cattle prices.

2:30 TO 3:30 P M—Musical selections.

Silent night.
KGO—Morning Oregonian, Portland (492 Meters)

11:15 A M—Market basket.
11:30 TO 12 M—Weather forecast.

12:30 P M—Program by Peck Holton's orchestra of Christensen's Hall.

3:30 P M—Talk for women under auspices of home economics department, Oregon Agricultural College.

7:30 P M—Baseball scores, weather forecast and market reports.

8 P M—Lecture provided by Portland School of Social Work.

10:30 P M—Hoot Owls.
KFSG—Angelus Temple, Los Angeles (278 Meters)

8 TO 9 P M—Crusaders in song, music and reading. National messages by Judge Carlos S. Hardy, justice superior court; Madeleine Gilliland, "The Happy Song Girl."

9 TO 10 P M—Gray Studio program through courtesy of Maude Reeves Barnard; Temple Silver Band and Male Quartet, "The family altar."

KFOA—Rhodes Co., Seattle (455 Meters)

8:30 TO 9:30 P M—The program will consist of a soprano and violin recital given by Mrs. Herbert V. Preeg, talented lyric soprano, and Herbert V. Preeg, accomplished violinist, now playing with the Seattle Symphony Orchestra.

KFI—Earle C. Anthony, Inc., Los Angeles (469 Meters)

4:45 TO 5:15 P M—Evening Herald news bulletin.

5:15 TO 5:45 P M—Examiner news bulletin.

KUO

KUO—San Francisco Examiner (380 Meters)
Daily Except Saturday and Sunday

9:05 A M—Weather forecast.

11:00 TO 11:30 A M—Market reports.

3:30 P M—Financial bulletin.

6:00 TO 6:20 P M—Financial and garden hint broadcast.

6:40 P M—Weather forecast.

Saturday Only

9:05 A M—Weather forecast.

6:00 TO 6:20 P M—Financial and garden hint broadcast.

6:40 P M—Weather forecast.

Sunday Only

9:05 A M—Weather forecast.

6:40 P M—Weather forecast.

Additional Friday

5:45 TO 6:00 P M—Health bulletin.

bulletins.

6:45 TO 7:30 P M—Concert by Myra Belle Vickers.

8 TO 9 P M—Evening Herald concert. Little Concert Band, under direction of J. P. Little.

KFAE—Washington State College, Pullman, Wash. (330 Meters)

8:30 TO 9:30 P M—"Bobbed Hair," a one-act play; pupils of Mrs. Della C. Miller. Soprano solos, Edith Woody, "Purpose of Livestock Club Work," C. M. Hubbard. Agricultural talk. Instrumental solos. Review of new books, Alice L. Webb.

Saturday, May 10

KPO—Hale Bros., Inc., San Francisco (423 Meters)

12 NOON—Time signals; reading of the Scripture.

1 TO 2 P M—Rudy Seiger's Fairmont Hotel orchestra.

2:30 TO 3:30 P M—Carey's Male Quartet. Among their selections will be a number of the eminent California composer's original songs:

Sierra Sue; When Honey Sings an Old-Time Song; She Sang Aloha; My Old Irish Mother; A Bungalow in Idaho; In the Harbor of Home, Sweet Home; Drifting Down to Dixie; You'll Never Be a Sister to Me; West, West, West in California; That Loving Mother of Mine. Carey's Male Quartet consists of Edwin Stott, first tenor; Ray Neelan, second tenor; Harold Bishop, baritone; Charles Delmar, bass; under direction of Joseph Carey, accompanist and coach.

3:30 TO 5:30 P M—Tea Damsel, E. Max Bradford's Versatile Band, playing from the Palace Hotel Rose Room Bowl.

8 P M TO 12 M—Dance music by Art Weldner and his popular orchestra. This orchestra plays at the Fairmont Hotel every Saturday night and the music is broadcast by wire telephony over KPO.

KGO—General Electric Co., Oakland (312 Meters)

12:30 P M—New York Stock Exchange and United States weather bureau reports.

4 TO 5:30 P M—Concert orchestra of the St. Francis Hotel, San Francisco, Fernin Cardona conducting.

8 P M—Chorus of First Presbyterian Church, Berkeley, and soloists.

10 P M TO 1 A M—St. Francis Hotel dance orchestra, San Francisco, Henry Halstead, leader.

FIRST PART

Piano solos, (a) Prelude (Assault) (Chopin); (b) Prelude (Presto con fuoco) (Chopin); (c) Valse (Vivace) (Chopin); Marian Patricia Cavanaugh, 12 years old, pupil of Joseph George Jacobson.

Soprano solos, (a) Tes Yeux (Rabey); (b) Flower of the Alps (Weckerlin); Ruth Collins; Charlotte Collins, accompanist.

Hawaiian instrumental selection, Honolulu Aires (Kellia), Prof. John Kellia, steel guitar; Guillermo del Oro, steel guitar.

Original poems, Will R. Hill, the Old Home Poet.

Soprano solos, (a) Ah, fors e lui (Traviata) (Verdi); (b) Laughing Song (Auber); Ruth Collins.

Tenor solos, (a) Vorrei (Tosti); (b) Cradle Song (Gaynor); Harry Robertson; harp accompaniment by Barbara Merkeley.

Piano solo, Second Hungarian Rhapsody (by request (Liszt); Marian Patricia Cavanaugh.

Soprano solos, (a) The Dove (Tuscan folk song); (b) When I Was Seventeen (Swedish folk song); Ruth Collins.

Tenor solos, (a) Crescent Moon (Anon.); (b) Musica Prohibita (Old Italian); Harry Robertson; harp accompaniment by Barbara Merkeley.

Hawaiian instrumental selection, Aloha oe, Prof. John Kellia, steel guitar; Guillermo del Oro, steel guitar.

SECOND PART

This part of the program provided by the First Presbyterian Church, Berkeley, Cal.; Rev. L. A. McAfee, minister; George N. Calfee, director of music; Mrs. George N. Calfee, organist. Solo quartet, Mrs. Harold Johnson, soprano; Mrs. Clarence Page, contralto; Leon Mills, tenor; George N. Calfee, bass, and chorus of 50.

Chorus selection, Festival Te Deum in E flat (Buck), chorus of the First Presbyterian Church, Berkeley, Cal.

Soprano solo, "Hear Ye, Israel!" (from Elijah) (Mendelssohn); Mrs. Harold Johnson.

Vocal selection for tenor and chorus, "Seek Ye the Lord" (Roberts), Leon Mills and chorus of First Presbyterian Church, Berkeley.

Bass solo, Lord, God of Abraham (Elijah) (Mendelssohn); George N. Calfee.

Chorus selection, "Let Mount Zion Rejoice (Herbert), Chorus of the First Presbyterian Church, Berkeley.

Duet for soprano and contralto, "I Waited for the Lord" (Mendelssohn); Mrs. Harold Johnson and Mrs. Clarence Page.

Contralto solo, "O Rest in the Lord" (Elijah) (Mendelssohn); Mrs. Clarence Page.

Chorus selection, "The Heavens Are Telling (Creation) (Haydn).

KLX—Oakland Tribune (500 Meters)
3 TO 5 P M—Baseball scores, all leagues.

7 TO 7:30 P M—News items, United States weather bureau report.

DISTANT STATIONS

KHJ—Los Angeles Times (395 Meters)
12:30 TO 1:15 P M—Program presenting Albert Broad, tenor, and Emma Wippert Ahlswede, pianist.

2:30 TO 3:30 P M—Program presented through the courtesy of Barker Bros.

7 TO 7:30 P M—Children's program, presenting Prof. Walter Sylvester Hertzog, telling stories of American history, Helena Frie, screen juvenile. Jeanne De Bard, 5 years old, singer and pianist. Bedtime

story by Uncle John.

8 TO 10 P M—Program presented through the courtesy of the Cauldron Club of Pasadena.

WBAP—Star-Telegram, Fort Worth Tex. (476 Meters)

7 TO 7:40 P M—Review of the interdenominational Sunday School lesson and radio Bible class, conducted by Mrs. W. F. Barnum. A membership certificate will be sent fans writing in.

CFAC—Calgary (Can.) Herald (430 Meters)

12 NOON—Latest news items, grain and cattle prices.

KGO—Morning Oregonian, Portland (492 Meters)

11:30 A M—Weather forecast.

3 P M—Special musical program.

3:30 P M—Children's program. Story by Aunt Nell.

10 P M TO 12 M—Baseball scores and weather forecast. Dance music by George Olsen's Metropolitan Orchestra of Hotel Portland.

KFI—Earle C. Anthony, Inc., Los Angeles (469 Meters)

6:45 TO 7:30 P M—Closing Music Week concert.

8 TO 9 P M—Florentine Redea, mezzo-soprano.

9 TO 10 P M—Examiner concert.

10 TO 11 P M—Popular concert.

Sunday, May 11

KPO—Hale Bros., S. F. (423 Meters)

11 TO 12—Organ prelude, Theo. J. Irwin; prayers and sermon, Dr. Frank Boyd, of Sydney, Australia, "Mothers of the World"; soloist, Miss Augusta Hayden, soprano.

8:30 TO 10—Rudy Seiger's Fairmont Hotel orchestra.

KGO—General Electric Co., Oakland (312 Meters)

3:30 TO 4:30—KGO Little Symphony Orchestra.

KGO—General Electric Co., Oakland (312 Meters)

3:30 P M—Concert by KGO Little Symphony Orchestra and soloists.

KLX—Oakland Tribune (500 Meters)

9:30 TO 10 P M—Talk by Rev. John Snape, pastor First Baptist Church, Oakland. Sacred music.

DISTANT STATIONS

WBAP—Star-Telegram, Fort Worth Tex. (476 Meters)

5 TO 6 P M—Concert by the Bowie Quartet, W. E. Benson, director. (E. L. O. announcing.)

11 P M TO 12 M—Popular program by Crockett's Texans Orchestra.

CFAC—Calgary (Can.) Herald (430 Meters)

10 A M—First Baptist Church.

5:30 P M—First Baptist Church.

A-1 CRYSTALS

GET DISTANCE

"Did not think it possible on home made crystal set, but got KFI and KHJ (Los Angeles) the first night with A-1 Crystals."—L. B., Oakland, Calif.

A-1 CRYSTALS

Guaranteed Tested

Sent Postpaid, 50c Each
60c If Sent C. O. D.

CALIFORNIA RADIO MINERALS
HARRY GRANT, JR.
904 Oak Grove Ave.,
Burlingame, California

AFRICA GETS THRILL OUT OF FIRST STATION

A staff sergeant capering in Capetown Castle to "Mr. Gallagher and Mr. Shean" played in Johannesburg, 900 miles away—this signified the coming of broadcasting to South Africa.

Africa's first program consisted of five concerts broadcast from a temporary station at Johannesburg, employing a Western Electric 500 watt transmitter. General Smuts, Premier of British South Africa, broadcast a Christmas speech, which along with a varied program was clearly heard and enjoyed by many people in Transvaal and Rhodesia.

The people of South Africa had been interested in radio broadcasting for some months due to reports of its benefits and entertainment on the other continents.

Dr. J. D. Carpenter, South African manager of the Western Electric Co., suggested a plan for temporary operation of broadcasting apparatus whereby concerts given by the South African Railways could be sent out. The Railway people were at once enthusiastic and arrangements were made so the concerts could be picked up with receiving sets in the little mining towns surrounding Johannesburg and all along the famous gold reef.

Canadian Chain

The transcontinental radio chain across Canada will be completed with the erection of broadcasting stations in Winnipeg, Saskatoon, Regina, Edmonton and Calgary. The chain will be operated by the Canadian National Railways.

SURGEON USES RADIO KNIFE

BY GEORGE BRITT

NEA Service Staff Writer

CHICAGO, May 5.—Have you been troubled of late by a strange, wild, buzz-saw sort of static?

Well, don't unwind your variometer on that account or broadcast curses at the atmosphere. The cause may be one of the new radiothermies, a boon to surgeons and a balm to the sick, which makes the science not only a commercial and entertainment marvel but a promise of almost magic healing.

Dr. Louis E. Schmidt here is one of the first surgeons to put the device into practice. It has been pronounced a success.

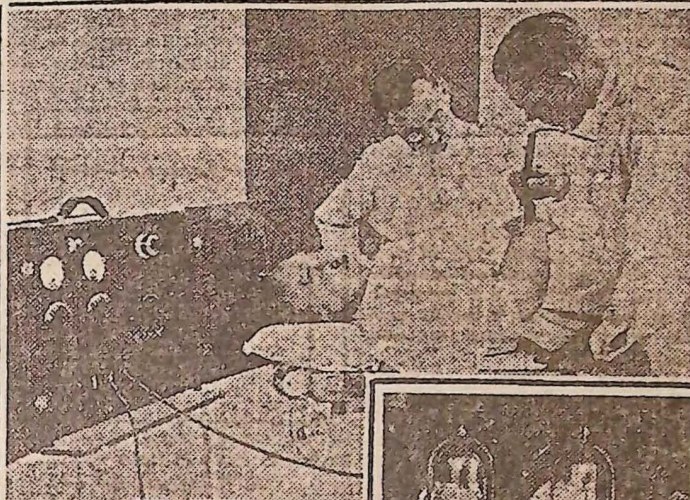
The radiotherm is simply an electric knife. The patient lies upon a metal pad which connects with the source of electricity in the instrument.

"Incision"—Burnt

The knife is merely a contact point, attached by wire to the same instrument. When it is touched to the patient's flesh, a circuit for the current is completed, heat is created by the resistance of the body and the incision is made by burning.

Radio enters in the development of the current. Originally the electricity is drawn from an ordinary lamp socket. That current, however, is not of sufficient frequency to develop the required heat.

Between the intake socket and the knife point there are placed two tubes, similar in appearance and function to the vacuum tubes of a broadcasting station. The current here is stepped up to a frequency of nearly 2,000,000 oscillations a



Surgeons operating on a patient with the radio knife. Lower photo, the high-frequency set.

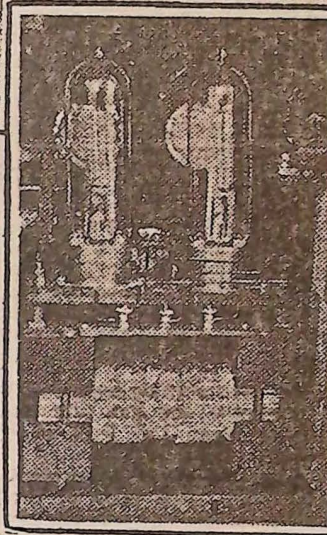
second. For broadcasting purposes, the frequency is only about 40,000.

Boon and Pest

The great merit of the new radio knife is that it makes virtually a bloodless cut. The heat seals the capillaries. Also no pressure is required as with a knife, and healing is just as rapid as after any other known incision.

But while one of the new devices is in operation, there's a fearful disturbance in the atmosphere. The tubes sending out to the knife point a current of nearly 2,000,000 oscillations a second have no regard for jazz band concerts, news bulletins and bedtime stories.

That's the cause of the new "static" you may be hearing.



For Dog Lovers

Dog lovers on WJZ do better than in on WJZ every Monday evening. Frank Dole, noted kennel authority, has been broadcasting interesting dog lectures from this station for the last 18 months.

DANGER FROM LIGHTNING UNNECESSARY

BY DAVID DIETZ

With the approach of warm weather, thunder storms are already beginning to make their appearance.

Consequently a word about radio and lightning is not out of season.

The first rule for all radio amateurs is: Stay away from your radio sets during a thunderstorm.

Do not attempt to operate your set at such a time. There is danger of the aerial being struck by lightning. In addition there is the danger of an extra load of static hitting the aerial.

The amateur is not missing anything by staying away from the set, because reception at such a time is down to a minimum.

The second rule is to have the set properly protected by a lightning arrester, and providing further that you do not attempt to operate the set during a thunder storm.

Ban in Jamaica

Jamaica practically forbids the erection and operation of radio equipment there, reports the American consul at Kingston. But the administration is considering granting permission for radio reception to its inhabitants.

Turkey Behind

Turkey has not yet started popular radio, although a German firm has applied for a concession to operate a low-power broadcasting station at Constantinople. Sale of radio receiving sets is expected to boom if this is granted.

HERE'S WHY LOOP ANTENNA OPERATES

BY R. H. LANGLEY

(Radio Engineer, Gen. Electric Co.)

The loop antenna is a very interesting device. It is quite different in its method of operation from the outdoor antenna. The outdoor antenna is, in effect, nothing more or less than a condenser. It is a very large condenser, to be sure, so far as its physical dimensions are concerned, but electrically it is a relatively small condenser. The loop, on the other hand, is an inductance. This fundamental difference between the two is the reason why it is necessary to use different methods of tuning with the two types.

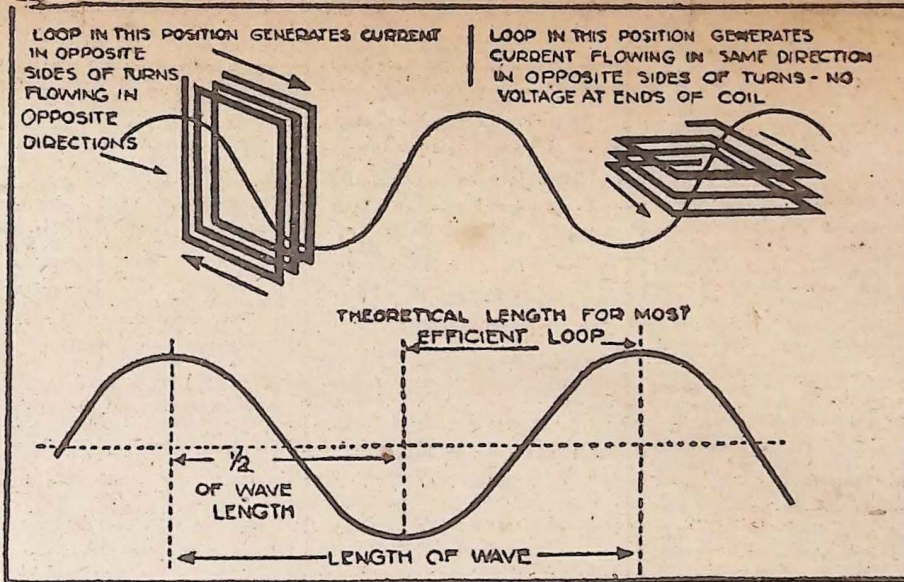
Let us examine this special form of inductance which we call a loop and see why it serves as a pick-up device for radio signals and how it should be made to be effective.

Generator Analogy

There is a very close parallel between the ordinary direct current generator or dynamo and the loop antenna exposed to a passing radio wave. In the dynamo a number of coils, corresponding to the loop antenna, are rotated in a powerful magnetic field. The purpose of rotating them is that they may move with respect to the field and thus have a voltage generated in them. The amount of this voltage depends, of course, upon the strength of the field and the speed at which the wires are swept through it.

In the radio example the coil stands still but the field moves swiftly past the coil, thus accomplishing the same result. The speed at which the field moves cannot, of course, be varied and it is always the speed of light—that is, 186,000 miles per second.

Let us see now what form of loop would have the greatest voltage generated in it by a passing radio wave. Let us think of this radio wave as very much like a great smooth wave on the ocean, which, of course, also moves forward with a very definite velocity. The turns of wire on our loop antenna are necessarily in series with each other—that is to say, they form a continuous winding. If the maximum voltage is to be generated in any one turn of the



Showing how the loop antenna acts when "in phase" and "out of phase" with oncoming radio waves.

loop, then the voltage generated in the two sides of this turn should be in opposite directions, so that they may add and not oppose each other. If the voltage generated in both sides of the loop were in the upward direction at any one instance, then these two voltages would cancel each other, but if the voltage on one side of the turn was up and on the other side of the turn it was down, then they would add, and if the loop were connected to a receiver a current would flow around the turns of the loop. This is, of course, exactly what we wish to have happen.

Half Wave Length Loop

Now, in order to have the voltage generated on one side of the loop in the opposite direction to that generated on the other side of the loop the loop would have to be one-half a wave length long—that is to say, it would have to be long enough in the horizontal direction so that one side was in the crest of the wave when the other side was in the trough of the wave. Since the distance between the crest of the wave is the wave length itself, then the distance from the crest to the trough is one-half the wave length.

Loops

The higher the sides of the

loop—that is, the longer the vertical wires—the greater will be the voltage generated, and, of course, the voltage generated in each turn is added to the voltage generated in all the other turns.

But a loop one-half a wave length long is quite out of the question. It would be as long as a steamship and almost as difficult to handle. The loops which we are using every day are of quite reasonable dimensions. They are only a few thousandths of a wave length long. How do they function? In order to answer this question let us ask ourselves how we would build a coil of wire in order that absolutely no voltage should be generated in it by the passing wave. The only way in which they could be accomplished would be to build the coil that the same voltage would be generated in both sides of it and that the voltages generated in the two sides would be opposed to each other. This would give a complete cancellation and no voltage at all at the terminals of the loop or coil. It is obvious that the only way in which this could be done would be by so arranging the loop that it had no length at all—that is to say, ar-

ranging it so that the two sides were exactly in the same position in space. This would mean that the horizontal wires across the top and the bottom of the loop would cease to exist and the loop would become nothing but a wire laced up and down between pegs on the plain surface of a board.

If there be any distance at all between the two sides of the loop, then there will be some difference not in the amount of voltage generated in the two sides but in the time at which this voltage is generated, and there will consequently be some voltage at the terminals of the loop, since complete cancellation of voltages cannot occur.

If the loop be rotated so that its horizontal wires are at right angles to the direction in which the signal is coming, then the loop has no length so far as those signals are concerned. The passing wave strikes both sides of each turn in the loop at exactly the same instant, and the voltages generated are therefore equal and opposed and there is no terminal voltage. This is, of course, the fact which gives the loop antenna its very useful directional property. It is to be noted, however, that if the loop is turned ever so slightly from

this zero position, then the voltages no longer cancel and there is a voltage at the terminal. This means that the zero position of the loop is very sharp but the maximum position is very broad.

Practical Application

In applying the loop antenna to an actual radio receiver it is necessary that provision be made to tune it to resonance with the desired signal. This is accomplished by means of a variable air condenser, and since this condenser has a very definite maximum capacity the amount of inductance which the loop can have is also limited. This maximum inductance, with the maximum capacity of the variable condenser, must give resonance to the longest wave to be received. The specification for the best loop antenna, therefore, is that it shall have just as many turns as possible, each turn being just as long as possible and just as high as possible, and still have no more than the required maximum inductance. The higher the loop the greater will be the voltage generated in each side of each turn, and the longer it is the greater will be the difference in time at which these voltages are generated in the two sides of the loop and consequently the greater will be the voltage at the terminals, but it must not have an inductance value greater than that required for tuning.

Now, the inductance of a coil of wire increases very rapidly as the turns are wound closer together. The maximum inductance is obtained with the minimum number of turns when they are wound just as close to each other as possible. In order to get the maximum number of turns for a given inductance, which is what our loop requires, the turns should be wound just as far apart as possible. Now, it is found that this spacing is best accomplished by winding the loop on a frame which has the form of a vertical cylinder. The wire goes up one side of the cylinder across the top and down the other side and across the bottom, and the turns are spaced around the circumference of the cylinder so that the complete winding covers an arc of about 120 degrees on each side of the cylinder.

KEITH CIRCUIT STARS BARRED FROM RADIO

NEW YORK, May 5.—Keith circuit vaudeville performers hereafter will be forbidden to broadcast by radio.

This action has been decided upon after an investigation which proved to the satisfaction of the Keith officials that radio broadcasting was injuring attendance at their theaters.

One of the results of this decision is the enforced abandonment of music broadcast by the famous Vincent Lopez, it being found that his drawing power was being destroyed by appearance at prominent stations. His radio contract was to expire about May 1.

Broadcasters, however, make the counterclaim that radio "made" Lopez, that he would never have become nationally famous were it not for his broadcasting, which started with selections of his orchestra being put on the air direct from the Pennsylvania Hotel. And, they add, it was fame as an orchestra broadcaster that won him his contract to appear in vaudeville.

Radio From Ground Up

(Concluded from Page Five) and with several poles or "field magnets" so that the speed will not have to be so great.

The transformer is a device with which we come in frequent contact. It consists of an iron "core" having two separate coils of wire placed on this core. The transformer is useful for changing the voltage from low to high or vice versa, according to the proportions of the windings. If the voltage is desired to increase 10 times, the second coil is wound with about 10 times as many turns of wire as the first coil, or if it is desired to decrease to one tenth, it is wound with only one-tenth as many turns.

If the current passing through the first or primary coil is steady, there will be no voltage induced in the secondary. Therefore the primary current into a transformer must be either alternating or direct current broken rapidly into "pulses." In either case the magnetic field spreading out from the primary and enveloping the secondary will rise and fall rapidly, thus snapping across all the wires of the secondary.

A. C. in Secondary

The current set up in the secondary is alternating because of the fact that the magnetic field from the primary flashes out in one direction when the current in the primary starts and snaps back the other way when the current in the primary stops or reverses. A familiar case of the transformer is in the automobile spark coil. Here an interrupted or pulsating direct current is sent through the primary by a vibrating armature (as used in the buzzer). There are several thousand turns of wire on the secondary coil, and the voltage is "stepped up" to eight or ten thousand. At that pressure a spark of about one-half inch will jump if the circuit is not completed. This is used to ignite the compressed vapor mixture in the cylinder of the automobile engine.

Transformers form the very basis of radio reception as they are used in receiving radio signals and in making them loud enough for the radio loud speaker.

Esperanto Program

Esperanto is the only language spoken on a test program sent out by WIP, Philadelphia. The broadcasters hope to break broadcasting records with these programs, which will attempt to reach beyond the shores of America.

Guides Balloonists

Weather bulletins from station WOC, Davenport, Ia., guided balloonists of the U. S. Air Service in their test flights over Illinois to establish the truth of forecasting theory. Fifteen such tests are planned.

Eleven broadcasting stations ceased operation during March.

TRY THIS ON YOUR PIANO!



Ever have a tune running through your head? Paul Reese, the Program Director of the Earle G. Anthony station, has written a song so singable that Margerie Lyon, the KFI hostess, could not resist the idea of singing through her hat. National Music Week was the inspiration for the design, for which Miss Lyon is responsible. If you have a favorite tune, put it on your hat; it's much more decorative than wearing your heart on your sleeve.

3000 Taking KGO Radio Spanish Course

Great interest has been created among radio fans by the course in Spanish to be given over Station KGO, commencing Monday, May 5. To date about 3000 people have enrolled, or have asked for charts. Radio, besides furnishing amusement

to the public, has recently touched unlimited possibilities, the education of the masses. Opportunity is knocking on the door of every radio fan who tunes in on the series of weekly Spanish lessons over Station KGO.

Nightingale Radio

British broadcasters are planning to try broadcasting the song of the nightingale in its native haunts, this summer. It will be caught by a microphone set near the bird's nest and transmitted by the famous station 2LO.

What's the Use?

Inhabitants of Italy are permitted to buy radio receiving sets. But it is practically impossible to obtain government sanction to use them. The famous Lombardy Society is centering its efforts to obtain this approval.

TO GET THE FACTS

There is only one way to be certain of getting the best of the news of the radio world as it occurs daily. That is by having The Daily News sent to your home each afternoon. If you are not a regular subscriber, mail this coupon to the Circulation Department and receive The Daily News. The price is only 50c a month.

Name

Street and number

Send this coupon to The Daily News, 340 9th-st, San Francisco; or just telephone and say, "I want The Daily News."

Record Broadcasting

Although Class B stations are not permitted to broadcast phonograph music, one of the largest record manufacturers is planning a station from which the songs and other selections of famous by-gone artists may be put on the air. For this special purpose, perhaps, permission may be obtained for the erection of a Class B studio.

Radio Foils Police

Since the police have been active in repressing betting on races near Cleveland, O., bookmakers and others gambling on the races have taken up radio for their activities. Race information is sent on low wave lengths by prearranged code from small transmitting stations near the track to the receivers.

Solder Connections

Every fan knows connections should be soldered to keep them secure. But it isn't necessary to solder all, especially those that can be screwed down tightly, with pliers. These are, for instance, the lines to the tube sockets, transformers and some binding posts.

- Repeater Head Sets.....\$3.00
- Tom Mack Crystals......25
- Aerial Wire, No. 14,
100 ft.65
- Stranded Aerial Wire,
100 ft. 1.00
- 45-volt B Battery..... 5.00
- FREE DELIVERY SERVICE
- Radio Batteries Recharged 75c

Webb and Gross
420 CASTRO ST.
Phone Market 1234

AMATEURS IN VANCOUVER TO ENGLAND TEST

BY H. S. GOWAN

KITCHENER, Ont., Canada, May 5.—A remarkable demonstration of the possibilities of short wave amateur radio communication was given recently when a message was transmitted by private amateur radio stations from Bristol, England, to Vancouver, British Columbia, a distance of more than 6000 miles, in a little more than an hour.

The test was conceived, it is believed, by S. G. Vigers, owner of station 3WS at Port Arthur, Ontario. He called the amateur operators, E. Maynard of Morse, Sask., and H. Linke, of Kitchener, and asked them to make arrangements with western and eastern amateurs to be "on the air" the night of the test. He also sent a message to J. J. Fassett, owner of station 1AR at Dartmouth, N. S., asking him to request an English station to give him a message for Vancouver.

Mr. Fassett, whose powerful station has been able to make contact with European amateurs almost every night, got in touch with the operator of British 5KO at Bristol. The latter eagerly agreed to send a message, and when the time came for the relay, a complete string of amateurs was waiting to pass the message across Canada.

The message was received from England by 1AR at about 2:10 a. m., Atlantic time, and immediately relayed to 3B, reaching this point about 1:15 a. m., eastern time. In less than five minutes the message was received by 3WS at Port Arthur. The latter, however, was not able to get it off as easily as the preceding stations and was heard calling 9BX of Morse, Sask., for nearly half an hour before he could connect with that station.

Meanwhile, the operator of station 3B, seeing that there was trouble in getting the message west of Port Arthur, tried to connect with 6ARB in California in a desperate attempt to get the message through the south if it failed. This was evidently why with another station closer to him and was "dead" to the Canadian station's repeated calls.

The operator at Morse finally answered his call and relayed the transcontinental message to 4DQ of Vulcan, Alta. The latter, after much "CQ-ing," was able to raise E. Chang, station 5GO, at Vancouver, and thus the message reached the western coast by an all-Canadian route. Mr. Chang immediately started another message in reply to the one from England, which was handled through the same Canadian stations and reached Kitchener about 3:30 a. m., eastern time.

This, however, was 4:30 a. m., Atlantic time, and 1AR, next operator to the east in the relay, was "off the air," so the answer waited in Kitchener until 7:00 p. m. when it was sent to 1AR and, as far as could be determined, went to England that night.

All of this work was done on the 125 to 150 meter wave lengths which were authorized for amateur use by the Canadian government a short time ago. This band has proved to be highly satisfactory as very little interference is experienced.

\$4.95 New and Complete **RADIO** RECEIVING SET

NO ACCESSORIES TO BUY. LOOK HERE IS WHAT YOU GET: AM- PHONE RECEIVER, CRYSTAL AERIAL, INSULATORS, LEAD-IN GROUND WIRE AND A 1000-ohm RECEIVER—ALL TESTED EQUIPMENT. Nothing more to buy—no batteries or tubes needed—no wiring of any kind. THE SET IS COMPLETELY ASSEMBLED AND READY to operate and to hear the broadcast programs, market reports, time signals, ship calls or land station messages. SAN FRANCISCO ORDERS FILLED AT SALES OFFICE. **R. & O. Manufacturing Co.** 643 Pacific Bldg., 4th and Market Sts. Or will mail upon receipt of cash. Balance Parcel Post C. O. D. Supply Limited—Order Now.

NEW WAVE DISCOVERY ANNOUNCED

BY EDWARD H. FRAZER

The paper delivered by Raymond H. Heising before the Institute of Radio Engineers in New York recently on recent advances in transatlantic radio telephone equipment indicates some developments which may be applied to radio broadcasting transmitters soon.

While the system described was of an experimental nature and represents a complex method of communication by radio telephony, it is not unlikely the discoveries made in the Western Electric laboratories will eventually be applied to broadcasting.

There are necessarily problems of development which require considerable research before they may be placed in practical operation on short waves, but certainly they are not barriers which cannot be surmounted by the radio engineering genius now applying itself to these problems.

Essentially, the method of transmission described by Heising possesses three important features:

First, the carrier wave is suppressed and is not radiated into the ether; second, the voice frequencies are concentrated upon one band instead of two, an upper and a lower, as obtains with present methods of modulation, and third, only a small fraction of the power required for carrier wave transmission is necessary to secure equal results with the new system.

The suppression of the carrier wave is of tremendous significance. This discovery applied to radio broadcasting would eliminate 90 per cent of squealing now encountered in reception.

Squealing is caused by a heterodyne effect between the carrier of the broadcasting station to which you are listening and a continuous wave radiation from an oscillating receiver listening to that same station.

To Eliminate Squealing
If wave with the new system of transmission, there would be no heterodyning when a listener employs a radiating receiver. The only occasion for squeals would occur if two receivers were oscillating on practically the same wave length with an energy of the same order of magnitude at the observing point.

While the saving of transmit-

Says Radio's Not Hurting Cables

NEW YORK, May 5.—Transatlantic radio is not taking overseas business away from cable companies, says Newcomb Carlton, president of the Western Union Telegraph Co.

"The Radio Corporation of America is today transmitting from 12 to 14 per cent of the eastward and westward business between the United States, Great Britain and continental Europe," said Carlton. "While a considerable part of this business would no doubt have gone to the cable companies, an important part is newly created traffic."

"The radio rate from New York to London is 18 cents a word, competing against a cable rate of 25 cents. With rates 20 per cent cheaper, the radio is doing from 12 to 14 per cent of the business."

Five Element Tube

A vacuum tube consisting of a filament, two grids and two plates is the invention of a German radio engineer. It is a step beyond the four-electrode tube invented by a Frenchman. The new tube is used for generating small waves of only two or three meters.

FOR SALE

Radio Pole, 40 feet, with pulley and staples; new, ready to use. Also Omnigraph Key and Buzz and 3-foot loop.

Apply 6235 California St.

ting energy is of some importance in broadcasting, it is of vital importance in bringing about the commercial application of transatlantic telephony, where large amounts of power atlantic tests shows that fading is reduced by perhaps two-thirds. This is an important step in securing service of a commercial standard.

So far as broadcasting is concerned, a valuable result of suppressing the carrier is the reduction of fading. An analysis of the results obtained in transatlantic tests shows that fading is reduced by perhaps two-thirds. This is an important step in securing service of a commercial standard.

Better Broadcasting
Transmission on a single side band doubles the number of stations which can operate

over a given span of wave length and without interference. The result is better broadcasting, less interference and more reliable long distance reception.

An essential feature of a receiver to pick up transmission is the use of a local oscillator which supplies the missing carrier wave for reception purposes. This oscillator must be accurate within 20 or 30 cycles, as compared with the carrier wave which is generated by the transmitter, but suppressed before radiation takes place. If the local heterodyne in the receiver is not accurate distortion is very great.

It is not, however, a serious disadvantage that a local oscillator of such accuracy is required, as a good home constructor

can make one without much difficulty.

Heising devoted most of his paper to describing the complete equipment required to transmit by the new method. This process is too technical to describe here. Suffice it to say that an elaborate layout of filters is required.

The first element of the transmitter is a low power oscillator modulated with the radio frequency current which it is desired to transmit. Steps are then taken to separate the upper and lower side bands and to blot out the upper side band by means of a filter. High power amplifiers bring up the remaining currents to an order of sufficient magnitude to transmit the desired distance.

In actual tests loud speaker

reception is easily obtained on the other side of the Atlantic with sufficiently accurate reproduction that speakers may be identified by their voices.

Just how soon transatlantic radio telephony on a commercial scale will become a reality is dependent upon the amount of traffic which such a system would obtain from the public, for the expense of carrying on conversation over this distance is considerable.

The number of wave lengths available for international use is somewhat limited, which reduces the number of international radio speech circuits which may be operated simultaneously. But, as in the case of long distance telephony, engineering genius will meet requirements of the times.

Readers of The Daily News Radio Magazine Section

will be interested in this advertiser's appreciation of your patronage.

RADIO DEALERS

will be quick to appreciate that the thousands of persons reading this section weekly have money to spend, and can be readily persuaded to buy from responsible radio concerns. **ADVERTISE YOUR RADIO SETS and SUPPLIES** in this section next Monday. Just telephone Market 400 for advertising rates.

CALIFORNIA RADIO MINERALS.

HARRY GRANT, JR.

904 OAK GROVE AVE. BURLINGAME, CALIFORNIA

SUPERIOR RADIO CRYSTALS

April 26, 1924

DAILY NEWS,
Advertising Dept.,
San Francisco, Calif.

Gentlemen:-

We wish to express our appreciation and amazement at the pulling power of DAILY NEWS ads. The remarkable thing is that, although our advertisement appears only in the Radio Section published on Mondays, replies to the advertisement are received every day of the week.

If the Radio trade realized that the Radio section of the NEWS is not thrown away by fans but is kept for future reference you would have much more of that advertising. Dealers and manufacturers would get better returns from their advertising appropriations by advertising with you.

We believe the DAILY NEWS has proven the fallacy of so many advertising managers who hold that the life of a newspaper is only from one edition to the next.

RESULTS SECURED BY US FROM OUR DAILY NEWS ADVERTISING PROVE THAT THEORY TO BE FALSE - at least as to Radio ads.

Yours very truly,

CALIFORNIA RADIO MINERALS

Harry Grant, Jr.

By