

# Radio Digest

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## EVERY WEEK

# Illustrated

## TEN CENTS

PROGRAMS

REG. U. S. PAT. OFF. & DOM. OF CANADA

Vol. X / Copyright 1924 By Radio Digest Publishing Co. SATURDAY, JULY 12, 1924 No. 1

# NEW CIRCUIT IN ENGLAND

## PHILHARMONIC GOES ON 3 TIMES WEEKLY

### WJZ UNDERTAKES THIRD SUMMER SEASON

Broadcasts Popular Stadium Concerts In New York With Remote Control

NEW YORK.—Arrangements have been completed between the executive officers of the New York Philharmonic society and Radiocast WJZ, whereby that station will give the Stadium concerts by the Philharmonic orchestra, commencing with the first concert of the 1924 summer season.

WJZ will Radiocast three concerts a week direct from the Lewisohn Stadium, employing the same system of remote-control transmission as was used during the Radiocasting of the Stadium concerts in 1922 and 1923. This is the third consecutive year of WJZ's co-operation with the Philharmonic society.

#### Is Famous Symphony Body

The New York Philharmonic orchestra includes over 100 members this season, with Willem Van Hoogstraten conducting. The orchestra has long been one of the leading symphonic organizations of the world, and the Stadium concerts constitute one of the country's outstanding musical series of the summer.

An unusual feature of the present season is the visit of Fritz Reiner, conductor of the Cincinnati Symphony orchestra, as guest conductor of the concerts between July 24 and August 6, for no guest conductor has ever before directed a Stadium concert. Willem Van Hoogstraten, conductor of the New York Philharmonic orchestra, will direct the concerts from July 3 to July 24, and from August 6 until the final concert of the season on August 21.

## WGY Players Desert Air During Hot Days

### Student Radarists Take Their Place for Summer

SCHENECTADY, N. Y.—The WGY Players concluded their 1923-24 season of Radio performances with the production of "Cappy Ricks," a comedy based on Peter B. Kyne's lovable Pacific Coast shipper. The Radarists will not be missing from WGY programs during the summer, however, as the WGY Student Players will be heard weekly in one-act plays and full-length dramas. Edward H. Smith, director of the players will be in charge of the student productions.

## SHE JUST KNEW SHE HEARD HIM SAY SOS

DAYTON, O.—While testing out an airplane Radiophone set here recently, the embryo announcer, A. C. Studebaker, caused a commotion by starting to sing, "London Bridge Is Falling Down." The phone in the laboratory of McCook field began to ring. A feminine voice announced, "There's a man up there in distress. He keeps calling that he is 'falling down.' Can't you help him?"



Rita Rogan, eight-year-old motion picture actress, is known as the prettiest girl in the movies. Recently she appeared in a program given by well-known stage children from WOR, Newark.

### Radio Manufacturer Census

WASHINGTON.—The bureau of census, for the first time, is taking a manufacturers' census of the Radio industry. The census is in connection with the manu-

facturers' census of 1923, begun by the bureau on the first of January.

Great Britain expects to institute a regular service of Radiocasting to the schools beginning in September.

## BRITON'S SET INCORPORATES RADICAL IDEA

### Use of Four Electrode Tube Eliminates Necessity of Plate Batteries

### Conducting Experiments

#### Hook-Up Especially Adapted to Portable Outfits Where Light Weight Is Factor

No B batteries are required in the latest epoch-making and revolutionary circuit developed in England, which, despite the absence of the plate batteries, is said to function excellently and equal to, if not better than sets now in use.

With portable sets in the limelight there is a great demand for a set that doesn't require a lot of heavy, space-wasting B batteries. And England reports it has solved the problem through the medium of four electrode tubes!

Some of these English valves, as they call them over there, have been ordered so that a series of experiments can be conducted on the new circuits.

#### Collect Data in England

The information presented is the result of considerable data collected in England and prepared as an introduction.

It is not unknown to many that the three electrode tube will function properly when the plate battery is omitted and the return of the plate circuit is made to the positive terminal of the A battery. Unfortunately the amplification value of a three electrode vacuum tube without a plate battery appears to vanish entirely. Although three electrode tubes could be designed for very low plate potentials, yet the effect on the other characteristics of the tube would make it rather impractical at the present stage of research.

#### Four and Five Electrode Tubes

Four and five electrode tubes have been available in Europe for a considerable period of time. This has given many over there, the opportunity of individual research into this field. In this country, (Continued on page 6)

## HUGE HORN STANDS TWELVE FEET HIGH

CHICAGO.—Largest of any loud speaker in the world was the mammoth reproducer here in the Elizabethan room of the Congress hotel, used during the political conventions to repeat happenings at Cleveland and New York. It stood twelve feet high, was more than eight feet across the flare of the horn, and the hole from which the sound issued measured six feet in diameter.

# No. 8 OFFICIAL BALLOT

## Announcers' Contest

### RADIO DIGEST FIRST ANNUAL GOLD CUP AWARD

Gold Cup Award Editor, Radio Digest,  
510 North Dearborn St., Chicago, Ill.

Please credit this ballot as one vote for:

.....of Station.....  
 (Announcer's name) (Call letters)  
 Signed .....

Address .....

City.....State.....

If you desire, tell below in five or less words what you most like about the announcer for whom you have cast this ballot:

## GOLD CUP ENTHUSES ARMY OF LISTENERS

### STANDING OF ANNOUNCERS APPEARS IN TWO WEEKS

List of Nominees Reaches Total of 118—  
Eighth Ballot Marks Halfway Point in Voting

Radio Digest's First Annual Gold Cup Award enthruses the whole invisible audience! From Key West to Seattle, Cape Cod to San Diego, come letters, nominations, ballots from anxious Radiophans who desire to see their favorite announcer crowned King of the Ether World.

With this issue is given the eighth ballot, completing half the series. There will be eight more. Listeners sending in a complete series of eight ballots for their choice will be given a twenty-five vote bonus, or a total of thirty-three votes. BUT if the complete series of sixteen ballots is saved and voted at one time for one announcer, the lucky recipient will be credited with a bonus of seventy-five, or a total of ninety-one votes.

#### First Standing in Two Weeks

Hundreds of announcers and hundred thousands of listeners in will be gratified to know that the relative standings of the 118 nominees will appear issue after next. Beginning with the first announcement in the July 26 number, the tabulated standing will be brought up to date every week till the close of the balloting.

The rules and regulations governing the procedure, given last week, will be given again next issue. Remember to address all communications concerning the award to the Gold Cup Award Editor, Radio Digest, Chicago. Controversies over balloting, etc., which may arise will be settled by the Gold Cup Award Editor, whose decision will be final.

#### List of 118 Nominees

Twelve more announcers were nominated during the past week, bringing the total to 118. The complete list of these, with distinctive initials or nom de plume when used, follows:

- Adair, Sam, WOQ, Kansas City.
- Arlin, H. W., KDKA, East Pittsburgh.
- Arnoux, G. C., WBAP, Fort Worth.
- Bach, A. E. W., WBZ, Springfield.
- Bachman, Miss Alberta, WBAH, Minneapolis.
- Bailey, S. T. (STB), KLLX, Oakland.
- Barnes, E. T., WGY, Schenectady.
- Farnett, S. W. (BWS), WOC, Davenport.
- Becker, Otto, WGR, Buffalo.
- Bohannan, J. K., WTAR, Norfolk.
- Buell, Earle, WLAG, Minneapolis.
- Buhlert, F. A. (Spark Plug), KFJC, Seattle.
- Bertier, Jaques N., CKAC, Montreal, Can.
- Clark, David C. (DC), WHAM, Rochester.
- Laussing, Leroy, WEBH, Chicago.
- Coats, D. R. P., CKY, Winnipeg.
- Coggesil, A. O., WGY, Schenectady.
- Cole, N. D. (Old King Cole), WHO, Des Moines.
- Cooperman, Tess, WLAG, Minneapolis.
- Cadigan, John J., WTAT, Boston.
- Carlin, Phillip, WEA, New York.
- Cowan, Thomas H., WJZ and WJY, New York.
- Cross, Milton J. (AJN), WJZ and WJY, New York.
- Cunningham, L. C., WBZ, Springfield.
- Daggett, Uncle John, KHJ, Los Angeles.
- Darling, Walter, CFCF, Montreal.
- DePew, J. H., WCBD, Zion City.
- Dodge, Jack S., WNAC, Boston.
- Douherty, C. L., WSB, Atlanta.
- Eastman, M. L., KYW, Chicago.
- Eds. A. F., WBZ, Springfield.
- Ehrhart, Harry E. (HEE), WDAR, Philadelphia.
- Emery, C. R., WGI, Medford Hillside.
- Entzkin, C. A., WCAH, Columbus.

- Erbstein, Charles (Ha Ha Man), WTAS, Elgin.
- Fanning, Major J. J., WNAC, Boston.
- Fay, Wm. A., WGY, Schenectady.
- Field, Henry, KFNE, Shenandoah.
- Fitzpatrick, Leo (Merry Old Chief), WDAF, Kansas City.
- Gaal, C. A., KUO, San Francisco.
- Graham, C. W., WIP, Philadelphia.
- Granlund, N. T. (NTG), New York.
- Grant, W. W., CFCN, Calgary.
- Greene, P. A., WSAI, Cincinnati.
- Hager, Kolin (KH), WGY, Schenectady.
- Haller, Richard V., KGW, Portland.
- Hammond, Carl E., KFOA, Seattle.
- Harnach, F. F., KDKA, E. Pittsburgh.
- Harrington, Ted, WCX, Detroit.
- Harris, Credo, WHAS, Louisville.
- Harrison, P. W., WBZ, Springfield.
- Hatfield, Helen G., WCK, St. Louis.
- Hay, Bill, KFXX, Hastings.
- Hay, George (The Solemn Judge), WLS, Chicago.
- Hayner, Rutherford, WHAZ, Troy.
- Hired Hand, WBAP, Ft. Worth.
- Herske, Arthur R., WTAM, Cleveland.
- Jester, Carl, WGY, Schenectady.

- Johnson, Elmer (Swan) G., WJAX, Cleveland.
- Johnson, F. W. (FWJ), CHYC, Montreal.
- Johnson, Paul, WLAG, Minneapolis.
- Jones, Miss V. A. L., KSD, St. Louis.
- Kancy, Sen A. W., WGN, Chicago.
- Kay, Lambdin, WSB, Atlanta.
- Kerly, E. J., KFOV, Sioux City.
- Kirby, Corley F. (CFK), WWJ, Detroit.
- Ludgate, William, KSD, St. Louis.
- Mack, Johnnie, WJAS, Pittsburgh.
- MacPhee, Don, WAAW, Omaha.
- Martin, Victor, WHAM, Rochester.
- McNamee, Graham, WEA, New York.
- Mentzer, Carl, WHAA, Iowa City.
- Milholland, Howard, KGO, Oakland.
- Mullen, J. E., KDKA, E. Pittsburgh.
- Munn, Robert, WGR, Buffalo.
- Nelson, Jack, WDAP, Chicago.
- Palmer, Lester (LP), WOAW, Omaha.
- Paschal, —, WOR, Newark.
- Patt, John, WDAF, Kansas City.
- Pearson, W. G., WCAP, Washington.
- Perham, D. M., WJAM, Cedar Rapids.
- Pierce, Jennings, KGO, Oakland.
- Pierce, F. W. (ANR), WOC, Davenport.
- Pierson, Wm. T., WCAP, Washington.
- Poehler, Eleanor, WLAG, Minneapolis.
- Randall, C. R., WCAG, New Orleans.
- Reese, Paul, KFI, Los Angeles.
- Reid, J. Lewis, WJZ, New York.
- Reilly, John, WJAR, Providence.
- Reynolds, R. F., WEAN, Providence.
- Rice, —, CJCA, Edmonton, Canada.
- Robinson, Irving B., WNAC, Boston.
- Rose, William, CKCD, Vancouver.
- Rothafel, S. L. (Roxie), WEA, New York.
- Rouse, Gene (GR), WOAW, Omaha.
- Sartory, Joseph, WCAE, Pittsburgh.
- Salzer, Harold A., WHAS, Louisville.
- Schilling, John T., WHB, Kansas City.
- Smith, Fred, WLW, Cincinnati.
- Smith, Edward H. (Uncle Josh), WGY, Schenectady.
- Smith, George, WEBH, Chicago.
- Stafford, H. E., WSAE, Providence.
- Stefan, Karl, WJAG, Norfolk.
- Sullivan, Jerry, WQJ, Chicago.
- Sweet, Ray R., WLAG, Minneapolis.
- Tatom, WCAR, San Antonio.
- Tison, W. W., WSB, Atlanta.
- Tomy, C. D., WCX, Detroit.
- Trumbull, Steve, KYW, Chicago.
- Tyson, Edwin L., WWJ, Detroit.
- Uncle Kaybee, WCAE, Pittsburgh.
- White, Major Andrew, WJZ, New York.
- Weidaw, Robert, WGY, Schenectady.
- Whitney, Robert S., WMAQ, Chicago.
- Willetts, G. V. (GWW), WOC, Davenport.
- Wilson, R. H., KDKA, E. Pittsburgh.
- Wilson, Walter, KYW, Chicago.
- Witten, J. M. (JMW), WOS, Jefferson City.

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## Looking Ahead

"What One Tube Can Do" is the intriguing topic Paul Edelman discusses next issue. He discusses the many possible variations of the single tube circuit, bringing about a realization of its true capabilities. Each function of the tube is studied in detail, and the method of linking the various functions into a unified, working receiver, is demonstrated. You'll like this "Thirty-Minute A-B-C" lesson.

Eliminating the B Battery by the use of four electrode tubes is the subject of an interesting article next week by H. J. Marx. This is a continuation of the treatise on the new English "Unidyne" receiver, the first part of which is given this issue. While four electrode tubes are not available at this time in America, it is believed that the popularity of the Unidyne may force their production and sale.

Improving the Single Circuit Tuner promises to tear up a lot of old single circuit sets. G. S. Corpe's experiments and suggestions, to appear next week, will undoubtedly be hailed with delight by many adherents to this simple type of foolproof receiver. The necessary changes are described in detail by Mr. Corpe.

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# COUNTRYSIDE HEARS FLYERS TALK IN AIR

## TEST RETRANSMISSION OF AERIAL CONVERSATION

Aviators' Description of Washington, D. C., at Night Heard Clearly in Eastern U. S.

By L. M. Lamm

WASHINGTON, D. C.—Flying just under the clouds above the city and environs recently, two aviators in an army airplane demonstrated for the first time the practicability of retransmission by land Radiocast of Radiophone conversation sent out from a plane.

Constantly in communication with Station WRC, Radio Corporation of America, here, the airmen gave a running description of the picture of Washington at night, which was heard clearly in all parts of the city, in Baltimore and probably over a great part of eastern United States. The flight was for the purpose of showing the development of Radio in aviation.

With Lieut. Donald Bruner as pilot and Lieut. Burdette S. Wright as observer and communications officer a specially equipped plane took off from Bolling field. In a few minutes its red and green navigation lights were sighted as the plane approached the Capitol and then the plane began to play its searchlight on the stately dome. Presently there came the plain, far away voice of Lieut Wright as he called, "Hello, WRC."

### Keep Up Constant Talk

At the station, Lieut. L. L. Koontz established communication with the plane and from then on there was constant conversation between the two, partly marred by heavy static. Although Lieut. Wright came through plainly at all times to Station WRC, he had difficulty in understanding Lieut. Koontz because of poor atmospheric conditions. Some amateur stations reported they had difficulty during the latter half of the flight in hearing the plane, but it is believed this was while Station WRC was attempting to reradiocast.

At the first, the plane used a wave length of 469 meters and then at the direction of Lieut. Koontz increased its wave length to 750 meters in order that WRC might reradiocast on 469 meters. During this experiment, amateur sets tuned to WRC got a double dose of static. In a test the morning after, however, the arrangement worked successfully under better atmospheric conditions.

## Built Plant, Owns It, Runs It—All Himself

Dr. Landry Operates One-Man Station at CJCM

MOUNT-JOLI, QUE.—Besides being owner, announcer and vaudevillian at Radiocast CJCM here, Dr. J. L. P. Landry is also the builder. In fact, the doctor has had very little assistance, and has built antenna masts, chokes, condensers, transformers and whatnot for his 500-watt Radiocast, so often heard in the States.

It is said that the only manufactured parts of CJCM are the vacuum tubes, electrical measuring instruments and the generator, which only recently burned out. But Dr. Landry is irreplaceable and will soon be back on the air, meanwhile using his 20-watt auxiliary Radiophone set.

## Fans Thank Broadcasters of Democratic Convention

NEW YORK.—As a concluding part of the Democratic convention here, was read a resolution from the listening in public thanking those who contributed toward Radiocasting the proceedings. The resolution was entered upon the official records of the convention and will stand as a marker of the modern invention which has thus changed political procedure.

## SET CLOCKS BY AIR, NEW RADIO WRINKLE

RADIO, Va.—Arlington time signals transmitted by Radio every noon and ten p. m. (Eastern time) may soon be adopted to set clocks automatically. A recent experiment in Radio clock setting was successfully performed at the bureau of standards. With the special apparatus any clock may be set twice daily. There is nothing new in setting clocks by wire, but the Radio setting is unique, it is said.

## GOVERNMENT OKEHS NEW TYPE OF TRIODE

WASHINGTON.—The government has adopted a new standard tube that has several innovations in its design. While resembling a WD-11 electrically and having a base the same size as a UV-199, its prongs have horizontal spring clips which engage knife-blade contacts in the socket. The filament draws 0.25 ampere at one volt, and the plate stands 60 volts with a grid bias of three volts.

## HEAR AS WELL AS SEE MOVIES



Hearing as well as seeing your favorite motion picture stars is one of the marvels brought about by Radiocasts. Film luminaries are now heard from many stations throughout the land. Few programs are complete without one or more silver-sheet favorites. Here is pretty Colleen Moore talking to Radiophans from KHJ, the Times, Los Angeles. P. & A. Photo

## Paul Revere Takes His Ride on Airways July 4

CHICAGO.—The spirit of the wars of American history lived again on the evening of July 4 in a song pageant Radiocast over the Sears, Roebuck Agricultural Foundation station, WLS. Practically every other local station marked the day with some sort of special program.

Immediately following the Lullaby hour the Declaration of Independence was read from WLS. A medley of Revolutionary war songs followed, with a few short descriptions of their history. Again Paul Revere took his heroic ride. But this time it was not along the green roadways of Lexington and Concord, but over

the invisible highways of the air that the click of his horses' hoofs broke the silence.

## Auto Tourists Bound for Florida Get WSB Advice

ATLANTA, GA.—Road conditions and tour advice for the special benefit of motorists driving to and from Florida is Radiocast every Friday night at 8:30 Central time from WSB, the Atlanta Journal. The service was inaugurated eight months ago by the Atlanta Motor club, which has since found the information so much appreciated as to warrant its regular continuance.

# WILL TRY TO RADIO PHOTO OVER OCEAN

## EUROPE'S FIRST PICTURE SENT BY AIRWAVE

Frenchman So Successful in Land Test He Will Now Attempt Trans-Atlantic

PARIS.—The first photograph ever transmitted by Radio in Europe was printed recently in the *Matin*. The picture of Gen. Gustave A. Ferrie, director of the Eiffel tower station, was an excellent one, but it bore several vertical smudges, which however, were easily eliminated by retouching.

The picture was sent by the process of Edouard Belin, the inventor of the method of transmitting pictures and photographs by wire. Although the details of the wireless method have not yet been disclosed, it is known that it is on the same method as is used on the wires.

### Will Attempt Trans-Atlantic

The first Radio picture sent by M. Belin was from Malmaison, a few miles outside of Paris, to the *Matin* newspaper office. The experiment was so successful that M. Belin declared he was sure transatlantic transmission was quite practicable and will be attempted shortly. A second picture, sent an hour after General Ferrie's had been received, was even clearer than the first.

The experiments of M. Belin in Radio transmission of pictures began in 1912, and the *Matin* in announcing his success today, predicts that "television," or long-distance seeing, will soon be accomplished. Its advantages are said to include not only better reproduction with the elimination of wires, but also far greater speed.

### American Inventor in Bad Fix

BIRMINGHAM, ALA.—Alfred Marchant of Mobile, Ala., says that after two years of hard study he has perfected a system by which he can send photographs through the air by Radio.

"I am ready to give a demonstration if I can get the assurance that my secret will be fully protected," Marchant said. Just what to do with the discovery Marchant seems at a loss to know. He realizes without giving a demonstration his discovery is valueless, and should he give a demonstration he is fearful that his secret will leak out, and that he would lose the benefits of his years of work and study.

"It is possible to transfer any photograph through the air by Radio with my invention," Marchant said.

## NEW TUBE MAKES DEBUT ON EIFFEL

May Be Taken Apart for Repairs Without Having to Be Pumped Out

PARIS.—A new kind of vacuum tube for use by Radiocasts has recently been perfected in France and is now in use in the great sending station at the Eiffel tower here.

The new tube will come apart any time for repairs and readjustment. It does not have to be pumped out in advance by a vacuum machine. On the contrary, the pump that maintains the necessary vacuum is continually attached to the tube itself. The tube is kept pumped down continually to any desired degree of vacuum—or as the Radiophan says, "hardness."

The new tube was invented by Prof. F. Holweck, a well-known physicist of the Institute de Radium. The first tubes built on the new design had a power of ten kilowatts. More recently a fifteen-kilowatt tube has been built and still larger ones are proposed. The demountable construction of the tube not only permits easy repairs but facilitates the design of the artificial cooling devices that become so necessary with tubes handling large amounts of power.

## THE ANTENNA BROTHERS

Spir L. and Lew P.

## Part I—New Way to Catch Birds



## TAXIS MAY SOON BE FITTED WITH RADIO

DISPATCHERS IN CONTACT WITH ALL CABS

Birmingham to Mark Trial in New Field of Practical Use for Airwaves

BIRMINGHAM, ALA.—Leading taxicab companies of Birmingham may soon equip their cabs with Radio, while some of the even more progressive taxicab companies are contemplating installing Radio sets by means of which their cabs may be dispatched.

W. O. Arzinger, Birmingham Radio engineer, has been working for some months on the design of a transmitting set to be used for dispatching taxicabs and receiving sets to be placed within the cabs. He announces that his preliminary designs are now complete and that they work to perfection.

"With one of these transmitting sets installed in the central taxicab office, and with each taxicab equipped with a receiving set, the central or main office at any time can reach anyone or all of their cabs," Mr. Arzinger said.

### Could Reach Passenger in Emergency

"And with the use of these sets, a passenger, has been working for some months station, or on any other occasion, for that matter, may be communicated with," he continued.

Asked if these sets would be very expensive, Mr. Arzinger replied that they would not. "An outfit for the central office will cost something like \$100, while sets for the individual cabs will only cost about \$50 each," he said.

Mr. Arzinger said that at least one taxicab company would install the sets in their cabs before attempting to market the outfits generally. "Since I live in Birmingham and expect to manufacture here, I want the taxicabs of Birmingham to be the very first in all the world to be equipped with Radio," Mr. Arzinger continued.

### Monday Opera Talks

CINCINNATI.—Descriptive talks about the operas to be given every Monday evening at the Zoo and broadcast through the Crosley Radiocast WLW, are given the same day at 4:00 p. m. Central time. The description is given by Mrs. Fred Smith, wife of the studio director of WLW.

## SUPER-HETERODYNE IS AUTO COMPANION

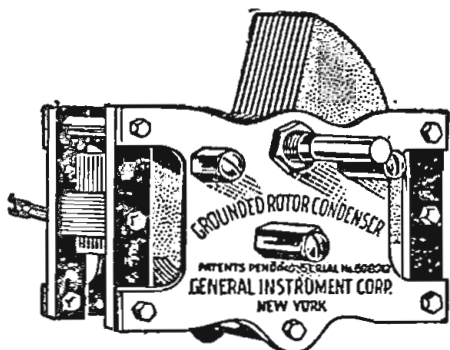


A super-het is companion to Miss Mary Moor, New York City, while she tours the East by automobile. P. & A. Photo

### WBAP Eliminates Evening Concerts Until September

FORT WORTH, TEX.—WBAP, the Star-Telegram, Radiocast here, has started its summer vacation on night musical concerts, which will continue until September 15. While the night concerts are temporarily discontinued, a special noon-day concert will be inaugurated. It has been found that during Texas summers, musical reception is much better in mid-day than at night. The usual hourly market service and the four evening periods devoted to baseball, will be continued. Distant listeners have been unanimous in their acclaim of WBAP's summer reach.

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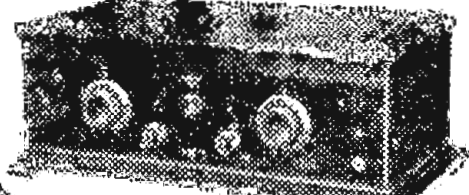


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**CROSLEY 50.** A new one tube Armstrong Regenerative Receiver. We believe this to be the most efficient one tube receiver ever put on the market. Uses any standard storage battery or dry cell vacuum tube.....**Price \$14.50**

**CROSLEY 50-A.** A new two stage Audio Frequency Amplifier to match the new Model 50 Receiver. When used in connection with the Crosley Model 50 Receiver, it gives the equivalent of a three tube regenerative receiver. Long range on loud speaker.....**Price \$18.00**

**CROSLEY 51.** In twenty-four days this receiver became the biggest selling radio receiving set in the world and it holds that position today. It uses two standard storage battery or dry cell tubes, regenerative detector and one stage of audio frequency amplification. Will bring in local stations on the loud speaker at all times, and under average conditions will also bring in distant stations on the loud speaker .....**Price \$18.50**

**CROSLEY 51-A.** A new one stage Audio Frequency Amplifier to match the Model 51 Receiver. Combined they give the equivalent of a three tube receiver. Long range on loud speaker.....**Price \$14.00**

**CROSLEY 52.** A new three tube Armstrong Regenerative Receiver. It is unusually efficient, will provide loud speaker volume on distant stations under practically all conditions, and is in every way an ideal receiver for the home. Extra phone jack to plug in on two tubes.....**Price \$30.00**

**CROSLEY 51-P.** This is our new portable set. It is the Crosley Model 51 two tube receiver mounted in a leatherette covered carrying case, battery space and all self-contained. Convenient for home or traveling.....**Price \$25.00**

**CROSLEY TRIRDYN 3R3.** This three tube receiver gives the efficiency and volume of a five tube receiver. Incorporating Radio Frequency Amplification, Regenerative Detector with one stage of Reflexed and one stage of straight Audio Frequency Amplification. Can be calibrated accurately—stations logged and returned to at will. Used on outdoor or short indoor antenna and is, we believe, the most efficient and sharpest tuning receiver on the market at any price for bringing in long distance stations. Received country-wide approval of radio experts....**Price \$65.00**

**CROSLEY TRIRDYN 3R3 SPECIAL.** This receiver is exactly the same as the Trirdyn 3R3 except the solid mahogany cabinet is larger to contain accessories and "A" and "B" Batteries required when standard dry cell tubes are used.....**Price \$75.00**

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# BEFORE THEY THOUGHT OF "MIKES"



The youngster at the left is one of the first Radio announcers at one of the first stations in the country.

At the right is Hugh B. Marshall, WTAY, the older of the two babies shown last week, and next to him, Corley W. Kirby, WWJ.

The young man above is announcer at a station owned by a telephone company and located in the city where Volstead was made famous.

### Hugh B. Marshall, WTAY

BORN in a town called LaCrosse, Wisconsin, in 1897; and living there until 1918, sure is some record for an announcer. No big town stuff until his Uncle Sam decided that he needed a few good men in the army, and then according to Hugh—"he looked at me."

Being somewhat of an impersonator, he did his stuff for the boys in the army in the fall of 1918. Whether it was because of his good work or not, we have been unable to determine, but they decided to finish the war and let him make some money. He signed up with the Red Path Chautauqua and started a jaunt covering 32 states; then he decided that the home ties were calling and returned to La Crosse, thence to school to study dentistry.

It was while he was performing in Chautauqua that he met his wife—yeh! he's married has been for four years. She was sitting in the audience at Akron, Iowa, and wouldn't even smile at his wise cracks. But, she laughed two years later—wedding bells and slow music, you know how it is.

His hobby is "flivvers"—taking them apart and putting them together again; profession, recent dentistry graduate of Northwestern university, intends to open up office and practice in August in Oak Park; ambition, "to be an ethical dentist;" aversion, second hand Fords and an old maid looking for a husband; gifts from fans, box of cough drops and a faded, withered, badly dilapidated rose—the last rose of summer.

Last summer he started at Station WJAZ as studio manager but long hours forced him to give it up because of school. When WTAY started in February, 1924; he filled the position of manager and announcer.

His creed as an announcer is: "A little humor, here and there, if not too long—make announcements different."

### Corley W. Kirby, WWJ

THIS young man has so trained his voice that his wife doesn't know whether he is announcing, or his "side-kick," Edwin L. Tyson. This outstanding feature is exceptionally useful

when he desires a night off to go to the club.

It is his misfortune to have to carry around the given name of Corley hooked up with a perfectly good Irish christian name of Kirby. He was born in the latter part of the nineteenth century, to be exact, 1896, in a little town called Peoria, which appears only on country maps. Of course, he was educated in his home state, Illinois.

His eyes are brown and hair is akin to that color. Sometimes it is combed, and sometimes it isn't, largely because he has the unhappy faculty of mussing it up when in a pensive mood. Gifts from admirers cover a large variety; sometimes it is a piece of wedding cake, another time it is flowers, and again it may

be cigars or cigarettes. His old standby is his pipe, which perhaps is the most delapidated looking pipe in the city. It has had years of service and speaks for itself, with no weak accents, either.

Tennis is the predominating sport at the present time, although he enjoys baseball and football. His height is five feet ten inches, and comes in very handy in playing tennis. As for vices, of course he has them, just the average quantity for a man of his age, not too good and not too bad.

Being an old newspaper man, he is a bearcat when it comes to correct pronunciation and enunciation, and he firmly believes that every announcer should be careful just what he says and how he says it to the listening public.

## New Towers, Antenna Raise WDAF'S Power

### Fans' Letters Show Volume of Signals Greatly Increased

KANSAS CITY, MO.—According to hundreds of letters received by The Kansas City Star, the new 160-foot towers with the new antenna erected on top of The Star building greatly increase the volume of the signals. There has been a slight drop in radiation, but this probably will not decrease the distance of the station.

The towers are a part of the entire new equipment to be installed by WDAF. Other new parts will include a larger studio and operating room, and a new transmitter. Work on these improvements has not yet begun but is expected to start soon.

Happenings of the Shrine convention in this city, the Republican convention in Cleveland, and the Democratic convention in New York have been transmitted to listeners over this new antenna and thousands of letters are pouring in congratulating WDAF on the volume and clarity of everything.

The towers are of massive steel, painted a battleship gray, and stand 160 feet on top of the building which is 85 feet in height.

### Destroy German Station

BERLIN.—An attempt was made recently to destroy the great Radio station at Koenigsvueterhausen. One mast was actually brought down.

## 'Largest Spark Coil' Is Source of 'Death Ray'

### English Chemist Says All He Needs Is Bike Lamp

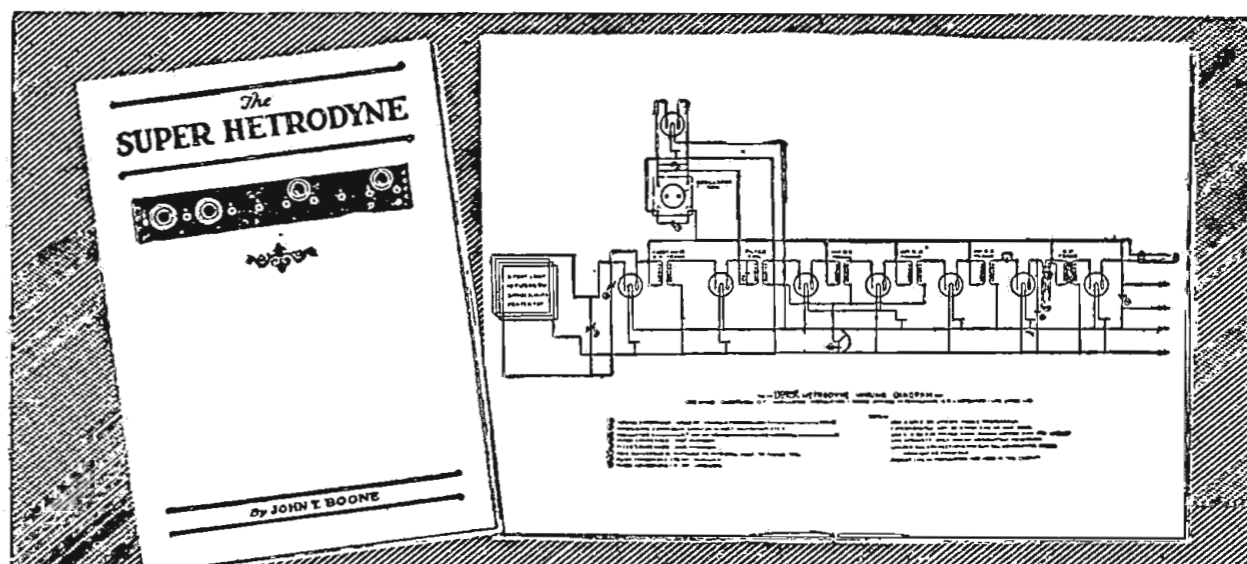
LONDON.—Two weeks ago it was announced that nearly every European power had at least one death ray inventor. Now England has been stricken with another.

The last arrival on the scene is a chemist, but evidently his ray is based on electrical phenomena for he claims to have the largest privately owned spark coil in the world. It is from this that he gets his ray. He maintains, however, that he can direct his death-dealing ray along a beam from a bicycle lamp or even a pocket flash-lamp. With a common searchlight beam he claims that he could wreck a Zeppelin in no time.

The claims of the many inventors are attracting but little attention in official circles. However, serious consideration is being given to the development of the two plans suggested by well-known and successful scientists; the plan of Grindell-Matthews (the first one proposed) and the plan of Professor Wall of Sheffield university.

### Hoover Meet in September

WASHINGTON, D. C.—No official announcement has been made at the department of commerce relative to the date for the third Radio conference. Secretary of Commerce Hoover has let it be known unofficially, however, that he will call the conference for the latter part of September.



## Every Radio Fan Needs This Book

### A Complete Text Book on Super-Hetrodynes

Here for the first time is a thoroughly scientific volume treating of what the super-hetrodyne means to radio, together with a wealth of data on its development, advantages and operation. Written by a man who was a pioneer in the development of radio, this book covers the entire field of super-hetrodyne equipment. Profusely illustrated, and liberally supplied with charts and wiring diagrams, this book gives you a fund of information found nowhere else. The price is \$1.00 postpaid. Order today. Use coupon below.

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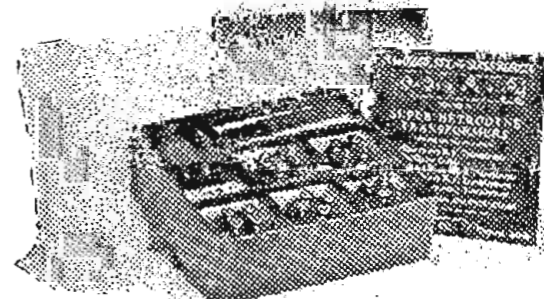
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Dear Sir:

I nominate .....

Station and Call.....

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Address .....

Town ..... State.....

### NEW UNIDYNE RECEIVER

(Continued from page 1)

such tubes have been confined only to the laboratories of a very few large firms who have offered little information relative to any experimental work they may have carried on. This possibly may be explained by the fact that the sale of three electrode tubes has been very profitable so why detract from same by introducing a few more new tubes that would require

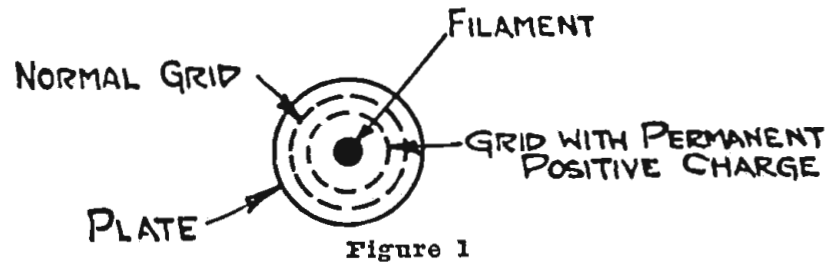


Figure 1

expensive machinery for production, and other numerous items which would materially effect the profits of the year.

#### The Fourth Electrode

The effect of the third electrode or grid in the vacuum tube has been repeatedly described so that all should be well acquainted with it.

If, as shown in Figure 1, the inner grid around the filament is positively charged by connecting it to the positive terminal of the filament battery it accomplishes the same thing as increased filament heat would, namely accelerate the departure of electrons from the filament. The result is a more pronounced flow of electrons to the plate. From tube curves it is known that increasing the positive potential on the grid has the same effect on the plate flow as increasing the plate battery. Another way of saying it would be that the equivalent internal resistance of the plate circuit has been reduced.

This first inner grid then simply becomes an accessory to the filament in providing an increased flow of electrons. The second or outer grid performs the same functions as the grid in the normal three electrode tube, that is, as the incoming oscillations change from positive to negative, it assists or resists the flow of electrons to the plate.

#### What Amplification Depends On

It is obvious that this increased flow of electrons from the filament through the use of the extra or inner grid is equivalent to the same increase through use of plate batteries, hence there should be no difference in tube life. The suggestion might be made that by using a plate battery in addition, an even greater plate flow will result. Depending on the characteristics of these new tubes, this may be true, but it must be remembered that

the amplification power of a tube depends on the effect of the normal grid on this plate current. Regardless of how great this plate current may be, the variations in the potential of the normal grid will be no different from the usual tube and hence the plate current fluctuations correspond closely to those in the present tubes in use. It must be kept in mind that the purpose of this tube and its circuits is primarily to eliminate the necessity of the B battery. Research will undoubtedly create further development which as yet are unthought of.

#### Unidyne Circuit

The circuit used in conjunction with this four electrode tube is shown in Figure 2. On examination, the circuit will appear normal with the exception of three points. 1—The extra grid. 2—No B battery. 3—The transformer. The extra grid is the one connected to the positive A battery lead. The plate circuit runs from the plate of the tube, through the tickler coil, then through the primary of the transformer, through the receivers and back to the filament circuit. The secondary of this ten to one ratio transformer connects on one side to this inner grid and the other side to the plate

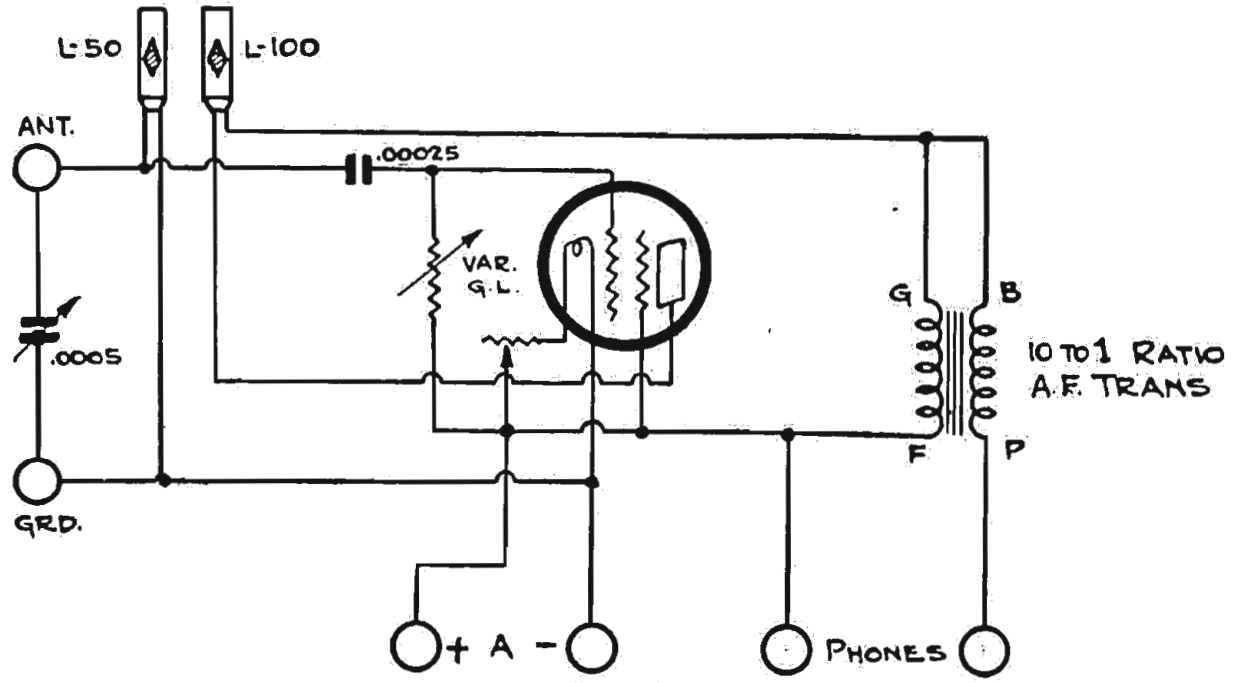


Figure 2

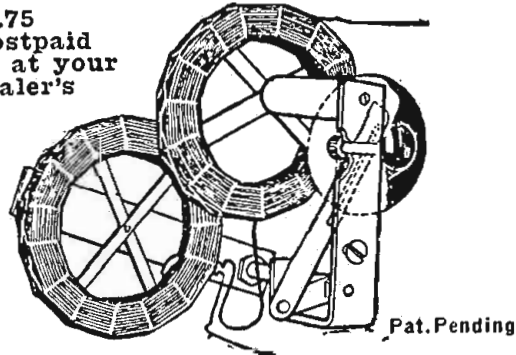
circuit. The theory of this transformer is, producing what might be called an additional regenerative feature. Undoubtedly this makes the circuit very difficult to control because in further circuits the flow which is fed back into the inner grid

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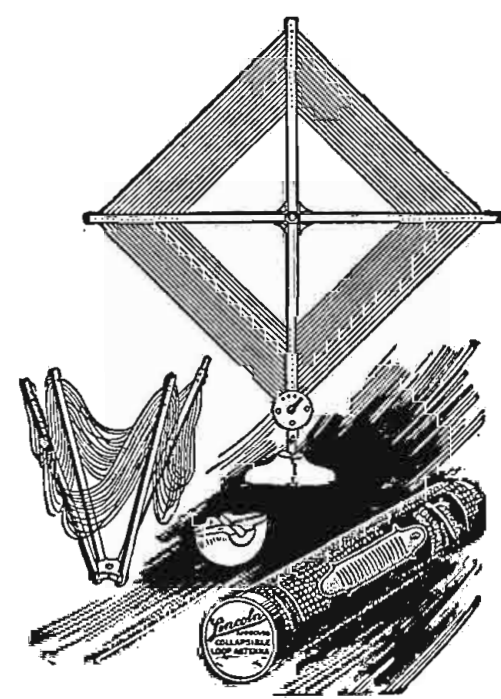
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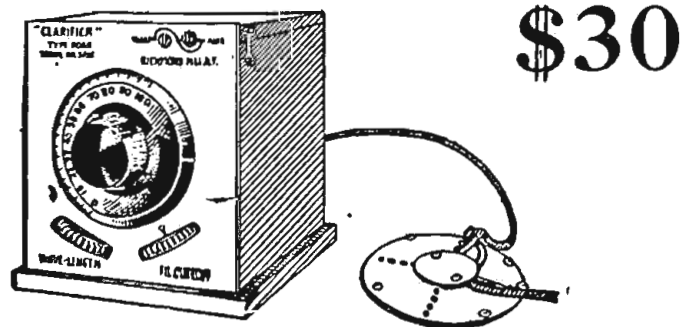
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IT HAS been the tradition of the Federal Company, over its 25 years in manufacturing Electrical Communication Equipment, that it must give its users the highest refinements of the art.

Federal tradition will not permit the manufacture of a radio set just for radio noises. Each and every manufacturing necessity to produce a harmonious set is known to Federal Engineers, and no Federal set is produced without them.

Federal radio sets are built with two thoughts in mind—first: simplicity of operation, but three controls being necessary—second: special controls for refinement if the user is interested in reproducing all the beauty of tones that fill the air.

"Lovers of good music" know why Federal is better, and know the real value of the refinement placed at their command to make it easy to obtain the clearest tone reception.

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# Summertime Operating and Trouble Shooting

## Hints Covering All Makes of Sets

By Harry J. Marx

**D**URING these warmer months when the aerial artillery seems to be continually in action, the problem of successful operation of a receiving set assumes decidedly greater importance than ever before. There are however, quite a few little kinks in operation and tuning, which, when properly applied, will be of considerable value in obtaining very satisfactory reception.

### The Antenna

If during the winter months you found that your long antenna gave you lots of volume and permitted the best long distance reception, better get acquainted with the fact that in the summer time that same antenna makes a decidedly efficient collector of interference. Fans have already discovered that 25 to 50 feet gives good results in warmer weather with a decided reduction in the interference that accompanies all out of town stations.

If, however, you decide to put up an extra wire of shorter length for summer time use, don't run it close to and parallel to your long distance antenna. Why? well your long antenna will pick up signal and interference as before and pass it on to the small antenna by induction unless the wires are sufficiently far apart and not parallel. Likewise don't keep two lead-ins close together coming down into the room where the set is located because exactly the same thing may happen there.

Unless you have enough stages of Radio frequency don't try loop aerial reception. The chances are against your getting much reception. A loop aerial necessitates two stages of Radio frequency amplification for satisfactory operation on any out of town stations.

### Static Eliminators

The so-called static eliminators seem to sound good in news stories but somehow or other a real practical one hasn't appeared on the market up to the present time. It is peculiar how their merits are extolled during the winter weather but as soon as summer is with us the static eliminator has vanished. The best type of static eliminator is the fan who carefully watches all those little points in the proper operation of his set and who therefore gets the best possible

signals. His results always make the other fellow think there's a nigger in the woodpile! A little less volume without noise is better than a street corner bellow with a machine gun background.

### Efficiency of Receiving Set

In cold weather, when volume is good and reception is clear, little attention is paid to a number of little noises in the receiving set, such as battery noises, tube noises, audio amplifier whistles, ground hum, scratching and crackling from poor connections and even loud speaker troubles. But during warmer weather all these help to build up the level of interference to the detriment of good reception.

### Run Down Batteries

Both plate and filament batteries when run down develop additional resistances in the circuit which is also the cause of crackling discharges in reception. For this reason more care should be taken during hot weather to see that these sources of current are always in the best of condition.

Poor joints in the wiring of your set, especially due to careless soldering, are the causes of poor electrical connections which are often indicated by irregular and very noisy reception. Careful attention to each soldered joint would improve the efficiency of many a condemned Radio set.

The elimination of noisy tubes is of more importance now than ever before. Soft tubes appear to have a larger proportionate number of offenders than the hard amplifiers. Many of the A type tubes have a bad habit of softening under continued use or high plate voltages and then soon become very noisy in operation. Just borrow a few tubes some time and find out a little more about the tubes in your set.

### Ground Hum

Ground hum is an especially annoying source of discomfort nowadays. It may be due to a number of things such as run down A batteries, wrong rheostat adjustments, poor grid leak, improper tuning, interference from power line, proximity to some form of generator of electrical oscillations, flashing signs or

imperfections in the tuning apparatus. It requires considerable patience to trace down the sources of trouble but it can be done.

Cheap or defective audio frequency transformers will often introduce a whistle in reception. Occasionally it is quite distinct and piercing while often it is just audible in the background of reception. There are two or three methods of combating this trouble outside of replacing the transformers. Grounding the metal cores or shields of the transformers; connecting a small fixed condenser (.00025 to .002 mfd.) across various terminals of the transformer, or across the variable grid leak. One of these methods will usually eliminate the trouble.

Filament control jacks and even the other types of jacks occasionally start trouble due to imperfect contact between springs. It may be necessary to sand-paper the contact points or possibly to slightly bend the springs so as to increase the contact pressure.

### Trouble With Phone Plugs

Phone plugs sometimes become wet or dirty and cause trouble in reception. Loud speakers sometimes go on a strike and

it is often that diaphragms develop cracks that produce cracking sounds when in operation. Occasionally the writer has to take apart the loud speaker because some thoughtless friend thought the horn was an ash receptacle.

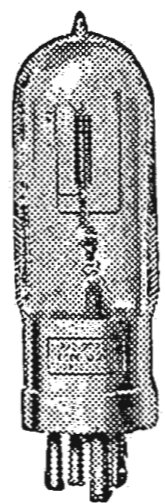
Fixed condensers are big factors in improving a reception, but with the inaccuracy and poor quality of the numerous cheaper grades on the market they do much toward spoiling your set. Be wise and buy the best.

### Grid Leaks

Poor quality grid leaks or improper adjustment of variable grid leaks will develop anything from a shrill pitched whistle to intermittent choking of reception. Fixed grid leaks vary considerably from the marked ratings, especially during warm and moist weather conditions. Moisture collecting on grid leaks reduces the resistance to a marked degree. Watch your grid leaks.

Very few people realize the importance of good contact in tube sockets. This problem of contact of springs with the tube prongs is of especial importance in Radio frequency stages. Checking this over in your set will help solve some of your troubles.


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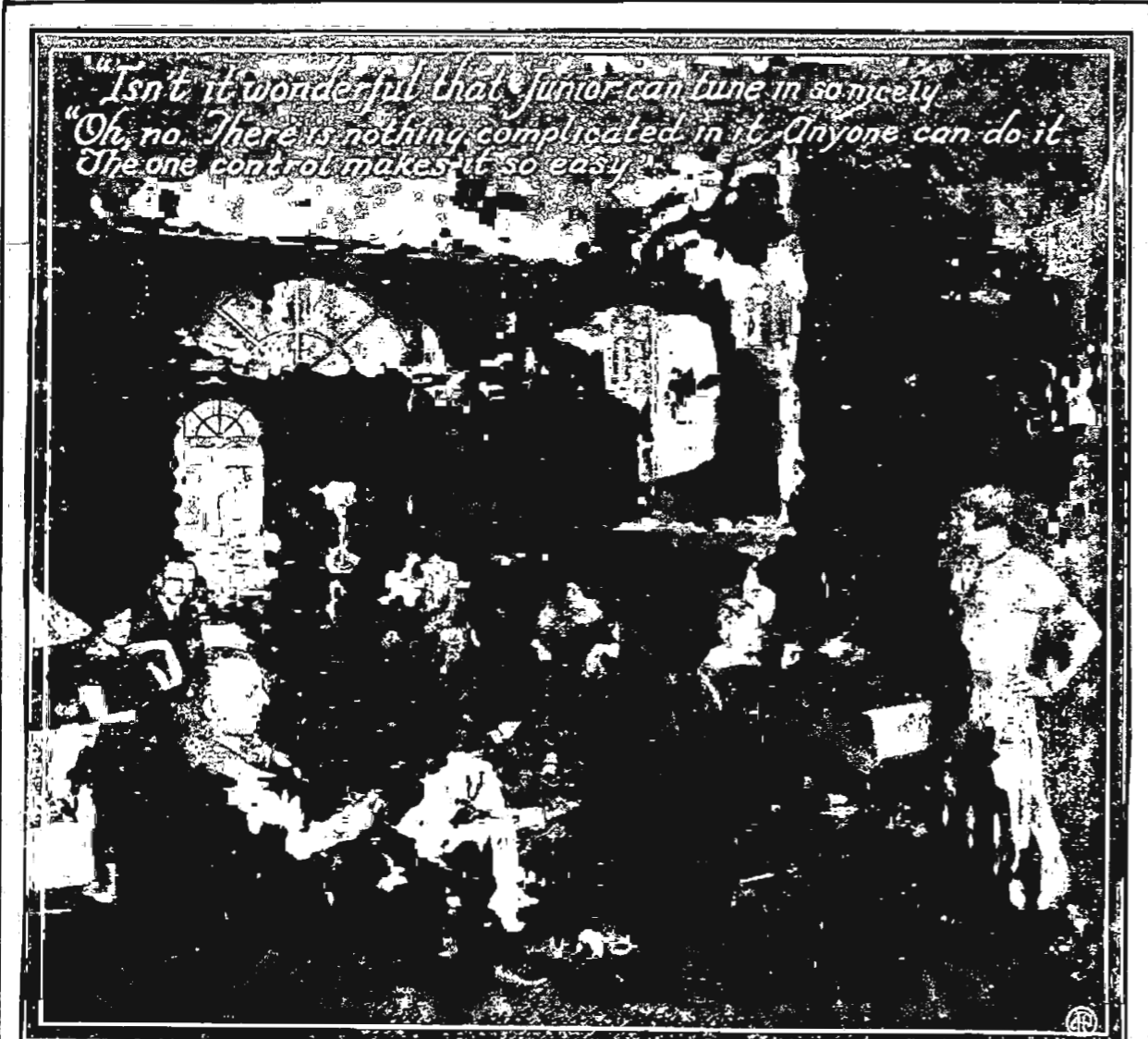
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### Bristol Single Control Radio Receiver

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## All-Americans Improved My Set 100%

By Hans Erbs, Chicago

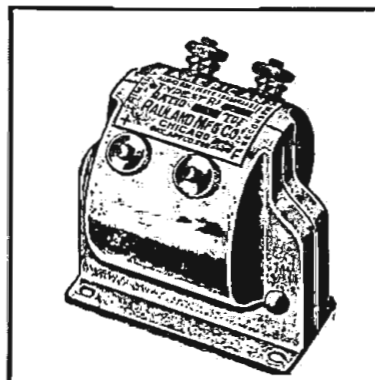
"As I am a radio fan and get the Radio Digest every week, I saw it that a fellow from British Columbia—using All-American Transformers—got Kansas City, about 1700 miles.

"I had been unable to get more than about 500 miles on my three-tube set, so last Saturday I bought two All-American Transformers, 10:1 and 3:1 and put them in, in place of two I had.

"Monday I picked up WKY, Oklahoma City, Okla. Tuesday, March 18th, at 10 p. m.—just as KYW, WDAP and WJAZ

(now WEBH) the powerful local stations at Chicago came on—I picked up **KGO, Oakland, Cal.,** on the loud speaker and held them 'til they signed off at 12:10, Chicago time.

"I think that is a little better than the other fellow. All-Americans improved my set one hundred per cent."



All-American Audio Frequency Transformers. Come in three ratios: 3:1, \$4.50; 5:1, 10:1, \$4.75. The best—no necessity to pay more.

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# ENGLAND PROMISES ETHER MOVIES SOON

## RADIOPHANS "HEAR" PICTURES IN LONDON

J. L. Baird's Scheme Uses Disks Similar to That of C. Frances Jenkins Device in America

LONDON.—British Radio movie specialists are experimenting in the transmission of motion pictures by Radio, as is also C. Frances Jenkins in America.

Broadcast listeners around London have "heard" moving pictures by Radio many times, but few fans, if any, have seen them, because they are not possessed of the proper receiving apparatus. All the listeners heard was a high-pitched, intermittent whistle.

Recently a Radio device capable of transmitting motion pictures which can be received on tube sets, similarly to music and speeches, was tested by the

inventor, J. L. Baird, operating from a south coast town in England.

The transmission apparatus is said to be simple, the object to be transmitted being placed in a beam of light before a rotating, perforated disk. Rays of light then pass through a second rotating disk, and are received on a selenium cell. They are then translated into an electric current.

### How Movie Receivers Operate

Receiving sets will be equipped with another rotating disk equipped with a ring of electric lights arranged in positions corresponding to the holes in the disk of the transmitter. As the disk revolves rapidly, the lamps are lighted by the incoming signals.

Earlier experiments in television transmitted a sharp image, but it was subject to flickering. This difficulty has now been overcome, it is understood, through the employment of the revolving disk, and a picture similar to a brush drawing is reproduced at the receiving end.

"A cinema picture can be transmitted so faithfully that every movement is reproduced," the inventor states. To insure the dual operation of both the transmitting and receiving disks at exactly the

same speed, a Radio wave is sent out by the transmitter which is used to regulate the speed of the receiving motor.

## WHN Serializes a Drama, Part a Day for Six Days

NEW YORK.—Serializing a play from the legitimate stage was recently accomplished by Radiocast WHN here to overcome difficulties in installing a direct wire to the Princess theater.

The play at the Princess was "The Wonderful Visit," by H. G. Wells, and its serialization at the WHN studio took six days, devoting from ten to twenty minutes each time. This is believed to be the first time a Radario has been serialized.

### Radio in Portugal Now

WASHINGTON, D. C.—Authority to install and operate Radio apparatus in Portugal has been given by a recent decree of the Portuguese government. Until this action was taken no legal right existed whereby amateurs could install receivers.

## NEW UNIDYNE RECEIVER

(Continued from page 6)

transformer is omitted. The values of the component parts used are given in the diagram and as will be noticed are the same as in any of our own circuits for the usual Radiocast reception.

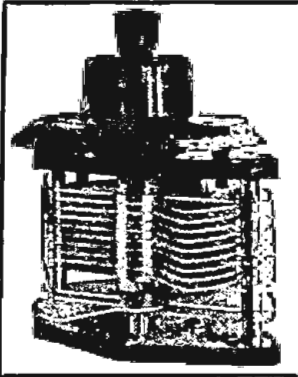
In the continuation of this article, details of an amplifier circuit and also a two-tube receiver will be described.

(TO BE CONTINUED)

## Hears 586 Radiocasts on 3-Tube Set; Claims Record

ALEDO, ILL.—Glen Peterson, of this city, claims the world's record for Radiocast reception. He has, he says, heard 586 stations on his three-tube set.

The finance ministry, in accordance with authority recently granted, has entered into a contract with the Danish Radio Company, Limited, for the erection of four Radio stations in Greenland.



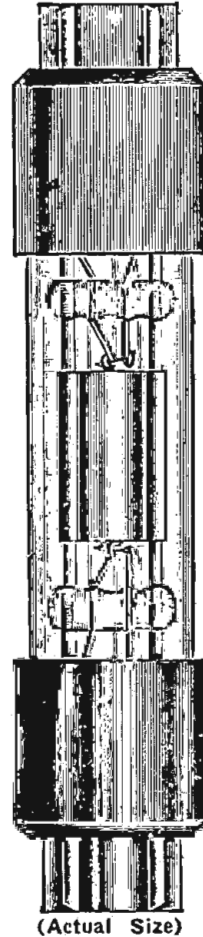
Plain type 3-plate \$1.25, 5-plate \$1.50, 13-plate \$2, 17-plate \$2.50, 23-plate \$2.75, 43-plate \$3, at dealers.

Vernier type: 13-plate \$4, 23-plate \$4.50, 43-plate \$5.50, at dealers'.

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# AROUND THE WORLD

A New Zealand amateur got Alabama (10,000 miles) on one Myers Tube—heard the signals and message perfectly. Certified by Radio News.

This remarkable performance indicates that there is no limit to long-distance reception with Myers Tubes because their design is right.

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add to the efficiency of any set by cutting out noise, tube hiss and interference.

Two types: Dry Battery and Universal (for storage battery). Write for free circuit diagrams.

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**\$5** EACH Complete with clips ready to mount on your set; no sockets or other equipment necessary.

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The Boston Traveler—This three-coil hook-up provides a combination sensitive, selective and, above all, flexible.

Philadelphia Public Ledger—The hook-up that gives long distance, sharp tuning, low cost, volume.

New York Evening Mail—A receiver of this type will do everything that the triple honeycomb receiver, the old standby, can do, and more.

Pittsburgh Post—The set will be found remarkably selective, free from objectionable noises and easy to control.

The set is shipped completely mounted, requiring nothing but simple wiring by our special blue print provided, and is ready to operate in less than an hour. The compact arrangement of instruments is more ingenious than any set ever offered by anyone. Every part is standard goods—high quality throughout.

It is a real masterpiece, and looks it. You will enthusiastically agree when you see it.

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1 Triploid Mounting Socket.  
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4 Brunswick Under-slung Foundation Brackets.  
2 Brunswick Jacks with Gold-Plated Fronts; 1 for phones; 1 for loud speaker.  
1 Freshman Mica Grid Condenser.  
1 Standard Glass-Enclosed Grid Leak.  
2 30-Ohm Shackton Bakelite Rheostats.  
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1 Special Blue Print for this circuit. Not an ordinary hook-up, but in clear picture form child can understand and make. Assembled ready to wire, and packed in handsome box, complete. Only \$27.95 C. O. D. Send no money.

Scoring Committee of Philadelphia, Pa., hears 49 stations from Cuba to Los Angeles sign off in 8½ hours.

Wins Competitive Distant Test of "New York Evening World." The only PERFECT score.

## THE NEW DE LUXE AMBASSADOR MAKES NEW RECORD

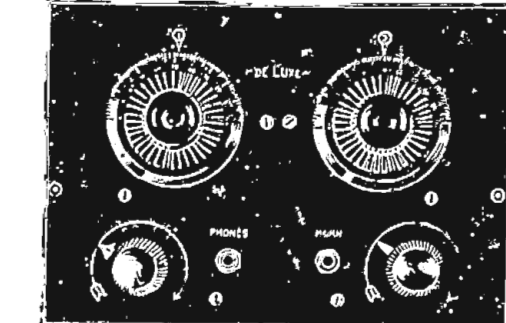
London, England, (2LO) Broadcast checked by radio editors of "Philadelphia Inquirer" heard loud and clear.

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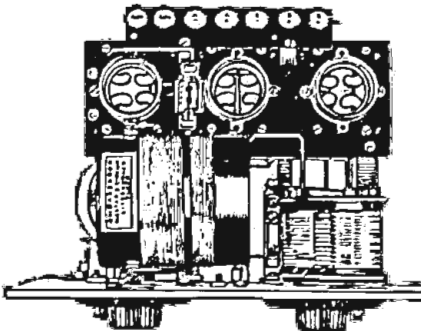
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# "OLD SEA DOGS" AT WMC SATURDAY

## Wednesday, July 9

Silent night for: CKAC, RNF, KSG, KGO, WBAV, WEAQ, WFAA, WFI, WGY, WIP, WMC, WOAW, WRC.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 1:45 p. m., Mount Royal orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:51 a. m., concert, Daugherty's orchestra; 5:30 p. m., Pittsburgh Athletic association orchestra; 6:30, Uncle Remus will entertain the radio children; 8, Mary Shaw Bohrer, soprano; Grace Clawson, soprano; Agnes Joneslee, contralto; Arthur Davis, tenor; Fred Wise, baritone; Bessie Z. Smith, reader; Corinne Bell, accompanist; John Ingram, flutist; Adult chorus, South Avenue Methodist church, Wilkingsburg.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Detective stories by Detective Nick Harris; concert; 8-9, Evening Herald concert; 9-10, Examiner concert; 10-11, Hollywoodland orchestra; 11-12, Ambassador-Cocanut Grove orchestra.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., program, Rev. Allen B. Gable, director.

KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m., Metropolitan Building company musical program, Freda Tildon, director.

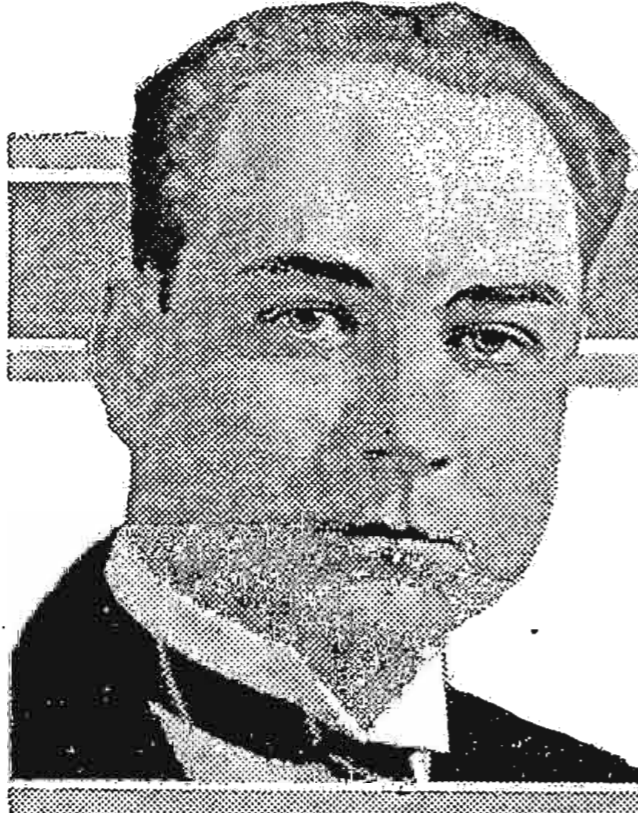
KFSG, Los Angeles, Calif. (Pacific, 278), 2:30-4:30 p. m., divine healing service; sermon; 6:30-7:30, "Kozy hour," Annie Lecey, child soprano; Marjorie Warwick, soprano; Francis Floto, bird whistler; Merion Wyant, contralto; William Howse, trombone soloist (late of British Royal Horse Artillery band); Stella Prough, saxophone; Esle Binkley Loy, cornetist, in solos and duets; story by Mother, Ruth Frances Thomas, accompanist and soloist.

KGO, Oakland, Calif. (Pacific, 312), 3 p. m., "Responsibilities of the Press," James E. Welles; 4-5:30, concert orchestra of the Hotel St. Francis.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., talk, Jeanette P. Cramer; 8, concert; 10, dance music, George Olsen's Metropolitan orchestra; Rayberta and Margory Reed, juvenile artists.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., concert, the Junior Novelty Three, courtesy, "Radio Red"; 2:30-3:30, matinee musicale; 6-6:30, Art Hickman's concert orchestra; 6:45-7:30, children's hour, Prof. Walter Sylvester Hertzog; Geneva Smith, age 12, pianist, pupil of Mrs. Shepard; Marjorie Kertchbaum, violinist, pupil of Louise Moody; Victorie Kerner, screen juvenile; Dick Winslow, juvenile

John D. Clark, one of Columbus' prominent musicians, is the organizer of the Dispatch Little Symphony orchestra which will play Friday night, July 11 from WBAV.



reporter; bedtime story, "Uncle John," 8-9, concert, courtesy of the Ben Hur company; 9-10, Dr. Mars F. Baumgardt, lecture; Hoffman's Hawaiian trio, courtesy, Hoffman Candy company; 10-11, Art Hickman's dance orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Selger's Fairmont Hotel orchestra; 2:30-3:30, Jack Falt's Entella Cafe orchestra; 4:30-5:30, Rudy Selger's Fairmont hotel orchestra; 8-11, E. Mex Bradford's Versatile band.

KQV, Pittsburgh, Pa. (Eastern, Daylight, 270), 5-5:30 p. m., "Sunset Stories" and "Diary of Snubs Our Dog," for the kiddies; 9-10, Music Box sextette, 10:30 Homer Rodehaver, special evangelistic songs.

KSD, St. Louis, Mo. (Central, 546), 8 p. m., music and specialties, Del Monte theater.

KVW, Chicago, Ill. (Central, Daylight, 536), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 6:45, children's bedtime story; 7-7:30, dinner concert, Congress hotel; 8-8:58, Emilla Cipriani, soprano; Sallie Menkes, accompanist; Earl Wetterland, pianist; Saint Procopius choir; 12:30, midnight revue.

PWX, Havana, Cuba (Eastern, 400), 8:30 p. m., General Staff band of the Cuban army, Captain Jose Molina Torres, leader.

WBAH, Minneapolis, Minn. (Central, 417), 12:30-1:30 p. m., Dick Long's trio and soloists; 7-7:30, lecture, Dr. J. W. Holland.

WBAV, Philadelphia, Pa. (Eastern, 423), 12 m., Ila Lorbach Owens, pianist.

WBBR, New York, N. Y. (Eastern, Daylight, 273), 8 p. m., Mrs. A. Semenger, violinist; 8:15, Bible lecture, Victor Schmidt; 8:35, Mrs. A. Semenger; 8:50, instrumental selections.

WBZ, Springfield, Mass. (Eastern, 337), 6 p. m., WBZ trio; 7:30, bedtime story for the kiddies; 7:40, WBZ trio; Helen Estey Winkley, soprano; Mrs. Robert A. Case, accompanist; 9, D. H. Newell, baritone; 11:30, Leo Reisman and his Hotel Brunswick orchestra; 12, songs, Bill Coty, Jack Armstrong.

WCAE, Pittsburgh, Pa. (Eastern, Daylight, 462), 3 p. m., Fred Rosenfeld, pianist; 6:30, dinner concert, William Penn hotel; 7:30, Sunshine Girl; 9:30, J. V. Krabec's Bohemian orchestra.

WCAP, Washington, D. C. (Eastern, 469), 7:30-9 p. m., U. S. Navy band, Charles Bentler, director; 9-10, studio program.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., musical program; 8, dinner concert; 8:30, musical program directed by Harrison Burch and Harold Parker.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's Radio trio; 6-7, school of the air; piano tuning in number on the Duo-Art; address, weekly health talk, Health Conservation association; the Tell-Me-a-Story Lady; music, Carl Norberg's Plantation players, Hotel Muehlebach; 8-9:15, program arranged and presented by James Prior and other soloists.

WOAR, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; 12:30, Arcadia Cafe concert orchestra; 2, Arcadia Cafe concert orchestra; 4:30, Edna Finestone, pianist; 7:30, Dream Daddy's bed-

## Headliners of the Week

IF YOU would like to hear a singer who has pleased audiences in Berlin, Paris, and Petrograd, tune in for WTAM Wednesday. Rachel Frease Greene is a soprano well known on two continents.

Dairy farmers will be interested in the report of Prof. Oscar Erf Thursday from WEAQ. He has made an exhaustive survey of this country's dairy business. Motorists who have had difficulty with different state traffic rules, should tune in for WIP and get all the tips Eugene Hogle has to give on where to go and how to get there.

Camp Fire girls will dial for KFOA Friday to hear the program given by the Kiwanis club of Seattle. Camp Fire girls will be the feature of the program.

All "Old Sea Dogs" who are no longer sailing over the happy seas, should tune in for WMC, Memphis, on Saturday night. W. McMaster White is giving a special program which will make any sailor homesick for the rolling main.

Gertrude O'Neil Ganley who is a fascinatingly funny impersonator, will entertain again from WBAH Monday. Be sure and tune in if you want a good time. Next time she is on, we promise a good picture of her.

Once upon a time before the white man came the red man lived where now our cities stand. Ernest A. Reed will tell some of the Indian Legends of Old New Jersey over the microphone of WOR, New York.



Ella Mylius is the feature on the program of WEAF, New York, Monday, July 14. She is an exceptional lyric soprano.

time stories; 9:30, special program, East Coast studio; 10:30, Arcadia Cafe dance orchestra.

WEAF, New York, N. Y. (Eastern, Daylight, 492), 11-11:15 a. m., Rita Rotermel, pianist; 11:15-11:45, young mother's program; 4-4:15 p. m., Al Friedman's orchestra; 4:30-4:45, Virginia Glover, pianist; 5-6, children's program; 6-7, dinner music, Welford-Astoria hotel; 7-7:30, Synagogue services; 7:30-7:45, Albert Kowalski, violinist; 7:45-8, American agriculturist; 8:15-8:30, "Introductions to Psychology," Dr. G. Murphy, Columbia university; 8:45-9, Gold Dust Twins; 9-9:15, eveready entertainers; 9:30-9:45, Viola Silva, contralto.

WEAQ, Columbus, Ohio (Eastern, 360), 1:30 p. m., educational lecture, member Ohio State university faculty; 4 p. m., farm talk, faculty member; music, university talent.

WEBH, Chicago, Ill. (Central, Daylight, 380), 7:30-8:30 p. m., Marie Kelly, reader; Oriole orchestra; 9:30-10:30, Chicago quartet; dance selections, Oriole orchestra; 11:30-12:30, steel guitar duets, Langdon brothers; Fred W. Agard, tenor; dance selections, Oriole orchestra.

WFAA, Dallas, Texas (Central, 476), 12:30-1 p. m., musical program, Jack-rabbits orchestra.

WFI, Philadelphia, Pa. (Eastern, Daylight, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, Caroline Hoffman, pianist; 8, Sunny Jim, the kiddies' pal; 6:30, Meyer Davis Bellevue Stratford concert orchestra.

WGI, Medford Hillside, Mass. (Eastern, Daylight, 360), 6:30 p. m., message to Camp Fire Girls, Charles W. Casson, "Big Smoke"; 7, meeting of the Amrad Big Brother club; 7:30, musicale; popular song hits, Don Ramsey.

WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 12:30-1 p. m., George Albert Bouchard, organist; 6:30-7:30, dinner music; 8:45-9, Murray Whiteman, tenor; 9-11, concert, Mrs. Vernon Curtis; 11:30, Vincent Lopez Hotel Statler dance orchestra; Harold Giesler, director.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., "Wisconsin's Educational program," John Callahan.

WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., "Some Misconceptions in Regard to Federal Taxation," Prof. F. H. Knight.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo Theater orchestra; Dick Quinlan's Golden Derby orchestra; 7:30-9, concert, Mrs. J. E. Harmon, director.

WHB, Kansas City, Mo. (Central, 411), 7-8 p. m., educational talks and music.

WHN, New York, N. Y. (Eastern, Daylight, 405), 2:15-2:30 p. m., Edw. B. Marks Music company; 2:30-2:45, Natalie Shotland, soprano; 2:45-3:15, Original Louisiana Five Al King, leader; 4-4:15, Mary Hunter, pianist; 4:15-4:30, Madeline Groff, soprano; 4:30-4:45,

Vincent Lane, tenor; 5-5:30, N. Y. Philharmonic orchestra Co., Chas. Mamm, conductor; 6-7, at the Alamo festival board; 7-7:15, Roemer sport period, Thornton Fisher; 7:30-8, Roseland dance orchestra; 8-8:20, Union of Orthodox Jewish congregation; 8:45-9:15, Railway Elks quartette; Percy D. Watt, secretary; 9:15-9:45, Chas. Strickland's orchestra; 10-10:30 Gem Razor orchestra.

WHO, Des Moines, Ia. (Central, 526), 7:30-9 p. m., Bankers Life Radio orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 1:05 p. m., seashore gossip; 3, "What the wild waves are saying"; 3:05, "Mental Hygiene," Dr. Samuel Leopold; 3:30, Comfort's Philharmonic orchestra; Madeline Reed, lyric soprano; Edwin McKnight, xylophone soloist; 6:05, Dick King and his Stanley dancing orchestra; 7, Uncle Wip's bedtime stories.

WJZ, New York, N. Y. (Eastern, Daylight, 455), 4-4:10 p. m., Eleanor Gunn's fashion talk; 4:10-4:15, daily menu; 4:15-4:30, talk, Meat Council of New York, John C. Cutting; 4:30-5:30, Welford-Astoria tea music; 7-7:20, Seizer's Cafe Boulevard orchestra; 7:30-8, Seizer's Cafe Boulevard orchestra; 8-8:15, "Golf," Innis Brown; 8:15-10, Goldman band concert; 10-10:15, "East of Suez," J. E. Starkey; 10:15-10:30, William F. Sweeney, baritone; 10:30-11:30, Emil Coleman's Trocadero orchestra.

WKAQ, San Juan, P. R. (Central, 360), 6-8 p. m., municipal band.

WLAC, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints, Mrs. C. A. Kirby; 11:35-12 m., surprise hour; 2:10-2:40 p. m., woman's club hour, "Beauty Talk," Maude Hart; 2:40-3:10, magazine reading, "Pirale Parson"; 6, baseball scores, sport hour; 7-7:30-8:15, farm lectures, "Hello-therapy," Mrs. N. I. Gordon; "Desirability of Fruits and Vegetables in the Diet," Chas. Hoffman; 8-8:15, business message; 8:15-9:15, concert, Laurette Rietsch Lunde, soprano; Sigmund Resow, violinist; 11-12, dance program, Geo. Osborn's Nicolet Hotel orchestra.

WLS, Chicago, Ill. (Central, Daylight, 345), 1 p. m., John Stamford, tenor; review of agricultural college work, Book Farmer; 6:30-7, Frank Westphal's orchestra; 7, Jarvie trio; 7:45-8, lullaby time; 8-9, Lone Scout meeting; story, "The First Potter," B. H. Darrow; "How Boys Are Making Money for Camp"; some funny games; 9-10, "The McLane County System of Hog Sanitation," Harrison Fahrnkopf; poultry talk, D. E. Hale; 10-11, program, Industrial Home for Blind, John Peardon, director.

WLW, Cincinnati, Ohio (Central, Daylight, 423), 8 p. m., original compositions, Mary Steele; pianologues, Sade Elizabeth Huck; 8:20, Virginia entertainers; "For Better or for Worse," Hon. Senator Schultz; 9:10, program, Wurlitzer instrumental trio.

WMAQ, Chicago, Ill. (Central, Daylight, 447.5), 6 p. m., Chicago Theater organ; 6:30, stories for children, Katherine Waller; 8, weekly Northwestern lecture, "Oriental Immigration," Prof. Edward T. Williams; 8:30, talk, John Howatt; 8:40, "Around the World on \$8," John Fisher Anderson; 9, talk, Chicago charities; 9:15, Hazel O'Neil, soprano; J. A. Baughild, baritone.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., program, Jules Gargaro and company; 11, midnight frolic, Hines' Tennesseans.

WOC, Davenport, Ia. (Central, 484), 12 m., chimes; 6:30, sandman's visit; 8, Ervin Swindell, organist; Mrs. John Melloy, soprano.

WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal tea room orchestra; 4:45, Mary E. Vogt, organist; 7:30, hotel Adelphia concert orchestra; 8, Harriet G. Ridley, pianist; 9, Mary E. Vogt, organist; 10:30, Hotel Adelphia dance orchestra.

WOO, Kansas City, Mo. (Central, 360), 3-3:30 p. m., musical program; 7:30-8, musical recital.

WOR, Newark, N. J. (Eastern, Daylight, 405), 7-7:30 a. m., WOR gym class, Arthur E. Gagley of Newark Y. M. C. A.; 2:30-2:45 p. m., Betty Brown Bailey, soprano; 2:45-3, Florence Steele, contralto; 3:30-3:45, Betty Brown Bailey; 3:45-4, Florence Steele; 6:15-6:55, "Musie While You Dine," Baudistel's Olympic Park orchestra; 6:55-7, Resume of the Day's Sports; 8-8:15, Dr. Wm. N. Thayer, Jr., Supt. of Institution for Defective Delinquents; 8:30-8:45, Antonio Pesci, tenor; 9-9:15, Antonio Pesci; 9:15-10, concert, Bayway Refinery band of Standard Oil company; 10-11, WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., "Hessian Fly Control," Leonard Haseman; 8:20, G. E. Wyss String hand. Bell Record Symphony orchestra.

WPAL, Columbus, Ohio (Eastern, 286), 7:30 p. m., concert, Old Fiddlers; political talk, Juliette Sessions.

WQJ, Chicago, Ill. (Central, Daylight, 448), 3-4 p. m., "Vegetables in Season," Helen H. Downing; "Deserts—Dainty and Refreshing," Ethel M. Lord; "Ready-to-eat—Meats," Marthe Logan; 7-8, Otis Pike Jester, soprano; L. Van Ball, reader; Rainbo House, pianist; 10-2, Ralph Williams and his Rainbo Garden orchestra; Bert Davis—The Clown of the Air; Lew Butler, baritone; Manel Rodriguez, tenor, ballads, Anne O'Neil; songs, Aimee Torian.

WRC, Washington, O. C., (Eastern, 469), 3 p. m., fashion developments of the moment, Women's Wear; 3:10, songs; 3:45, Eleanor Glynn, pianist; 3:50, current topics, Editor of the Outlook; 4, songs; 6, stories for children, Peggy Albion; 6:15, talk, auspices of the Smithsonian institute.

WTAM, Cleveland, Ohio (Eastern, 390), 8 p. m., program arranged by Cleveland Plain Dealer; "Canton (Ohio) Night," address, Mayor Chas. C. Ball, Canton, Ohio; Dorothy Antony, pianist; Bert Beadle,



Marjory Garrigus Smith, who recently married the attractive studio director of WLW, Cincinnati, every Monday afternoon interprets the opera to be broadcast from the Zoo in the evening.

monologist; Mrs. Guy Clemmitt, soprano; Mrs. Gail Watson Cabie, violinist; Grotto Glee club, direction Clarence K. Dretke; Rachel Frease Greene, soprano; Mrs. D. M. Herrold, pianist; Virginia Jones, soprano; Jones Quartette, Virginia, Harry, Paul and Alice Jones; Karm and Andrews Moonlight Garden dance orchestra; Mrs. Chas. W. Latz, contralto; Temple choir, direction Mrs. Ghas. W. Latz; James Sutton, cello; Carl Rupp's Hollenden Hotel orchestra; Mrs. Eva B. Salter, "The Rhyime Lady," bedtime story.

WTAY, Oak Park, Ill. (Central, Daylight, 283), 6:45-7:45 p. m., dinner hour program, Wells String trio; J. A. McFarland, bass; ten minutes talk; 9-9:45, dinner hour artists Jimmy Eggert, popular singer.

WWJ, Detroit, Mich. (Eastern, 517), 8 a. m., setting up exercises, R. J. Horton; 12 m., Detroit News orchestra; 3 p. m., Schmemmen's band; 7, Detroit News orchestra; 7:30, Schmemmen's band.

## Thursday, July 10

Silent night for: KFOA, KQV, KSD, WAAW, WBAV, WCAP, WDAW, WGR, WOO, WOR, WOS.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 9 p. m., J. C. Bellefleur, pianist; Mme. Paul Rolland, soprano; Damien Rolland, boy soprano; Prof. A. Avon, violinist; Hilda Strachan, reader; Adrienne Hainault, soprano; "How to Send and Carry Money Abroad," W. H. Bryce; R. Lauzon, baritone; Cecile Gingras, soprano; duet, M. Gaudou, R. Lauzon; B. Daoust, soprano.

KOKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., Scalzo's orchestra; 5:30 p. m., Westinghouse band; 6:30, songs for Radio children, Little Miss Merry Heart; 7, "Roses and Rose Culture," Fruit Growers' nurseries; 7:15, farm program; 8, Westinghouse band; Edith and Kathryn McKee; soprano soloists; 10, concert.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., concert, Y. M. C. A.; lecture; 8-9, Ambassador hotel concert; 9-10, Examiner concert; 10-11, concert program, John Smallman.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., Old time music, Lacoq String trio.

KFSG, Los Angeles, Calif. (Pacific, 278), 3:30-5:30 p. m., Hour organ recital, R. E. Ballard; Margaret Kennedy, soprano; Isabelle Wilson-Cornlie, soprano; Gladwyn N. Nichols, cornet solos; Hazel Lankocel, violinist; Mrs. R. W. Klages, soprano; Roy Red Brignale, accompanist; 4:30-7:30, "Kozy hour," program, Cousin Jim (Harry James Beardsley) and associates; bedtime story, Mother; 8-9, concert, R. P. O. Elks band, No. 672, Pasadena, assisted, W. W. McCann, baritone; Elks quartet; Angelus Temple baptismal service, male quartet; sermon, Aimee Torian.

(Continued on page 10)



# STARS FEATURE WEEK'S PROGRAMS



If you heard Florence (left) and Harriet (above) Leach last Monday evening, you will want to tune in again this Monday, July 14 for KGW, Portland. Notice the peculiar quality in the voice of the Portland announcer. He writes that the sisters are very beautiful.



Fred Hughes is the popular tenor visiting all the large stations. He is following Malle and Little vaudeville team about the country.

p. m. concert Long Beach Californians, courtesy, Piggly-Wiggly; 2:30-3:30, matinee musicale; 6-6:30, Art Hickman's concert orchestra; 6:45-7:30, children's hour, Prof. Walter Sylvester Hertzo; Hector Dyer, age 14, pianist, pupil, Mrs. Walter M. Reckford; Helene Pirie, screen juvenile; bedtime story, "Uncle John"; 8-10, concert, courtesy of San Diego B. P. O. Elks; 10-11, Art Hickman's dance orchestra.

### Where to Hear Talks

TALKS, instructive, serious, humorous and even frivolous, are broadcast daily and below are listed the stations.

**Wednesday:** KGO, WBAH, KPO, KQV, WAAW, WBAH, WBBR, WCX, WDAF, WDAW, WBAH, WDAF, WBAH, WHAA, WHAS, WHN, WJZ, WLAG, WLS, WLW, WMAQ, WPAL, WOS.

**Thursday:** KDKA, KYW, WAAW, WBBR, WBAH, WCAE, WDAF, WBAH, WGI, WHAS, WHB, WHN, WIP, WJAX, WJY, WJZ, WLAG, WLW, WMAQ, WOR, WRC.

**Friday:** CKY, KFOA, KYW, WAAW, WBAV, WBZ, WDAF, WBAH, WGI, WGY, WHA, WHB, WHN, WJZ, WLAG, WOS, WPAJ, WQJ.

**Saturday:** KDKA, WBAH, WBAH, WBBR, WDAF, WFI, WGI, WJZ, WLAG, WOA, WRC.

**Monday:** KGO, WBZ, WDAW, WGR, WHN, WLAG, WLW, WQJ, WOS.

**Tuesday:** KFSG, KGO, KYW, WAAW, WCAE, WDAF, WGI, WGY, WHAA, WHAS, WJY, WJZ, WLAG, WMAQ, WRC.

from Lake Harriet, Minneapolis, Minn., under direction of Engelbert Roentgen; 11-12, dance program, Geo. Osborn's Nicolet Hotel orchestra; Mrs. Geo. Palmer, soprano; Mrs. Russell Sabor, accompanist. WLS, Chicago, Ill. (Central, Daylight, 345), 7:45-8 p. m., lullaby time; 8-9, request music; 9-12, national barn dance night, George Adamson team, Charles Hart team, Walter Peterson.

## Monday, July 14

Silent night for: CKAC, KNFB, KFSG, KGW, KYW, WBBR, WDAW, WEBB, WGI, WGR, WHAS, WIP, WLS, WMAQ, WOD, WOR, WDS, WQJ, WRC, WTAY.

## Sunday, July 13

Silent night for: CKAC, KFAE, KFDA, KGD, KQV, KSD, WAAW, WBAH, WDAF, WDAW, WGR, WIP, WOD, WTAY, WJY.

from Lake Harriet, Minneapolis, Minn., under direction of Engelbert Roentgen; 11-12, dance program, Geo. Osborn's Nicolet Hotel orchestra; Mrs. Geo. Palmer, soprano; Mrs. Russell Sabor, accompanist. WLS, Chicago, Ill. (Central, Daylight, 345), 7:45-8 p. m., lullaby time; 8-9, request music; 9-12, national barn dance night, George Adamson team, Charles Hart team, Walter Peterson.

Chn, director; 11, midnight frolic, Bob Miller and his Steamer Idlewild orchestra. WDAW, Omaha, Neb. (Central, 526), 6 p. m., speakers half hour; 6:30-7:30, dinner program, Pat's Melody boys; 9-11, recital program, vocal class of Walter B. Graham.

## Saturday, July 12

Silent night for: KFDA, KFSG, KPD, KQV, WAAW, WBAV, WCX, WDAF, WDAW, WFI, WGR, WLW, WDO, WDS, WWJ.

Continued on page 12



# STARS FEATURE WEEK'S PROGRAMS

roadcast

WHN,  
WMAQ,

WBAP,  
WJZ,

WGR,  
WOS,

KY W,  
WGY,  
WLAG,

Publications,  
Church of the  
m., Western

10:45 p. m.,  
pastor of the  
chapel service,  
Nebr.

a. m., sacred  
orchestra; 8,  
radio orchestra,  
light, 509), 10  
Sunday school,

9), 8 p. m.,  
Missouri State

), 8-10 p. m.,  
den orchestra;  
ecker, soprano;  
anist.  
p. m., Schme-  
; 7:30, services

## July 14

NF, KFSG, KGW, KYW,  
VGI, WGR, WHAS, WIP,  
OR, WOS, WQJ, WRC,

tern, Daylight, 425), 1:45  
luncheon concert; 4:15,

Pacific, 469), 8-9 p. m.,  
Examiner concert; 10-11,  
orchestra.

c, 455), 8:30 p. m., musi-

. 312), 4-5:30 p. m., Hotel  
; 8, educational program.  
492), 3:30 p. m., literary  
association; 8-10, Miller's

(Pacific, 395), 12:30-1:15  
and Rendezvous Ballroom

; 8-10, de luxe concert.

rn, Daylight, 270), 5-5:30  
Diary of Snubs our dog;

ballad singer.  
(Central, 417), 12:30-1:30  
d soloist; 9:30-11:30, con-  
ey, reader; Lucille Frank-

stern, 423), Ha Lorbach

tral, 345), 8 p. m., male  
ouer and Mason; Jasper  
ason, trombonist; Erwin  
D. Inman, soprano; Edith  
Elroy, pianist; Mrs. Eva

(Central, 411), 3:30-4:30

; 5-5:30, weekly Boy Scout  
City council; 6-7, school

number on the Duo-Art;  
ly "Request Story Night,"

ic, Carl Norberg's Planta-  
s radio orchestra with the

m.-1 a. m., Nighthawk  
ood Beach orchestra.

(Eastern, Daylight, 395),  
; 12:02 p. m., organ re-

30, Arcadia cafe concert  
concert orchestra; 4:30,  
30, Dream Daddy's bed-  
id Abbott; 10:30, Arcadia

Eastern, Daylight, 492), 4-

soprano; 4:30-5, Women's  
s of America; 6-7, dinner

el; 8:30-10, Marine band  
-10:15, Adam Carroll and

476), 12:30-1 p. m., "The  
Boon; 8:30-9:30, W. B.

orchestra.  
n, Daylight, 319), 12:30-1

hard, organist; 6:30-7:30,  
ress, "Selling Yourself,"

5; 8:15-9, Murray White-  
birds; 9-11, concert, (classi-  
scher, soprano.

(Eastern, 380), 1 p. m.,  
ontrol of Potato Diseases

F. Barrus; 7:30, "High  
lection of Poultry," Prof.

mental program pupils of  
Austin Springer, director;

Ada Noble, soprano; talk,  
ican Boy magazine.

al, 400), 4-5 p. m., Alamo  
Quinlan's Golden Derby

n, 380), 9 p. m., Edward

and Daylight, 405), 2:15-

and his entertainers; 2:45-

oser; 3-3:30, Harry Hock  
ard Partridge's Mayflower

mac festive board; 7:15,  
ton Fisher; 7:30-8, Rose-

u, people's concert, Marcia  
lestain, jazz pianist; 8:45-

9-9:30, Chas. Strick-  
hestra; 10-11, Jack Shuck

stern, Daylight, 509), 1:05

"What the wild waves are  
Philharmonie orchestra;

o, Walter Perella, clarinet;  
lance orchestra; 7, Uncle

aul, Minn. (Central, 417).

household hints; 11:35-12 m., sur-  
-10-2:40, woman's club hour, "Dress-

Myrtle Saperston; 2:40-4, matinee  
program; 4-4:30, magazine reading; 6-7 p. m., dinner  
hour concert, Geo. Osborn's Nicolett Hotel orchestra;  
7:30-8:15, farm lectures.

WJZ, New York, N. Y. (Eastern, 455), 9-10 a. m.,  
children's hour; 11-1 p. m., church services; 8:30-9:50,  
Stadium concert New York Philharmonic orchestra.  
WLAG, Minneapolis-St. Paul, Minn. (Central, 417),  
10:20-12 m., service, Westminster Presbyterian church;  
4:15-5:40 p. m., services, House of Hope Presbyterian  
church; 7:45-9, service, Central Lutheran church.  
WLS, Chicago, Ill. (Central, Daylight, 345), 6:30-8  
p. m., Italian choir, Derrfuss Concert company, as-  
sisted by Dorothy Derrfuss.  
WLW, Cincinnati, Ohio (Central, Daylight, 423), 9:30

Tompkins, D. D., rector.  
WJZ, New York, N. Y. (Eastern, 455), 9-10 a. m.,  
children's hour; 11-1 p. m., church services; 8:30-9:50,  
Stadium concert New York Philharmonic orchestra.  
WLAG, Minneapolis-St. Paul, Minn. (Central, 417),  
10:20-12 m., service, Westminster Presbyterian church;  
4:15-5:40 p. m., services, House of Hope Presbyterian  
church; 7:45-9, service, Central Lutheran church.  
WLS, Chicago, Ill. (Central, Daylight, 345), 6:30-8  
p. m., Italian choir, Derrfuss Concert company, as-  
sisted by Dorothy Derrfuss.  
WLW, Cincinnati, Ohio (Central, Daylight, 423), 9:30

Waldorf-Astoria orchestra; 8:20-8:35, "The Slums of  
London." Geo. Laval Chesterton; 8:35-8:50, Frank  
Anderson, baritone; 8:50-9:50, program, auspices of  
N. Y. Times, Dunlap, Radio editor; 10:15-10:30,  
"Exchange of Populations between Turkey and Greece,"  
A. C. Jacquith of Near East Relief; 10:30-10:45,  
Elsie Aherns, soprano; Marlon B. Witcover, contralto;  
11-11:30, Club Lido Venice orchestra presented by  
Paul Specht.  
WLAG, Minneapolis-St. Paul, Minn. (Central, 417),  
11:35-12 m., postcard club; 7:30-8:15, business mes-  
sages; 8:15-10 p. m., municipal band concert direct

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m.,  
concert, Henry Field Seed company and friends.  
KGO, Oakland, Calif. (Pacific, 312), 4-5:30 p. m., con-  
cert orchestra of the Hotel St. Francis; 8, San Jose  
Sclots' band; Mrs. George W. MacMillan, soprano;  
saxophone quartet; G. Franklin Roberts, baritone; Ed.  
Moore, cornetist; D. E. Neal, baas; Edna Kindall,  
pianist; 10-1, Hotel St. Francis dance orchestra.  
KGW, Portland, Ore. (Pacific, 492), 8 p. m., chil-  
dren's musical program, pupils, Marie C. Dooley; 10,  
dance music, George Olsen's Metropolitan orchestra.  
KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15

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(Continued on page 12)

Monday, July 14

(Continued from page 11)

orchestra; 9-11, recital program, Vocal Class of Lee G. Krutz.
WDC, Javenport, Ia. (Central, 484), 12 m., chimes; 5:15 p. m., chimes; 6:30, sandman's visit; 8, Elta B. Stiles, reader; Maggie Marsh, violinist; Louis Crowder, pianist; 10, Pasadena orchestra.
WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., Mary E. Vogt, organist; 12:02 p. m., Wana-maker crystal tea room orchestra; 4:30, Mary E. Vogt, organist; 7:30, Hotel Adelphi concert orchestra; 8, health talk, Pblia. Bureau of health; 9, R. O. T. C. band; 10, Hotel Adelphi dance orchestra, A. Candelari, director.
WDR, Newark, N. J. (Eastern, Daylight, 405), 2:30-2:45 p. m., talk, New York Y. M. C. A.; 2:45-3, Lena Klevsky, pianist; 3:30-3:45, talk, Charun magazine; 3:45-4, Lena Klevsky, pianist; 6:15-7, Elite orchestra, Dolph Itebucel, leader; 8-8:15, Alva Polaska, soprano; 8:30-8:45, "I See by the Papers," says "Hollywood" McCosker; 8:55-9, Alva Polaska, soprano; 9:05-9:30, Common Sense of Music, Dr. Sigmund Spaeth; 9:30-10, Manhattan serenaders; 10:15-11, WOR Monday Nighters, classical program.
WDS, Jefferson City, Mo. (Central, 440.9), 8 p. m., "Crushing Clouds with Lime," "Insurance for Your Next Clover Crop," "Two March Westward," Colonel Arthur T. Nelson; 8:20, varied musical program, Moberly talent.
WQI, Chicago, Ill. (Central, Daylight, 448), 3-4 p. m., "Cheese in Place of Meat," Helen H. Downing; "Pressure Cookers," H. F. West.
WTAM, Cleveland, Ohio (Eastern, 390), 8 p. m., Prof. Bernard Melzak, pianist; Myrtle Baron, violinist, Palmantonio Ruffo, tenor; Geraldina Watrus, soprano, fashion developments of the moment, Woman's Wear; 3:10, songs; 3:25, current topics, Editor of the International Interpreter; 3:35, pianist; 3:50, "What Women are Doing Today," Mrs. William Alcherton Du Puy; 4, songs; 4:10, book review, auspices of the League of American Penwomen; 6, stories for children, Peggy Alblon; 6:20, talk on education, auspices, National Education association.
WVJ, Detroit, Mich. (Eastern, 517), 8 a. m., setting-up exercises, R. J. Horton; 12 m., Detroit News orchestra; 8:30 p. m., Schuman's band; 9:30, Detroit News orchestra.

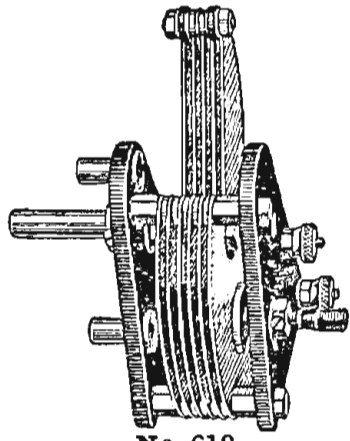
Tuesday, July 15

Silent night for: KFDA, KFSG, KQV, KYW, WAAW, WDAK, WEAD, WFI, WDC, WDD, WDR, WRC, WSAI.
CKAC, Montreal, Can. (Eastern, Daylight, 425), 7 p. m., kiddies' stories in French and English; 7:30, Mount Royal Hotel orchestra; 8:30, variety program; 10:30, Joseph C. Smith and his Mount Royal Hotel dance orchestra.
KFNH, Shenandoah, Ia. (Central, 266), 7:30 p. m., Elks band, Harry Day, director.
KGD, Oakland, Calif. (Pacific, 312), 8 p. m., Musaeus trio, Natalie Levin, violinist; Jozena Van der Ende, cellist; Wilhelmina Voithus, pianist; Eva Gruningar Atkinson, contralto; Walter H. Bundy, baritone; Jack Sheen, tenor; court scene from "Merchant of Venice," Wilds Wilson Church, director; William Emery, tenor; address, "The Imprisoned Splendor of Service," Rev. Harvey V. Miller; duet for contralto and baritone, Corinne Keefer, Walter H. Bundy; 10-11, Hotel St. Francis dance orchestra.
KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., talk, Jeanette P. Cramer; 10, dance music, George Olsen's Metropolitan orchestra; Leona Mourtou, contralto.
KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., concert; 2:30-3:30, matinee musicale; 6-6:30, Art Hickman's concert orchestra; 6:45-7:30, children's hour, Prof. Walter Sylvester Hertzog; weekly visit of the Sandman and Queen Titania; bedtime story, "The John"; 8-10, de luxe concert; 10-11, Art Hickman's dance orchestra.
WBAH, Minneapolis, Minn. (Central, 417), 12:30-1:30

p. m., Dick Long's trio and solists; 7-7:30, musical, Minneapolis Boy Scouts.
WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., The Star's radio trio; 5-5:30, weekly child talent program, pupils of Conannon School of music; 6-7, school of the air, piano tuning in number on the Duo-Art; third of a series of piano lessons, Maudellen Littlefield; address, Clerin, Zumwalt; the Toll-Me-a-Story Lady; music, Carl Norberg's Plantation players.
WDAK, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., daily siamance; 12:02 p. m., organ recital, Stanley theater; 12:30, Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; 7:30, Dream Daddy's bedtime stories.
WFAA, Dallas, Tex. (Central, 476), 12:30-1 p. m., address, DeWitt McMurray; 8:30-9:30, vocal recital, B-Natural quartet; 11-12, Mrs. Margaret Fifer and her orchestra.
WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 12:30-1 p. m., George Albert Bouchard, organist; 6:30-7:30, dinner music.
WGY, Schenectady, N. Y. (Eastern, 390), 6 p. m., dinner concert, Joseph A. Chickens and his Clorer club orchestra; 7:45, El-Kays Saxophone orchestra, Leo Killum, conductor; Cora L. Whitmyre, contralto; Mrs. Stuart G. Knight, accompanist; "Services of an Architect," C. E. Schermerhorn; Charles Rowe, saxophonist; Mable Kilmer, soprano; 9:30, Emily C. Rullison, violinist; 10:15, Stephen E. Botselair, organist.
WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., readings, music; 8, "Tales of the Air," Prof. Floyd A. Nagler.
WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Dick Quilian's Golden Derby orchestra; Alamo Theater orchestra; 7:30-9, Zur Schmelde Harmony singers.
WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 1:05 p. m., seashore gossip; 3, "What the wild waves are saying"; 3:30, Comfort's Philharmonic orchestra; 6:05, WIP little concert orchestra; 7, Uncle Wip's bedtime stories; 8, Comfort's Philharmonic orchestra; 8:45, "What the wild waves are saying"; 8:50, Vessallas concert band, Inga Wank, contralto; 10, Bob Lehman's dance orchestra; 11:05, Marburger's Reading Pennsylvania's dance orchestra.
WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m.,

program furnished by Cleveland News-Leader; E. G. Johnson, bedtime story; Don Palmer, radio talk cartoon; Joe Smith-Martha Lee Club orchestra; special features, favorite entertainers.
WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints; 11:35-12 m., surprise hour; 2:10-2:40, woman's club hour, talk arranged by League of Women Voters; 2:40-4, matinee magazine reading; 6-7, dinner hour concert, Geo. Osborn's Nicollet Hotel orchestra; 7:30-8:15, farm lectures.
WLV, Cincinnati, Ohio (Central, Daylight, 423), 10 p. m., Glee club, Littleford Collegiate school of business; Robert Schneider, violinist; Harriet Morris, pianist; Clara Bamberger, reader; Luellie Foster, whistler; G. E. McClellan, baritone; 10:30, Foster's Southern Bellhops; 11:30, William C. Stress, violinist; 11:55, Chubb-Stelberg orchestra.
WMAQ, Chicago, Ill. (Central, Daylight, 447.5), 6 p. m., Chicago Theater organ; 6:30, Hotel LaSalle orchestra; 8, talk, Harry Hansen; 8:20, John Clark, baritone; 8:40, French lessons; 9, Civil Service commission; 9:15, Maunaloa Hawaiian trio; Harry Geske, pianist.
WDD, Philadelphia, Pa. (Eastern, Daylight, 509), 11 p. m., Mary E. Vogt, organist; 12:02 p. m., Wana-maker crystal tea room orchestra; 4:30, Mary E. Vogt, organist.
WDR, Newark, N. J. (Eastern, Daylight, 405), 2:30-2:45 p. m., "Suburban Bee-keeping," Walter C. Morris; 2:45-3, Harry Jentes, pianist; 3:30-3:45, Harry Jentes; 3:45-4, "Indian Legends of Old New Jersey," Ernest A. Reed; 6:15-6:30, Halsey Miller and his orchestra; 6:30-7, "Man in the Moon Stories," for children; 7-7:20, Halsey Miller and his orchestra; 7:20-7:30, Resume of the day's sports.
WQI, Chicago, Ill. (Central, Daylight, 448), 3-4 p. m., "From Immigrant to Inventor," Rev. Fred Harrison; "The Frame for Your Face," Anne Prang Knehaus; "Various Classes of Lighting," Curtis Lighting; 7-8, Laneaster Smith, bass; "Real Estate Mortgages a Safe Investment," Cook County Real Estate board; Mrs. Laneaster Smith, pianist; 10-2, Ralph Williams and his Rainbo Garden orchestra; Phil Fleming and Vernon Rick, "The How Do You Do Boys"; "How to Get Better Radio Reception," Harry J. Marx.

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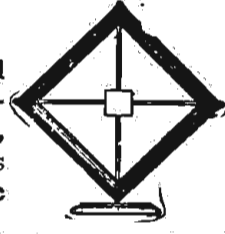
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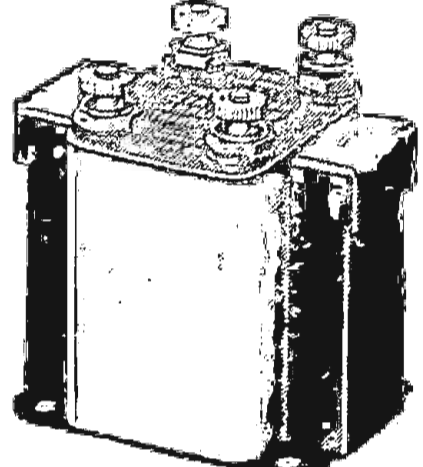
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The highest grade of every made a price lower than they ever were sold before.
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D60-Wood Cabinet; panel size 7"x16"..... 3.50
D61-Wood Cabinet; panel size 7"x20"..... 3.75
D62-Wood Cabinet; panel size 7"x24"..... 4.00
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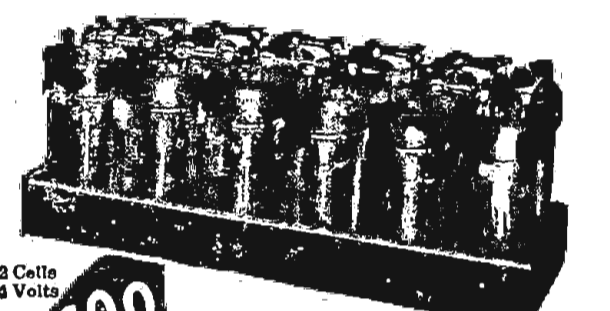
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# 30 Minute A-B-C Lessons for Radio Beginners

## Chapter XVII—Reproducers; the Finishing Touch of Radio

By P. E. Edelman

**I**N THIS series of articles the story of Radio is told in so simple a manner that the uninitiated can follow theory and practice whether or not he knows anything about electricity or its application to broadcasting and reception. The series consists of twenty-five chapters, of which the five next will be:

Chapter XVIII—The Hero Circuits of Radio.  
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 Chapter XX—How Far Can I Hear?  
 Chapter XXI—Choosing a Radio outfit.  
 Chapter XXII—Making Your Own Radio.

**E**VERYTHING that has gone before, from the time that the original sound is broadcast until it passes through various carrying and amplifying

means to move it. The diaphragm communicates this motion via the air to the ears of the listener. A simple arrangement is indicated in Figure 157. A large number of turns of fine wire are wound

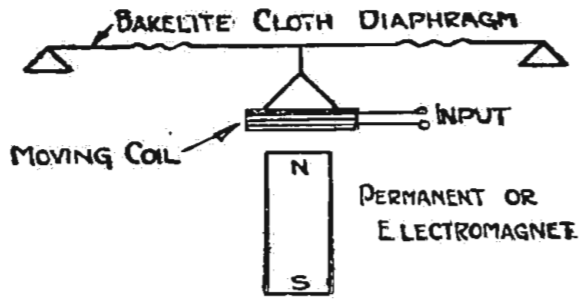


Figure 160

around a permanent magnet carried in a casing. A thin iron diaphragm is clamped against the casing so that the magnet and the winding can pull on it via magnetic lines of force. The diaphragm can thus be flexed each time a little changing pulse of current is sent through the winding.

That is why you sometimes can hear the carrier of a distant station without getting the voice clear, if at all. In such case your local receiver heterodynes its oscillations with the incoming feeble frequency received, but the incoming frequency is not carrying enough energy to properly actuate your detector or rectifier.

Headsets should be connected so that the battery or plate current aids the magnetic field of the permanent magnets and such makers label the terminals for this purpose. By trial, you can determine which connection gives best results. Some earphones and many types of loud speakers use a mica or other diaphragm connected by a mechanical linkage or lever to the actuating magnetic pulling means, as indicated by Figure 159.

### Loud Speaker Unit

One form of loud speaker unit employs a moving coil and this coil is connected to move the diaphragm. The input current is sent through this coil under the influence of a permanent or electromag-

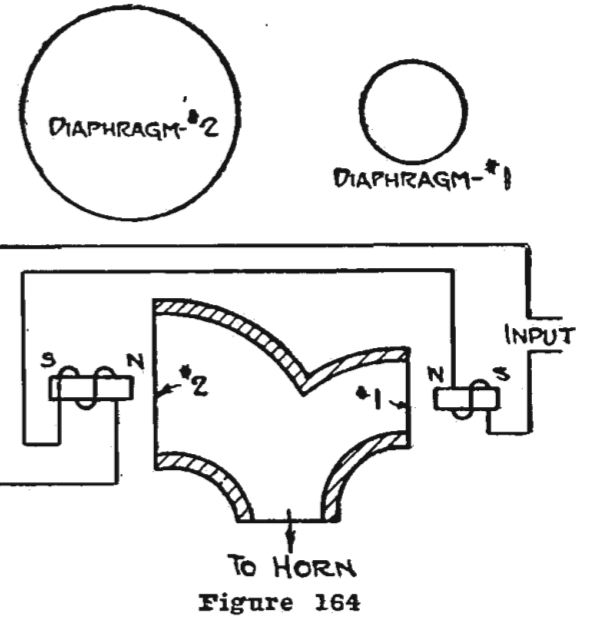


Figure 164

net character usually employ no horn. Other kinds of speakers are built up by using

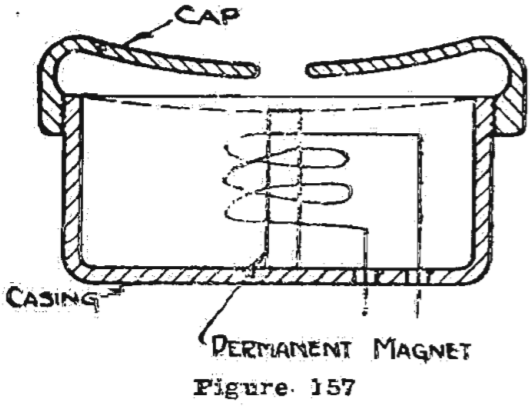


Figure 157

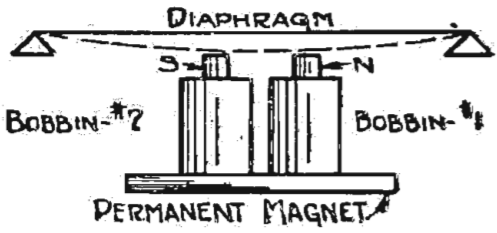


Figure 158

mediums, aims to actuate a reproducer. Common reproducers are known as headsets or earphones, and loud speakers. The finishing touch of Radio comes at the reproducer where electrical currents are converted back into the form of sound.

Broadcast listeners include some people who are satisfied with getting some distant station, even if not clearly, just to hear that a program is going on. Others are more interested in getting clear reproduction, if only from a much nearer station from which an entire program

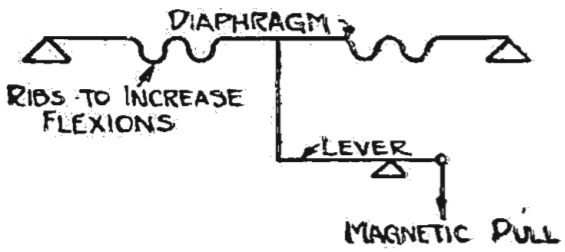


Figure 159

can be understood without interruption. Principle of Telephone Receiver  
 An earphone or telephone receiver comprises a diaphragm with electromagnetic

phones, the series connection is preferably used. Telephone receivers are very sensi-

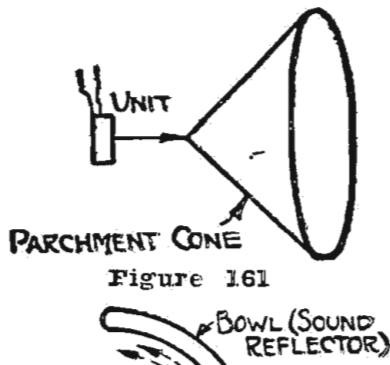


Figure 161

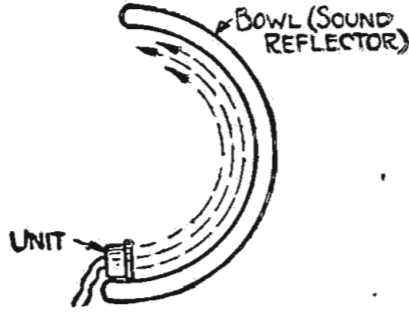


Figure 162

Most earphones are built with double magnet windings as diagrammed in Figure 158. A ring-shaped permanent magnet has poles N and S each carrying a bobbin winding. Two units are connected in series, one complete unit for each ear. In connecting-in additional sets of ear-

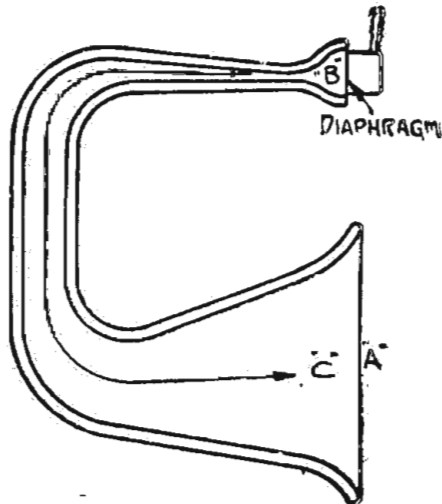


Figure 163

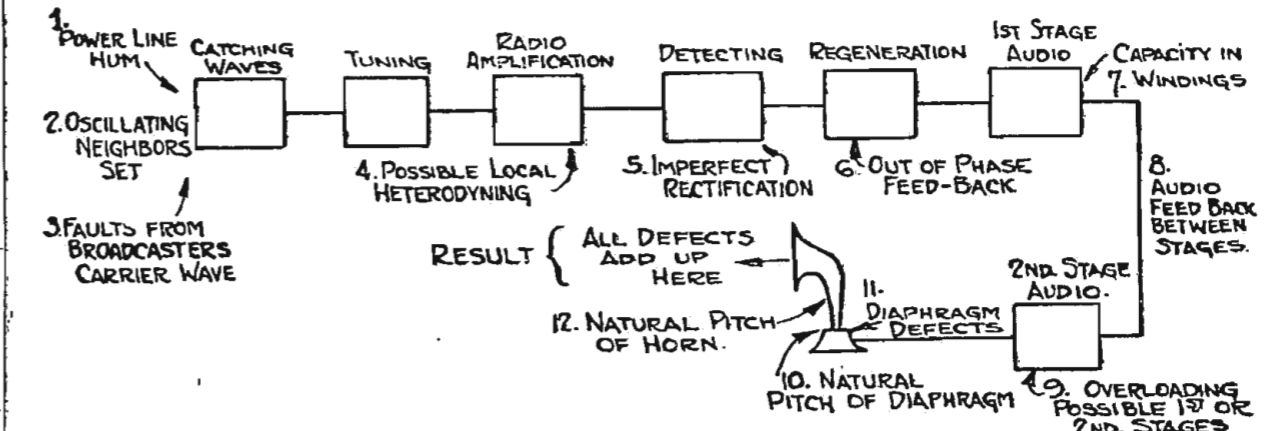


Figure 165

net and operates the diaphragm as usual. Loud Speakers Without Diaphragm  
 There are some types of loud speakers using cones or other sound surfaces besides the well known diaphragm. Sometimes a parchment cone is used as in Figure 161. Receiving reproducers of this

reflecting surfaces. A simple form comprises a unit facing a bowl or sound reflecting surface, per Figure 162. Purpose of Horn  
 Most loud speakers employ a horn. A horn has the effect of concentrating and (Continued on page 16)

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## Household Helps

### Aid in Keeping Abreast of the Times

RED plush photograph albums, parlor whatnots and horse-hair furniture have largely vanished from the homes of the laud along with the other decorative doodads of a few generations ago, but there are still many American homes where artistic interior decoration has continued to be conspicuous by its absence.

Toward correcting this situation, Radio is undoubtedly contributing more today than any other single factor. Not only has the new art brought thousands of homes into daily and intimate contact with the great outside world and its large and varied interests, but it has brought into homes new ideas and additional knowledge of everyday household problems and interests which are helping to make the average home a much happier and more attractive place in which to live.

Housewives all over the land not only have an opportunity to hear the best of music but they can keep in touch with the best menus for family meals, dressmaking and millinery hints. Through talks on home decorations and furnishings the housewife in the smallest village or on the remotest farm comes in touch with current ideas in the metropolitan centers. Not only does she learn that fringed tidies, seashells with ribbons tied around them, and dried ferns under glass have passed out but she is also informed what has come into take their place.

The Radio brings her up to date and reliable information on color schemes, curtains, draperies, wall-paper, hangings, pictures and types of furniture.

## Those Big Spark Transgressors

### Spoiling an Evening's Entertainment with Dashes

THERE is never anything so satisfying to some individuals as to be constantly annoying other folks even though the thing done has no personal gain. The great Radio crowd has enough annoyances and difficulties to overcome without some egotistical person that wants his presence known. You can find those fellows everywhere, they are always with us, throwing monkey wrenches into the machinery or casting a chunk under the wheels of progress. The air hound is one in this class. Why such a person must come in on the air when Radiophans are enjoying the time when they have the leisure, the fore part of the night, is more than a person of rational mind can comprehend.

You will say its thoughtlessness of the party doing the act. No! its not thoughtlessness at all, its pure meanness and a desire to be heard. We have those little fellows in every locality who persist in clogging up the air just at a time when thousands are wanting to hear something particular of interest to them.

Then, too, we have the big fellow who goes under the name of high officials and makes tests for the government. The eastern section has this difficulty. A powerful spark is sent out during the first part of the night or at a time when the best Radiocasts are on and it destroys all the signals. Why this test should be made at nine o'clock and on until midnight is quite beyond the average person's ability to answer. It is nothing more than downright meanness, for this test could be made at midnight and thereafter just as well.

## Rural Popularity of Radio

### Has Greater Influence Than the Telephone

RADIO, while generally regarded as belonging more to urban than to rural life, has become popular in the country. The department of agriculture recently completed a survey showing that 145,000 farm families are now equipped with receiving sets.

Based upon an estimate of five persons to a family, this would mean that there are now 750,000 rural Radiophans capable of tuning in and hearing the various programs put on at broadcast stations.

Radio may work as a greater influence than the telephone, good roads, electricity or the motor car in keeping the people on the farm, for these conveniences, in many cases, only increased the hunger for urban things.

## RADIO INDI-GEST

### You Owe Us Four Dollars, Ambrose

Dear Indi: Enclosed you will find a Masterpiece (?) written in song that seems to size up the present Radio situation pretty well, especially the patent situation. If you can use it in your publishing machine you have my wholehearted consent to do so. If it is good please send me a super-heterodyne for it; if it is not so good send me a crystal set. If it is not worth publishing will you please loan me two bits on it.

Here goes: (To be sung by members of the asylum to the tune of Casey Jones, accompanied by the Choo-Choo whistle of WLS in Memory of the brave martyr in whose honor this song was written.)

Come all you Hams if you want to hear  
The story of a Radio Engineer.  
Casey was an amateur of worldwide fame,  
He invented a circuit that bears his name.

#### CHORUS

Casey Jones, for hours he did toil,  
Casey Jones, never would he shirk,  
Casey Jones, he burned the midnight oil,  
He never slept a wink till the circuit worked.

Now Casey got a patent on this circuit fine,  
He called it the Hokuspokussuperiordyne.  
It would bring in China and WNP  
So he sold it to the company of A. T. & T.

#### CHORUS

Casey Jones, he sold his little patent.  
Casey Jones, to a powerful company.  
Casey Jones, he sold his little patent.  
He sold his little patent to the A. T. & T.

Now Casey was sued in the Court Supreme  
For infringing on the patent of a highfalutin "Bean."  
They put him through the mill and he came out cleaned,  
Now he rides no more in his limousine.

#### CHORUS

Casey Jones, has started back to workin'  
Casey Jones, he loafs never more.  
Casey Jones, has started back to workin'.  
Now he fools no longer with his Radio.

If this don't get 'em carbohic acid will. Yours very truly,  
5AKB.

A Radio-phanette who is reducing has to do her dozen stations daily.  
W. B. P.

J. M. Witten, genial WOS, Jefferson City, announcer, dropped in the other day. And here we were, thinking he was a convict! "Do you lock up the Prison Band when they're in the studio?" we asked. "No," J. M. replied, "but I carry my Army 45 for luck."

## Thought for the Day

Oft in the stilly night, ere slumber's chains have bound me,  
I listen to the jazz, and other things around me.  
And sighs and tears and childish fears again and yet assail me,  
And I weep in vain for a classic strain—but what do my weeps avail me?  
PAPRIKA.

There's just two classes of Radiophans; those that listened in on the Republican convention, and those that listened in on the Democratic.

## Mrs. Partington Speaks Out

Dear Indi: Mizz Partington says her friends Roxie and his gang at WEAJ went out and raised a lot of money and bought Radios for all the "shut in" fellers at the service hospitals so they can listen in and enjoy being sick.

She says Roxie should "ort" to hurry up and buy good sets for two more "shut ins" so they can trade off their crystal sets they must of had, then they can listen better to the convention, next time, and they won't be the only two people that won't know what the convention done until a month after they concluded their final number and signed off. The campaign committee could afford a contribution big enough to help Roxie buy two Super-Hets in place of buying railroad and parlor car tickets for one feller from every State but Wisconsin, besides a chairman, to make a trip to the White House, so they can holler for Cal. to come to the front porch a minute, while they let him know for sure he's the one they voted into getting onto the ticket next fall; and more tickets to buy on the railroad, for another crowd like that, which has to go to Chicago and wait for the bank to open up, for them to git in and break the bad news to Charlie Dawes what the convention done to him; and when he finds out its him that can't tune in on nothing but the Senates' programs for four whole years, why, if he don't say "Hell Marlar!" or worse than that, even, he is not a going to git her vote next fall, whether he gits the Senate Committee to O. K. his expenses account or not.



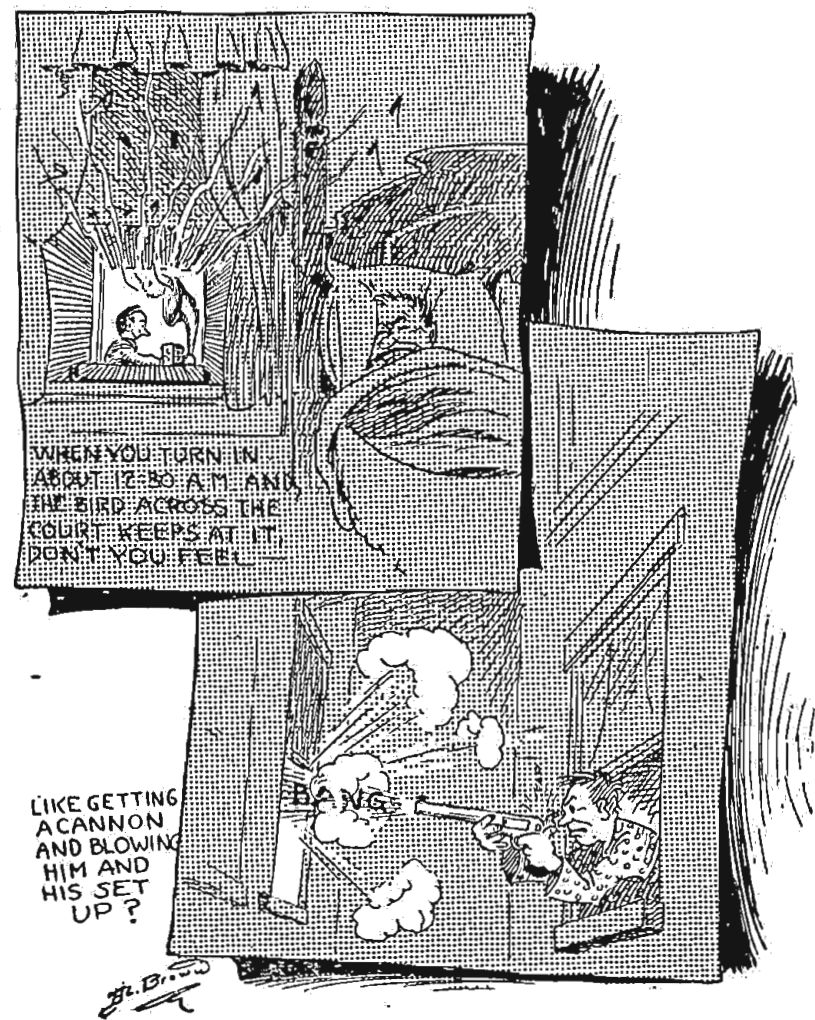
SIGNING OFF.

Oh where, oh where have my Indi scribes gone?  
Oh where, oh where can they be?  
They think that because it is summer time,  
My mail box should be empty!  
INDI.

## Next Song Will Be a Dance

Dear Indi: "You are listening to Station K-W-I-T, Podunk! Our next number will be 'The Waters of My-new-skonker,' an effusion of that greatest of American songwriters, Drillen Wholes.  
"Madame Luce—Howle, lyric soprano, will splash—  
"Mr. Pennyworth A. Nichol, pianist, will paddle.  
"One moment, please!"  
JACK-POT.

## Premeditated Murders



## Condensed

### By DIELECTRIC

Probably no definite plan to support Radiocasting has yet taken final form, though the question of who is to pay keeps bobbing up in the minds of both those who now operate studios and the Radiophan. It is believed in some quarters that the civic Radiocasting plan is the most likely one to meet the situation. The city of Milwaukee has taken over Station WCAJ which receives its support now from ten firms, each contributing \$2,500 annually. Again we wonder if business houses will take care of civic stations, or popular subscriptions be raised for the purpose.

Usually some species of bird life is to be seen and heard in the cities, if only the chirping of a sparrow, and yet song birds are seldom found in densely populated areas. So many thousands of Radio listeners never leave the cities for country attractions that what is brought to them via Radiophony of rural nature is greatly appreciated. Not long ago the song of the nightingale was sent through the ether to English listeners in a treat which is rare indeed to Londoners. One of our own song birds, the robin, volunteered his services at a Radiocasting from the University of Iowa, WHAA, of the baccalaureate sermon delivered on the campus and was heard distinctly throughout much of the service. Occasionally we have to entertain us men who know the wild life of the jungles and their talks help to visualize these unusual beasts and birds, yet, with the aid of their calls or song we could feel better acquainted.

In no sense of the word is amateur aid to commercial interests a gain-seeking endeavor; the Radio amateur is glad to use his knowledge whenever needed. However, it is only natural for a beneficiary to wish to reward his amateur benefactor as instanced in the case of two boys, operators of Station 9DOE in Duluth, who had maintained constant communication with a ship tied up in an ice blockade at the entrance of Duluth harbor. The president of the company owning the ship gave to the boys passage to Detroit, entertainment while there and stops at the important islands in the Great Lakes. If the zeal for amateur Radio work is not increased thereby, nothing will do it. Yet reward was not their objective.

When the Los Angeles Times conceived the idea of awarding a substantial prize to the best orator among California school pupils, there began a movement which culminated in the Radiocasting of orations by the seven winners in as many zones throughout the United States, comprising one million scholars in all. These seven boys and girls had the distinction of being preceded by President Coolidge in a speech which, together with theirs, carried to a vast unseen audience tuned to one of the three stations Radiocasting the proceedings from Washington. Other scholars listening in will be spurred to greater efforts when the contest is renewed next year, as it certainly should be.

Why the move to enlist public interest in securing receiving sets for the disabled veterans of the World War should have come so late is more than I can explain. But, thank heaven, it's here now! A thrilling experience was that of listening to the program put out from the Shubert-Boston opera house by Station WNAC, WTAT, WGI and WBZ last month as a benefit performance to purchase Radio equipment for wounded veterans. Orchestra music, glee club and quartet singing, instrumental trios and sketches comprised the amusing features, while Major General Edwards gave an inspiring address. Let's hope the good work has only begun.



# Underground Antennas for Summer Receiving

## Part III—Installation for Limited Space

By Edward Thomas Jones, A.I.R.E.

IT MAY not be possible for a great number of listeners to install either of the systems already discussed in the first two articles of this series. That is why we are going to take up the authors work on underground antennas as it was he who made considerable im-

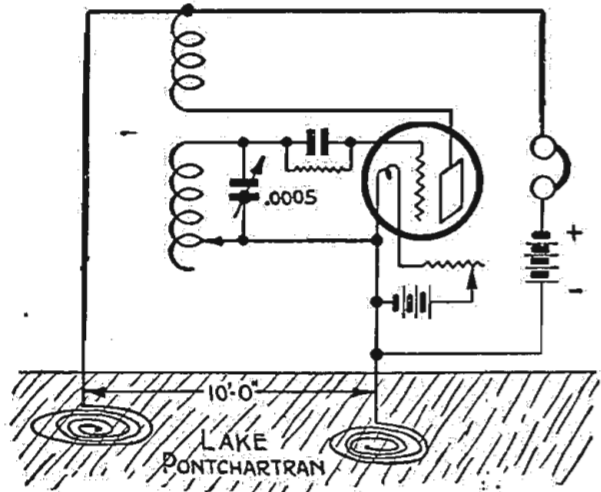


Figure 9

provements over the Rogers system during the war—which work was protected by patents number 1,372,658 and number 1,429,240. While working on the Rogers system, the length of the wires required for good reception always bothered me. I was determined to reduce the overall dimensions of the antenna installation. In fact, that was very necessary, as the department was having considerable trouble in purchasing adjoining property on which to run the Rogers long wave wires.

### Details of First Experiment

My very first experiments were conducted in Lake Pontchartrain, La. In most of these experiments, two coils were employed—without direct ground connection. Two coils each 24 inches in diameter and composed of 200 feet of high tension cable were lowered into the lake and rested on the mud bottom approximately four feet below the surface of the

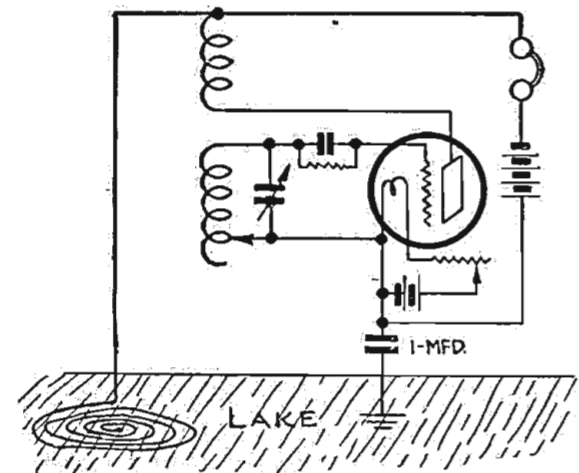


Figure 10

water. The water was slightly brackish but not salty enough to cause the system to work in any way different than when the coils were submerged in fresh river water. The coils were spaced 10 feet apart as shown in Figure 9. No audio amplification is shown in this drawing for the sake of simplicity—however, the usual two-stage amplifier was employed during the experiments.

An ordinary variocoupler serves as the tuner. To the outside-longer winding of the variocoupler—a 23-plate, .0005 variable condenser is shunted. The rotor of the variocoupler is connected in the plate circuit in the usual way.

### Second Experiment

My next experiment consisted of the same coils submerged to a depth of 12 feet in the Mississippi river. The coils were spaced 50 feet apart, that being the best distance of separation found by exhaustive experiments. With these coils buried in the river—and connected to the standard navy type receiver, it was possible to pick up numerous distant stations with exceptionally good volume accompanied by very little static. The following stations were picked up: Swan Island (900 miles); NAX, Colon, Panama (1,300 miles); NAR, Key West (650 miles); NAA, Arlington, Va. (750 miles); time signals, NAJ, Great Lakes (1,050 miles); working on small 2 kw set, XAB, Mexican station (750 miles) and many others.

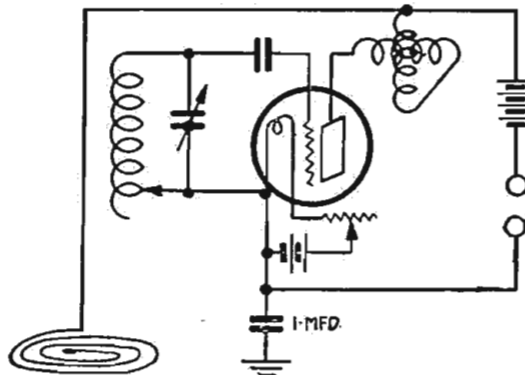
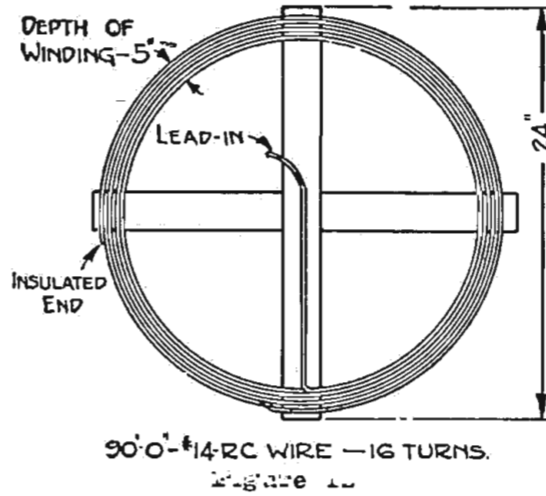


Figure 11

These stations' wave lengths ranged from 600 to 4800 meters. No directional effects were noticeable. Signals from all directions came in with what was considered equal intensity. It was ascertained from these experiments that; due to the concentration of the inductance, it not being distributed at considerable lengths as in the Rogers system, the signal-static ratio of the authors system greatly exceeded that possible with the Rogers system.

### Increasing Size of Coils

Next we tried increasing the size of the coils. Coils 4 feet in diameter were built, lowered into the river and tested under the same conditions that the smaller 2 foot coils were. A marked increase in signal strength was noted. The signal



static ratio was very nearly the same. Of course, the larger the coil, everything else being the same, the poorer the signal-static ratio—because of the increased pick-up area of the coils. At no time, however, will the ratio be less than that possible with the Rogers system.

It was later determined that one of the coils could be eliminated from the circuit and even under those conditions the signal-static ratio held up very well (Figure 10). Here, a one micro-farad condenser is connected between the filament and the ground in place of the insulated coil. This increases the volume,

but does not permit the same signal-static ratio.

In fact, it was determined very early that the very best results were only obtained when the system employed buried-insulated wires for both the usual antenna and ground connections. It is absolutely necessary that the coils be built with free-open ends. This is clearly shown in all the drawings. The open end is insulated by placing it in an ordinary clay tube and filling the same with molten wax or rosin, as pointed out earlier in the series.

A modification of Figure 10 is shown in Figure 11 where a variometer is shown

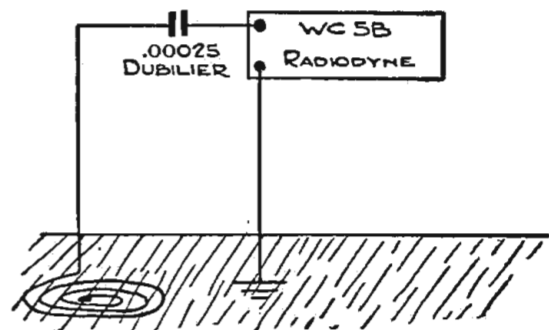


Figure 13

connected in the plate circuit of the detector to provide regeneration. This (Continued on page 16)

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| 1 Amisco 6 Ohm Rheostat        | 1 Pr. Como Dup. P. P. Transformers |
| 3 Amisco 20 Ohm Rheostats      | 1 Panel, 1x12                      |
| 2 Amplex Grid Densers          | 1 Sub Panel, 3x2 1/2               |
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### THIRTY-MINUTE A-B-C

(Continued from page 13)

focusing the sound waves so that an apparent amplification results. A horn is indicated in Figure 163. The mouth A is sometimes called a bell and the length B should be carefully curved and tapered to get good accoustical results.

It is possible to use two diaphragm inputs for a horn as indicated in Figure 164 and this might be an advantage if one diaphragm is large and the other small, so as to get more uniform frequency reproduction. Any diaphragm tends to respond to certain frequencies much better than to others, so that the best reproducer is one which minimizes this effect. The natural vibration of a diaphragm can be enhanced to the detriment of reception if a tinny horn with its own natural vibration period is used.

In Figure 165 there is a diagram of the sources of distortion and noise in a typical receiving outfit. One or more or all of these can partially affect or spoil clear reception.

Though your own outfit differs from the example indicated, one or more of the causes may possibly be recognized in any type of receiver.

#### Transformation of Energy Means Loss

It should be clear that the various transformations of form of energy employed in Radio, starting from the broadcaster, and extending to the reproducer, mean loss in form and value. The value is easily made up by supplying local energy via amplifiers but the form loss repeats.

Hearing depends on the individual. Some persons have a range of frequencies within audibility which others are deaf to. Many people hear better with one ear than with the other and certain frequencies better with one ear than the other. The pair of ears was intended for the so called binaural or directional effect. A sound coming from your right reaches your right ear before it comes to the left ear and you recognize this difference in time value or phase and can thus judge direction.

#### Caution in Using Earphones

Constant prolonged use of earphones is tiring. Do not wear a tight headband nor keep the earphone tightly pressed against your head for long periods.

(How so many circuits have made the name of their inventors well known will be the inspiring topic of the next article by Mr. Edelman.—Editor's Note.)

### UNDERGROUND AERIAL

(Continued from page 15)

entirely eliminates the tickler coil. It was found, however, that the tickler was the best arrangement because the tuned-plate variometer circuit was too critical—especially so with the underground antenna system.

#### Present Installation

The installation used by the author at the present time is one which anyone can make use of. Down here in New Orleans where it is practically impossible in the summer months, such as June and July, to guarantee any reception from distant stations, the author accomplished exceptionally good results. This year, even better results will be obtained because the transmitters have increased their power and I have increased the sensitivity of my receivers, and have improved on the antenna installation. Of course, we are from 550 to 600 miles away from any powerful broadcast station, and

during this time of the year it is not very often that we can pick up distant stations—even on the best overhead installation.

However, those broadcast listeners who live but from 200 to 300 miles from a powerful station will find this system of great help throughout the year. It not only reduces the static considerably during the summer months, but improves the quality of reproduction, due to the lack of much of the parasitic noises picked up by the overhead antenna installation.

#### Coil Used

The coil buried by the author is clearly described in Figure 12. Two pieces of wood, each 24 inches in length, were fastened together to form a cross. The number 14 rubber covered wire was fastened to the cross arms by insulated staples. The wires were run as close

together as possible, the ninety feet of wire making a coil with a five inch depth of winding as shown. There are sixteen complete turns.

The coil was buried under the house—two feet deep. It was placed directly under the refrigerator so that the water dripping through the floor would keep the soil surrounding the coil moist at all times.

The receiver used is connected to the coil through a .00025 condenser. The ground connection going directly to the water works.

(THE END)

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Improved Model

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Complete Tuner, Walnut cabinet..... 15.00

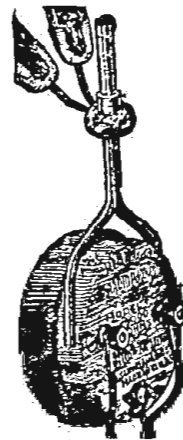
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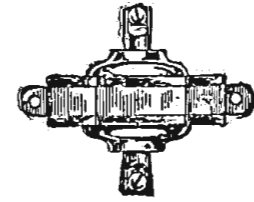
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Size 7x18 inches.....\$ 2.00  
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# Neutralized Radio Frequency Circuit

## Eliminating Capacity Coupling Effect in Set

Radio frequency amplification with regeneration is usually difficult to attain, but this combination is one of the best known methods of eliminating interference from re-radiation.

### WORKSHOP KINKS EARN A DOLLAR—

THERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. Send them in with full details, including stamped envelope, so rejected copy may be returned. The work must be entirely original, not copied.

RADIO KINKS DEPARTMENT,  
Radio Digest,  
510 North Dearborn St., Chicago

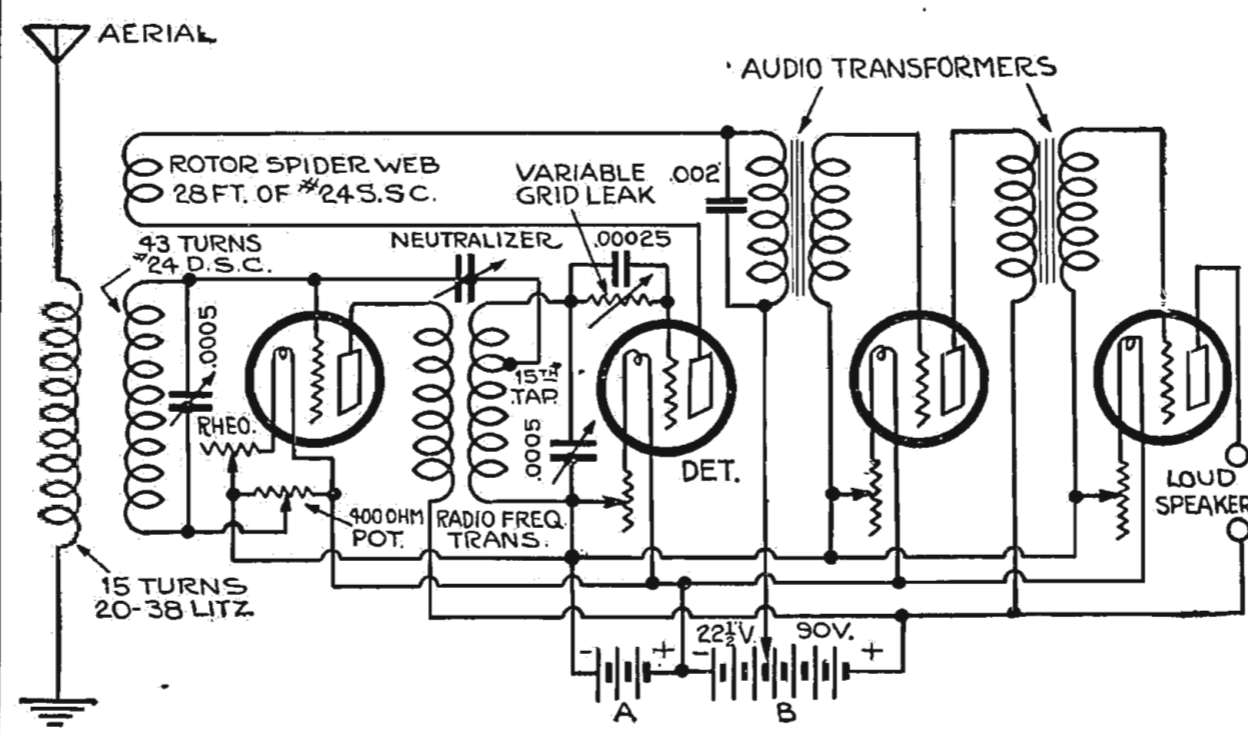
Such a circuit, that is easily constructed and operated, is described herewith.

The tuning coil used in the circuit has an untuned primary, and in using a coil of this type in my experiments it was exceedingly difficult to find the proper type that would give an even control of regeneration.

I tried different types of coils, using the untuned primary principle, and finally devised a coil using a primary of Litz wire and a secondary of number 24 dsc. magnet wire, while the rotor was made in spider-web fashion and wound with the same size wire as the secondary.

Using this new coil with the spider-web rotor mounted to give a 180 degree turn, I found that the regeneration was very easy to control and the circuit easy to handle. Any one so desiring can easily make this coil.

## SPECIAL COIL USED IN HOOK-UP



out" principle. Tune in a strong signal, turn the filament off without removing the tube from the socket, and then adjust the neutralizing condenser until the signal entirely disappears.

This proves conclusively that this method eliminates regeneration instead of counteracting it, as it would be impossible to have regeneration with a cold filament.

This circuit prevents the receiver acting as a miniature transmitter, and does not cause interference with nearby receiving sets.

The variable condenser shunted across the secondary of the Radio frequency transformer should be .0005 mfd. capacity, and be of very good quality, with low losses.

The specifications of the Radio frequency transformer are as follows: The primary consists of fourteen turns of number 24 dsc. magnet wire wound on a

piece of 2 7/8-inch tubing 3 inches long. The secondary has 58 turns of the same wire wound on a 3 1/4-inch tube, 3 inches long, and a tap is taken off at the fifteenth turn.

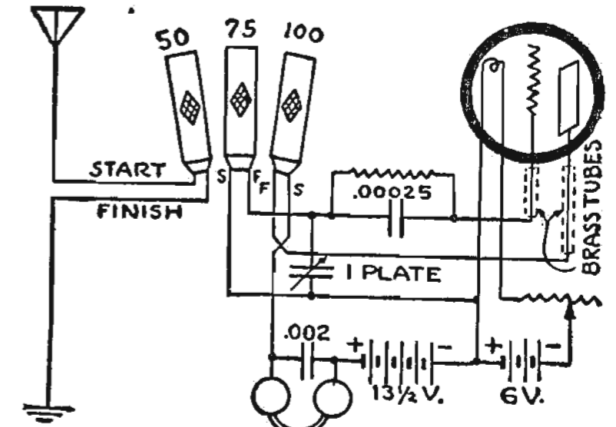
The primary is then placed inside the secondary so that both windings are parallel and in the same direction. This coupling is fixed.

The transformer should then be placed on the rear of the .0005 mfd. variable condenser at a 45-degree angle to eliminate any inductive effects.

The potentiometer used on the Radio

## Stable Circuit Having Flewelling Qualities

This is not a freak circuit and it has the qualities of the Flewelling set. I have been using this set for some time and after tearing it down and rebuilding it I find that none of the receiving qualities



are lost. I have used a UV-200 tube but a 201 with 34 volts on the plate is much easier handled.—J. D. Carruthers, Gainsborough, Sask.

frequency tube should be of the non-inductive type.

—William H. Kleinberger, Philadelphia, Pa.

- Material Necessary**
- 2 Variable condensers, .0005 mfd. capacity, good grade.
  - 1 Neutralizing condenser.
  - 1 400-ohm potentiometer.
  - 1 Variable grid leak.
  - 1 Mica condenser, .002 mfd.
  - 1 Mica grid condenser, .0025 mfd.
  - 2 Audio transformers, ratio about 5 to 1.
  - 1 Panel 7x24 inches.
  - 2 Double-circuit jacks and 1 single-circuit jack.
  - 3 Rheostats, 20 ohms.
  - 1 Rheostat, 6 ohms.
  - 4 Tube sockets, standard base.
  - 2 45-volt B batteries.
  - 1 UV-200 tube.
  - 3 UV-201A tubes.
  - 1 6-volt storage battery.
  - 1 Piece bakelite or formica tubing 2 7/8 inches in diameter by 3 inches long.
  - 1 Piece bakelite or formica tubing 3 1/4 inches in diameter, 3 inches long.
  - 1 Piece bakelite or formica tubing 3 3/8 inches in diameter, 2 3/4 inches long.
  - 1 Hardwood disc 1 3/4 inches in diameter, 3/8-inch thick.
- Hardware for 180-degree rotor, degree angle, as shown in the illustration.

The neutralizing condenser must be adjusted for the particular type amplifying tubes used, and then remains constant. The method employed is the "balancing-

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COMO duplex audio transformers (per pair)..... 9.29

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Consists of 1-type "A" Ultraformer, 3-type "B" Ultraformers, 1 tuning coil, and 1 os-20.58  
cillator coil (coils silk on BAKELITE).....  
Set of 4-Ultraformers separate.....\$16.76

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RATHBUN condensers, 11-Pit..... 2.39  
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Plain, 11-Pit., \$3.78 23-Pit., \$4.19 43-Pit., \$5.04  
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Nickel plated locknut and polished knob

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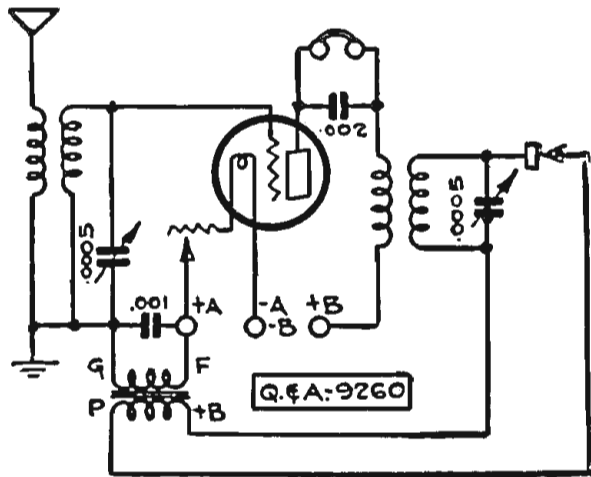
Improves Your Radio Set  
Drill only one hole in your radio panel to install the Bradleyswitch. Nickel-plated knurled nut holds it securely in place. Totally enclosed and dustproof.

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Manufacturers of the Universal Bradleystat

# Questions and Answers

### Reflex Circuit

(9260) DJW, Atlanta, Ill.  
 Please show a diagram with one stage of audio frequency amplification of the hook-up given in the May 10th issue of Radio Digest, page 29. Give the capacity of the fixed condenser across the phones.  
 A.—The circuit was submitted by a correspondent and published on his authority for its effectiveness. The circuit is a single tube nonregenerative which presents limitations in volume.  
 We are improving this circuit as shown



in the diagram. As it is the reflex action is not carried to involve audio frequency as well as Radio frequency amplification and it will therefore be found advantageous to complete amplification by the addition of a standard low frequency transformer in the reflex method. This will provide amplification comparable with your contemplated stage of straight audio frequency without involving an additional tube.

If preferred, however, a stage of audio frequency can be added as shown on page 15 of the September 1 issue of Radio Digest.

Fixed condenser across the phones should be .002 microfarad.

### Buzz Interference

(07131) MR. Sanford, Fla.  
 As a reader of your admirable paper I would like to have your advice on a matter which is very important to the Radio fans in and near Sanford. For some time the fans close to here have been bothered with a loud deep toned buzz. I have heard this buzz in the daytime and it seems to be up on the wavelengths around four hundred and fifty meters.

From my explanation can you tell what this might be, and what would be the right steps to take in having this nuisance stopped?

This buzz is not continuous. Some nights it will come on and stay on steady for hours, while on others it is off and on.

A.—We regret that we are unable without a knowledge of conditions in your environment to offer any very helpful

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suggestion as to the source of interference to which you are subjected in operation of your receiver. It could be due to varying factors, such as high tension lines in vicinity or operation of an electrical appliance nearby. It will be necessary to trace the disturbance to its source in order to determine if remedial measures are possible. Such conditions are often

impossible to overcome since co-operation outside of your personal efforts is necessary.

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Has capacity of 150-foot Outdoor Aerial. Cuts down Static—Gives sharpest tuning. Practical and ornamental—for any home. Shipped all ready to be installed.

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Hilco Oscillating Coupler..... 7.00

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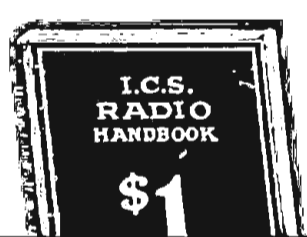
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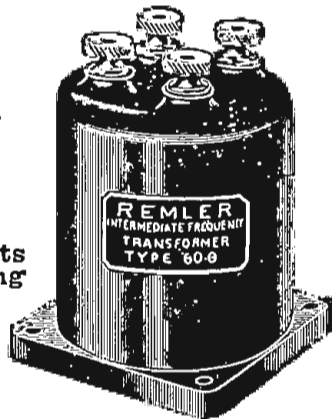
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It has brought in 2LO England, and California stations two thousand miles from Elgin, clearly and without interference on a loud speaker with only one tube, and that while our powerful local station was broadcasting three miles away.

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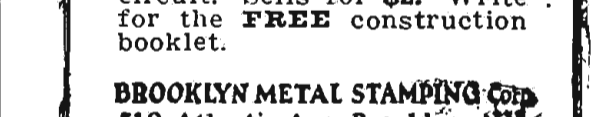
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# Radiophone Broadcasting Stations

## Corrected Every Week—Part II

### FIND MISTAKES AND YOU'LL GET DOLLAR

ONE DOLLAR will be paid to the Radiophon reader of Radio Digest submitting the most errors in any one station's listing in the Directory of Radiophone Stations, which appears in four parts, serially continuously, on page 19. Letters must reach Radio Digest's office not later than one week from date of issue corrected. Readers are not limited to correcting one station, but such corrections must be verified by the stations themselves, and NOT by comparison to other so-called accurate broadcasting directories or lists. Turn in corrections for as many stations as you can find—if you can find errors! Use separate sheet of paper for each station submitted and place name and address on each sheet. In case of tie, duplicate awards will be made.

(Note—The second part of the schedule list appears below. The first appeared two weeks ago.)

**KFNL**, Paso Robles, Calif. 240 meters. 10 watts. Radio Broadcast Assn. Slogan, "The Home of the Sun." Mon, 8-10 pm, music. Pacific.

**KFMV**, Santa Rosa, Calif. 234 meters. 5 watts. L. A. Drake.

**KFNX**, Peabody, Kan. 240 meters. 10 watts. Peabody Radio Service. Daily 7-7:30 pm, baseball, weather. Thurs, 9-10 pm, Central.

**KFNY**, Helena, Mont. 261 meters. 5 watts. Montana Phonograph Co. Slogan, "Helena, Heart of the Rockies." Daily, 7:15-7:45 pm, concert and bedtime story. Sat, 9:15-10 pm, dance music. Mountain.

**KFNZ**, Burlingame, Calif. 231 meters. 10 watts. Royal Radio Co. Daily ex Sun, 4-5:30 pm, concert; 7-7:30 pm, news, weather. Wed, 8-10 pm, classical music. Sat, 8-12 pm, dance music. Pacific.

**KFOA**, Seattle, Wash. 455 meters. 500 watts. Rhodes Dept. Store. Mon, Wed, Fri, 8:30 pm, concert. Pacific.

**KFOC**, Whittier, Calif. 236 meters. 100 watts. First Christian Church.

**KFOD**, Wallace, Idaho. 224 meters. 10 watts. The Radio Shop. Slogan, "The Valley of Mines." Irregular schedule.

**KFOF**, Marshfield, Ore. 240 meters. 10 watts. Rohrer Elec. Co.

**KFOH**, Portland, Ore. 283 meters. 15 watts. Radio Angelus. Daily ex Sun, 2:30-3:30 pm, music, features. Mon, 9-10 pm, fishermen's reports and concert. Fri, 9-10 pm, concert. Sun, 2:30-4:30 pm, concert; 4:30-5:30 pm, church services. Pacific.

**KFOJ**, Moberly, Mo. 246 meters. 5 watts. Moberly High School Radio Club.

**KFOL**, Marengo, Iowa. 234 meters. 10 watts. Leslie M. Schabus.

**KFON**, Long Beach, Calif. 234 meters. 100 watts. Echophone Radio Shop. Slogan, "Where Your Ship Comes In." Club, "Black Cats." Daily ex Sun, 12:30 pm, 1:30-2:30 pm, 5:45-6:40, 8-9, Pacific.

**KFOG**, Salt Lake City, Utah. 261 meters. 10 watts. Latter Day Saints University.

**KFOP**, Dallas, Texas. 268 meters. 100 watts. Wilson Construction Co. Club, "Southwest Radio Club." Daily ex Sun, 11-11:30 am, news, reports; 4-5 pm, music. Daily ex Sun, Wed, 9:30-10:30 pm, entertainment. Sun, 2 pm, church program. Central.

**KFOQ**, Galveston, Texas. 240 meters. 50 watts. Ora William Chancellor. Wed, 8 pm, specials. Fri, 8-9:15 pm, Central.

**KFOR**, David City, Neb. 226 meters. 10 watts. David City Tire & Elec. Co. Slogan, "The Voice of David City."

**KFOT**, Wichita, Kansas. 231 meters. 50 watts. College Hill Methodist Church-College Hill Radio Club. Mon, 8:30-9:30 pm. Sun, 11-12:30 pm; 7:30-9, church services. Central.

**KFOU**, Richmond, Calif. 254 meters. 100 watts. Hommel Mfg. Co.

**KFOV**, Sioux City, Iowa. 234 meters. 10 watts. Davis Elec. Corp.

**KFOX**, Omaha, Neb. 248 meters. 100 watts. Board of Education, Technical High. Fri, 7:30-9 pm, music. Central.

**KFOY**, St. Paul, Minn. 226 meters. 50 watts. Beacon Radio Service. Slogan, "St. Paul—The Beacon of Progress." Tues, 10-12 midnight frolic. Central.

**KFOZ**, Fort Smith, Ark. 233 meters. 20 watts. Leon Hudson Real Estate Co. Mon, Fri, Sun, evening program. Central.

**KFPB**, Seattle, Wash. 224 meters. 15 watts. Edwin J. Brown.

**KFPD**, Los Angeles, Calif. 238 meters. 100 watts. Garretson and Dennis.

**KFPH**, Salt Lake City, Utah. 242 meters. 50 watts. Harold Charles Mallaender.

**KFPL**, Dublin, Tex. 242 meters. 20 watts. C. C. Baxter. Mon, Thurs, 8-8:45 pm. Sun, 3:30 pm. Central.

**KFPM**, Greenville, Tex. 242 meters. 10 watts. The New Furniture Co. Slogan, "The New Furniture Co., the Home of Good Furniture," located at Greenville, Texas where you find "The Blackest Land, the Whitest People." Daily ex Sun, 2 pm, music. Daily 7 pm, baseball. Tues, Wed, Thurs, Fri, 7:45 pm. Sun, 11 am, services. Central.

**KFPN**, Jefferson City, Mo. 212 meters. 100 watts. Slogan, "Voice of the National Guard." Tues, 10-11:30 pm, news, music. Sat, 10-11 pm, talks, music. Central.

**KFPO**, Denver, Colo. 231 meters. 500 watts. Colo. National Guard.

**KFPY**, Olympia, Wash. 236 meters. 20 watts. G. & G. Radio and Elec. Shop. Daily 6:30-7:30 pm. Wed, 11 pm, Pacific.

**KFPZ**, Denison, Tex. 231 meters. 20 watts. Clifford W. Esler. Daily ex Sun, 12-12:30 pm, music, markets, Wed, 9-9:30 pm, music. Sat, 9:30-10 pm, Central.

**KFRR**, Los Angeles, Calif. 231 meters. 500 watts. Los Angeles Co. Forestry Dept.

**KFPS**, Casper, Wyo. 242 meters. 10 watts. Carter A. Ross Motor Service Co. Wed, 9-10 pm. Mountain.

**KFPT**, Salt Lake City, Utah. 268 meters. 500 watts. Cone & Johnson Co.

**KFPV**, San Francisco, Calif. 236 meters. 50 watts. Helms & Kohnoos, Inc. Slogan, "Ain't We Got Fun?" Sun, 7-8:30 pm. Pacific.

**KFPW**, Cartersville, Mo. 268 meters. 20 watts. St. John M. E. Church, S. Slogan, "Keeping Pace with Christ Means Progress." Wed, 8-10 pm, popular program. Sun, 11 am, church service. Central.

**KFPX**, Pine Bluff, Ark. 242 meters. 100 watts. First Presbyterian Church. Sun, 11 am, 12 m, 7:45 pm, 8:45 pm, church services. Central.

**KFPY**, Spokane, Wash. 283 meters. 100 watts. Symons Investment Co.

**KFQA**, St. Louis, Mo. 261 meters. 50 watts. The Principia.

**KFQB**, Fort Worth, Tex. 254 meters. 100 watts. The Search Light Pub. Co.

**KFQC**, Taft, Calif. 227 meters. 100 watts. Kidd Bros. Radio Shop.

**KFQD**, Anchorage, Alaska. 290 meters. 100 watts. Chovin Supply Co.

**KFQE**, Colorado Springs, Colo. 224 meters. 5 watts. Dickinson-Henry Radio Laboratories.

**KFQF**, Minneapolis, Minn. 224 meters. 10 watts. Donald A. Boulton. Slogan, "In the Land of Ten Thousand Lakes."

**KFQG**, Los Angeles, Calif. 226 meters. 100 watts. Southern Calif. Radio Assn.

**KFQH**, Hillsborough, Calif. 231 meters. 50 watts. Albert Sherman.

**KFQI**, Culver City, Calif. 234 meters. 100 watts. Thomas H. Ince Corp.

**KFQJ**, Oklahoma City, Okla. 236 meters. 150 watts. Harbour Longuire Co. Daily ex Sun, 2-4 pm, concert, news; 9:30-12, dance music. Central.

**KFQK**, Fayette, Mo. 236 meters. 10 watts. Democrat Leader.

**KFQL**, Muskogee, Okla. 252 meters. 20 watts. Oklahoma Free State Fair Assn.

**KFQM**, Austin, Tex. 268 meters. 100 watts. Texas Highway Bulletin.

**KFQN**, Portland, Ore. 283 meters. 5 watts. Third Baptist church.

**KFQO**, Russell, Kansas. 261 meters. 10 watts. Meier Radio Shop.

**KFQP**, Iowa City, Iowa. 224 meters. 10 watts. George S. Carson, Jr.

**KFQS**, Los Angeles, Calif. 278 meters. 500 watts. Angelus Temple. Daily ex Sun, 6:30-7:30 pm. Daily ex Wed, Sat, 8-10 pm. Tues, Thurs, Fri, Sat, 3:30-5:30 pm. Sun, Wed, 2:30-4:30 pm. Sun, 10:30-12:30 pm, 7-7:30, Pacific.

**KFQT**, Tacoma, Wash. 252 meters. 50 watts. Tacoma Daily Ledger. "This is KGB in Tacoma, Washington, the Lumber Capital of America and the Gateway to Mount Tacoma." Mon, Wed, Fri, 7-9 pm, Pacific.

**KFQU**, Portland, Ore. 360 meters. 50 watts. Hallock & Watson Radio Service. Slogan, "The Rose City." Daily ex Sun, 5:30-6 pm, music, entertainment. 7:30-8 pm, reports. Sat, 8-8:30 pm, answers to Radio questions. Sun, Wed, 9-10 pm, music. Pacific.

**KFQV**, Oakland, Calif. 312 meters. 1,000 watts. Gen. Elec. Co. Daily ex Sun, 1:30 pm, Sat, 12:30, markets, weather; Mon, Wed, Fri, 3 pm, music. Mon, 4-5:30 pm, orchestra. Daily ex Sun, Mon, 4-5:35 pm, orchestra. Daily ex Sat, Sun, 6:45 pm, reports, news. Mon, Tues, Thurs, Sat, 8 pm, lectures, music. Tues, Sat, 10-11 am, dance music. Sun, 3:30-5 pm, concert. Pacific.

**KFQW**, Honolulu, Hawaii. 360 meters. 500 watts. Marion A. Mulroney, The Honolulu Advertiser. Daily, 7:30-9 pm. Tues, Thurs, Sat, special program. 10th meridian. 2 1/2 hours later than Pacific.

**KFQX**, Portland, Ore. 492 meters. 500 watts. Portland Morning Oregonian. Slogan, "KGW, Keep Growing Wiser." Daily ex Sun, 11:30 am, weather; 3:30-4 pm, woman's program. Daily ex Sat, Sun, 7:30 pm, markets, weather. Mon, Wed, Thurs 8-10 pm, music, entertainment. Wed, Thurs, Sat, 10 pm, dance music. Fri, 10:30 pm, Hoot Owls. Sun, 6 pm, church services; 7, concert. Pacific.

**KFQY**, Lacey, Wash. 258 meters. 10 watts. St. Martin's College. Slogan, "Out Where the Cedars Meet the Sea." Tues, Fri, Sun, 8:30-9:30 pm, news, concert, lecture. Pacific.

**KFQZ**, Los Angeles, Calif. 395 meters. 500 watts. Los Angeles Times. Daily ex Sun, 12:30, 1:30, 2:30, 3:30, 6-6:30, 6:35, 7:30, 8, 10, 11, 11:30, Pacific.

**KFQA**, Seattle, Wash. 360 meters. 100 watts. Louis Wasmer.

**KFIB**, Siltipoc, Minn. 421 meters. 500 watts. Steele Co. Program irregular.

**KFIC**, Stockton, Calif. 273 meters. 5 watts. Gould, The Light Man. Daily ex Sun, 5-6 pm, concert. Wed, Sat, 9-11 pm, dance music. Mon, 9-10 pm. Sun, 10-11 am, church. Pacific.

**KFID**, Seattle, Wash. 283 meters. 50 watts. Northwest Radio Service Co. Daily ex Sun, 5:30-6:15 pm, reports. Mon, 7:30-8:30 pm, music. Wed, Thurs, 7:30-8:30 pm, concert, lectures, bedtime stories. Pacific.

**KFIE**, Los Angeles, Calif. 360 meters. 750 watts. Bible Inst. of Los Angeles. Slogan, "King Jesus Saves." Tues, Thurs, 8-9 pm, sacred, music, lectures, etc. Sun, 10:45-12:30 pm, 6-6:45, 8-9:30, church services. Pacific.

**KFIF**, Oakland, Calif. 360 meters. 250 watts. Warner Bros. Radio Supplies. Daily 11:30-1 pm, Fri, 8-9 pm. Sun, 12-1 pm. Pacific.

**KFII**, Oakland, Calif. 509 meters. 500 watts. Oakland Tribune. Slogan, "Where Rail and Water meet." Daily ex Sun, 3-5 pm, baseball scores; 7 news, 7:30, weather. Mon, Wed, Fri, 8-10 pm, talks, entertainment. Pacific.

**KFIM**, Denver, Colo. 283 meters. 500 watts. Reynolds Radio Co. Daily ex Sun, 8:30 am, 10:15, 12:15. Daily ex Sun, Wed, 7:30-8 pm, news, markets. Thurs, 8:15-9:30 pm. Mon, Sun, 9-10:30 pm. Mountain.

**KFIN**, Fresno, Calif. 248 meters. 50 watts. San Joaquin Lt. & Pr. Corp. Slogan, "Voice of the San Joaquin." Irregular schedule.

**KFIO**, Tacoma, Wash. 360 meters. 10 watts. Association Station. (Love Electric Co.) Mon, Wed, Fri, 6-7 pm, popular program; 9-10, artist's program. Pacific.

**KFIP**, Kukak Bay, Alaska. 263 meters. 100 watts. Walter Hemrich.

**KFIQ**, Los Angeles, Calif. 360 meters. 100 watts. Elec. Lighting & Supply Co. Mon, 2:30 pm, Wed, Fri, 3:15 pm, concert. Pacific.

**KFIR**, State College, N. M. 360 meters. 500 watts. N. M. College of Agri. & Mech. Arts. Slogan, "The Sun-Shining State of America." Daily 11:55-12 m, 9:55-10 pm, time reports. Mon, Wed, Fri, 7:30-8:30 pm, concert. Mountain.

**KFIS**, Detroit, Mich. 286 meters. 500 watts. Detroit Police Dept. Slogan, "Safety First." Daily ex Sun, 1 pm, 6:30, reports, police information, emergency. Special concerts, safety talks. Eastern.

**KFIT**, San Francisco, Calif. 423 meters. 500 watts. Hale Bros., Inc. Slogan, "The City by the Golden Gate." Daily ex Sun, 12 m, reading. Daily ex Sat, Sun, 1-2 pm, 4:30-5:30 pm, music. Daily ex Sun, 2:30-3:30 pm, studio program. Fri, 12:45-1:30 pm, talks. Sat, 1, 1:30 pm, 3-5 pm, music. Mon, Tues, Wed, Thurs, 5:30 pm, children's hour; 7-7:30, dinner music; 8-11, concert, lectures. Sat, 8-12 midnight, music. Sun, 11-12:15 pm, church services, 8:30-10, music. Pacific.

**KFIV**, Hood River, Ore. 360 meters. 10 watts. Apple City Radio Club. Slogan, "The Home of the Hood River Apple." Fri, 6:30 pm, music. Wed, 9 pm, special. Pacific.

**KFIV**, Hillsburgh, Pa. 270 meters. 500 watts. Double-day-Hill Elec. Co. Daily ex Sun, 11-11:30 am, 1-1:30 pm. Mon, Tues, Thurs, Fri, 3:45-4:15 pm, 9:30, music, twilight tales. Mon, Wed, Fri, 9-10 concert. Eastern daylight saving.

**KFIV**, San Jose, Calif. 360 meters. 50 watts. Chas. D. Herrold. Daily ex Sun, 1-1:30 pm. Wed, 8-9 pm, concert. Pacific.

**KFIV**, Berkeley, Calif. 275 meters. 50 watts. Daily Gazette. Mon, Wed, 8-10 pm, concert. Pacific.

**KFIV**, St. Louis, Mo. 546 meters. 500 watts. St. Louis Post Dispatch. Daily ex Sun, 8:40 am, 9:10, 10:40, 11:40, 12:40 pm, 1:40, 2:40, 4, Mon, 8:30 pm; Tues, Fri, Sat, 8 pm; Wed, 8:30 pm, 9, 11. Thurs and Sun, silent nights. Central.

**KFIV**, Seattle, Wash. 360 meters. 750 watts. First Presbyterian Church. Sun, 11-12:30 pm, 3-4:30, 7-9:30, church service. Pacific.

**KFIV**, San Francisco, Calif. 360 meters. 150 watts. San Francisco Examiner. Slogan, "The Voice of the West." Daily ex Sat, Sun, 9:05-9:20 am, weather, news; 11-11:30, markets; 2:30-2:45 pm, sports; 3, financial bulletin; 6-6:30, sports; 6:40, weather. Fri, 5:30-5:45 pm, health. Sat, 9:05-9:20 am, news; 2:30-2:45 sports; 6-6:20, sports, news; 6:40, weather. Sun, 9:05 am, 6:40 pm, weather. Pacific.

**KFIV**, El Monte, Calif. 256 meters. 50 watts. Coast Radio Co. Wed, 4-4:30 pm. Sat, 3-4 pm. Pacific.

**KFIV**, Stockton, Calif. 360 meters. 50 watts. Portable Wireless Telephone Co. Daily ex Sun, 4-5 pm, news, concert, markets. Tues and Fri, 8-9 pm, concert. Sun, 2-3 pm, concert. Pacific.

**KFIV**, Honolulu, H. T. 270 meters. 100 watts. Elec. Shop, Lures & Joaquin Co., Ltd.

**KFIV**, Chicago, Ill. 534 meters. 1,000 watts. Westinghouse Elec. & Mfg. Co. Daily ex Sun, Sat aft, 9:30 am, 10, 10:30, 11, markets; 10:55, time; 11:05, weather; 11:30, news; 11:35, table talk; 12 m, 12:30 pm, 1, 1:20, 2:15, 2:30, markets; 3, 3:30, 4, news; 4:15, markets; 4:30, 5, news; 6:30, markets. Daily ex Sun, Mon, 6:50, bedtime story; 8, concert; 9, special. Tues, Thurs, 2:35-3 pm, musical frolic. Wed, Fri, 3:30, Sun, 11 am, 6:45-8:45, church services. World Crier every half hour. Central daylight saving.

**KFIV**, Oakland, Calif. 360 meters. 100 watts. Western Radio Institute (Hotel Oakland). Daily ex Sun, 6:45-7 pm, news. Pacific.

**KFIV**, Wenatchee, Wash. 360 meters. 50 watts. Wenatchee Battery & Motor Co.

**KFIV**, Radio, Va. 435 meters. United States Navy Dept.

Daily ex Sun, 9:45-10:40 am, 12:25-12:40 pm, 1:45-2:20, markets, weather; 2:45-3 (Tues only), Dept. Interior; 3:25-4, 5:05-5:20, markets, weather 10:05-10:20, weather, Wed, 7:25-7:40 pm, Civ. Ser. Daily ex Sat, Sun, 7:45-8 pm, dept. programs. Mon, 8:25-8:40 pm, Dept. of Interior. Eastern.

**OA**, Ottawa, Ont., Can. Dept. of Marine & Fisheries. Discontinued temporarily.

**PWX**, Havana, Cuba. 400 meters. 500 watts. International Tel. & Teleg. Corp. Wed, Sat, 8:30-11 pm, music. Eastern.

**WAAB**, New Orleans, La. 268 meters. 100 watts. V. Lamar Venable.

**WAAC**, New Orleans, La. 360 meters. 400 watts. Tulane Univ. Fri, 7:15-7:30 pm, reports; 8-9:30, educational and entertainment program.

**WAAD**, Cincinnati, O. 360 meters. 25 watts. Ohio Mechanics Inst. No regular schedule.

**WAAF**, Chicago, Ill. 286 meters. 200 watts. Chicago Daily Drivers Journal. Daily ex Sun, 8:40 pm, 10:30, 10:45, 12:30 pm. Daily ex Sun, Sat, 12:15, 3, 4:30, live stock and weather reports. Central.

**WAAM**, Newark, N. J. 263 meters. 250 watts. I. R. Nelson Co. Daily ex Sun 9:15-9:45 am. Daily ex Sat, 11-11:55 am; Daily ex Fri, Sun, 7:30-11 pm, music, entertainment, lectures. Eastern daylight saving.

**WAAN**, Columbia, Mo. 254 meters. 80 watts. Univ. of Mo.

**WAAP**, Omaha, Neb. 360 meters. 500 watts. Omaha Grain Exchange. Slogan, "Where Agriculture Accumulates Wealth." Daily ex Sun, 8:45 am, 9:45, 10:45, 11:45, 12:15-1 pm, 8, market reports. Mon, 7:30-9 pm; Thurs, 8-9 pm, concert. Central.

**WABA**, Lake Forest, Ill. 266 meters. 100 watts. Lake Forest University. Wed. eve, music, talks. Central, daylight saving.

**WABB**, Harrisburg, Pa. 266 meters. 100 watts. Harrisburg Sporting Goods Co. Tues, Fri, 8 pm, sports, music. Sun, 9 pm, church services. Eastern.

**WABD**, Dayton, O. 283 meters. 5 watts. Parker High School. Discontinued during summer.

**WABE**, Washington, D. C. 283 meters. 100 watts. Y. M. C. A. Temporarily discontinued.

**WABG**, Jacksonville, Fla. 275 meters. 100 watts. Arnold Edwards Piano Co. Slogan, "Will Always Be Growing." Daily ex Sun, 8-9 pm, Eastern.

**WABH**, Sandusky, O. 240 meters. 20 watts. Lake Shore Tire Co.

**WABI**, Bangor, Me. 240 meters. 100 watts. Bangor Ry. & Elec. Co. No regular schedule.

**WABL**, Storrs, Conn. 283 meters. 200 watts. Connecticut Agri. College. Mon, Wed, Fri, 7-9 pm. Eastern.

**WABM**, Saginaw, Mich. 254 meters. 100 watts. F. E. Doherty Automotive & Radio Equip Co. Daily ex Sun, 10:15 am, news, markets, weather, stocks; 6, news, stocks, sports, music. Eastern.

**WABN**, Cross, Wis. 244 meters. 450 watts. Ott Radio, Inc.

**WABO**, Rochester, N. Y. 283 meters. 100 watts. Lake Avenue Baptist Church.

**WABP**, Dover, O. 266 meters. 100 watts. Robert F. Welgig.

**WABQ**, Haverford, Pa. 261 meters. 50 watts. Haverford College Radio Club. Irregular evening programs.

**WABR**, Toledo, O. 270 meters. 50 watts. Scott High School. Daily ex Sat, Sun, 9:20 am, garden talk. Fri, 7:30-8:30 pm, dance music. Eastern.

**WABS**, Newark, N. J. 244 meters. 50 watts. Essex Am. Co.

**WABT**, Washington, Pa. 252 meters. 100 watts. Holiday-Hall Radio Engineers. Mon, Tues, Wed, Thurs, Fri, 12:15-1:15 pm, 6-7; Sat, 10-12 midnight, dance music. Sun, 5:30-7 pm, church service. Eastern.

**WABU**, Camden, N. J. 226 meters. 50 watts. Victor Talking Machine Co.

**WABV**, Nashville, Tenn. 263 meters. 60 watts. John H. DeWitt, Jr.

**WABW**, Wooster, O. 234 meters. 100 watts. The College of Wooster, Dept. of Physics.

**WABX**, Mt. Clemens, Mich. 270 meters. 150 watts. Henry B. Joy.

**WABY**, Philadelphia, Pa. 242 meters. 50 watts. John Magaldi, Jr. Slogan, "Quaker City Sleep Dodgers' Club." The American Broadcasting Club. Sun, 9 pm, music; 10:30, orchestra; 11:30, "Sleep Dodgers' Session." Eastern.

**WABZ**, New Orleans, La. 263 meters. 100 watts. The Coliseum Place Baptist church. Slogan, "The Station with a Message." Wed, 8:45-10 pm, talks, music; Sun, 7:30-8:45 pm, church service. Central.

**WAR**, Sisseton, Wis. 406 meters. 500 watts. Kopp Radio Co. Indefinite schedule.

**WBA**, Lafayette, Ind. 360 meters. 250 watts. Purdue University. Daily ex Sun, 9:50-11:35 am, stock, markets. Mon, Fri 7:15 pm, special programs. Central.

**WBAH**, Minneapolis, Minn. 417 meters. 1250 watts. The Dayton Co. Daily ex Sun, 12:30-1:30 pm, 7-7:30. Mon, Thurs, 9:15-10:15 pm. Central.

**WBAK**, Harrisburg, Pa. 400 meters. 500 watts. Pennsylvania State Police. Daily ex Sun, 10:30 am, 1:30 pm, 5:45, police reports, fire protection, markets; 12 midnight, police reports. Mon, Tues, Wed, 7:30 pm, special. Eastern.

**WBAN**, Paterson, N. J. 244 meters. 100 watts. Wireless Phone Corp. Slogan, "The Silk City of America." Daily ex Sun, 11:30 am, 12:30-5:30 pm. Sat men only. Sun, 10-12 am, 2-3 pm, 7:30-10:30. Eastern. daylight saving.

**WBAO**, Decatur, Ill. 360 meters. 50 watts. James Millikin Univ. University activities. No definite schedule.

**WBAP**, Fort Worth, Tex. 476 meters. 750 watts. Fort Worth Star-Telegram. Club, "Radio Truth League." Daily, 5-5:30 pm, 6:30-6:45, baseball scores. Daily ex Sun, 9 am, 10, 11, 12 m, 1 pm, 1:20, 2, 2:30, 3, 4, market reports, weather; 4-4:30, special; 6-6:15, "Port of Blessing Men."

**WBW**, Columbus, O. 223 meters. 500 watts. The Erie and Hoopins Co. Slogan, "We Broadcast a Variety." Daily ex Sun, 12-1 pm. Tues, Fri, 8-10 pm. Eastern.

**WBAX**, Wilkes-Barre, Pa. 360 meters. 70 watts. John H. Stenger, Jr. Wed, 8 pm-12 midnight. Eastern.

**WBAY**, New York, N. Y. 492 meters. 500 watts. A. T. & Co. Experimental purposes only.

**WBBA**, Newark, O. 240 meters. 100 watts. Newark Radio Lab. Daily ex Sun, 6:30-7:30 pm, news. Mon, Thurs, 7 pm, musicale. Sun, 2:30 pm, Radio Chapel service. Eastern.

**WBD**, Reading, Pa. 234 meters. 50 watts. Barbey Battery Service. Wed, 10-11:30 pm. Sat, 10-11:30 pm. Eastern.

**WBF**, Atlanta, Ga. 270 meters. 500 watts. Georgia School of Technology. Slogan, "The Southern Technical Institution with a National Reputation." Off the air for the summer.

**WBBG**, Mattapoisett, Mass. 248 meters. 500 watts. Irving Vermilya. Wed, 8-10 pm, music. Sun, 10:30-12:30 pm, church service; 2:30-5, music. Eastern.

**WBBH**, Port Huron, Mich. 246 meters. 50 watts. J. Irving Bell.

**WBBJ**, West Palm Beach, Fla. 258 meters. 50 watts. Neel Elec. Co. Slogan, "Where Summer Spends the Winter." Tues, Thurs, Fri, 8-10 pm. band. Sun, 11-12 m, 7:30-9 pm, church services. Eastern.

**WBBL**, Richmond, Va. 283 meters. 5 watts. Grace Covenant Presbyterian church. Tues, 8 pm. Sun, 11 am, 8 pm. Eastern.

**WBBM**, Lincoln, Ill. 226 meters. 200 watts. Frank Atlas Produce Co. Mon, 8 pm. Central.

**WBBN**, Wilmington, N. C. 275 meters. 10 watts. A. B. Blake. Mon, Wed, Sat, 8-8:15 pm, markets; 8:15-10, music and educational program; 10, weather. Eastern.

**WBBO**, Rogers, Mich. 250 meters. 1000 watts. Mich. Limestone & Chem. Co.

**WBBP**, Petoskey, Mich. 246 meters. 10 watts. Petoskey High School.

**WBBQ**, Pawtucket, R. I. 252 meters. 50 watts. Frank Crook.

**WBBR**, Staten Island, N. Y. City, N. Y. 273 meters. 500 watts. International Bible Students' Association. Mon, Wed, Sat, 8-9 pm, lectures, music. Sun, Thurs, 9:10-10:30 pm. Eastern, daylight saving.

**WBBT**, Philadelphia, Pa. 234 meters. 5 watts. Lloyd Brothers. Mon, Thurs, 8-9:30 pm, dance music. Tues, 7:30-9:30 pm, popular music. Wed, 8-9:30 pm, orchestra. Fri, 8-9:45 pm, dance music. Eastern, daylight saving.

**WBBU**, Monmouth, Ill. 224 meters. 50 watts. Jenks Alford Sales Co.

**WBBV**, Johnstown, Pa. 248 meters. 5 watts. Johnstown Radio Co.

**WBBW**, Norfolk, Va. 222 meters. 50 watts. Ruffner Junior High School. Wed, 4 pm, music. Fri, 10 pm, entertainment. Eastern.

**WBBY**, Charleston, S. C. 268 meters. 20 watts. Washington Light Infantry. Wed, 8-10:30 pm, talks, music. Sun, 6:30-9:30 pm, orchestra. Eastern.

**WBBZ**, Indianapolis, Ind. 227 meters. 50 watts. Noble B. Watson. Mon, 8-9:30 pm. Central.

**WBR**, Butler, Pa. 1599 meters. 250 watts. Pa. State Police. Daily ex Sun, 10 am, 10:30, 11, 1:30 pm, 2, 4:30, 5:45, 7, 11, 11:30, 12, Eastern.

**WBS**, Newark, N. J. 360 meters. 100 watts. D. W. May, Inc. Daily, 11-12 m, music; 1-2:15 pm, reports, music. Tues, Thurs, Fri, 7:30-9:30 pm, program. Sun, 12:30-3 pm. Eastern daylight saving.

**WBT**, Charlotte, N. C. 360 meters. 500 watts. Southern Radio Corp. Slogan, "Queen City of the South." Daily ex Sun, 11 am, weather; 6:30, music; 7:15, markets. Tues, Thurs, 9 pm, music. Sun, 11 am, 8 pm, church services. Eastern.

**WBZ**, Springfield, Mass. 327 meters. 1000 watts. Westinghouse Elec. & Mfg. Co. Daily ex Sun, 12:35 pm; 1:15, time, weather, markets; 6-7, music; 7-7:30, baseball scores, lecture; 7:30, bedtime story; 7:40-10:30 (ex Fri), music; 10:55, time. Wed, 11:30 pm-12:30 am, dance music. Fri, 10-12 mid, music. Sun, 10:45-12:30 pm, church services; 7-9:30, concert. Eastern daylight saving.

**WCAD**, Canton, N. Y. 280 meters. 250 watts. St. Lawrence Univ. Slogan, "The Voice of the North Country." Daily, 11 am, weather, reports, time. Wed, 8:30 pm, program. Eastern.

**WCAE**, Pittsburgh, Pa. 462 meters. 500 watts. Kaufman & Baer Co., Pittsburgh Press. Daily ex Sun, 12:30 pm, news; 3:30, news, music; 4:30, reports, entertainment; 6:30, music; 7:30, news; 8:30, music. Sun, 3 pm, sermon; 6:30, music. Eastern daylight saving.

**WCAG**, New Orleans, La. 268 meters. 100 watts. Clyde R. Randall. Mon, Thurs, 8-9 pm, professional concert. Central.

**WCAN**, Columbus, O. 286 meters. 200 watts. Enteklin Elec. Co. Slogan, "The Heart of Ohio." Daily ex Sun, 11:30-12:30 am, music, news. Tues, 8-10:30 pm, Sun, 10-12:30 pm, 7:30-9, church services; 4, vesper. Eastern.

**WCAP**, Univ. Place, Nebr. 360 meters. 500 watts. Nebr. Wesleyan Univ. Daily, 10:30 am, weather. Tues, 7 pm, Children's Hour. Thurs, 7:30 pm, 9:30, music, lectures. Central.

**WCAK**, Houston, Tex. 263 meters. 10 watts. Alfred P. Daniel. Slogan, "Where Eighteen Railroads Meet the Sea." Wed, 7:30-9 pm, novelty program. Sun, 3-4 pm, feature program. Central.

**WCAL**, Northfield, Minn. 360 meters. 500 watts. Dept. of Physics, St. Olaf College. Slogan, "The College on the Hill." Off the air for the summer.

**WCAM**, Villanova, Pa. 360 meters. 150 watts. Villanova College.

**WCAO**, Baltimore, Md. 360 meters. 50 watts. Sanders & Stayman Co. Daily ex Sun, 12-1 pm. Mon, Wed, 8-9 pm. Eastern.

**WCAP**, Washington, D. C. 469 meters. 500 watts. Chesapeake & Potomac Tel. Co. Mon, 8 pm, studio program. Wed, 7:45-9:45, program. Fri, 7:40-8 pm, Sun, 7:20-10 pm, jointly with WEAH. Eastern.

**WCAR**, San Antonio, Tex. 360 meters. 200 watts. Southern Radio Corp. of Texas. Club, "Royal Order of Prevaricators." Mon, Thurs, Sat, 8:30-9:30 pm, concert. Wed, Sat, 11 pm. Central.

**WCAS**, Minneapolis, Minn. 280 meters. 100 watts. Wm. H. Dunwoody Industrial Inst. Slogan, "From the Flour City of the World." Mon, 7-7:30 pm, technical program. Tues, 8:15-9:30 pm, or 9:30-10:45 on alternate weeks, music, lectures. Wed, 6:30-7 pm, radio problems. Thurs, 7-7:30 pm, code, radio problems. Central.

**WCAT**, Rapid City, S. D. 240 meters. 100 watts. S. D. State School of Mines. Daily ex Sun, 9:30 am, 12:30 pm, weather, reports. Thurs, 7:15 pm, concert. Mountain.

**WCAU**, Philadelphia, Pa. 286 meters. 250 watts. Durham & Co. Daily 5-5:45 pm, market. Sun, 10:55 am, service; 3 pm, technical talk; 3:15, talk on psychology; 4:10, Bible Readings; 6-8, concert. Eastern daylight saving.

**WCAV**, Little Rock, Ark. 360 meters. 20 watts. J. C. Dice Elec. Co. Wed, Fri, 8:30 pm, lecture, music. Sun, 9-10:30 pm, special musical concert. Central.

**WCAW**, Milwaukee, Wis. 266 meters. 250 watts. Milwaukee Civic Broadcasting Station.

**WCAZ**, Carthage, Ill. 246 meters. 50 watts. Carthage College. Wed, 9-10 pm, music. Athletics as scheduled. Central.

**WCBA**, Allentown, Pa. 280 meters. 10 watts. Chas. W. Heimbach. Wed, 8:15-11 pm, Sun, 9-11 pm. Eastern.

**WCBC**, Ann Arbor, Mich. 280 meters. 200 watts. U. of Mich.

**WCBD**, Zion Ill. 345 meters. 500 watts. Wilbur Glenn Voliva. Slogan, "Where God Rules, Man Prospers." Mon, Thurs, 8-10:15 pm, concert. Thurs, 2:30-3:45 pm, service. Sun, 9-10:15 am, Bible School; 2:30-6, church services. Central daylight saving.

**WCB**, New Orleans, La. 263 meters. 5 watts. Uhalé Radio Co. Slogan, "Second Port U. S. A." Mon, Thurs, 9-10 pm, concert. Sun, 1-2 pm, dinner concert. Central.

**WCBF**, Pittsburgh, Pa. 236 meters. 50 watts. Paul J. Miller. Slogan, "We Cheerfully Broadcast Freely." Sun, 1:30-2 pm, 9:30-10:30, music. Occasional Sat program. Eastern.

**WCBG**,

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