INTERNATIONAL TESTS FAIRLY GOOD

(Continued from page 1)

fragmentary programs were not worth the time required to tune them in.

The management sponsoring the tests, headed by Arthur H. Lynch, found Edinburgh, 2EH; Hamburg; Rome, 1RO; Leeds, 2LS; London, 2LO; Sheffield, 6FL; Paris (Petit Parisien); Berlin (Vox Haus); Aberdeen, 2BD; Bournemouth, 6BM; Lyons, France, PTT, and Madrid, Spain, also PTT, to be the most consistently reported European broadcasters.

The furthest west reception was made by a Radiophan living in San Rafael, California.

Regarding the tests, Mr Lynch said, "I am gratified at the great co-operation shown by broadcasters in North America, which I feel sure everyone interested in Radio appreciates. They have shown a wonderful spirit of sportsmanship, and we are swamped with reports."

Reception of Americans Abroad

Indicative of the less sensitive receivers used by European Radiophans is the report made by the London correspondent of Radio Digest:

"The British Broadcasting company successfully relayed KDKA from 2LO Tuesday, November 25. Other American reception however, was poor. Atmospherics were very bad. CYL, Mexico City, was also received on Tuesday here in London."

The London correspondent continued:

"South Africa received America well. Later in the week it was possible to hear KDKA, WBZ and WGY very clearly despite terrific storms. A number of other American stations have been heard, but not so distinctly. (Editor's Note.—KDKA, WBZ and WGY were working on increased power.)

Capt. P. P. Eckersley, chief of the British Broadcasting company, who recently severely criticized American broadcasting practice, has forecasted, as a result of the tests, that ordinary transatlantic conversation will be possible in thirty years."

Mexican Station Starts Trouble

CYL, Mexico City, was the innocent cause of much grief to officials conducting the test when it broadcast a piano solo between 10 and 11 p. m., Central time, one night of the tests. Hearing the announcements made in a foreign tongue, many American listeners decided that they had heard Europe.

They insisted they must know who it was that was broadcasting a piano solo on 480 meters at the time in question.

After much persuasion they turned back to their dials to bring in the most distant ones across the Atlantic ocean.

Broadcasters Tell Results of Tests

A special telegraphic canvass of American and Canadian broadcasting stations, made by Radio Digest, showed that many of these had not as yet heard from overseas. Many had not attempted the reach, while others were merely awaiting confirmations.

The interesting comments made by these Radiocasters shows very well how the international test proceeded in the vicinities represented by each individual station. Their comments follow:

CFCN, W. W. Grant, Ltd., Calgary, Alta.

"CFCN was not engaged in the recent transatlantic trials. No authentic reception reports have been received in this vicinity, though both stations were closed down to facilitate reception."—Wm. W. Grant, CFCN.

CKAC, La Presse, Montreal, P. Q.

"Among over a thousand reports received by the General Radio company and the Daily Express, London, 120 amateurs reported perfect, detailed reception and participated in drawing prizes offered by the Express. This occasion was during special transatlantic program by CKAC on the morning of November 19, radiating 34 amperes that morning.

"About 300 Montreal amateurs received various European stations during the week of November 24."—Jacques Cartier, CKAC.

CKY, Manitoba Telephone System, Winnipeg, Man.

"CKY featured talk on Manitoba in Esperanto Tuesday night of test week and also broadcast regular programs, but received no report from Europe.

"Numerous listeners in the outskirts of Winnipeg claim to have heard Glasgow, Sheffield and Newcastle, but regenerative squeals killed everything in the city."—D. R. P. Coats, CKY.

CNRO, Canadian Ntl. Rys., Ottawa, Ont.

"This station did not attempt the transatlantic test. Canadian National Railroad Radio station, Moncton, was heard in Scotland, November 12, however, on ordinary broadcast. CNRO, Ottawa, signed off in order to give American stations the air.

"Best reception made here was by superheterodyne by Dr. Geldert, receiving 2BD, Aberdeen, Scotland."—Station CNRO.

KDKA, Westinghouse Co., E. Pittsburgh.

"Though gratified, we are not surprised to learn that of all the American stations taking part in the international tests, KDKA and WBZ were the only stations reported as heard in Great Britain and on the continent.

"A few weeks ago we received a letter from a resident of Capetown, South Africa, quickly followed by a letter from still another South African, indicating that the first reception was not a freak, but that others living in this land 8,000 miles from Pittsburgh could receive KDKA. The consistent long distance range of KDKA and WBZ is the result of the steady pioneering and development work which the Westinghouse company has constantly carried on.

"The long distance reception of these two stations is another indication that before long international broadcasting will be a commonplace occurrence."—C. W. Horn, superintendent of Westinghouse broadcasting operations.

KFDM, Magnolia Petroleum Co., Beaumont, Texas

"We have not had transatlantic reception at this point. Neither have we been heard across, as far as we know. We expect reports later, however."—Station KFDM.

KFI, Earle C. Anthony, Inc., Los Angeles

"We have not received any communication regarding distance reception of our station during the test. American reception of foreign stations has been very successful."—Station KFI.

KFKB, Brinkley-Jones Hospital Assn., Milford, Kans.

"To date we have no information that would indicate that we got across in transatlantic tests; neither have we any authentic information that any foreign stations were heard in this locality."—Station KFKB.

KFKX, Westinghouse Co., Hastings, Nebr.

"We have received no report that KFKX is being heard in Europe. A. R. Thompson of Hastings claims he heard Sheffield, England, distinctly Monday, November 24. Others claim reception, but confirmation is lacking."—W. G. Hay, KFKX.

KFQX, Seattle, Wash.

"Transatlantic trials proved total failure here. No receivers had success on Northwest coast. Too much interference."—Vivien Potter, KFQX.

KGO, General Electric Co., Oakland, Calif.

"Radiograms received by Radio Corporation officials, San Francisco, indicates the complete success of KGO Japanese broadcast on November 22, between 1:00 and 3:00 a. m., Pacific time. From Tokio comes this Radiogram: 'Hiraiso Technical Laboratory reports KGO gave great satisfaction to Radio scientists and newspapermen assembled here last night. They listened to whole program through loud speaker strength, light static and interference.' This program was also heard at all other Pacific points.

"No positive check on transatlantic reception of KGO is available here. As far as we know, very few receivers on the Pacific coast picked up the European signals."—C. W. Rhodehamel, KGO.

KGW, Portland Oregonian, Portland, Ore.

"KGW made no special attempt to participate in international Radio week save in the observance of silent hours. We have received no reports of the reception of our station in foreign countries last week.

"We also have heard no confirmed reception from foreign broadcasting stations by listeners in this locality, although a few believe they heard."—R. V. Haller, KGW.

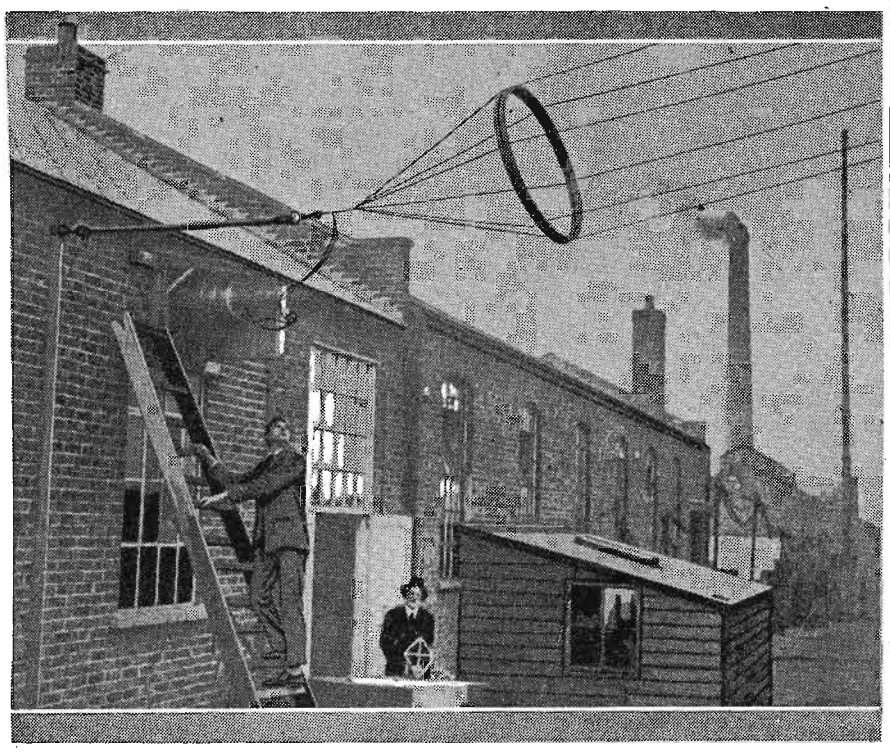
KLX, Oakland Tribune, Oakland, Calif.

"KLX spanned the Pacific ocean during international tests, but no word was received from Europe. Thomas Beebe, with a nine-tube super-heterodyne, received 2LO, and same was confirmed. On November 22 KLX was heard in New York on a loud speaker in the day time. This is the first time a coast station has crossed the continent in the daytime."—Seth Bailey, KLX.

WABN, Ott Radio Co., La Crosse, Wis.

"WABN transmitted only Monday, November 24. No reports have been received yet. Best reception was on Friday, November 28, when Mrs. Ott heard 2LO, London; 2ZY, Manchester, and SBR, Brussels. Reception was incoherent due to local regenerative sets. Local receivers report Paris, Berlin and Aberdeen."—Station WABN.

5XX, ENGLAND, IS SUPER POWER



5XX, Chelmsford, England, working on 1,600 meters with a power of 25 kilowatts, was one station enlisted in the recent international tests, November 24 to 30. Although it was, without question, able to outreach practically every British broadcaster, few American fans heard it due to their receiver's inability to reach the wave of 1,600 meters. Picture shows the lead-in at 5XX.

WAHG, A. H. Grebe Co., Richmond Hill, N. Y.

"In the recent transatlantic tests, WAHG, have verified the following reports: Irving A. McGrew, rector of Christ church, Denton, Maryland, reported hearing 2LO on a CR-9; Kenneth J. Waite, Jamaica, N. Y., reported hearing 5NG on a Syncrophase receiver; W. J. Schwartz, 30-Radde place, Brooklyn, reported hearing 2BD on a CR-12, with plenty of spark interference.

"Arthur S. Williams of the Radio shop at Lynchburg, Va., reported hearing 5NO at 11:45 playing a selection from Rigoletto, also a violin, piano and mandolin playing.

"F. B. Ostman, a Grebe engineer making special observations at Providence, R. I., heard European stations 100 feet away from the loud speaker.

WBAP, Star-Telegram, Fort Worth, Texas

"WBAP was left out of transmission tests, but the staff was very successful in hearing Scotland and Spain. Many fans in Fort Worth reported hearing foreigners, but no confirmations have been received by anyone.

"Your consideration much appreciated, as it contrasts with another magazine."—G. B. Locke, WBAP.

WCAL, St. Olaf College, Northfield, Minn.

"WCAL broadcast international test program each evening, but no foreign report has been received so far. 2LO, London, was the only foreign station heard here, and was received by George Zitz of WCAL staff on specially built two-tube regenerative receiver." — H. Skifter, WCAL.

WCCO, Washburn-Crosby Co., Minenapolis-St. Paul, Minn.

"We were heard in England, Ireland and Holland last week, according to cablegrams received. Reports of reception have come from Mrs. M. Sieger, 156 Kensington High street, London; Geo. Wallace, 79 Eglantine avenue, Belfast, Ireland, and Julius Roentgen, Conservatoire, Kaiser Grach, Amsterdam, Holland.

"All of the above had friends or relatives on WCCO's international program. Julius Roentgen heard his son Engelbert, who is first cellist in the Minneapolis Symphony orchestra, play on the Holland program November 26.

"A large number of reports have come in from the Northwest of overseas stations heard. The majority of these picked up 5NO, Newcastle; Vox Haus, Berlin and 1RO, Rome. Many other stations were heard, but the listeners failed to get the call letters or names of the stations.

"H. J. Loucke of Minneapolis had exceptional success in getting various stations every night of the week. Approximately 350 reports of overseas reception have been reported at this station."

WOAI, Southern Equipment Co., San Antonio, Texas

"Incompleted improvements being made to our station precluded the possibility of our making serious effort to get across. Hence, we did not try.

"Several local listeners claim to have heard snatches of European programs, but none satisfactorily."—Station WOAI.

WDAF, K. C. Star, Kansas City, Mo.

"WDAF had little difficulty in getting Aberdeen, Scotland, Friday night, November 28. We have received numerous reports of others being successful Five-tube neutrodynes and super-heterodynes were used most successfully."—Leo Fitzpatrick, WDAF.

WDAR, Lit Brothers, Philadelphia

"Up to this time we have received no word relative to our test last week. We have no information as to test reception here in Philadelphia."—Station WDAR.

WEAY, Iris Theater, Houston, Texas

"WEAY has no information yet about being heard in Europe. WE tried three times. Locally there is one unconfirmed report of reception of some Spanish station, PTT, it is believed. Mr. C. O. Gadbois of Houston received music and announcements from 2LO on super-heterodyne. Unconfirmed reports say several other local receivers got 2LO."—Station WEAY.

WFAA, News and Journal, Dallas, Texas

"It is unknown if we were heard across. D. V. Wilson, operator of WFAA, heard Rome, 1RO, Wednesday night, November 26, when twenty-seven miles south of Dallas, using Western Electric superheterodyne. Several claim hearing same, but are unverified. Local conditions were bad all of week."—L. B. Henson, WFAA.

WFI, Strawbridge and Clothier, Philadelphia

"WFI was picked up Saturday, November 29, by 2LO, London, who broadcasted confirmation at 11:30 Eastern standard time. 2LO announcement follows:

"'Is that you WFI? Picked you up at 8:15 American standard time.'

"2LO announcement was verified by Roland S. Young, Philadelphia, and Mrs. John Madden, Wawa, Pa."—E. E. Lewis, WFI.

WGAQ, Glenwood Radio Corp., Shereveport, La.

"W. E. Antony, first-class operator in charge of this station, heard PTT, Madrid, and 2BD, Aberdeen, November 27. He also heard 5NO, Newcastle, on November 29, as well as a French station, whose letters were incoherent.

"No record received, as yet, of our station being heard in Europe."—Station WGAQ.

WGR, Federal Tel. and Tel. Co., Buffalo, N. Y.

"We have no information on transatlantic test as yet."—M. A. Rigg, WGR.

WGY, General Electric Co., Schenectady, N. Y.

"Radio Corporation operator at Stavenger, Norway, reported reception of entire program of WGY Tuesday evening, November 25. Our station was also picked up in England, but so far as cable reports were concerned, did not get over as well as during the months of September and October.

"From October 22 to November 10, we received 293 fan letters from Great Britain.

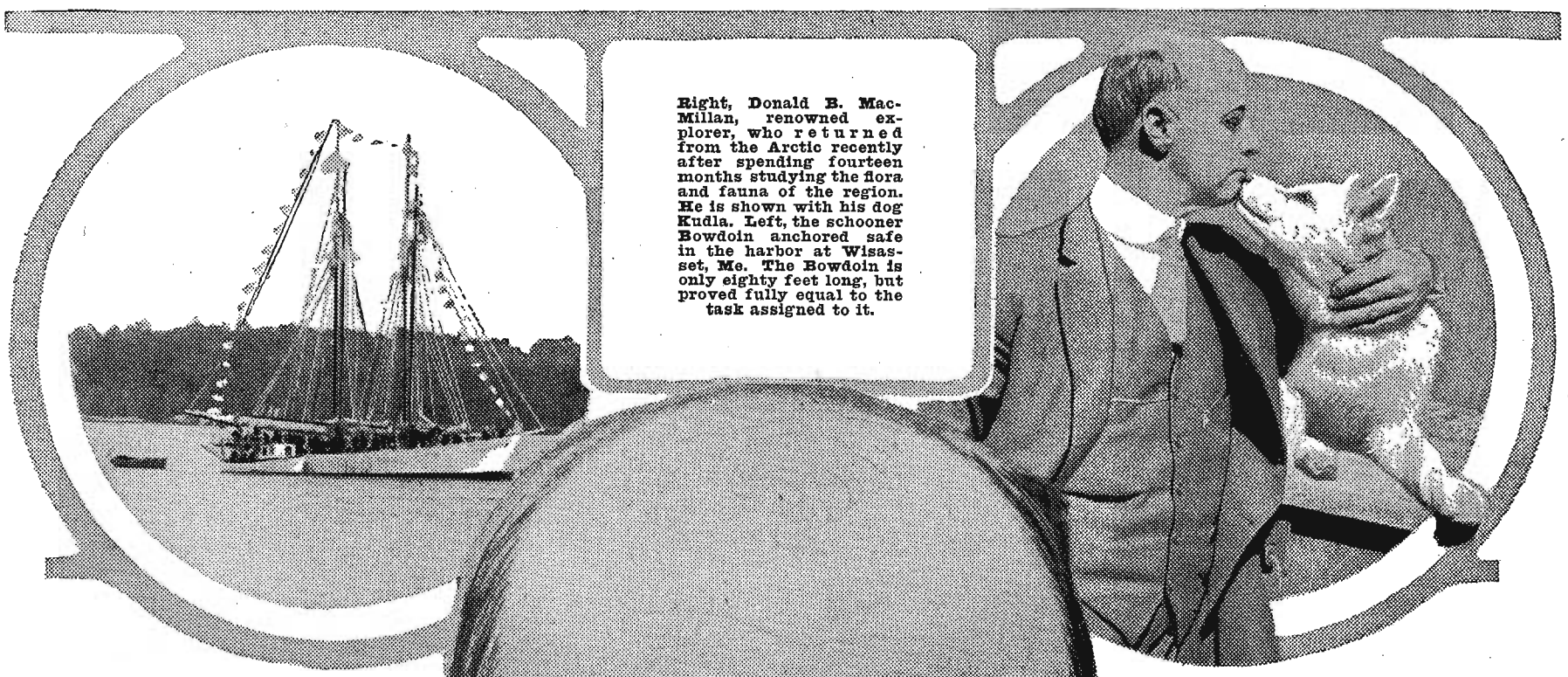
"Halsey Kline of General Engineering Laboratories, General Electric company, picked up Newcastle and Aberdeen Tuesday, Thursday and Friday nights, using low loss regenerative type receiver with two tubes and single wire antenna L type, 100 feet long and 30 feet high. P. H. Miller, our laboratory, got 2LO, London, and 5SC, Glasgow, on super-heterodyne with loop antenna."—W. T. Meeham, WGY.

WHAA, Univ. of Iowa, Iowa City, Iowa

"We have learned that we were heard abroad. Local reception unsatisfactory. Manchester, Aberdeen, Newcastle were heard. Not certain of any continental station, however. There was much inter-

(Continued on page 18)

In the Heart of the Arctic with WNP



Right, Donald B. MacMillan, renowned explorer, who returned from the Arctic recently after spending fourteen months studying the flora and fauna of the region. He is shown with his dog Kudla. Left, the schooner Bowdoin anchored safe in the harbor at Wisasset, Me. The Bowdoin is only eighty feet long, but proved fully equal to the task assigned to it.

MacMillan's Expedition Returns

By John Galbraith

FAR from the outposts of civilization, ten degrees from the North Pole, seven men were huddled together in narrow quarters on board the small auxiliary schooner Bowdoin, listening to music broadcast from Station WJAZ, located in Chicago.

Outside the doorway, Eskimo's were gathered around, greatly impressed and overawed. The entire northern territory and its Eskimo inhabitants had circulated the story of "the horn that speaks from far away!" They had difficulty, however, differentiating between Radio and phonographs.

This is the story that Donald B. MacMillan brought back with him recently, after a fifteen months' stay in the polar regions.

"While dancers in Chicago were undoubtedly enjoying ice cream," continued Dr. MacMillan, "we were enjoying frozen walrus liver, the delicacy of the far north."

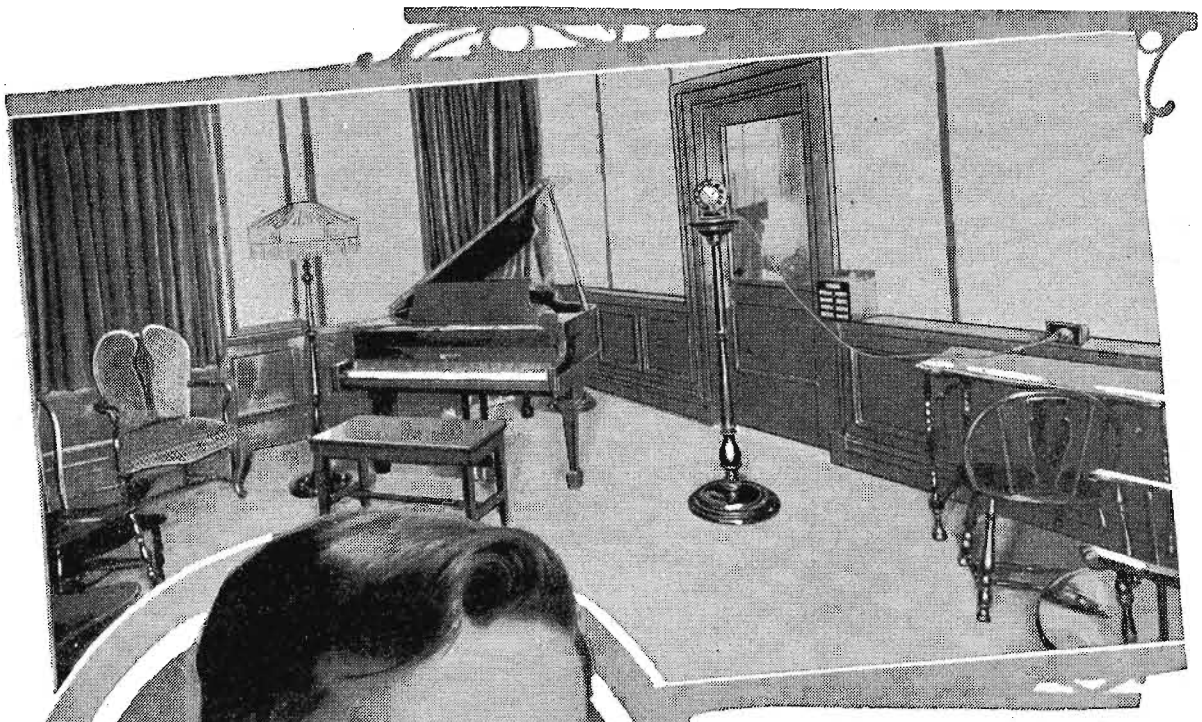
The purpose of the expedition was to study the flora and fauna of the northland and to gather data on magnetic phenomena. Regarding the latter, Dr. MacMillan, when interviewed, said:

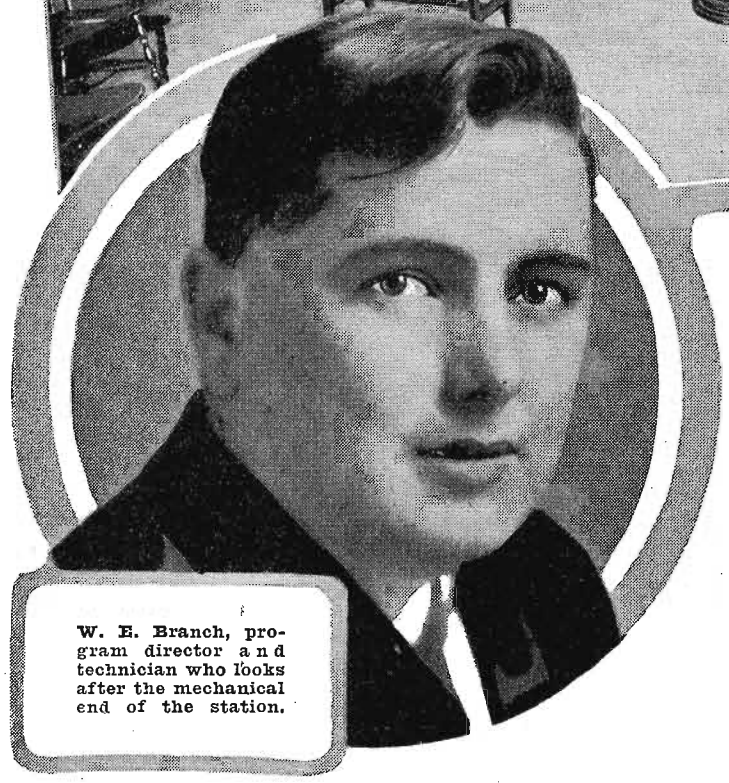
"An observatory was set up for terrestial magnetism in 78 degrees and 32 minutes north latitude. At this point, the compass pointed south in place of north!

"It was found that neither reception nor transmission was affected by the Aurora Borealis. Reception apparently was improved when passing across the line of the magnetic pole. Northeast winds carried electrical potentials that caused interference which could not be overcome. (*Continued on page 10*)

Captain Donald B. MacMillan and the crew of the exploration ship Bowdoin. Although having returned from the Arctic a short time ago, he is preparing to go back to the Arctic in the spring. The Bowdoin, designed especially for sailing in ice, will again be pressed into service by Captain MacMillan.

WBAP—Home of the Famous "Hired Hand"





W. E. Branch, program director and technician who looks after the mechanical end of the station.

Upper left, is a photo of the studio at WBAP, showing the room which is acoustically perfect. Above, the famous Hired Hand, who recently won fourth place in the Radio Digest contest.

TING-a-ling-a-ling," sounds the cowbell, and an audience that is bounded only by the poles, dials WBAP of the Fort Worth Star-Telegram. It's a long hark back, as events go, to the spring of 1922, when as a 20-watt set, WBAP made its advent to the world. Hanging on the wall of the Radio office is a map of the continents; as letters and telegrams came from enthusiastic listeners in, black-headed pins marked points of reception.

It was when the Star-Telegram told the world in banner headline that the lusty infant sponsored by them had been heard 500 miles that the decision was made to install the best set obtainable. The 500-watt transmitter was installed less than six months later.

The pins have marked off many a mile since those days. The most distant point remains at present 6,520 miles—Apia, Samoan Islands. However, like the dreamer returning from his trip to St. Peter—"for more chalk"—we noticed the Hired Hand going out the other day—"for more pins." Some folks just can't be satisfied!

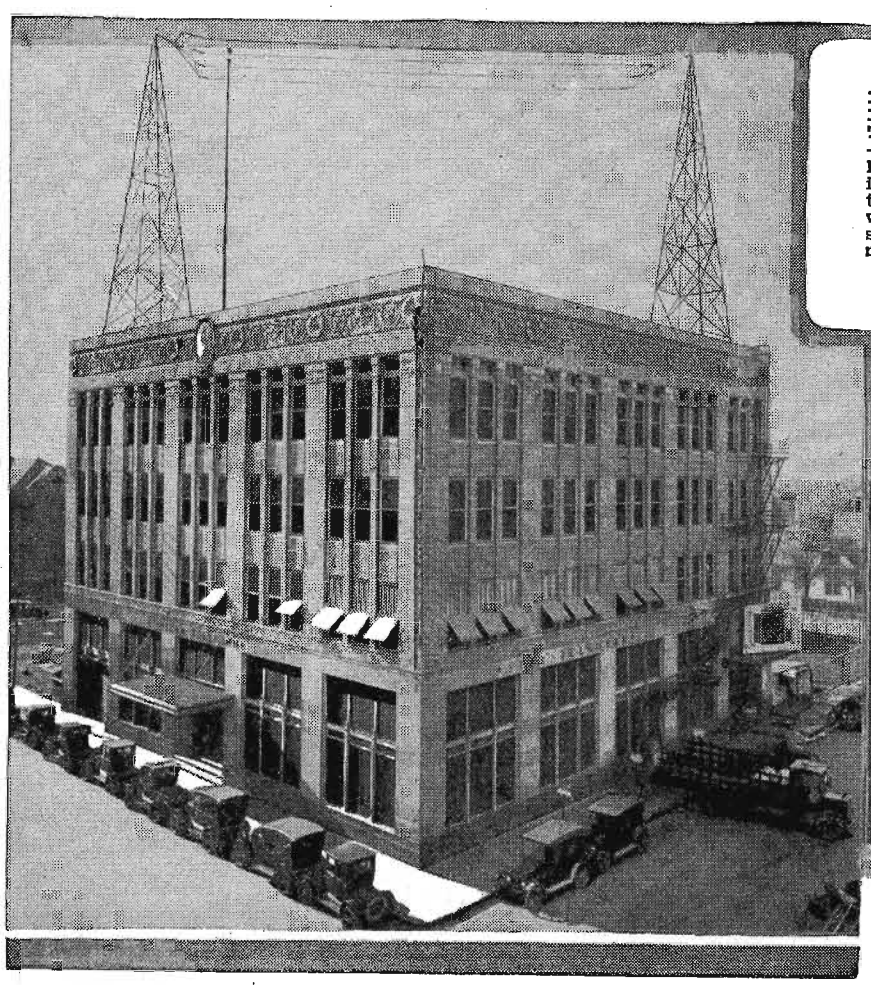
In September, 1923, power was raised to 750 watts and one year later increased to 1,000 watts.

The personnel is composed of three announcers, the technician and secretary. C. B. L., or C. B. Locke, chief announcer, also Radio editor of the Star-Telegram, has taken the position recently vacated by E. L. Olds. Mr. Locke was formerly connected with WBAP in an unofficial capacity, since it first took the air.

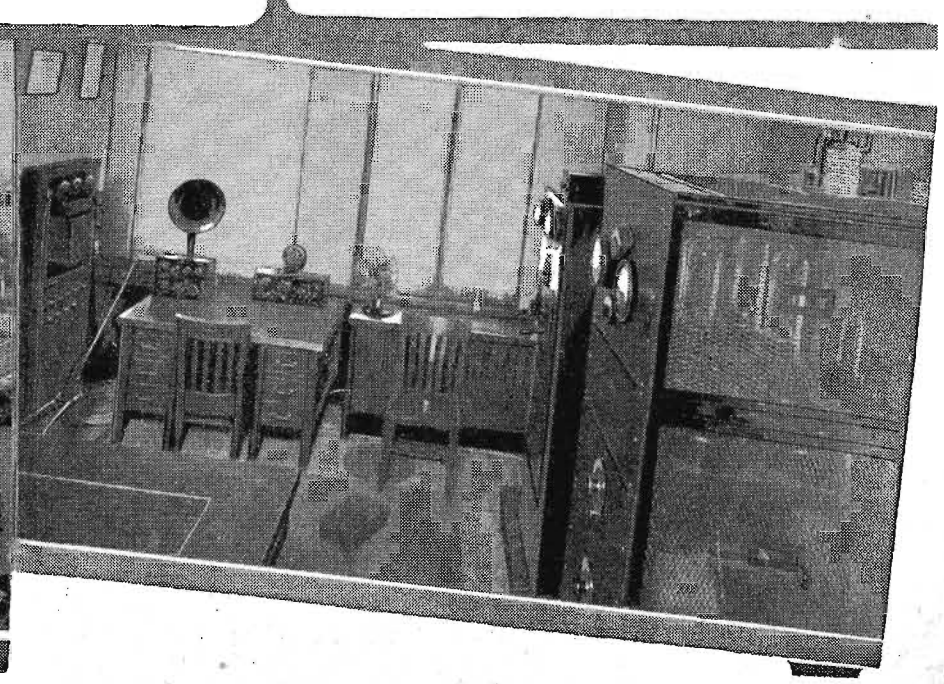
H. H., the Hired Hand, needs little introduction. His ability to glide in flowery language from the sublime to the ridiculous has made him a genuine favorite to all within sound of his voice. Aside from serving as substitute announcer and assisting in the boiler room, H. H. is also president of the Radio Truth society, with thousands of members daily living the motto: "Truth must be protected from abuse and overwork." Membership is limited to those qualifying with a satisfactory "truth."

W. E. B., or W. E. Branch, is program director and the technician. He "makes the wheels go 'round"; to him much credit is due for the continued improvement of this station.

J. R. S., or J. R. Sullivan, like all bearing his cognomen, is noted for his modesty; this explains why we have no photograph to accompany this article. It is he who gives the hourly market and weather reports. This feature is essential in a state (*Continued on page 10*)



Home of WBAP—Fort Worth Star-Telegram building—is shown at the left. Right, operating room showing the transmitter which adjoins the studio, and is connected by light and signal system.



CHAMPION ACTS AS MASTER ANNOUNCER

DEMPSEY ENTERTAINS AT STATION WNAC

Answers Questions Which Fans Telephone in to Studio—Makes Good Impression

BOSTON, Mass.—In this particular instance, it was not a fistic possibility for championship, but the "mike" of broadcasting fame and at the studios of Station WNAC, The Shepard Stores, Boston.

Jack Dempsey

Dempsey is appearing at the Loew's Orpheum theater in this city and the manager of the theater's interest in Boston provided Radiophans with an opportunity of hearing Dempsey as an announcer in the weekly midnight revues, at which Dempsey acted as master of ceremonies and announcer.

Aside from the musical offerings from the theaters, sport writers and editors of the various newspapers, interviewed Dempsey in front of the "mike." Previous to this interview, Major J. J. Fanning, director of broadcast, announced to the listeners in, that by calling the studio on the telephone and asking a question, Dempsey would answer the question, or as many as he could during the evening. Needless to say, the telephone was kept very busy. Questions ranged all the way from "Who he would fight next," to "When he expected to propose again." "If he was in love," and "Whether he liked bob-haired women," to acknowledging numerous invitations of one sort and another. Telephone lines were absolutely jammed with questions.

Dempsey had a ready answer for all he could take care of, and no small amount of humor was obtained as a result of this invitation. Dempsey stuck to his post as an announcer, until the conclusion of the program, when he bid the Radio audience good night and expressed his enjoyment of the opportunity offered him to take the part of announcer for that period.

Opening of New KFI Transmitter Is Delayed

Due to Changes on Transmitter Not on Air Till Later

LOS ANGELES.—Delivery of the new type Western Electric 5000-watt transmitter to Earle C. Anthony, Inc., owners of the present KFI station, has been delayed somewhat due to some minor changes made.

The new big Pacific Coast station will not be on the air much before the Christmas holidays.

The present KFI transmitter has been sold and will be erected in Hollywood shortly after the first of the year, according to a report. It is the intention of the promoters of this venture to enter the already crowded broadcasting field of Los Angeles on a purely commercial basis. Plans are complete, remote control leases sold and the station will come on the air as the first out-and-out attempt, in this part of the country, at least, to make a dividend paying proposition out of a Radiocast station.

Intercity Radio Telegraph Is Very Much in Business

NEW YORK.—Although reported as having gone out of business twice in false reports originating with the department of commerce, the Intercity Radio Telegraph company, maintaining Radio equipment on several great lakes vessels and a chain of general public coast stations, has called attention to the fact that it has never gone out of business. In fact, it is very much alive.

The Intercity company, it will be remembered, fought the department of commerce over a renewal of license for one of its stations, but the case was mooted after some discussion.

Ask Help to Get Set

DAVELLA, Ky.—Parnell Crum, treasurer of the Davella Community organization here, has now received $203.70 toward a goal of $250 needed to purchase a community Radio receiver. The people of the community are unable to contribute more toward the fund, and are asking outside assistance. The village is practically without church services and wishes to use the set for religion and education.

European Notes

For the first time in history London's famous annual pageant, the Lord Mayor's show, was broadcast this year. As the new lord mayor, Sir Alfred Bower, passed by in his gilded carriage, the music and mighty cheer was heard by Radiophans all over Great Britain.

F. Guery, French scientist, recently attempted to refute the theory that each electron possesses a magnetic field, and that the total value of the magnetic field of a current is made up of the geometrical sum of the magnetic fields of the electrons composing it. His observations were purely mathematical.

Approximately 997,000 Radio receiving licenses have been taken out up to the present time by Radiophans in Great Britain.

The Hamburg, Germany, broadcasting station, working on 387 meters, is making special announcements to promote the sale of herrings and other fish. The plan is meeting with marked success.

Dundee, Scotland, 2DE, is the latest relay station to be opened by the British Broadcasting company. Its wave length is 331 meters. A new station at Swansea, Wales, was to be opened December 12.

A very unusual treat was offered to British amateurs on November 20 when George Bernard Shaw, the famous dramatist, read his play "Flaherty, V. C.," from 2LO, London. The play, which takes only twenty minutes to read, marked the famous author's first appearance before a Radio audience.

The new Belgian broadcasting station at Ruysselede is being constructed rapidly. It will be ready for operation sometime in 1925, but no broadcasting is scheduled to begin before 1926.

Like the WIP broadcast of a diver under the ocean, British amateurs were entertained recently by a swimmer who sang, played a harmonica and made a speech in a copper bell under water.

M. Etienne Clementel, French finance minister, recently broadcast a message recommending purchase of a new French bond issue.

Big Ford and Little Glenn Sign Theatrical Contract

CHICAGO.—Thousands of parents will have to sing their kiddies to sleep themselves again until December 21, instead of merely tuning in on "Lullaby Hour" of Station WLS and letting "Big" Ford and "Little" Glenn do it.

Ford and Glenn, in private life, Ford Rush and Glenn Rowell, signed for a three week contract with the Balaban & Katz theater interests, and are appearing at the Chicago theater, the Tivoli and next week at the Riviera.

However, the popular entertainers will be heard on December 16, at 11 p. m., over WEBH, from the Riviera theater.

NIGHTHAWKS HAVE ANNIVERSARY NIGHT

Leo Fitzpatrick

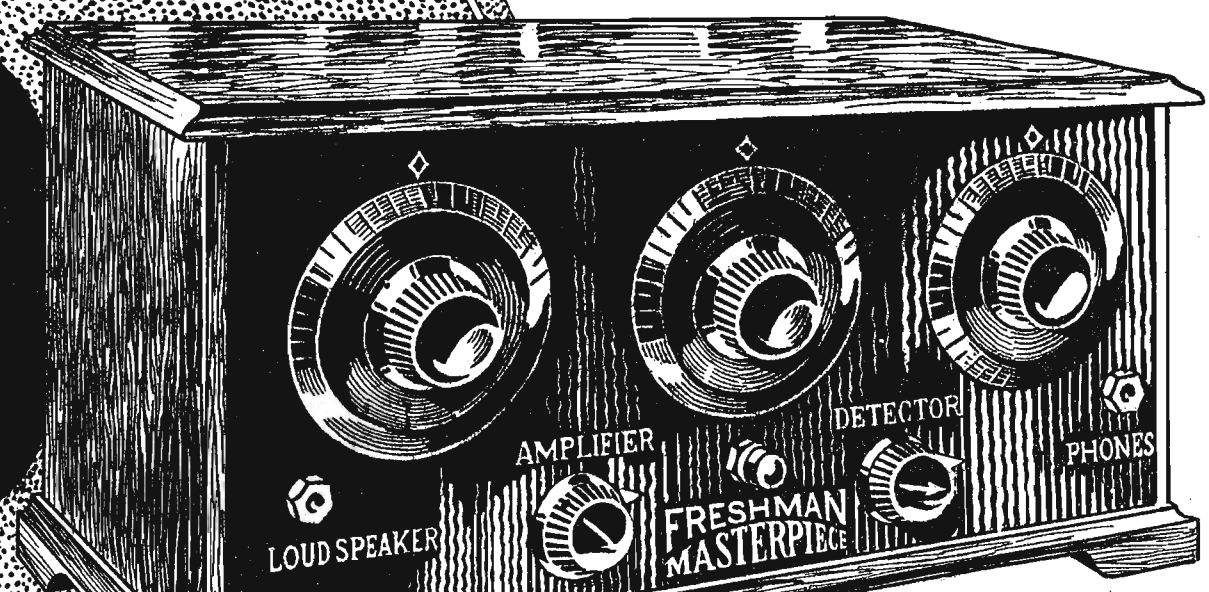
KANSAS CITY, Mo.—The "Merry Old Chief" and the Nighthawk club of WDAF celebrated their second anniversary on Friday night, December 5. The celebration was an eight-hour program beginning at eight o'clock. Six of the Star's favorite orchestras played for the Radio audience.

They were: The Plantation Players and the Trianon Ensemble at the Hotel Muehlebach, Eddie and Bobbie Kuhn's Kansas City Athletic club orchestra, Cordson-Mac's Hotel Bellerive orchestra, the Newman theater orchestra, and the Star's Radio orchestra. The Corbin fiddlers of Merwin, Missouri, who proved so popular on last year's birthday program, again furnished the old-time dance music for the older fans. The WDAF minstrels and many other popular soloists took part in the program.

While the organization is already two years old applications are still pouring into the Star's office and hundreds of listeners are initiated each midnight.

FRESHMAN MASTERPIECE

$60



Five Tube Tuned Radio Frequency

The Greatest Value Ever Offered in a Radio Receiving Set

Built of the finest low loss materials, in a beautiful genuine solid mahogany cabinet, it is attractive enough to grace the finest of rooms and economical enough for the most modest.

The Masterpiece is the equal, if not the superior, of any 5-tube set on the market regardless of price. Brings in even the most distant stations with remarkable clarity and volume. So selective that you can pick up any station you want—night after night — at the same points on the dials.

WHAT'S MORE, It Is the Easiest Set in the World to Operate

All genuine Freshman Masterpiece Sets have a serial number and trade-mark riveted on the sub-panel. The Receiver is not guaranteed if number has been removed or tampered with.

FRESHMAN MASTERPIECE

Tuned Radio Frequency Kit

$17.50

No Neutralizing or Balancing Condensers Required

With these marvelous units you can easily build a five-tube tuned Radio Frequency Receiver that will be highly selective as well as a remarkable distance-getter, bringing in all stations with pleasing clarity and volume.

Kit consists of 3 Masterpiece Tuned Radio Frequency Units carefully matched and balanced. Complete with wiring diagram and instructions for building any 5-tube tuned radio frequency receiver, and also drilling template for proper mounting.

Each and every Freshman Masterpiece Coil bears a serial number and trademark — our guarantee of electrical and mechanical perfection. For your protection demand only the genuine.

HAVE YOUR DEALER INSTALL ONE IN YOUR HOME

Chas. Freshman Co. Inc.

Radio & Condenser Products

106 Seventh Ave., New York, U.S.A.

FURTHER CRITICISM FROM BRITISH CHIEF

CAPT. ECKERSLEY AGAIN BREAKS FORTH

Compares British and American Systems of Broadcasting—Admits We Have Better Sets

By A. C. Blackall

LONDON.—Captain P. P. Eckersley, chief engineer of the British Broadcasting company, which has the monopoly of British broadcasting, has followed up the brief statement upon Radio in America, which he made on returning from a tour of investigation, by a long statement pointing out the striking differences between American and English methods.

Captain Eckersley has come to the conclusion that, so far as Radio is concerned, the two countries are treading entirely different paths.

"Broadcasting," he said, "began in the United States more than a year before the British Broadcasting company was formed. It took the country unawares. Any man, provided he was a respectable member of society and fairly well backed financially, was able to obtain permission to Radiocast. Consequently stores, theaters, religious bodies, city councils, apparatus manufacturers, and so on have all erected stations. Some of them are allowed to 'sell time' to advertisers, and so informational publicity is broadcast." (Note: All advertisement and publicity matter is rigidly excluded from the British programs, which are paid for by the B.B.C. out of the license fees it obtains from fans.)

Criticizes Program Quality

"As there are not enough wave lengths to share between the 580 stations, they 'divide time'," continued Capt. Eckersley. "In one city you may have 10 stations, but all of them do not work at once" (Note: In England no city has more than one station—many have none. All stations work regularly every day and time is never divided between them.)

"The actual programs in the majority of cases do not compare favorably with English programs. Lack of funds in hundreds of the smaller ones makes it imperative for them to obtain free talent. Even the larger stations are not always able to engage leading talent. (Note: The $2.50 annual fee collected by the British monopoly company brings in a total of about $2,500,000 per year, which is sufficient for them to pay high fees to engage the leading talent regularly. Free talent is not called for, although volunteers, if good enough, are occasionally permitted to Radiocast.

Americans Have Better Sets

"Practically no American fan would confess to owning a crystal set; it would be like a man in England admitting that he wears a celluloid collar. The least you can expect in America is three tubes; the better-off people have six tube Radio frequency or sensitive super-heterodyne. (Note: America is away ahead of England in this direction. Probably one-half of all the sets used in England are still crystals.)

"This development of super receiving sets has come about as a direct corollary to the broadcast scheme. A particular listener cannot, as in England, guarantee to himself a good, robust signal from somewhere, nor can he be sure that his nearby station will have a first-class program. He therefore sets himself the problem of cutting out his local station and listening to a more distant but better one. He succeeds only to find that he is up against fading, distortion, atmospherics, and oscillation. His interest in the program from the distant station wanes, marred as it is by persistent interruption. He reaches out further and becomes in a while fascinated; he cares little for the program—he is entirely intrigued with the hobby. (Note: The chief object of British fans is to receive a good clear program. If there was any trouble in doing this, they would probably lose interest. Certainly it is the minority who are interested in experimentation.)

Captain Merely Amazed

"So what has America to teach England? Of England's broadcasting problem nothing; it is impossible to compare the two. America is a country with a population which has a superstitious fear of any kind of regulation and would, if necessary, willingly pay five hundred dollars for a set, but would grudge one dollar a year for a license, and would rather have a poor service than pay for a better one."

Captain Eckersley is not prejudiced against American Radio; he is simply amazed at the vast difference in the methods adopted from those used in England.

WBCN to Use 266 Meters

CHICAGO.—WBCN, new Southtown Economist Radio station soon to open here, has been granted a wave length of 266 meters. At 266 meters, WBCN will not have to share its wave length with another Chicago station.

BLACK CAT NIGHT AT CKAC IS BROADCAST

An impression of Bourgeois as the show was being broadcast recently is shown above. Left to right: Ernest Patience, piano; A. Bourgeois; Charles Marchand; Miss Camille Bernard.

WGBS Evolves Novel Method of Reviewing

Prominent Author Cables Review of European Plays Each Week

NEW YORK.—The honor of being the first foreign correspondent for an American broadcasting station goes to Oliver Sayler, prominent author and critic, whose "Footlight and Lamplight" weekly review of plays and books has been an interesting feature at WGBS, since the Gimbel Brothers station has been opened.

Mr. Sayler is now in Europe and each week sends by cable to WGBS reviews of the latest European productions. These are read to the Radio audience every Thursday evening at 8:30 Eastern time. Mr. Sayler has just left Berlin, where he witnessed the newest German stage offerings and is now in Russia. Cabled reviews of the Russian dramas will follow.

Mr. Sayler leaves Moscow December 17 and will reach New York in time to make his personal talk over the Radio on Thursday, January 1.

RADIOPHANS PICK NEW ANNOUNCER FOR WBBF

Twelve Students Try Voices Before "K" Is Picked

ATLANTA, Ga.—Announcer "K," J. H. Persons, was recenly selected by Radiophan vote as announcer for Georgia Tech's new station, WBBF, recently back on the air.

Twelve different students at the university tried their hand at the microphone during the same evening, each telling the listeners that he was announcer "A," "B," etc.

As a result twenty-six states were heard from and Mr. Persons was voted into office.

KFQX Goes Up to 1,500 Watts

SEATTLE, Wash.—KFQX, the newly opened 1,000-watt Radiocaster here, has increased its power to 1,500 watts. Reports have been received from every state in the Union and many foreign countries. A woman, Vivien Potter, is the announcer.

NEW YORK TO TREAT SYMPHONY LOVERS

SERIES COVERS PERIOD OF NEXT FIVE MONTHS

Entire Season of Eighteen Concerts to Be Broadcast from WJZ and WJY

NEW YORK.—One of the most extensive presentations of symphonic music which Radio broadcasting has yet attempted, covering a period of more than five months and including eighteen symphony concerts, is the result of arrangements recently completed between Franklin Robinson, executive secretary of the American Orchestral society, and the Radio Corporation of America.

Recently commencing with the opening concert of the season, every one of the society's concerts will be broadcast by one or the other of the twin broadcasting stations, WJZ and WJY, in New York city.

The schedule of concerts includes four distinct groups. Five concerts, on December 18, January 22, February 19, March 26 and April 23, will be given at and broadcast from the great hall of the college of the City of New York; five concerts, on December 14, January 18, February 15, March 22 and April 19, will be given at Cooper Union and broadcast direct from that hall. Two concerts on February 28 and March 30 are scheduled at Town Hall. All twelve concerts will be given by the full orchestral society orchestra of over one hundred members under the direction of Chalmers Clifton.

The final group of five children's concerts, to be given by a selected orchestra of sixty men under the direction of Ernest Schilling, will take place in Aeolian Hall on Saturday mornings during February and March.

HOME OF HIRED HAND

(Continued from page 5)

of as varied industries as has Texas. Occupying as it does the cattle center of the country, the cowbell was adopted as the symbol of WBAP. A unique collection of bells have found their way to the concert room—gifts of admiring Radiophons.

The bell was recently purloined by the ever extant souvenir hunter, so it was necessary to obtain a new one. Fans were appealed to, with the result that a collection of bells were sent in from many distant states.

The bells were "tolled" over the air, and Radiophans selected one that was sent in from the Little Bear ranch, Wyoming—this bell came by fast express, billed as "one cow's lavalliere."

Among the unique bells was one in miniature, made of gold by a local watchmaker.

This page would seem incomplete to old friends of WBAP were not mention made of G. C. Arnoux, former announcer of this station. G. C. A. started his career before the "mike" here and was one of the leading factors in making WBAP one of the favorite broadcasting stations of the country. Mr. Arnoux has recently assumed charge as announcer-director of the new Hot Springs, Arkansas station, KTHS.

Aside from its regular broadcasting, services are broadcast by remote control from four churches; entertainment is offered from three ballrooms, three theaters and the Chamber of Commerce. During the annual stock show, events are broadcast direct from arena where roping, bulldogging and sports that have made the big-hearted, big-hatted cowboys famous throughout the United States (and notorious in London) take place. The Dixie series is likewise broadcast direct from the stirring field of action. Weekly programs are broadcast from Mineral Wells, Texas, WBAP sending an operator to that point.

The high quality of programs offered have done much to popularize WBAP, the aim at all times being to please its invisible audience, to amuse as well as educate. Hawaiian orchestras, old-time songs, jazz, operatic airs, vocal solos, all have their devotees, with jazz possibly leading as favorite. The old square dance music is a monthly feature; it was WBAP who first introduced the broadcasting of this and set the feet of the nation tapping to the airs of our grandparents.

Finally, to paraphrase a popular advertiser: "When better broadcasting is to be had—WBAP will be there."

Six Stations Linked for Gilbert-Sullivan's Opera

NEW YORK.—Gilbert and Sullivan's ...mic opera, "H. M. S. Pinafore," was re...tly rendered with great success from ...ions WEAF, WJAR, WEEI, WFI, ...E and WGR, which were linked for ...casion. The opera was put on by ...erready quartet, instrumental trio ...ssisting chorus.

Most Proposed to Artist to Be Heard from WEBH

CHICAGO.—Virginia Johnson, who lays claim to being Radio's most proposed to entertainer, will announce her engagement in song Tuesday, December 16, at 11 p. m. Central time from WEBH, Edgewater Beach hotel here.

During the two years she has been prima donna for the Balaban & Katz theaters here, she has received by mail over 1,500 proposals of marriage, and has only recently fallen.

Besides her theatrical work, Miss Johnson has sung nearly every Saturday evening from WMAQ, Daily News station here, in the Chicago theater Radio revue.

Erect New Station

MINNEAPOLIS.—Officials and business men of three counties joined hands on a recent afternoon to break ground for the new 5000-watt Gold Medal station, WCCO, Minneapolis-Saint Paul, which it is expected will be completed April 1.

The new station will be 18 miles northwest of Minneapolis and Saint Paul, and two miles west of the town of Anoka.

IN ARCTIC WITH WNP

(Continued from page 4)

"We could get stations in western United States and in Honolulu, but the east was 'dead' in winter, being heard only in the fall. It is a phenomenom we can not explain," said the explorer.

"At some periods static was bad, especially during terrific magnetic storms. Some of the disturbances were so violent that the magnetic needle traced like a scribbling pen across the record sheet."

He explained that it may have been caused by particles of snow constantly blowing over the surface of the snow or ice. This develops electricity through friction, he pointed out.

"There is a possibility that it may have been caused by the meeting of air currents of different temperatures," said Dr. MacMillan. "Over our heads blew air that had swept across 5,000 square miles of ice in a temperature of 60 degrees below zero. This air swept out to the sea where, at open water, it met a temperature of 29 degrees, in sea water."

"I believe that this proves that terrestrial magnetism is the cause of Radio signals fading"!

While frozen in, the expedition heard the Christmas greeting sent by President Coolidge, also the greetings extended to the various members of the expedition and broadcast by Dr. MacMillan's sister and members of the crew's families from Station WJAZ. This raised the morale of the entire company.

Donald H. Mix, operator on board the Bowdoin, formerly an old amateur operator, was picked by the A. R. R. L. as the best man to go with the expedition. While in the Arctic, he handled a total traffic of more than 30,000 words More than 100,000 words of press matter were copied.

The greatest distance that the signals of WNP—call letters of the Bowdoin—were heard, was on May 19, at 4:30 p. m. when an operator in Coogee, Australia, copied the call letters distinctly.

It was noticed that waves under 200 meters in length travelled much better than longer waves. When the Bowdoin arrived at Wiscasset, Maine, the apparatus was dismanteled and taken to New York and Chicago to be placed on exhibition.

Radiophans in India will have to pay for their broadcast programs, as is done in England.

OPERATING AND TROUBLE SHOOTING

For the Owner of a Stromberg-Carlson No. 1-A

THE following list gives a number of antenna selections for this and other neutrodyne receivers, in the order of their distance and volume-getting value: An outdoor antenna composed of a single horizontal wire not over 60 feet long and between 20 and 40 feet above the earth. Indoor antenna of single horizontal wire 40 to 50 feet long, located in an open attic and with the receiving set in any room under one end of the horizontal wire. Indoor antenna of two or three horizontal wires, between 25 to 30 feet long, spaced above 2 feet apart and located under the roof in an attic. Indoor antenna, consisting of a single conductor lamp cord, supported on small insulators or on picture moulding and running the length of a hall or corridor, 30 feet or longer, with the receiving set located at one end. Indoor antenna, consisting of a single conductor lamp cord, running around the picture moulding in the room where the receiving set is installed.

Location of Loud Speaker

Usually the location of a loud speaker with respect to a neutrodyne receiver has no effect on the correct operation of the receiver or loud speaker. The loud speaker, however, should not be placed on the top of the cabinet and the loud speaker cord should not be carried behind the cabinet or draped over the cabinet top.

These locations of the loud speaker or cord may cause an electrical coupling in the receiving set circuits and result in oscillation noises. A correctly designed loud speaker will operate with no coupling noises when placed on a table or cabinet along side this set.

It will be noted that the number 1-A neutrodyne receiver is provided with two antenna binding posts each marked "ANT" on the post proper, but one with the word "SHORT" and the other with the word "LONG" engraved above it on the panel. The "Short-Ant." post connects directly to the receiver circuit, gives the greatest sensitivity to the receiving set and should always be used when maximum distance is desired, regardless of antenna length.

The "Long-Ant." post connects through a small fixed condenser to the receiving set circuit and should be used when the reading of the large dial number 1 is more than 6 or 7 divisions lower than that of large dials number 2 and number 3. In other words, it equalizes the settings of the three large dials when an antenna of high fundamental wave length is employed.

Grid or C Battery

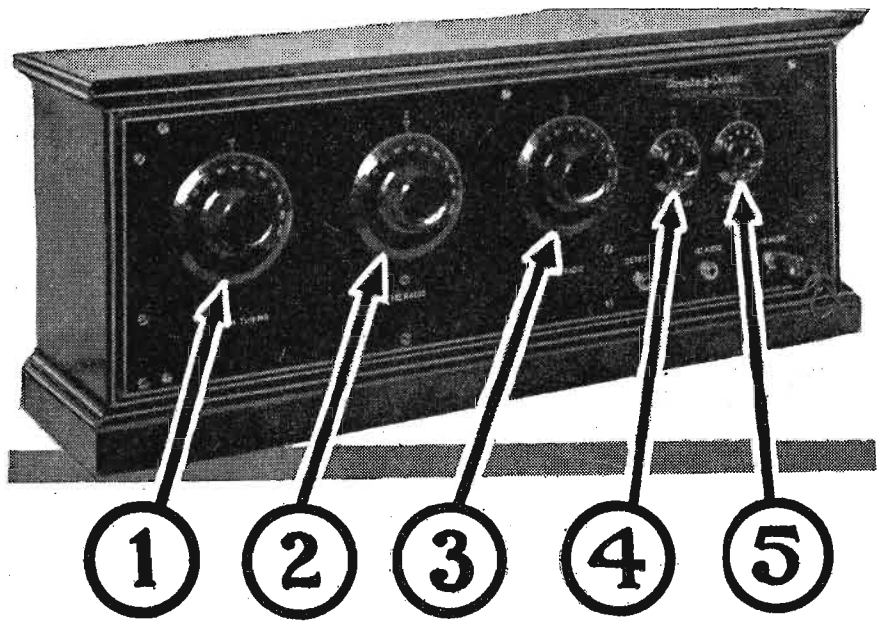
This battery may be a 4½-volt of any reliable make. It is located in a space provided under the base of the Radio cabinet and is held in place by a metal strap. Each number 1-A receiver comes with one of the C batteries correctly installed, unless otherwise specified on the packing case. The C battery should be replaced about every six months or at any other time that the loud speaker fails to give a good clear tone on the "2nd Audio" jack when the same setting of the tuning dials gives a clear signal with a head set plugged into the "Detector" jack.

Use of Storage B Battery

Storage type B batteries can be used in place of the dry cell B battery if electric light circuits and a suitable rectifier are available for charging. This battery should have 48 cells and give a normal voltage of 96. The B Bat + receiving set binding post connection for a "hard" type detector tube (UV-201A or C-301A) should be taken between the 24th and 25th cells so as to give 48 volts.

If a "soft" type detector tube is used (UV-200 or C-300) the connection from the receiving set binding post marked "B Det + should go to the + terminal of the 11th or 12th cell counting from the — end of the battery. The storage B battery has the advantage of uniform operating voltage, as it should never fall below 90 volts when discharged or run over 110 volts when fully charged. This will maintain good, loud speaker volume at all times.

Some owners of this receiving set who use dry B batteries may wish to use a very senstitive "soft" type (low vacuum) tube, such as a UV-200 Radiotron or C-300 Cunningham. This type of tube can be used in the Number 1-A neutrodyne receiver by merely connecting the receiving set binding post marked B Det. + to the + 22½ volt terminal of the particular B battery block that connects to the B Bat — binding post of the receiving set. This change in battery wiring gives the required 22½-plate voltage for the soft type detector tube, instead of 45 volts for the hard type detector tube.



Rheostat Settings

See that the rheostats are correctly set before plugging into the jacks. For UV-201A or C-301A tubes, all four rheostat dials on number 1-A receivers above serial number 500 can be set at the following markings at the time this receiver is installed and need not be disturbed unless the A battery voltage drops below the safe limit.

Rheostat	Location	Setting
"Radio Amp."	Front Panel	60
"Detector"	Front Panel	40
"1st Audio"	Rear Panel	30
"2nd Audio"	Rear Panel	30

It is not necessary to turn off or otherwise disturb the adjustment of these rheostats when shutting off this set. The act of removing the loud speaker or head set plug from the jacks disconnects the filament (A battery) current from the tubes.

Adjusting the Radio Amp. rheostat toward the 0 setting reduces the volume of the received signal without causing distortion, so this dial, number 4, can be used as a volume control. The Detector rheostat, number 5, serves as a control on the sensitiveness of the detector tube action but in no case should it be turned so close to the 0 setting as to make the

(Continued on page 26)

AN EVENING AT HOME WITH THE LISTENER IN

(SEE INSTRUCTIONS FOR USE BELOW)

Station and City	Met.	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
AT9, Fort Bragg, N. C....	435	7:00- 8:55	7:00- 8:00	Silent	7:00- 8:55	Silent	7:00- 8:55	Silent
CFAC, Calgary, Alta.....	430	Silent	Silent	9:00-11:00	Silent	6:00- 7:00	10:00-11:00	7:00- 8:00
CFCA, Toronto, Ont.....	400	Silent	6:00- 7:00	7:00- 8:00	7:00- 8:00	7:00- 8:00	7:00- 8:00	7:00- 8:00
CFCN, Calgary, Alta.....	440	11:00- 1:00	Silent	Silent	12:30- 1:30	Silent	Silent	Silent
CHYC, Montreal, Que.....	341	Silent	8:00- 9:00	Silent	Silent	7:30- 8:30	Silent	Silent
CKAC, Montreal, Que.....	425	6:30- 9:30	3:30- 4:30	Silent	6:30- 9:30	Silent	6:30- 9:30	Silent
CKCD, Vancouver, B. C...	410	10:30-11:30	Silent	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30
CKY, Winnipeg, Man.....	450	Silent	7:00- 8:00	Silent	7:30- 9:15	Silent	7:30- 9:15	7:30- 9:15
CNRO, Ottawa, Ont.....	435	6:30-11:30	Silent	Silent	Silent	6:30-11:30	Silent	Silent
CYB, Mexico City, Mex...	370	8:30- 9:00	Silent	Silent	8:30- 9:00	Silent	9:00-11:00	Silent
CYL, Mexico City, Mex.....	480	Silent	Silent	Silent	10:00-11:30	Silent	Silent	10:00-11:30
CYX, Mexico City, Mex...	330	Silent	Silent	9:00-12:00	Silent	Silent	Silent	8:00-10:00
KDKA, E. Pittsburgh, Pa..	326	5:30- 8:00	6:30- 7:30	5:30- 8:00	5:30-10:00	5:30- 8:00	5:30-10:00	5:30- 8:00
KFAE, Pullman, Wash.....	330	Silent	Silent	9:30-10:30	Silent	9:30-10:30	Silent	9:30-10:30
KFDM, Beaumont, Texas.	306	Silent	7:00- 9:00	Silent	Silent	8:00-11:00	Silent	8:00-11:00
KFQZ, Berrien Spgs., Mich.	286	Silent	Silent	7:00- 9:00	Silent	7:00- 9:00	Silent	7:00-10:00
KFI, Los Angeles, Calif...	469	8:45- 2:00	8:45- 1:00	8:45- 1:00	8:45- 1:00	8:45- 2:00	8:45- 1:00	8:45- 2:00
KFKB, Milford, Kan.....	273	7:20- 2:00	8:00-10:30	7:20- 2:00	7:20- 2:00	7:20- 2:00	7:20- 2:00	7:20- 2:00
KFKX, Hastings, Nebr.....	291	Silent	Silent	9:30-11:00	Silent	Silent	9:30-11:00	Silent
KFMX, Northfield, Minn.	283	Silent	7:00- 8:00	Silent	Silent	9:00-10:00	Silent	Silent
KFNF, Shenandoah, Ia.....	266	7:30- 9:00	6:30- 7:30	Silent	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00
KFOA, Seattle, Wash.....	455	Silent	Silent	10:30-12:00	10:30-12:00	10:30-12:00	10:30-12:00	10:30-12:00
KFPT, Salt Lake Cy., Utah	268	Silent	Silent	10:00-11:00	Silent	10:00-11:00	Silent	10:00-11:00
KFQX, Seattle, Wash.....	238	7:15- 2:00	Silent	9:15- 1:00	9:15- 1:00	9:15- 1:00	Silent	9:15- 1:00
KGO, Oakland, Calif	312	10:00- 3:00	9:45-11:00	10:00- 3:00	10:00- 3:00	Silent	10:00- 3:00	Silent
KGW, Portland, Ore.....	492	12:00- 2:00	8:00- 9:00	10:00-11:00	10:00-11:30	10:00- 2:00	Silent	10:00- 1:30
KHJ, Los Angeles, Calif...	395	10:00-12:00	10:00-12:00	Silent	10:00-12:00	10:00-12:00	10:00-12:00	10:00-12:00
KJS, Los Angeles, Calif...	360	Silent	9:15-11:30	Silent	10:00-11:00	Silent	10:00-11:00	Silent
KLX, Oakland, Calif.....	509	Silent	Silent	10:00-12:00	Silent	10:00-12:00	Silent	10:00-12:00
KNX, Hollywood, Calif.....	337	8:00- 1:00	10:00-12:00	8:00- 1:00	8:00- 1:00	8:00- 1:00	8:00- 1:00	8:00- 1:00
KOB, State College, N. M..	360	Silent	Silent	8:30- 9:30	Silent	8:30- 9:30	Silent	8:30- 9:30
KPO, San Francisco, Calif..	423	10:00- 2:00	10:30-12:00	9:00- 1:00	9:00- 1:00	9:00-12:00	9:00- 1:00	Silent
KSD, St. Louis, Mo.....	546	8:00- 9:00	9:00-10:00	7:00-11:55	7:00-10:00	6:45-10:00	Silent	8:00- 9:00
KYW, Chicago, Ill.....	536	7:00- 2:00	7:00- 8:00	Silent	7:00-11:30	7:00- 2:30	7:00-11:30	7:00- 2:30
NAA, Radio, Va.....	435	Silent	Silent	5:45- 7:20	6:05- 7:20	6:25- 7:40	5:45- 7:40	7:05- 7:40
PWX, Havana, Cuba.....	400	7:30-10:00	Silent	Silent	Silent	7:30-10:00	Silent	Silent
WAAW, Omaha, Nebr.....	286	Silent	Silent	7:30- 9:00	Silent	Silent	7:30- 9:00	Silent
WABN, La Crosse, Wis.....	244	Silent	Silent	8:00-10:30	Silent	Silent	10:00-12:30	Silent
WBAP, Fort Worth, Tex..	476	7:00- 8:00	11:00-12:00	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45
WBAV, Columbus, O.....	423	Silent	Silent	Silent	7:00- 9:00	Silent	Silent	7:00- 8:00
WBBG, Mattapoisett, Mass..	248	Silent	Silent	7:00- 9:00	Silent	7:00- 8:00	Silent	7:00- 8:00
WBBR, Staten Island, N. Y..	273	7:00- 8:00	8:10- 9:05	7:00- 8:00	Silent	7:00- 8:00	8:10- 9:05	Silent
WBT, Charlotte, N. C.....	360	Silent	5:30- 6:30	Silent	7:30- 8:30	Silent	7:30- 8:30	Silent
WBZ, Springfield, Mass....	337	6:40- 8:55	6:00- 9:00	6:40-11:00	6:40- 8:55	6:40-11:00	6:40- 8:55	6:40-11:00
WCAE, Pittsburgh, Pa.....	462	6:30- 8:30	6:30- 8:30	6:30-10:30	6:30-10:30	6:30- 8:30	6:30-10:30	6:30- 8:30
WCAL, Northfield, Minn....	360	12:00- 1:00	8:30-10:00	Silent	Silent	Silent	9:00-10:00	8:30- 9:00
WCAP, Washington, D. C...	469	Silent	6:20- 9:00	6:30- 9:00	Silent	6:45- 9:00	Silent	6:30-11:00
WCBD, Zion, Ill.....	345	Silent	2:30- 6:00	8:00-10:30	Silent	Silent	8:00-10:30	Silent
WCCO, Minn.-St. P., Minn..	417	6:00- 9:00	8:00- 9:00	6:00- 9:00	6:00- 7:30	7:00- 8:00	7:00-10:30	6:00- 9:00
WCX, Detroit, Mich.....	517	Silent	6:15- 7:15	7:30- 9:00	10:00-11:00	6:00- 9:00	6:00- 9:00	6:00- 9:00
WDAF, Kansas City, Mo..	411	11:45- 1:00	4:00- 5:00	8:00- 1:00	11:45- 1:00	8:00- 1:00	11:45- 1:00	8:00- 1:00
WDAR, Philadelphia, Pa..	395	6:30- 7:30	Silent	6:30- 9:00	6:30- 7:30	6:30- 9:00	6:30- 7:30	6:30-12:00
WEAF, New York, N. Y...	492	7:00-11:00	6:20- 9:15	7:00 9:00	7:00- 9:00	7:00- 9:00	7:00-11:00	7:00- 9:00
WEAO, Columbus, Ohio....	294	Silent	Silent	Silent	Silent	Silent	7:00- 9:00	Silent
WEAY, Houston, Texas.....	360	0:15- 7:15	Silent	6:15- 7:15	6:15-10:00	7:30-10:00	6:15- 7:15	6:15-10:00
WEBH, Chicago, Ill.....	370	7:30-12:30	7:00- 9:00	Silent	7:30-12:30	7:30-12:30	6:30-12:30	7:30-12:30
WEBJ, New York, N. Y....	273	Silent	Silent	Silent	6:00- 8:00	Silent	Silent	6:00- 8:00
WEEI, Boston, Mass.....	303	Silent	6:20- 9:00	6:00- 9:45	6:00-11:00	6:00-11:00	6:00-11:00	6:00-11:00
WFAA, Dallas, Tex.....	476	8:30-12:00	6:00-11:00	8:30- 9:30	8:30-12:00	6:00- 7:00	8:30-12:00	8:30- 9:30
WFBH, New York, N. Y.....	273	6:00-11:30	4:00- 6:30	Silent	Silent	Silent	6:00-11:30	Silent
WFI, Philadelphia, Pa.....	395	Silent	6:30- 7:30	Silent	7:00- 8:00	Silent	7:00- 8:30	Silent
WGAQ, Shreveport, La.....	263	9:00-12:00	Silent	9:00-12:00	Silent	8:00- 9:00	Silent	Silent
WGI, Medford, Mass.....	360	6:30- 9:00	7:30- 9:00	Silent	6:30- 9:00	6:30-9:00	6:30- 9:00	6:30- 9:00
WGN, Chicago, Ill.....	370	6:00-11:00	2:30-10:00	Silent	6:00-11:00	6:00-11:00	5:30- 6:30	6:00-11:00
WGR, Buffalo, N. Y.....	319	5:30- 6:30	3:00- 7:30	5:30-11:00	5:30- 6:30	5:30-11:00	6:45- 9:00	5:30-11:00
WGY, Schenectady, N. Y.	380	8:30- 9:30	6:30- 7:45	6:45- 9:00	6:45- 9:00	Silent	Silent	6:45-10:30
WHA, Madison, Wis.....	360	Silent	Silent	7:45- 8:45	Silent	7:45- 8:45	Silent	7:45- 8:45
WHAA, Iowa City.....	484	Silent	9:00- 9:30	Silent	8:00- 9:00	Silent	Silent	Silent
WHAS, Louisville, Ky.....	400	7:30- 9:00	4:00- 5:00	Silent	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00
WHAZ, Troy, N. Y.....	380	Silent	Silent	8:00-10:00	Silent	Silent	8:00-10:00	Silent
WHB, Kansas City, Mo....	411	Silent	8:00-10:00	7:00- 8:00	8:00-10:00	7:00- 8:00	5:00-11:00	7:00- 8:00
WHK, Cleveland, Ohio.....	283	5:00-11:00	7:00-10:00	5:00- 6:30	5:30- 6:30	5:00- 6:30	8:30-11:00	5:00-11:00
WHN, New York, N. Y....	360	6:30-11:00	8:30-11:00	6:30-11:00	8:30-11:00	6:30-11:00	Silent	8:30-11:00
WHO, Des Moines, Ia.....	526	Silent	7:30- 9:00	7:30-12:00	Silent	7:30- 9:00	7:00-11:00	7:30- 9:00
WIP, Philadelphia, Pa.....	509	7:00-11:00	9:30-12:00	Silent	7:00-11:00	7:00-12:00	Silent	Silent
WJAR, Providence, R. I..	360	6:10- 7:10	Silent	7:00- 8:00	7:00- 8:00	7:30-10:00	6:30- 9:00	6:30-10:00
WJAS, Pittsburgh, Pa.....	286	Silent	Silent	7:30-10:00	7:30-10:00	7:00-12:00	8:00-10:30	6:30- 9:00
WJAX, Cleveland, O.....	390	Silent	Silent	Silent	6:30- 9:00	7:30-10:00	Silent	Silent
WJJD, Mooseheart, Ill.....	278	7:15-12:00	Silent	7:15- 8:15	7:15- 8:15	Silent	6:30- 9:30	7:15- 8:15
WJY, New York, N. Y.....	405	Silent	7:15- 7:45	Silent	6:45- 8:00	7:15- 8:15	6:00-10:30	6:30-10:30
WJZ, New York, N. Y.....	455	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:00	Silent	6:30- 8:00	6:00-10:30
WKAQ, San Juan, P. R...	360	Silent	Silent	Silent	7:00- 8:30	6:00- 7:30	Silent	Silent
WKBF, Providence, R. I..	286	Silent	Silent	Silent	8:00- 9:30	6:30- 8:00	Silent	Silent
WLBL, Stevens Point, Wis.	278	Silent	Silent	Silent	Silent	Silent	Silent	Silent
WLS, Chicago, Ill.....	345	8:00-12:00	6:30- 8:00	Silent	6:30- 1:00	8:00- 9:00	6:30- 1:00	6:30-11:00
WLW, Cincinnati, O.....	423	Silent	7:30- 9:15	8:00-10:00	10:00- 1:00	6:30-12:00	10:00-12:00	Silent
WMAK, Lockport, N. Y....	273	Silent	Silent	Silent	7:00- 9:00	7:00-10:00	Silent	Silent
WMAQ, Chicago, Ill.....	448	6:00-10:00	Silent	Silent	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00
WMC, Memphis, Tenn.....	500	8:30- 9:30	Silent	8:30- 9:30	8:30-12:00	Silent	8:30- 9:30	8:30-12:00
WMH, Cincinnati, O.....	309	10:00-12:00	Silent	8:00-10:00	Silent	8:00-11:00	8:00-10:00	Silent
WNAC, Boston, Mass.....	278	9:00-10:00	7:30- 9:30	6:00-10:00	8:00-10:00	6:00-10:00	8:00-10:00	6:00-10:00
WNYC, New York, N. Y...	526	7:30-10:30	Silent	7:30-10:30	7:30-10:30	7:30-10:30	7:30-10:30	7:30-10:30
WOAI, San Antonio, Texas.	385	Silent	9:30-10:30	Silent	9:30-10:30	Silent	7:30- 8:30	Silent
WOAW, Omaha, Neb.....	526	6:00-11:00	9:00-11:00	6:00-11:00	6:00-12:00	Silent	6:00-12:00	6:00-11:00
WOC, Davenport, Ia.....	484	9:00-10:00	7:00-11:00	8:00-11:00	Silent	8:00- 9:00	9:00-10:00	8:00- 9:00
WOI, Ames, Ia.....	360	Silent	Silent	10:00- 1:00	Silent	Silent	8:00- 9:00	Silent
WOO, Philadelphia, Pa.....	509	Silent	Silent	6:30-10:00	Silent	6:30-10:00	Silent	6:30-10:00
WOR, Newark, N. J.....	405	6:15-10:00	Silent	5:15-10:00	5:15-10:00	5:15-10:00	5:15- 6:30	5:15- 6:30
WOS, Jefferson City, Mo.....	441	Silent	7:30- 8:30	8:00-10:00	Silent	8:00-10:00	Silent	8:00-10:00
WQJ, Chicago, Ill.....	448	7:00- 2:00	8:00-10:00	Silent	7:00- 2:00	7:00- 2:00	7:00- 2:00	7:00- 2:00
WRBC, Valparaiso, Ind.....	278	Silent	7:30- 8:30	7:30- 8:30	Silent	Silent	Silent	Silent
WRC, Washington, D. C...	469	4:15-10:00	Silent	Silent	4:15-10:00	Silent	4:15-10:00	Silent
WRL, Schenectady, N. Y...	360	Silent	Silent	Silent	Silent	Silent	7:00- 8:30	Silent
WRW, Tarrytown, N. Y....	273	8:00- 9:30	7:00- 8:00	6:00- 9:00	8:00- 9:30	8:00- 9:30	7:00- 8:00	8:00- 9:30
WSAC, Clemson Coll., S. C	360	Silent	Silent	Silent	Silent	7:00- 8:00	Silent	Silent
WSAI, Cincinnati, O.....	309	8:00-10:00	3:00- 4:00	10:00-12:00	7:00-10:00	Silent	10:00-12:00	Silent
WSB, Atlanta, Ga.....	429	8:00-12:00	7:30- 9:15	8:00-12:00	8:00-12:00	10:45-12:00	8:00-12:00	8:00-12:00
WTAM, Cleveland, O.....	390	8:00-11:00	Silent	7:00- 9:00	Silent	7:00- 9:00	Silent	Silent
WTAS, Elgin, Ill.....	286	6:00-12:30	6:00-12:30	6:00-12:30	6:00-12:30	6:00-12:30	6:00- 1:30	6:00-12:30
WTAY, Oak Park, Ill.....	283	6:00-11:15	Silent	Silent	6:45-11:15	6:45-11:15	6:45-11:15	6:45-11:15
WWJ, Detroit, Mich.....	517	6:00- 9:00	Silent	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours. This table includes only the evening Radiocasts, and, on Sunday, the late afternoon program.

STATIONS IN ORDER OF WAVE LENGTHS USED

Meters	Call	Meters	Call	Meters	Call	Meters	Call	Meters	Call	Meters	Call
238	KFQX	283	WTAY	341	CHYC	380	WGY	423	WLW	476	WFAA
244	WABN	286	KFGZ	345	WCBD	380	WHAZ	425	CKAC	480	CYL
248	WBBG	286	WAAW	345	WLS	385	WOAI	429	WSB	484	WHAA
263	WGAQ	286	WJAS	360	KJS	390	WJAX	430	CFAC	484	WOC
266	KFNF	286	WKBF	360	KOB	390	WTAM	435	AT9	492	KGW
268	KFPT	286	WTAS	360	WBT	395	KHJ	435	CNRO	492	WEAF
273	KFKB	291	KFKX	360	WCAL	395	WDAR	435	NAA	500	WMC
273	WBBR	294	WEAO	360	WEAY	395	WFI	440	CFCN	509	KLX
273	WEBJ	303	WEEI	360	WGI	400	CFCA	441	WOS	509	WIP
273	WFBH	306	KFDM	360	WHA	400	PWX	448	WOJ	509	WOO
273	WMAK	309	WMH	360	WHN	400	WHAS	448	WMAQ	517	WCX
273	WRW	309	WSAI	360	WJAR	405	WJY	450	CKY	517	WWJ
278	WJJD	312	KGO	360	WKAQ	405	WOR	455	KFOA	526	WHO
278	WLBL	319	WGR	360	WOI	410	CKCD	455	WJZ	526	WNYC
278	WNAC	326	KDKA	360	WRL	411	WDAF	462	WCAE	526	WOAW
278	WRBC	330	CYX	360	WSAC	411	WHB	469	KFI	536	KYW
283	KFMX	330	KFAE	370	CYB	417	WCCO	469	WCAP	546	KSD
283	WHK	337	KNX	370	WEBH	423	KPO	469	WRC		
		337	WBZ	370	WGN	423	WBAV	476	WBAP		

Los Angeles Boasts of Many Famous Dance Orchestras

LOS ANGELES.—Southern California, noted for its pleasure haunts, has probably more famous dance orchestras playing regular broadcasting engagements than any other section of the country.

In addition to Isham Jones' band, heard over the air several times during n Orpheum engagement, Los Angeles ims a number of other masters of copation.

t Hickman's Biltmore hotel orchestra, Abe Lyman's Cocoanut Grove orchestra from the Ambassador, Herb Weidoft and his Cinderella Roof orchestra, Art Landry and his band, Paul Biese's band, Carl Allen's Rendezvous orchestra, Glen Osward's orchestra and the Montmartre cafe orchestra are the most prominent.

Grindell Matthews Returns to U. S.

LONDON. — Grindell Matthews, of "death ray" fame, now in England, is contemplating an early return to the United States in connection with his death ray and several other matters of importance.

UNCLE JOSH AT KPO WEDNESDAY

Saturday, December 13

Saturday, silent night for: CHNC, CNRT, KFAE, KFGZ, KFKX, WAAW, WBAV, WCBD, WCX, WEAO, WEEI, WHA, WHB, WJAX, WKAQ, WLW, WOI.

CKAC, Montreal, Can. (Eastern, 425), 7 p. m., kiddies' stories in French and English; 7:30, Rex Battle and his Mount Royal Hotel concert orchestra; 8:30, special entertainment; 10:30, Joseph C. Smith dance orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 1:30 p. m., concert, Daugherty's orchestra; 6, dinner concert, Westinghouse band, T. J. Vastine, director; 7:30, story time for the little folks; 7:45, feature; 8:30, Charles Wakefield Cadman program of Indian music, Westinghouse band; A. William Kuehner, baritone.

KFI, Los Angeles, Calif. (Pacific, 469), 5-5:30 p. m., Evening Herald, table talk, news; 5:30-6, Examiner news bulletins; 6:45-7, "Secret Service in India," Capt. Basil Webb; 7-8, Johnny Ogden's dance orchestra; 8-9, song recital; 9-10, Examiner varied concert; 10-11, Packard Radio club.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., old time music, Baldra brothers; 10:30, request program.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-11:30 a. m., sunshine hour program; 3:30-4:30 p. m., impromptu studio program, Roy Reid Brignall, G. N. Nichols and others; 7:30-9:30, Aimee Semple McPherson, evangelist, sermon on Divine Healing, special music.

KGO, Oakland, Calif. (Pacific, 312), 8 p. m., "Rip Van Winkle," a legend of the Catskills for the children, KGO players, Wilda Wilson Church, director; Arion trio; 10-1, Henry Halstead's orchestra.

KGW, Portland, Ore. (Pacific, 492), 10 p. m., dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30 p. m., Hi Moulton and his orchestra; 2:30-5, Charlie Wellman's Saturday afternoon frolic; 6-6:30, Art Hickman's concert orchestra; 6:30-7:30, Prof. Walter Sylvester Hertzog, little stories, American history; Helen Pirie, screen juvenile, Uncle John; 8-10, program, Los Angeles Investment company; 10-11, Earl Burtnett's Biltmore hotel dance orchestra.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., inspirational talk; 9, Town Crier, news; 9:30, talk on Radio; 5 p. m., closing markets; 6-7:30, dinner hour music; 8-10, program, Newbrook studios; 10-11, Abe Lyman's Cocoanut Grove orchestra; 11, June Purcell, popular songs.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont Hotel orchestra; 3:30-5:30, tea dansant, E. Max Bradfield's Versatile band; 8-12, Art Weidner and his dance orchestra.

KSD, St. Louis, Mo. (Central, 546), 8 p. m., concert, St. Louis Symphony orchestra, Rudolph Ganz, director; 11:30, Varsity club orchestra.

KYW, Chicago, Ill. (Central, 536), 6:35-7 p. m., children's bedtime story, Uncle Bob; 7-7:30, dinner concert, Congress hotel; 8-8:58, Ballentin Ladies' quartet, Mary Judah, soprano; Osco Heather, tenor; Harold O'Brian, violinist; 9:35-11:30, late show; 12-2, Congress carnival.

WAHG, Richmond Hill, N. Y. (Eastern, 316), 12-2 a. m., George Walter and his dance orchestra; Radio Santa Claus.

WBAV, Columbus, Ohio (Eastern, 423), 9 p. m., dance orchestra, Spring Lakes pavilion.

WBBR, New York, N. Y. (Eastern, 273), 8 p. m., Dr. Hans Haag, violinist; 8:15, piano recital, Mrs. Hans Haag; 8:20, Bible questions and answers; 8:40, Dr. Hans Haag; 8:50, piano solos.

WBZ, Springfield, Mass. (Eastern, 337), 6 p. m., Leo Reisman Hotel Lenox ensemble; 6:30, Copley Plaza orchestra, W. Edward Boyle, director; 7:05, bedtime story for the kiddies; 7:30, Hotel Kimball trio; 8, program, Theodore Schroeder, director; Etta Bradley, soprano; Emma Louise Diedenharn, contralto; Percival Appleby, tenor; Fredericke Schilke, soprano; Naomi Trombley, violinist; Ernest Harry Adams, pianist; 9, concert, Mrs. Margaret F. Anderson, director; 10, concert, Godlenaires-Trumpet quartet; Hayden R. Child, cornetist; Freeman L. Damon, 2nd trumpeter; M. E. Bullard, 3rd trumpterer; William Emery Dean, 4th trumpterer; Harry L. Augusta, accompanist; 11:30, Leo Reisman and his Hotel Brunswick orchestra.

WCAE, Pittsburgh, Pa. (Eastern, 462), 6:30 p. m., dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, special feature; 8:30, musical program, Knights of Columbus, Allegheny Council No. 285.

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf college chapel services; 12 midnight, Reuben Benson, banjoist; Herbert Hauge, saxophonist; Luther Noss, pianist.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., home service, Betty Crocker; 8 p. m., lecture hour; 8:30, musical program; 9:30, dance program, George Osborn's Original Nicollet hotel orchestra.

WCX, Detroit, Mich. (Eastern, 517), 6 p. m., dance music.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's Radio orchestra; 6-7, school of the air, piano tuning-in number on the Duo-Art; address, speaker to be announced; the Tell-Me-a-Story Lady; music, Hotel Muehlebach Trianon ensemble; 11:45-1 a. m., nighthawk frolic, the "Merry Old Chief" and the Plantation players; Cordsen-Mac's orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; 4:30, Cotton Pickers dance orchestra, direction Wilbur de Paris; 7:30, Dream Daddy.

Headliners of the Week

ALL the kiddies will take a trip with Big Ford and Little Glenn to the Land of the Midnight Sun Saturday night over WLS. If you would rather have weird experiences in a more mysterious country, dial for KFI, Los Angeles, and hear Capt. Basil Webb's address on "Secret Service in India." American Indian music will be the feature at KDKA, East Pittsburgh.

Sunday KGO will prepare all listeners in for the San Francisco Symphony orchestra concert to be given a week later. The interpretation of the second movement of the "Beethoven Pastoral Symphony" by the KGO orchestra will be interspersed with comments on Beethoven and his great work.

WLS will have a rival railroad train on the air Monday. WAHG, Richmond Hill, will open with the toot toot of the Long Island train whistle. Sunrise Trail band and the talk on railroad safety will remind one that this is a railroad night. Speaking of traveling, WOC schedules a talk on "What a Million Miles of Travel Have Taught Me," by Major Dent Atkinson.

Cornell college will travel a long way from home to put on a program over the microphone of WHAA Tuesday.

Wednesday night acquire a humorous philosophy at KPO with Uncle Josh. This station will also remind you with Hawaiian music that there is one place where winter is not, and soft warm breezes blow.

"Wedding Bells," an amusing comedy by the WGY players, will be a competitor of Broadway this week Thursday, when WJZ picks up the play from WGY and rebroadcasts it in New York.

Here is a cross word puzzle for you. The Monday Music club of Adel will appear Friday at WHO, Des Moines. KOB is putting New Mexico on the Radio map. A charming college operetta, "Yokahama Maid," will be the feature at this station this evening.

Perhaps all the little children or big listeners in to Aunt Vivien's bedtime stories would like to know that she is the director of KFQX and her picture appeared on the front page of last week's Digest.

Thomas J. Quigley, called "The Daddy of Them All," will sing again this week at WQJ, Chicago, Tuesday, December 16.

Joseph C. Smith is the leader of the Mount Royal Hotel dance orchestra, featured three times a week at CKAC, Montreal.

James H. Kanlo and his Hawaiian trio weekly feature of WEEI, Boston, at the Tuesday evening meeting of the Big Brothers club.

WEAF, New York, N. Y. (Eastern, 492), 4-5 p. m., Bruno Brothers dance orchestra; 6-7, dinner music, Waldorf-Astoria hotel; 9-10, concert, Hotel Waldorf-Astoria orchestra; 11-12, Vincent Lopez and his orchestra from the Hotel Pennsylvania.

WFAA, Dallas, Tex. (Central, 476), 12:30-1 p. m., address, Hugo Swan; 8:30-9:30, Kill-Kay college faculty; 11-12, Adolphus Hotel orchestra.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, Harmony Trumpet quartet, Joseph Myerov, pianist; Nandor Rogavoy, Maurice Freidman, violinists; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 7, Sunny Jim, the kiddies' pal; 8, health talk, "Periodical Examination," auspices Philadelphia County Medical society.

WGR, Buffalo, N. Y. (Eastern, 319), 2:30-4:30 p. m., Buffalo Courier and Enquirer musical program; 6-7:30, dinner music, Hallpryl string quartet.

WGY, Schenectady, N. Y. (Eastern, 380), 9:30 p. m., dance music, Phil Romano's orchestra.

WHAA, Iowa City, Ia. (Central, 484), 7:15 p. m., Wabash-Iowa basketball game.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo theater orchestra, Harry S. Currie, conductor; "Just Among Home Folks;" readings, Courier-Journal, Louisville Times; 7:30-9, Sylvian trio, Fannie Elizabeth Stoll, violinist, Arthur Bertelson, flutist, Evelyn Kaiser, pianist; xlyophone solos, Lee Johnson; Minne Johnson, accompanist.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program, Sweeney Radio trio.

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m., Ponce de Leon orchestra, Herbert Hayward, director, Grebe's Hanna restaurant; sports, news, culinary recipes; 8 p. m., Rainbow club entertainers, Alice Crandall, Vlolet Owens, Billie Bugbee, June Farley, Lucille Phillips, Betty Booth, Bobbie and Dede Fitzpatrick, Ethel Rohde, Dean Smith, Art Cooke, O'Mara and Cody, Phil Passon, George Seegitz, Alex Worth, John Peattie, Norman Waldman, Bert Lloyd, Worley Alton, Rudy Hopke; WHK-Bellhops orchestra, Dean Smith, director; 10 p. m., Ray Stilwell's New York dance orchestra.

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Karl Bonawitz, organist; 3, Aloha Hawaiian Glee club; 4:10, Harmonica recital, George W. Rogers; 6:05, Hotel St. James orchestra; 7, Uncle Wip's bedtime stories; 8, talk, auspices Philadelphia College of Science and Pharmacy; Germania Opera company; 11:05, organ recital, Karl Bonawitz.

WJJD, Mooseheart, Ill. (Central, 278), 9-12 midnight, dance music, Log Cabin.

WJZ, New York, N. Y. (Eastern, 455), 7-8 p. m., Waldorf-Astoria hotel dance orchestra; 10:30-11:30, Hotel Astor dance orchestra.

WLS, Chicago, Ill. (Central, 345), 7 p. m., Big Ford and Little Glenn's trip to Norway; 7:15-12, WLS Review night, Ralph Emerson, organist; Isham Jones and his College Inn orchestra; Carpenter and Ingram, The Harmony Girls; Walter Peterson, "The Kentucky Wonder Bean;" Ford and Glenn.

WMAQ, Chicago, Ill. (Central, 447.5), 6 p. m., Armour Tech. band; 8, Hotel LaSalle orchestra; 8:40, "Mexico," Charles Kent; 9, Chicago theater revue.

WMC, Memphis, Tenn. (Central, 500), 8 p. m., bedtime story, Uncle Jerry; 8:30, concert, Memphis Plectrum orchestra, R. L. Sharp, director; 9:30, Addy Britt & Dick Finch.

WMH, Cincinnati, Ohio (Central, 309), 10 p. m., "Half Hour with Your Neighbor's Children," George Conver, Earl Wintersohle; tenor solos, James Reevers, Thelma Copeland, accompanist; songs, Wright and Bissinger; harmonica solos, Ed. Wald; 11, Hotel Alms Winter Garden orchestra; contralto solos, Marie Turner; piano solos, Lelia Lemar; Murray Horton's orchestra.

WOC, Davenport, Ia. (Central, 484), 7 p. m., sandman's visit, Val McLaughlin; 7:30, discussion of the International Sunday School lesson, Rev. M. A. Getzendaner; 9, Louis Connor and his LeClaire hotel orchestra; song and novelty numbers, Peter MacArthur.

WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra, Robert E. Golden, director; 5:10, sports results and police reports; 5:15, organ recital, Mary E. Vogt; John Wanamaker Commercial Institute band concert.

WOR, Newark, N. J. (Eastern, 405), 2:30-3 p. m., Edna Dahl, contralto and Ida Fehleisien, soprano; 3:15-4, Edna Dahl and Ida Fehleisien; 6:15-7:15, "Music While You Dine," Clifford Lodge orchestra; 7:15-7:45, resume of the day's sports; 8-8:15, Schubert string quartet; 8:15-8:45, program, direction of Gordon Johnstone; 8:45-9:20, program, direction Mme. Florence Wesell; 9:20-9:35, Capt. Jerome Hart; 9:50-10, Capt. Jerome Hart; 10-10:45, Temple B'nai Abraham; 10:45-11, Ben Friedman entertainers.

WQJ, Chicago, Ill. (Central, 448), 11-12 m., home economics program, Helen Harrigton Downing; "What Every Housewife Should now about Linens," Mrs. Wilbur E. Fribley; "Women's Citizenship," Mrs. Sarah Darling; "Pressure Cookers," H. F. West; 3-4, "Rogee Klatsch;" 7-8, dinner concert, Ralph Williams and his Rainbo Garden orchestra; Henrietta Nolan, violinist; Miriam Burns, soprano; Lois Mackey, accompanist; Milford Burdsall, baritone; George Sippel, pianist; 10-2, Ralph Williams and his Rainbo Skylarks; Jerry Sullivan; Joey Stool and Lew Butler, Harmony Singers; Lindsey Coons, Baritone; Sandy Meek, Scotch tenor; the Melodians, Laurie, Eddie, Bennie.

WSAI, Cincinnati, Ohio (Central, 309), 8 p. m., chimes concert; 8:15, Stept and Collins; 8:30, Bicycle male quartet; 9, weekly news review, Allison F. Stanley; 9:15, Bicycle mixed quartet; 9:30, reading, "To Texas," John Drury; 12, Stept and Collins; 12:30, Freda Sanker's Toad Stool orchestra.

WSB, Atlanta, Ga. (Central, 429), 6 p. m., bedtime story, Bonnie Barnhardt; children's songs, Helen Colley; 8-9, Carolyn Hinkle on the Virginia Girls; Tommy Lowndes, J. C. Simmons; 10:45, Ed and Grace McConnell Hired Help Jubilee.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m., Guy Lomabardo's Royal Canadians orchestra; 9 p. m., WTAM dance orchestra, Ev Jones, director; solo numbers, popular entertainers.

WTAY, Oak Park, Ill. (Central, 286), 6:45-7:45 p. m., Helen Pollenz, pianist; Blossom Klein, violinist; Bashful Ray Luehr, baritone; Glenn Bruce, reader.

WWJ, Detroit, Mich. (Eastern, 517), 3 p. m., The Detroit News orchestra; 7, The Detroit News orchestra.

Sunday, December 14

Sunday, silent night for: CHNC, CKAC, CNRT, KFAE, KFKX, KFNF, KFQX, MAAW, WBAV, WCAE, WCBD, WEAO, WHA, WHAS, WJAX, WKAQ, WOI, WSAI, WTAY.

KFDM, Beaumont, Tex. (Central, 306), 9 p. m., sacred concert.

KFQZ, Berrien Springs, Mich. (Central, 286), 7 p. m., Aunt Ella's bedtime story; 8:15-8:30, Radio Lighthouse choir; 8:30-8:40, Katherine Borgen, violinist; Rena Eby, flutist; 8:40-9:05, Pastor John Knox, Lighthouse evangelist; 9:05-10:15, Robert Hodgins, cellist.

KFI, Los Angeles, Calif. (Pacific, 469), 10-10:30 a. m., L. A. Church Federation service; 4-5 p. m., vesper service; 6:45-7, musical appreciation talk; 7-8, stage act, specialties, orchestra of Metropolitan theater; 8-9, instrumental trio; 9-10, Examiner dance orchestra; 10-11, Packard Six orchestra.

KFNF, Shenandoah, Ia. (Central, 266), 3 p. m., religious service, Mrs. Ernest Frisch, director.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-12:30 p. m., complete religious service of Angelus Temple, Aimee Semple McPherson, pastor; 2:30-4:30, auditorium service and sermon, silver band and choir; 7-9:45, evening service Angelus Temple, sermon, Aimee Semple McPherson, special musical program; 10-11, organ recital, Roy Reid Brignall.

KGO, Oakland, Calif. (Pacific, 312), 3:30 p. m., KGO Little Symphony orchestra, Carl Rhodehamel, conductor; 7:30, service, First Baptist church, Rev. John Snape, pastor.

KGW, Portland, Ore. (Pacific, 492), 3 p. m., municipal concert; 6, church services, Portland Council of churches; 7, dinner concert, Colburn concert orchestra; Dorothy Lewis, mezzo-soprano.

KHJ, Los Angeles, Calif. (Pacific, 395), 10-10:30 a. m., address, Rev. Chas. F. Hustlor of Washington Christian church; 10:30-12:30 p. m., organ numbers and religious service of First Methodist Episcopal church, E. E. Helms, pastor; 6:30-7, Art Hickman's Biltmore hotel concert orchestra; 7-7:30, organ recital, Arthur Blakely; 8-10, program presented by Martin Music company.

KJS, Los Angeles, Calif. (Pacific, 360), 10:30-12:30 p. m., religious service, Church of Open Door, Dr. Freneh E. Oliver, pastor; 6-7, vesper service, special music; 8-9:30, evening service, organ recital and assisting artists.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., morning prayer; 7-7:30 p. m., vesper service; 8-9, Ambassador hotel concert orchestra, Jos. Rosenfeld, director; 9-10, program prescnted by Carson-Baruch Baking company.

KPO, San Francisco, Calif. (Pacific, 423), 11-12 m., undenominational and non-sectarian church services, Dr. James West, speaker; Greenwell, bass; Theodore J. Irwin, organist; 8:30-10, Rudy Seiger's Fairmont hotel orchestra.

KYW, Chicago, Ill. (Central, 536), 11 a. m., Central church service, Dr. F. F. Shannon; 2:30 p. m., studio chapel service, Arthur H. Kaub, rector at Windsor Park Evangelical Lutheran church; 7, Chicago Sunday Evening club, address, Dr. James I. Vance.

WBAV, Columbus, Ohio (Eastern, 423), 2:30 p. m., religious services at studio, Columbus Council of churches.

WBBR, New York, N. Y. (Eastern, 273), 9:10 p. m., Watchtower string quartet; 9:25, violin duet, George Twaroschk, Carl Park; Chester Haughlin, pianist.

WBZ, Springfield, Mass. (Eastern, 337), 8:30-10 p. m., concert.

WCAE, Pittsburgh, Pa. (Eastern, 462), 3 p. m., People's Radio church services; 4, Prof. Otto Kaltels, pianist; 6:30, dinner concert, William Penn hotel.

WCAL, Northfield, Minn. (Central, 360), 8:30 p. m., Erling Rossing, tenor; Alma Olsen, contralto; Arthur Solberg, pianist.

WCAU, Philadelphia, Pa. (Eastern, 278), 5:15 p. m., recital of sacred songs; 5:30, Bible talks; 6, dinner music, Meyer Davis Hotel Pennsylvania orchestra, direction Louis Baer.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 11 a. m., service, Trinity Baptist church, Dr. David

(Continued on page 14)

AMERICAN INDIAN MUSIC AT KDKA

Sunday, December 14

(Continued from page 13)

Bryn Jones, rector; 4:10 p. m., service, House of Hope Presbyterian church, St. Paul, Rev. H. C. Swearingen, pastor; 7:20, Second Church of Christ, Scientist; 9:15, classical concert.

WCX, Detroit, Mich. (Eastern, 517), 6 p. m., dance music; 7:15, church services.

WDAF, Kansas City, Mo. (Central, 411), 4-5 p. m., Milan Mahale, violinist, Kathryn Kirk, cellist and Jessie Mae Kirk, pianist (trio) playing "At Dawning" and "Deep River;" Thelma Harrison, pianist, playing "Polonaise;" Ruth Gurnell, violinist, playing "Souvenir;" Kathryn Kirk, cellist, playing "Berceuse;" Helen Banta, pianist, playing "Autumn;" Mortimer Alport, violinist, playing "Melodie;" Aletha Laport, playing "The Lark;" Milan Mahale, violinist, playing "Serenade;" and Dorothy Busher, pianist, playing "Impromptu."

WDAR, Philadelphia, Pa. (Eastern, 395), 2:30 p. m., Arcadia cafe concert orchestra, direction Feri Sarkozi; 8, round table forum.

WEAF, New York, N. Y. (Eastern, 492), 2-8:30 p. m., "Sunday Hymn Sing," auspices of Greater New York Federation of churches; 7:20-9:15, Roxy and His Gang, Capitol theater; 9:15-10:15, organ recital, Skinner Organ company.

WEEI, Boston, Mass. (Eastorn, 303), 7:20-10 p. m., musical program, Mark Strand theater, Moe Mark, director.

WFAA, Dallas, Tex. (Central, 476), 6-7 p. m., Radio Bible class, Dr. William M. Anderson; 7:15-9, evening service, City Temple Presbyterian church, Dr. L. D. Young; Jack A. Davis, pianist; Mort Herron, orchestra; Katherine Hammons, organist; J. Wesley Hubbel, choir director; 9:30-11, Jimmy Allen's orchestra.

WFI, Philadelphia, Pa. (Eastern, 395), 4 p. m., talk, Dr. Aydelotte, of Swarthmore college; 7:30, Arch Street Presbyterian church services.

WGR, Buffalo, N. Y. (Eastern, 319), 3-4 p. m., vesper service, the Rev. Fletcher Honan, pastor of the Central Park Methodist Episcopal church, speaker; 4-5, organ recital, John F. Gunderman, Jr.; 7:15, music and service, Central Park Presbyterian church, William Wall Whiddit, organist; Dr. Robert J. MacAlpine, speaker.

WGY, Schenectady, N. Y. (Eastern, 380), 10:30 a. m., service, First Reformed church, Rev. W. L. Searle; 3:55 p. m., program, WGY Symphony orchestra, Leo Kliwen, conductor; Ben Franklin, tenor; 5, Dr. Frank Sill Rogers; 7:30, services, First Reformed church; 9, Symphony music, Waldorf-Astoria, Joseph Knecht, director.

WHAA, Iowa City, Ia. (Central, 484), 9-9:30 p. m., familiar hymns, Mrs. Edna L. Hostatter, soprano.

WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., organ music; 10, church service, Broadway Baptist church, Rev. Dr. Russel Johnson Pirkey, pastor; H. U. Goodwin, organist; Mrs. O. W. Edinger, soprano; Angeline McCrocklin, contralto; Charles H. Barnes, Jr., tenor; William Cornwall, baritone; 4-5 p. m., vesper song service, auspices Mrs. Jane Webster Murrell.

WHB, Kansas City, Mo. (Central, 411), 9:45-11 a. m., services, Linwood Boulevard Christian church, Dr. Burris Jenkins, pastor; 8-9:15 p. m., classical program, Kansas City Western Dental College band, Forrest Cooke Castle, director; 12 m., popular program.

WHK, Cleveland, Ohio (Eastern, 283), 10:30 a. m., religious service, Old Stone church (Presbyterian), Rev. Dr. Foulkes, pastor; 8 p. m., chapel services, auspices Cleveland Federated churches, Rev. E. R. Wright, director; current religious topics; sacred music, invocation; 9 p. m., Miriam Ward, contralto; Mary E. Black, soprano; Jean Webster Erisman, soprano; Florence Clark Wiseman, Blanche M. Lehman; Elizabeth Wiedeman Kelly, soprano; F. W. Hinz, tenor; C. J. Sloan, baritone; Courtney Roy Putt, pianist; Roy J. Crocker, pianist.

WHO, Des Moines, Ia. (Central, 526), 7:30-9 p. m., The Emelie Ritchie String quartet; Hugh Gibson, 1st violinist; Keith Davis, 2nd violinist; Richard Cubbage, violin-cellist; Richard Zug, violist; Myrtle Williams, soprano; Helen Birmingham, pianist.

WIP, Philadelphia, Pa. (Eastern, 509), 4, talk, auspices Germantown Y. M. C. A.; 7:15, services, Holy Trinity church, Rev. Floyd D. Tompkins, D. D., rector.

WJY, New York, N. Y. (Eastern, 405), 8:15-10 p. m., American Orchestral society; 10-10:15, "Reminiscenses of a Reporter," William H. Crawford.

WJZ, New York, N. Y. (Eastern, 455), 9-10 a. m., children's hour, original stories by authors, music by composers, comic stories by originators of famous comedies; 11-12, church services; 2:30-3:30 p. m., Radio Bible class; "Your Best Christmas Gift," Rev. John H. Fitzgerald, Church Community chorus, direction of Clarence W. Allen, Helen Manning, accompanist; 3:30-4, "Three Steps in Glory," Rev. Henry Clay Risner; 4-5, St. George's Episcopal vesper services; 5:45-6:15, "The Heights of Heroism," literary vespers by Edgar White Burrill; 7-8, Nathan Abas' Hotel Pennsylvania orchestra.

WLS, Chicago, Ill. (Central, 345), 6:30-7 p. m., Ralph Emerson, organist; 7-8, musical program, Walther league.

WLW, Cincinnati, Ohio (Central, 423), 9:30 a. m., Sunday school; 11, sermon, Rev. Frank Stevenson, Church of the Covenant; 7:30 p. m., sermon, Dr. Frederick McMillin, Walnut Hills First Presbyterian church; 8:30, Western and Southern orchestra.

WMC, Memphis, Tenn. (Central, 500), 11 a. m., services, St. Mary's Episcopal cathedral, Rev. I. H. Noe, dean.

WMH, Cincinnati, Ohio (Central, 309), 7 p. m., sermon, Rev. J. J. Castleberry, Walnut Hills Christian church.

WOAW, Omaha, Nebr. (Central, 526), 9 a. m., Radio chapel service, conducted by Rev. R. R. Brown, pastor of the Omaha Gospel Tabernacle of the Christian and Missionary Alliance, and minister of the Sunday morning world Radio congregation; 2:15 p. m., matinee program, Carson, Iowa; 6, Bible study period, personal direction of Mrs. Carl R. Gray; 9, musical chapel service, First Methodist Episcopal church choir, Dr. James E. Wagner, pastor.

WOC, Davenport, Ia. (Central, 484), 8 p. m., church service, "The Wavelength from the Soul to God," Rev. Otis L. Bowman; 9:30, The Palmer School Radio orchestra, Erwin Swindell, conductor.

WOO, Philadelphia, Pa. (Eastern, 509), 2:30 p. m., musical exercise opening Sunday school session, Bethany temple; 6, grand organ sacred recital, Clarence K. Bawden; 7:30, services, Bethany temple, Rev. Dr. Gordon A. MacLennan; organ recital, Caroline Quigg.

WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m., First Presbyterian church, Rev. W. Hooper Adams.

WQJ, Chicago, Ill. (Central, 448), 10:30 a. m., sermon, Dr. Preston Bradley; choir 100 voices, Clarence Eddy; 8-10, Ralph Williams and his Rainbo Garden orchestra; Maria Dnaprova, Russian soprano; Lancaster Smith, bass; Mrs. Lancaster Smith, accompanist; Maxine Mordy, violinist; Alma Wilson McMahill, dramatic soprano; Ruth Wilson, pianist; Eleanor Wilson, cellist, contralto.

WSAI, Cincinnati, Ohio (Central, 309), 3 p. m., sermonette; 3:10, sacred chimes concert.

WSB, Atlanta, Ga. (Central, 429), 11 a. m., First Presbyterian church service; 7:30 p. m., Wesley Memorial church service.

WWJ, Detroit, Mich. (Eastern, 517), 2 p. m., The Detroit News orchestra; 7:30, services, St. Paul's Episcopal cathedral.

LISTEN TO WGR FOR "MIKE" AND HIS SAX

Here is Michael "Mike" Manguso, who makes the baritone saxophone in the Vincent Lopez Hotel Statler dance orchestra do tricks. He will be featured by the orchestra leader, Harold Gieser, the week of December 14 at WGR, Buffalo. See the Digest WGR programs for details.
Colegrove Studio, Buffalo.

Monday, December 15

Monday, silent night for: CNRT, KFNF, KYW, WBAV, WCAL, WEAO, WEBH, WGN, WHAA, WHAS, WJAX, WKAQ, WLS, WMAQ, WQJ, WRC, WTAM, WTAY.

CHNC, Toronto, Can. (Eastern, 350), 8:30 p. m., Adele Doney, pianist; Florence Richardson, violinist; Violet Murray, contralto; Elsie White, soprano; Gerrard J. Kelly, tenor.

CKAC, Montreal, Can. (Eastern, 425), 1:45 p. m., Mount Royal hotel concert orchestra; 4:30, Ilo lessons.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., Scotch songs and readings, Janet Rae; "Washington's 4-H Clubs and What They Did," Elmina White; Dea Davis, reader; "Mission of the Country Newspaper," T. J. O'Day; U. S. public health talk.

KFGZ, Berrien Springs, Mich. (Central, 286), 7 p. m., Aunt Ella's bedtime story; 8:15-9:15, Radio Lighthouse Musicmakers orchestra concert.

KFI, Los Angelos, Calif. (Pacific, 469), 8-9 p. m., Evening Herald Radiolians dance orchestra, Marjorie Lake, female baritone; 9-10, Walter Murphy program; 10-11, Examiner, Instrumental and vocal.

KFKX, Hastings, Nebr. (Central, 291), 9:30 p. m., program, Hastings College Conservatory of Music.

KFQX, Seattle, Wash. (Pacific, 238), 7:15-7:45 p. m., Aunt Vivien's bedtime story; 8-9, Earl Gray and his orchestra; 9-10, concert; 10-11, Earl Gray and his Butler hotel orchestra.

KGO, Oakland, Calif. (Pacific, 312), 8 p. m., Arion trio; "Our Forests—Shall We Burn or Protect Them?" Prof. W. Metcalf; "A Lesson in English," Wildo Wilson Church; "Cause and Cure of Stammering," Robert Lloyd; "Chats About New Books," Joseph Henry Jackson; 10-11, Henry Halstead's orchestra.

KGW, Portland, Ore. (Pacific, 492), 5 p. m., children's program; travel story, Aunt Nell; 8, concert, Oregonian concert orchestra; 10, dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:30 p. m., news and music; 2:30-3:30, matinee musicale, Pacific States Electric company.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., inspirational talk; 9, Town Crier, news; 10:30, Mrs. Kate Drew Vaughn, home economics; 11, Dr. Richard M. Scott, talk on domestic pets; 8-10, program, L. A. Ice and Cold Storage company; 10-11, Lindsey's Studebaker dance orchestra; 11-12, Abe Lyman's Cocoanut Grove dance orchestra.

KOB, State College, N. M. (Mountain, 360), 7:30-8:30 p. m., musical program.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont hotel orchestra; 4:30-5:30, Rudy Seiger's Fairmont hotel orchestra; 5:30-6:30, children's hour stories, Big Brother of KPO; 7-7:30, Rudy Seiger's Fairmont hotel orchestra; 8-9, Theodore J. Irwin, organist; 9-10, Lorraine Ewing, pianist; Janet Malbon, soprano; Irene Polzin, accompanist; Llewlyn Hughes, violinist; J. E. Driscoll, baritone; 10-11, E. Max Bradfield's Versatile band.

KSD, St. Louis, Mo. (Central, 546), 7 p. m., music and specialties, Missouri theater; 9, music, Grand Central theater.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 6:35-7, children's bedtime story, Uncle Bob.

WAAW, Omaha, Neb. (Central, 266), 7:30-9 p. m., program, Mrs. Ed Morcarty, director.

WAHG, Richmond Hill, N. Y. (Eastern, 316), 7:30 p. m., train announcer, toot-toot, here comes the L. I. train; 7:35-8:05, Trainmen's trio; 7:45-7:50, Mae Poehland, cornetist; 7:50-8:05, Sunrise Trail band; 8:05-8:10, Mrs. E. Bonne, soprano; 8:10-8:15, bridal chorus, Ralph Peters glee club; 8:15-8:25, recitations, Ethel Connor; 8:25-8:35, William R. Morris, tenor; 8:35-8:45, French horn, flute solos, Messrs. Risica and King; 8:45-9, Sunrise Trail band selections; 9-9:10, Santa Claus; 9:10-9:20, "Railroad Safety," T. P. Brennan; 9:20-9:30, "Foolishness," the McDermotts; 9:30-9:35, negro spiritual; glee club; 9:35-9:45, instrumental trio, cello, violin, piano, Messrs. Rengl, Sachse, Cravens; 9:45-9:50, Elizabeth Neusch, contralto; 9:50-10, a little jazz, Lopez Poehland, clarinetist; Mendelsohn, pianist; Posner, trombonist; Diehl, cornetist; Gluck, saxophonist; Cook, drum; 10-10:10, Laurence W. Ballou, baritone; 10:10-10:15, brass quartet, baritone; 10:15-10:25, Mrs. Margaret Molloy, soprano; 10:25-10:35, McDermott and Haegny, Scotch songs, stories; 10:35-10:45, J. Wesley Ossman, musical glasses; 10:45-11, Edna Zitzmann, pianist; 11-11:05, Ralph Peters glee club; 11-05-11:30, Sunrise Trail band selections; 12-2 a. m., midnight program, Colonial Royal dance orchestra; Santa Claus.

WBBR, New York, N. Y. (Eastern, 273), 8 p. m., orinetal music, Toufic Moubaid, Elizabeth Awad; 8:10, Fred Franz, tenor; 8:20, world news, editor of Golden Age; 8:40, Fred Franz, tenor; 8:45, oriental music.

WBZ, Springfield, Mass. (Eastern, 337), 6-7 p. m., dinner concert; 7:10, kiddies' bedtime stories; 7:15-7:30, lecture; 8-10:30, concert; 11:30-12, McEnelly's singing orchestra.

WCAE, Pittsburgh, Pa. (Eastern, 462), 6:30 p. m., dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, address; 8, weekly music chat, Mrs. Ethel Davis; 8:15, Radio dancing lesson, number 11; 8:30, musical program; 10:30, Flight of the Mythical Dirigible.

WCAU, Philadelphia, Pa. (Eastern, 278), 6 p. m., Meyer Davis Hotel Pennsylvania dance orchestra; 8, recital.

WCBD, Zion, Ill. (Central, 345), 8 p. m., saxophone quintet; Richard F. Hire, pianist; Mark Whiteside, baritone; M. P. Barton, tenor; Erma Reynolds, soprano; George Beem, marimba soloist; Glenn Sparrow, tenor.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., home service, "Cranberries," Betty Crocker; 2 p. m., woman's hour, "My Job," talk arranged Mpls. Woman's Rotary club; 2:30, matinee musical; 4, magazine hour, "Excerpts from the Autobiography of Mark Twain;" 5:30, children's hour, Gold Medal Lady; 8:30, musical program, Chamber of Commerce, Minot, North Dakota; 10, dance program, Original George Osborn's orchestra, Nicollet hotel; Fred Hughes and Bill Axtman, entertainers.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., music; 6, dance music; 7, musical program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's string trio; 5-5:30, weekly Boy Scout program; 6-7, school of the air, piano tuning-in number on the Duo-Art; C. H. Cheney, fifth of a series of talks on banking; the Tell-Me-a-Story lady; music, Hotel Muehlebach Trianon ensemble; 8-9:15, "Around the Town with WDAF;" 11:45-1 a. m., nighthawk frolic, the "Merry Old Chief" and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; 4:30, piano recital, Marcella North; 7:30, Dream Daddy; 7:45, short wargo-waves; 7:55, concert, Stanley theater; 8:30, Esther Cohen quartet, program of Hebraic music; 10:05, Arcadia cafe dance orchestra; vaudeville features from Fay's theater.

WEAF, New York, N. Y. (Eastern, 492), 6-7 p. m., dinner music, Waldorf-Astoria hotel; 8-8:15, Mears and company talk; 9-10, A. and P. Gypsies; 10-11, Bud Fisher's Happy players.

WEEI, Boston, Mass. (Eastern, 303), 6 p. m., Jack Renard and his Mansion Inn orchestra; 7, Boston Edison Big Brother club; 7:30, "A Few Minutes with Santa Claus," courtesy of Houghton & Dutton company; 8, Laselle Seminary Christmas concert; 8:45, Buddy's Bostonians; 9:30, musicale; 10:30, Dok Eisenbourg and his Sinfonians; 11, Dok Eisenbourg and his Sinfonians.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, report, closing prices Chicago grain market; 3:05, Catherine V. Heuser, trumpeter; Mildred Cox, soprano; talk, "Human Education," Mrs. Ed. S. Stackhouse; James T. Van Atta, violinist; Ambrose McIntyre, baritone; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 7, Sunny Jim, the kiddies' pal.

WGN, Chicago, Ill. (Central, 370), 1:40 p. m., luncheon concert, Drake concert ensemble; Blackstone string quintet; 2:30, Lyon & Healy artist series; 3, rocking chair time, musical program and excerpts from Chicago Tribune, Liberty magazine; 5:30, Skeezix time for the children, Sen Kaney; 6, organ recital, Lyon & Healy; 6:30-7, dinner concert.

WGR, Buffalo, N. Y. (Eastern, 319), 2:30-4:30 p. m., Buffalo Courier and Enquirer musical program; 6:30-7:30, dinner music, Vincent Lopez Hotel Statler dance orchestra, Harold Gieser, director; 9-11, concert, Wheat's Ice Cream company; 11:30, supper-dance music, Vincent Lopez Hotel Statler dance orchestra, Harold Gieser, director.

WGY, Schenectady, N. Y. (Eastern, 380), 2 p. m., "Keeping the Children Well in Winter," Dr. Caroline Crossdale; 2:45, WGY orchestra; Walter Reagles, tenor; Edward A. Rice, violinist.

WHA, Madison, Wis. (Central, 275), 7:45 p. m., Choral Union of University of Wisconsin, Prof. E. B. Gordon, director.

WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., talk, J. M. "Sam" Barry, basketball and baseball coach.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo theater orchestra; "Just Among Home Folks;" readings, Courier-Journal, Louisville Times.

WHAZ, Troy, N. Y. (Eastern, 380), 9 p. m., Lawrenee trio, Mrs. William T. Lawrence, soprano; William T. Lawrence, violinist; Willard D. Lawrence, cellist; Eleanor G. Padley, pianist; 11, Geiger's dance orchestra.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program, Sweeney Radio trio; 7-8, address, F. B. Hyde; music, Gilbert Jaffy's orchestra.

WHK Cleveland, Ohio (Eastern, 283), 6 p. m., Ponce de Leon orchestra, Herbert Mayward, director, Grebe's Hanna restaurant; sports, news, culinary recipes; 7, Ethel O. Havens, bedtime story.

WHO, Des Moines, Ia. (Central, 526), 7:30-9 p. m., Stewart Watson, baritone; classical program, Dean Holmes Cowper, director; 11:15-12, L. Carlos Meier, organist.

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Gimbel tea room orchestra, Ray Steen, director; 3, "Bible for the Student," H. W. Kline; 6:05, St. James orchestra; 7, Uncle Wip's bedtime stories.

WJJD, Mooseheart, Ill. (Central, 278), 7:15-8:15 p. m., Philharmonic orchestra; talk on athletics, Ben Oswalt.

WJZ, New York, N. Y. (Eastern, 455), 10-10:20 a. m., housewives league menu, Mrs. Julian Heath; 10:20-10:30, Shoppers' Guide, Mrs. Pauline Peck; 10:30-10:40, Home Beautiful, Dorothy Ethel Walsh; 10:40-10:50, talk, John C. Cutting of Meat Council of New York; 10:50-11, fashion talks, Eleanor Gunn; 1-2 p. m., Henry Vander Zanden's Hotel Ambassador trio; 4:30-5:30, Waldorf-Astoria tea music; 7-8:15, Bernhard Levitow's Hotel Commodore concert orchestra; 8:15-8:30, "Sociology," Prof. E. George Payne of N. Y. U. Air college; 8:30-9:30, club musicale; 9:30-9:45, "Philosophy of Nutrition," Alfred W. McCann; 9:45-10, Marguerite Manierre, soprano; 10:45-11:45, Jacques Green and his Club Deauville orchestra with Clarke's Hawaiians.

WLW, Cincinnati, Ohio (Central, 423), 8 p. m., Roegr's orchestra; 8:30, drama (second part) "The Joy of Living;" 9, Cooper orchestra and quartet; orchestra selections, "Clipso," "Medley of Southern Melodies," "A Toi," "Follow the Flag."

WMAQ, Chicago, Ill. (Central, 447.5), 4 p. m., mothers in council, Mrs. Frances M. Ford; 4:30, talk on English, Mrs. J. Elliott Jenkins; 6, Chicago theater organ recital; 6:30, Hotel La Salle orchestra.

WMC Memphis, Tenn. (Central, 500), 8 p. m., bedtime story, Unele Perey; 8:30, concert, Georgia Serenaders, Hotel Gayoso.

WMH, Cincinnati, Ohio (Central, 309), 8 p. m., songs, Wright and Bessinger; 8:30, Blue Grass orchestra; 8:45, organ recital, Kurt Henkel; 9, dance music, Blue Grass orchestra.

WOAW, Omaha, Nebr. (Central, 526), 6 p. m., dramatic hour, Davis Studio of expression; 6:30, to be announced; 6:45, dinner program, Sammy Heiman's orchestra of the Brandeis Store restaurants; 9, program, courtesy of Bnai Brith, Omaha Lodge, arranged by Abner Kaiman.

WOC, Davenport, Ia. (Central, 484), 7:20 p. m., "The Age of Chiropractic," H. E. Vedder; 8, Schmidt Music company concert orchestra; 9:30, "What a Million Miles of Travel Has Taught Me," Major Dent Atkinson; 10, one-act comedy, "The Rough Diamond," Dramatic club, W. Moy Van Allen, director.

WOI, Ames, Ia. (Central, 360), 8 p. m., Christmas carols, Girls' Glee club.

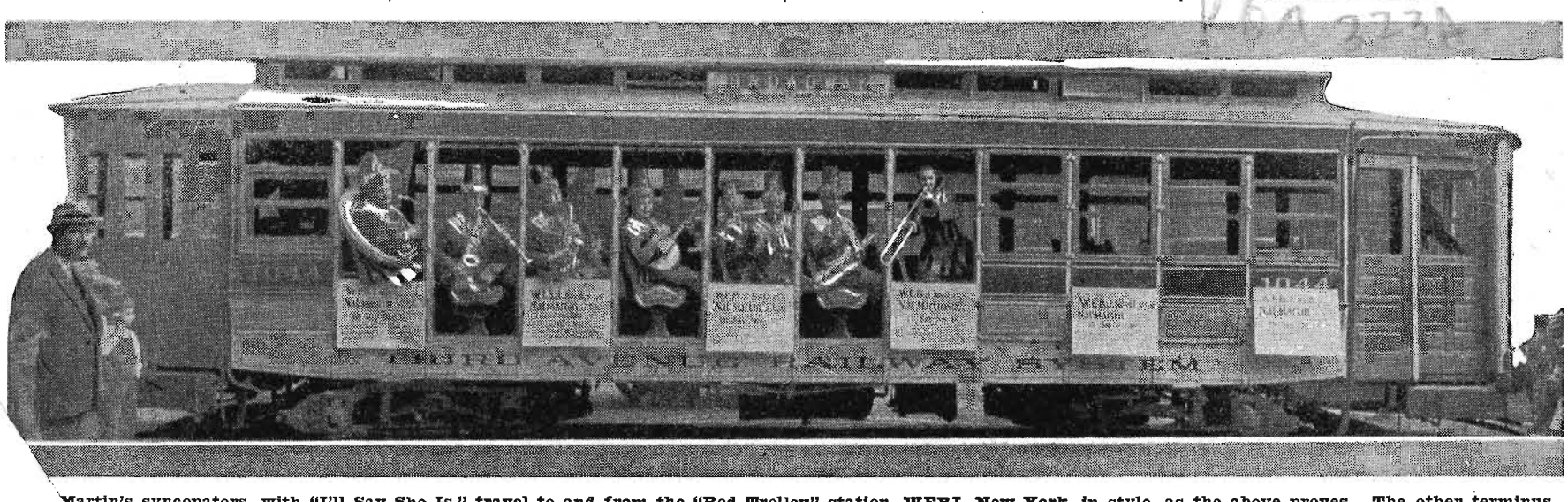
WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra, Robert E. Golden, director; 5:10, sports results; 5:15, organ recital, Mary E. Vogt; 7:30, A. Candelori and his Hotel Adelphia concert orchestra; 8:30, Erno Rapee and his Fox theater grand orchestra; 9, WOO concert orchestra; 10:03, organ recital, Mary E. Vogt; 10:30, Vincent Rizzo and his Hotel Sylvania dance orchestra.

WOR, Newark, N. J. (Eastern, 405), 2:45-3 p. m., Y. M. C. A. talk; 3:45-4, fashion talk, Charm magazine; 6:15-7:15, Dave Harmon's Cinderella orchestra; 7:15-7:30, resume of day's sports; 8-8:30, Albert Verchamp, pianist; 8:30-9:30, musical program, Branford theater; 9:45-10, Arthur Murray, dancing instructions; 10-11, Carolinians; 11-11:30, Perry and Russell, two-man singing orchestra.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., Harry M. Snodgrass, "King of the Ivories."

WQJ, Chicago, Ill. (Central, 448), 11-12 m., home economics program, Helen Harrington Downing, director;

(Continued on page 15)



Martin's syncopators, with "I'll Say She Is," travel to and from the "Red Trolley" station, WEBJ, New York, in style, as the above proves. The other terminus of their travels is the theater where "I'll Say She Is" is making a big hit. Hear them this week.

CORNELL COLLEGE ON AIR AT WHAA

Monday, Dec. 15

(Continued from page 14)

"Christmas Toys for Your Children," Marcia Meadows; "Helps for the Housewife," Mrs. Luelnia Judd; "Flower Decorations for the Holidays," Harvey E. Larson; 3-4 p. m., "Your Christmas Dinner," Helen Harrington Downing; book review, Rev. Fred Harrison.

WSAI, Cincinnati, Ohio (Central, 309), 10 p. m., songs, Stept and Collins; 10:15, Cliff Burns' Country club orchestra.

WSB, Atlanta, Ga. (Central, 429), 12 m., entertainment; 6 p. m., bedtime stories, Bonnie Barnhardt; 8-9, Emily G. Watts, soprano; W. S. Ghays, Jr., program; 10:45, Warners Seven Aces.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m., Philip Spitalny's Music Box orchestra; 8, conctrt program. Spitalny's Music Box orchestra; 8, concert program.

WWJ, Detroit, Mich. (Eastern, 517), 3 p. m., The Detroit News orchestra; 8:30, Central Concert quartet.

Tuesday, December 16

Tuesday, silent night for: CHNC, CNRT, KFAE, KFKX, KOB, WAAW, WBBR, WCBD, WEAO, WHA, WHO, WMH, WOC, WOI, WOS.

CKAC, Montreal, Can. (Eastern, 425), 7 p. m., kiddies' stories in French and English; 7:30, Mount Royal hotel concert ensemble; 8:30, Signor Manetta, from Milan opera and his party; 10:30, Joseph C. Smith and his Mount Royal hotel dance orchestra.

CNRR, Regina, Can. (Mountain, 420), 8 p. m., bedtime travel tale; H. J. Becord's orchestra.

Elsa Alsen (above) will sing Santuzza in the opera "Cavalleria Rusticana." Nelson Eddy (right) is Tonio in "Pagliacci."

KFI, Los Angeles, Calif. (Pacific, 469), 5-5:30 p. m., Evening Herald, talble talk, news; 5:30-6, Examiner: Anton Lada's Louisiana Five; 6:45-8, Aeolian residence pipe organ recital, Dan McFarland, organist; 8-9, Frederick Herrmann, basso-cantante; 9-10, Examiner: varied program; 10-11, Packard ballad hour.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., De Molay Harmony boys.

KFQX, Seattle, Wash. (Pacific, 238), 7:15-7:45 p. m., Aunt Vivien's bedtime story; 8-9, Earl Gray and his orchestra; 9-10, concert; 10-11, Earl Gray and his Butler hotel orchestra.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-11:30 a. m., sunshine hour; 3:30-4:30 p. m., organ recital, Esther Fricke Green; 6:30-7:30, children's program, "Cousin Jim" and associates.

KGD, Oakland, Calif. (Pacific, 312), 8 p. m., Oakland Orpheus male chorus; Edwin Dunbar Crandall, director; Bessie Beatty Roland, accompanist; Mrs. Ralph Lachmund, soprano; Charles F. Bulotti, tenor; Carl F. Volker, baritone; 10-1, dance music, Henry Halstead's orchestra.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., concert; 5, children's program; story, Uncle Dave; 8, agricultural lecture, Oregon Agricultural college extension service; "Progress in Wheat Production," G. R. Hyslop; 8:30, concert, Knowlton quartet; 10, dance music, Multnomah hotel strollers.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:30 p. m., Tommy Tibbets and his Rendevouz Ballroom orchestra; 2:30-3:30, matinee musicale, Pacific States Electric company; 6-6:30, Art Hickman's Biltmore hotel concert orchestra; 6:30-7:30, Prof. Walter Sylvester Hertzog, stories of American history; weekly visit Queen Titania and Sandman from Fairyland, Uncle John; 8-10, program, Martin Music company; 10-11, Gallan Hancock's dance orchestra; 11-12, Earl Burtnett's Biltmore hotel dance orchestra.

KJS, Los Angeles, Calif. (Pacific, 360), 8-9:30 p. m., vocal and instrumental concert of classical nature, organ recital.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., inspirational talk, 9, Town Crier, news; 9:30, State Board of Education program; 10:30, Mrs. Kate Brew Vaughn, home economics; 5 p. m., closing markets; 6-7:30, dinner hour music; 8-10, feature program of varied nature; 9-10, Paul G. Hoffman's Studebaker orchestra; 10-11, Abe Lyman's Cocoanut Grove orchestra.

KPD, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont hotel orchestra; 4:30-5:30, Rudy Seiger's Fairmont hotel orchestra; 5:30-6:30, children's hour stories, Big Brother; 7-7:30, Rudy Seiger's Fairmont hotel orchestra; 8-10, program, Olympic club of San Francisco; 10 11, E. Max Bradfield's Versatile band.

KSD, St. Louis, Mo. (Central, 546), 6 p. m., Benjamin Rader's orchestra; 9, program.

KYW, Chicago, Ill. (Central, 536), 4 p. m., afternoon frolic; 6:35-7, children's bedtime story, Uncle Bob; 7-7:30, dinner concert, Congress hotel; 7:30-7:45, around the town with KYW in Chicago; 8-8:20, Chicago Musical college; 8:20-8:45, speeches, American Farm Bureau federation; 8:50-9:30, Helen Bickerton Cole, soprano; Lucille Long, contralto; R. V. Thomas, bass; Irene Pierce, accompanist; Thomas B. Stephenson, tenor; 10-11:30, evening at home.

WBAV, Columbus, Ohio (Eastern, 423), 8 p. m., popular and ballad selections, WBAV orchestra, Frances Handibeau, director.

WBZ, Springfield, Mass. (Eastern, 337), 6-7 p. m., dinner concert; 7:10, kiddies' bedtime stories; 8:30-10:30, concert; 11:30-12, organ concert.

WCAE, Pittsburgh, Pa. (Eastern, 462), 6:30 p. m., dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, special feature; 8:30, concert; 9, concert, National Carbon company's Everready entertainers.

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf college chapel services.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., home service, "Sure Success in Cake Making," Betty Crocker, Gold Medal Radio Cooking school; 2 p. m., woman's hour, "Child Labor in the United States," Mrs. Andreas Ueland, Honorary President of Minnesota League of Women Voters; 2:15, "The Constitution and Child Labor," Mrs. F. W. Wittich, Vice-President Minn. League of Women Voters; 2:30, Roller Canary concert; 4, magazine hour, "Danger," Roy Chapman Andrews; 5:30, children's hour, Gold Medal Lady; 6, dinner concert, Biley's Concert orchestra, St. Paul hotel; Fred Hughes and Bill Axtman, entertainers; Mrs. W. H. Grindon, soprano; Eleanor Freemantel, accompanist.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., music; 6, dance music; 10, The Red Apple club.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's string trio; 5-5:30, weekly child talent program arranged by Mary F. De Bernardi; 6-7, school of the air, piano tuning-in number on the Duo-Art; tenth of a series of Radio piano lessons, Maudellen Littlefield; the Tell-Me-a-Story Lady; music, Hotel Muehlebach Trianon ensemble; 11:45-1 a. m., nighthawk frolic, the "Merry Old Chief" and the Plantation players; Cordsen-Mac's orchestra.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; 7:30, Dream Daddy; 7:50, "Both Sides of the Footlights," Arnold Abbott.

WEAF, New York, N. Y. (Eastern, 492), 11-11:15 a. m., musical program; 11:15-11:30, lecture, Board of Education; 11:30-11:45, motion picture forecast, Adele Waodard; 6-7 p. m., dinner music, Waldorf Astoria hotel; 7-8, John C. Smith and his Modern dance orchestra; 8-8:15, talk, John F. Hill, optometrist; 8:15-8:45, Gold Dust Twins; 8:45-9:45, "Eveready hour."

WEBJ, New York, N. Y. (Eastern, 273), 7-7:15 p. m., Blyburn's reviews of the new photoplays; 7:15-8, Nat Martin and his "I'll Say She Is" orchestra; 8-8:15, Richard B. Gilbert and his Tarapatch; 8:15-8:30, Kay Macrae, concert star; 8:30-9, Clarence Williams trio.

WEEI, Boston, Mass. (Eastern, 303), 2 p. m., Jack Brown and his orchestra; 6:30, Dok-Eisenbourg and his Sinfonians; 7:30-8:30, musicale; 8:30, Y. M. C. A. glee club concert; 9, program, New York studio, evereeady hour; 10, program, New York, Goodrich Silvertown Cord orchestra.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, report, closing prices, Chicago grain market; 3:04, recital, Musicale club; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 7, Sunny Jim, the kiddies' pal; 8, Christmas seal talk; 9, exerready hour from WEAF; 10, Goodrich Silvertown Cord orchestra.

WGN, Chicago, Ill. (Central, 370), 1:40 p. m., luncheon concert, Drake concert ensemble; Blackstone string quintet; 2:30, Lyon & Healy artist series; 3, rocking chair time, musical program, excerpts from Chicago Tribune, Liberty magazine; 5:30, Skeezix time for the children, Sen Kaney; 6, organ recital, Lyon & Healy; 6:30-7, dinner concert; 8-9, classical program, Drake concert ensemble; Blackstone string quintot; Mathilda Lampeau, soprano; 10-11, jazz dance program, Drake dance orchestra, Blackstone dance orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 2:30-4:30 p. m., Buffalo Courier and Enquirer musical program; 6-7:30, dinner music, Hallpryd string quartet; 9-10, "Eveready Hour" broadcast from WEAF; 10-11, musical program, Goodrich Silvertown Cord orchestra, brodcasting from WEAF.

WGY, Schenectady, N. Y. (Eastern, 380), 2 p. m., "A Christmas Breakfast Party with Tree," Helen A. Ballard; 6:30, dinner concert, Trio from Hotel Ten Eyck; 7:45, program, Albany Community chorus, Elmer A. Tidmarsh, conductor; Y. M. C. A. orchestra, Claude J. Holding, conductor; Albany Community chorus; Joseph Calhoun, baritone; Mrs. John C. Cary, contralto; Mrs. Edward H. Belcher, soprano; Elmer A. Tidmarsh, pianist; address, Mayor William S. Hackett; Albany Academy orchestra, Helen McElwee Miller; Jacob Nelson, flutist; Thomas Francis O'Neil, violinist; 11:20, Stephen E. Boisclair, organist.

WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., "Soap and Hard Water," G. E. Baker; 8, Cornell college program.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo theater orchestra, Harry S. Currie, conductor; "Just Among Home Folks;" readings, Courier-Journal, Louisville Times; 7:30-9, concert, Carl Zoeller's Melodists, Carl Zoeller, director; Elmore Weissrock, trumpeter; Aulyn Kanston, pianist; Ed Reithmuth, saxophonist; Jerome Weissrock, trombonist; Cliff Eblen, banjoist; Cecil Davis, tubaist.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program, Sweeney Radio trio; 8-9, Hazel Scott, pianist, playing "En Courant" and "Jonglere;" Irwin Moorman, cornet solo; Juanita Cooper, readings; Mrs. W. Fred Wamsley, vocal solos; classical program, orchestra; 9-10, popular program, Gilbert Jaffy's orchestra.

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m. Ponce de Leon orchestra Herbert Hayward, director, Grebe's Hanna restaurant; sports, news, culinary recipes.

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Karl Bonawitz, organist; 3, Walton quartet; 6:15, Harvey Marburger and his Vaudeville orchestra; 7, Uncle Wip's bedtime stories; 8, Elliott Lester, dramatic critic; 8:30, concert, auspices United Synagogues of America; 9:30, talk, Board of education; 10:05, "Behind the Screen with Screen Folk," E. M. Orowitz; 10:30, talk, Dr. Leon Feldman.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., Santa Claus' talk to boys and girls; Don Palmer, Radio cartoon talk; Tom Donohue's Bamboo Village orchestra; Evelyn Phillips, soprano.

WJJD, Mooseheart, Ill. (Central, 278), 7:15-8:15 p. m., concert band at auditorium.

WJY, New York, N. Y. (Eastern, 405), 8-8:30 p. m., Garrett Fitz Simons, tenor; 9-9:30, Frederick William Wile, director from WRC, Washington; 9:30-10:30, U. S. Army night: U. S. Army band; address, Maj. Gen. Merritt W. Ireland, Surgeon General of U. S. Army.

WJZ, New York, N. Y. (Eastern, 455), 10-10:20 a. m., housewives league menu, Mrs. Julian Heath; 10:20-10:30, etiquette talk, Vogue magazine; 10:30-10:40, "Art for a Dime," Grace P. Noxon; 10:40-10:50, Tribune institute, Bertha Baldwin; 10:50-11, Eleanor Gunn's fashion talk; 1-2 p. m., Nathan Abas' Hotel Pennsylvania orchestra; 4:30-5:30, Bernhard Levitow's Hotel Commodore tea music; 7-7:15, "Dogs," Frank Dole; 7:15-8:45, Hotel Vanderbilt orchestra; 8:45-10, N. Y. Mozart society concert direct from Hotel Astor, John Charles Thomas, baritone; Lester Hodges, accompanist; WRC will also broadcast; 10-11, the Brunswick hour of music; (WRC, WGY and KDKA also broadcast); 11-12, Meyer Davis Society orchestra from Cafe Le Parodis direct from WRC, Washington.

WKAQ, San Juan, P. R. (Intercolonial, 360), 9-10:30 p. m., Euterpe Jazz band, Carmelo Diaz, director.

WLW, Cincinnati, Ohio (Central, 423), 10 p. m., Ohio Rubber quartet and instrumental trio; Gordon Kibler's Black and White Pennsylvanians.

WMAQ, Chicago, Ill. (Central, 447.5) 12 m., weekly program, auspices Illinois Manufacturers association; 4 p. m., American Red Cross home nursing talk, Estelle Weltman; 4:30, program, Gunn School of Music; 5, the lullaby lady, Mrs. Gene Davenport; 6, Chicago theater organ; 6:30, Hotel La Salle orchestra; 8, book review, Harry Hansen; 8:20, Clara E. Laughlin; 8:40, Association of Commerce weekly talk; 8:50, University of Chicago program; 9:15, program, Philharmonic quartet.

WMC, Memphis, Tenn. (Central, 500), 8 p. m., bedtime story, Uncle Joe; 8:30, musical program arranged by Mazda Grotto Glee club; 11, midnight frolic, Stanacole Fellowship club of Memphis.

WNJ, Newark, N. J. (Eastern, 233), 10:30-12:30 a. m., Frank Daily and his Meadow Brook orchestra.

WOAW, Omaha, Nebr. (Central, 526), 6 p. m., "Advice to Lovelorn" period, Cynthia Grey; 6:25, dinner program, transmitted from WOAW's studio in the May Seed & Nursery Co. bldg., Shenandoah, Iowa; 9, program, Benevolent Protective Order of Elks, Omaha Lodge No. 39; 10:30, Wowl frolic, Frank Hodek, Jr. and his Omaha nightingales.

WOC, Davenport, Ia. (Central, 484), 12 m., chimes; 7 p. m., sandman's visit.

WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crytal tea room orchestra, Robert E. Golden, director; 5:10, sports results; 5:15, organ recital, Mary E. Vogt.

WOR, Newark, N. J. (Eastern, 405), 3-3:30 p. m., chummy chats on books; 6:15-6:30, Halsey Miller's orchestra; 6:30-7, Man-in-Moon stories; 7-7:30, Halsey Miller's orchestra; 7:30-7:45, resume of day's sports.

WQJ, Chicago, Ill. (Central, 448), 11-12 m., "Hints for Making Christmas Candles," Agnes M. Olsen; "Talk on Diet," Anna E. Boller; "Christmas Cakes," Cleve Carney; 3-4 p. m., "Family Favorites," Cora Beeman; talk, Mrs. Anita L. Freeman; 7-8, dinner concert, Ralph Williams and his Rainbo Garden or- R. Meyer, 2nd tenor; L. J. Booth, baritone; D. chestra; Excelsior quartet: L. A. Schaefer, 1st tenor; Middleton, bass; Tony Corcoran, tenor; Margaret Garrity, pianist; 10-2 a. m., Ralph Williams and his Rainbo Garden skylarks; Harry Geise; Nubs Allen, contralto; Edna Solomon, contralto; Rogers boys, Larry, Billy; Will Rossiter.

WSAI, Cincinnati, Ohio (Central, 309), 7 p. m., Hotel Gibson orchestra; 7:30, chimes concert; 7:45, children stories, Ethel Knapp Behrman; 8, Hotel Gibson orchestra; 9, soprano solos, Florence Braun; songs, Stept and Collins; tenor solos, Oliver Plunkett.

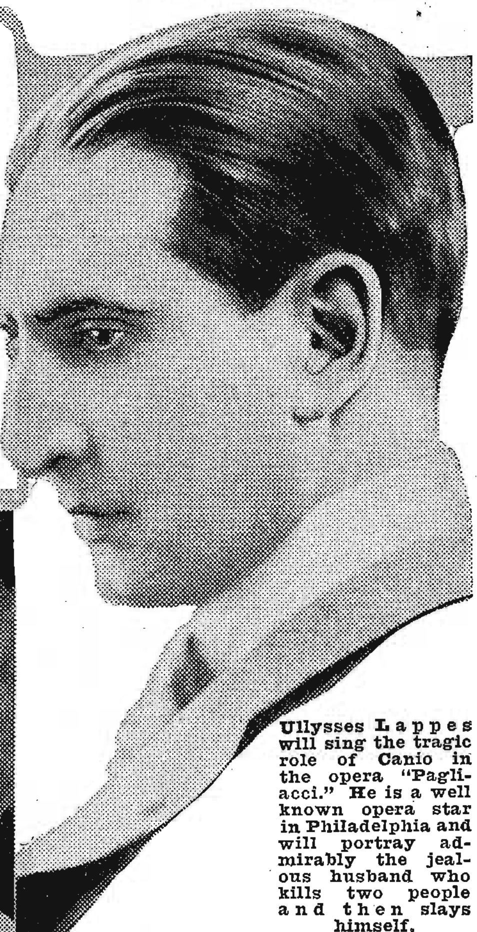
WSB, Atlanta, Ga. (Central, 429), 6 p. m., Bonnie Barnhardt's bedtime story; 8-9, Conklins harmonizers and vocalists; 10:45, Radiowl entertainment.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m., Guy Lombardo's Royal Canadians orchestra.

WTAY, Oak Park, Ill. (Central, 286), 6:45-7:45 p. m., Sandy Meek, baritone; Ray Kroe, Harry Sosnik, pianists; Raynor Dalheim & Co. orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 3 p. m., the Detroit News orchestra; 8:30, the Detroit News orchestra.

Opera lovers may enjoy the broadcasting of "Pagliacci" and "Cavalleria Rusticana" Thursday, December 11, when the Civic Opera company of Philadelphia goes on the air by means of WIP. Elliott Lester, the WIP dramatic critic, will give descriptive talks of the scenes and play action during the intermissions. Lillian May Tracy (below) is the president and general manager of the opera company.



Ullysses Lappes will sing the tragic role of Canio in the opera "Pagliacci." He is a well known opera star in Philadelphia and will portray admirably the jealous husband who kills two people and then slays himself.

Wednesday, December 17

Wednesday, silent night for: CHNC, CKAC, CNRT, KFKX, KGO, WAAW, WBAV, WCBD, WEAO, WFAA, WGY, WHAA, WHB, WJAX, WMC, WOAW, WOI, WRC, WSAI.

CKY, Winnipeg, Can. (Central, 450), 8 p. m., CNRW program: bedtime travel tale; O. Noel, bass; A. T. Diehl, tenor; Denzil Skiles, saxophonist; Fort Garry instrumental trio; Frank Wright Country club dance orchestra.

KFAE, Pullman, Wash. (Central, 330), 7:30 p. m., Alpha Chi Omega national sorority; violin duets and solos, Gladys Fraser, Doris McReynolds; Reba Collins, reader; vocal solos, Catherine Hunt; Lillian Pettibone, pianist; Dea Davis, reader; Margery Segessenmann, pianist; Georgia Whitford, reader; vocal solos, Marie Scroggin; group songs; Extension service jamboree; "Pointers on Dairy Farming," Prof. E. V. Ellington.

KFDM, Beaumont, Tex. (Central, 306), 8 p. m., musical concert.

KFI, Los Angeles, Calif. (Pacific, 469), 5-5:30 p. m., Evening Herald, table talk, news; 5:30-6, Examiner: news bulletins; 6:45-7:30, Nick Harris, detective stories; 7:30-8, vocal recital, Maud Reeves Barnard; 8-9, Jack Lawton's Syncopators; 9-10, Examiner: popular program; 10-11, Don's Melody makers.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., mouth harp contest.

KFQX, Seattle, Wash. (Pacific, 238), 7:15-7:45 p. m., Aunt Vivlen's bedtime story; 8-9, Earl Gray and his orchestra; 9-10, concert; 10-11, Earl Gray and his Butler hotel orchestra.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-11:30 a. m., sunshine hour; 2:30-4:30 p. m., auditorium service for sick; 6:30-7:30, children's program.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., concert, Bill Darby's orchestra; 5, children's program, fairy story, Aunt Nell; 8, concert, J. S. Vann; 10, dance music, Multnomah hotel strollers.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:30 p. m., Abe Perluss and his Rose Room dance orchestra; 2:30-3:30, matinee musicale presented by Pacific States Electric Co.; 6-6:30, Art Hickman's Biltmore hotel concert orchestra; 6:30-7:30, Prof. Walter Sylvester Hertzog, little stories American history; Dick Winslow, screen juvenile and reporter; 8-8:45, Dr. Mars Baumgardt, scientific lecturer; 8:45-10, historical program, Pacific Mutual Life Insurance company; 10-11, Earl Burtnett's Biltmore hotel dance orchestra.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., inspirational talk, 9, Town Crier, news; 10:30, Mrs. Kate Brew Vaughn, home economics; 5 p. m., closing markets; 6-7, dinner hour music; 7-8, Ambassador hotel concert orchestra, Jos. Rosenfeld, director; 8-9, program, Security Trust and Savings bank; 9-10, program, Dr. A. Zimmerman; 10-12, Hollywoodland dance orchestra.

KOB, State College, N. M. (Mountain, 360), 7:30-8:30 p. m., "What Is Known about Vitamines and Its Relation to Health," Prof. Titus; "Relative Importance of Carbohydrates and Protein in a Feeding Nation," Prof. Lantow.

KPO, San Francisco, Calif. Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont hotel orchestra; 2:30-3:30, Garry Fisher's Amphians; 4:30-5:30, Rudy Seiger's Fairmont hotel orchestra; 5:30-6:30, children's hour stories, Big Brothers; 7-7:30, Rudy Seiger's Fairmont hotel orchestra; 8-11, E. Max Bradfield's Versatile band; fifteen minutes of humorous philosophy, "Uncle Josh;" Hawaiian music, Prof. Kiluo O. Evanos, director.

KSD, St. Louis, Mo. (Central, 546), 6:45 p. m., Abergh's concert ensemble; Arne Arnesen, violinist; 9, program; 11, Varsity club orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 6:35-7, children's bedtime story, Uncle Bob; 7-7:30, dinner concert, Congress hotel; 7:30-8, program, Duncan Sisters Music Publishing company; 8-8:30, musical program, Walther legaue; 8:30-8:45, around the town with KYW in Chicago; 9, musical program; 9:05, "Good Roads," Chicago Motor club; 9:10, talk on income tax, H. Archibald Harris; 9:20, "Protecting Our Nation's

(Continued on page 16)

WGY PLAYERS TO COMPETE WITH BRO

Where to Hear Concerts

Central Standard Time

THESE are the stations for music lovers to dial, and you can hear, providing you dial correctly and read the programs carefully, everything from jazz to opera.

Saturday, December 13th: 6, KGO, WMAQ, WOAW; **6:30,** CKAC, WBZ; **6:45,** KDKA, WCAE, WOAW, WTAY; **7,** KYW, WBBR, WBZ, WHK, WLS, WOR, WQJ; **7:15,** WLS; **7:30,** CKAC, KDKA, KFNF, WCAE, WHAS; **7:45,** WOR; **8,** KSD, KYW, WBZ, WEAF, WSAI; **8:30,** WFAA, WMC, WSAI; **9,** WBZ, WHK, WMAQ, WOAW; **9:15,** WSAI; **9:30,** WMC, WOC; **9:35,** KYW; **10,** KFI, KGO, KHJ, KNZ, WMH, WQJ; **10:05,** WIP; **10:15,** WRC; **10:30,** KFNF; **11,** KFI, KFQX; **12,** KFAE, KFI, KYW, WCAL, WSAI; **1,** KNX.

Sunday, December 14th: 6:15, WGR; **6:20,** WEAF, WEEI; **6:30,** WLS, WOO; **7,** KYW, WDAR, WJY, WLS, WOR; **7:15,** WJY; **7:30,** WOR; **8,** WDAF, WGY, WHB, WHK, WQJ; **8:10,** WBBR; **8:15,** KFGZ, WEAF; **8:30,** WCAL, WJY; **9,** KFI, KHJ, WHAA, WOAW; **9:05,** KFGZ; **9:30,** WOC; **10,** KFI, KHJ, KJS, KNX, WOR; **10:30,** KPO; **11,** KNX; **11:15,** KFSG; **12,** KFI, KFSG, WHB.

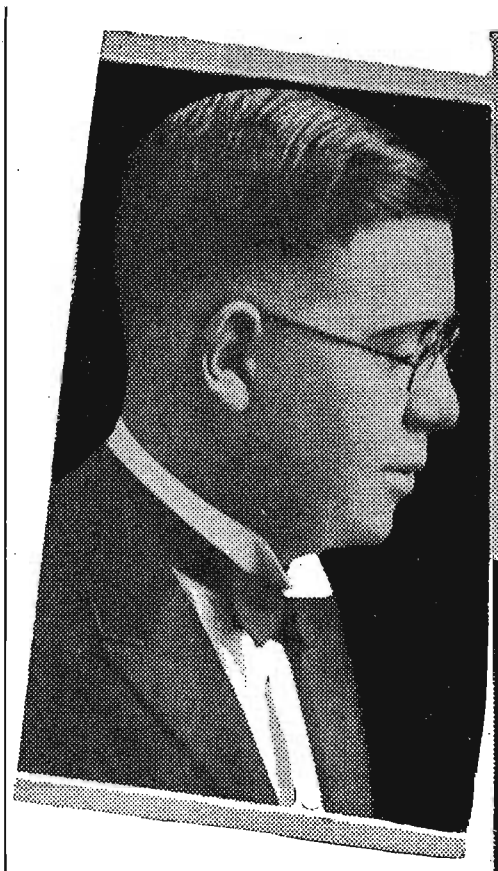
Monday, December 15th: 6, WCX, WJZ; **6:30,** WOO; **6:45,** WGY; **6:55,** WDAR; **7,** KSD, WBBR, WCAU, WTAM; **7:15,** WJJD; **7:30,** CHNC, WAAW, WCAE, WHO; **7:45,** WHA; **8,** WCBD, WEEI, WGR, WHO, WMH, WOC, WOI, WOS; **8:15,** KFGZ; **8:30,** KOB, WDAR, WEEI, WLW, WMC, WOS; **8:45,** WJZ; **9,** KSD, WOAW; **9:03,** WOO; **9:30,** KFAE, KFKX; **9:45,** WJZ; **10,** KGO, KNX, KPO, WOC, WSAI; **11,** KFI, KFQX, KPO; **11:15,** WHO; **12,** KFI, KPO.

Tuesday, December 16th: 6, KGO, KSD; **6:30,** CKAC, WEEI; **6:45,** WCAE, WGY, WTAY; **7,** WBAV, WJAX, WJY, WQJ, WSAI; **7:15,** WEAF, WEBJ, WJJD; **7:30,** KFNF, WCAE, WEBJ, WEEI, WHAS, WIP, WSAI; **7:45,** WEAF, WJZ; **8,** WCAE, WEEI, WFI, WGR, WHAA, WHB, **8:30,** WJY, WMC; **8:45,** KFI; **9,** KSD, WEEI, WGR, WJZ, WSAI, **10,** KFI, KGO, KHJ, KJS, KNX, KPO, WLW, WQJ; **10:20,** WGY; **11,** KFI, KFQX, WKAQ; **12,** KPO.

Wednesday, December 17th: 6, KGO, WCX; **6:30,** WOO; **6:45,** KSD, WCAE, WTAY; **7,** WBBR, WCAU, WEEI, WHB, WQJ, WTAM; **7:15,** WJJD; **7:30,** WCAE, WHAS, WJZ, WOR; **7:45,** WHA; **8,** WDAF, WGR, WLW, WMH, WOC; **8:30,** WOO, WOR; **9,** KNX, KSD, WEEI, WJZ, WOR; **9:03,** WOO; **9:30,** KFI, WOO; **10,** KNX, KPO, WEEI, WKAQ, WQJ; **11,** KFQX, KNX.

Thursday, December 18th: 6, KGO, WCX, WJAX; **6:30,** WEEI; **6:45,** WCAE, WTAY; **7,** WCAU, WEAO, WHK, WJAX, WJY, WQJ; **7:15,** WGY; **7:30,** KFI, KFNF, WCAE, WEAF, WHAS, WJZ; **8,** KHJ, WCBD, WMH; **8:10,** WBBR; **8:30,** WMC; **8:45,** WJY; **9,** WCAL; **9:30,** WJZ; **10,** KFI, KGO, KHJ, KJS, KNX, KPO, WLW, WQJ, WSAI; **10:30,** WGY, WKAQ; **11,** KFI, KPO; **12,** KFI, KPO.

Friday, December 19th: 6, KGO, WCX, WJZ; **6:30,** WOO; **6:45,** WTAY; **7,** WBAV, WCAU, WDAR, WEEI, WQJ; **7:15,** WCAE, WEBJ; **7:25,** WJY; **7:30,** CNRT, KFNF, WCAE, WEAF, WEBJ, WHAS, WHK, WHO; **7:45,** WHA; **8,** KHJ, KSD, WDAF, WEEI, WGR, WJZ, WOC; **8:15,** WHO; **8:30,** KOB, WMC, WOO; **8:45,** KFI; **9,** WJY; **9:03,** WDAR, WOO; **9:15,** WJZ; **9:30,** KFAE; **10,** KHJ, WQJ; **11,** KFQX; **12,** KFI.



Harry J. Kaufmann, violinist, appears at WDAF once a week. He is a teacher as well as an artist and several of his pupils have made their debuts over the Radio.

Mrs. Louise Bowen (right) is arranging a special classical program at WMC, Memphis, Thursday, December 18. Below is the new leading lady and director of the Radio dramatics at WLW, Cincinnati. She has picked out her supporting cast for their beautiful voices. Tune in Monday for "The Joy of Living" and enjoy the modulations.

Wednesday, December 17

(Continued from page 15)

Health," E. C. Brown; 9:45-2:30, midnight revue; Coon-Sanders Original Nighthawks; W. Remington Welch, organist.

WAHG, Richmond Hill, N. Y. (Eastern, 316), 7:30-12 midnight, special program, Brooklyn Eagle, including stars of musical and dramatic world; topics of the day, H. V. Kaltenborn.

WBBR, New York, N. Y. (Eastern, 273), 8 p. m., Watertower orchestra; 8:15, violin duets, George Twaroschk, Carl Park; Harry Corson, pianist; 8:20, "How the First Man Was Made," W. E. Van Amburgh; 8:40, Watchtower orchestra.

WBZ, Springfield, Mass. (Eastern, 337), 6-7 p. m., dinner concert; 7:10, bedtime stories; 7:15, lecture; 8:30-10:30, concert; 11-12, dance program, Leo F. Reisman.

WCAE, Pittsburgh, Pa. (Eastern, 462), 6:30 p. m., dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, special feature; 8:30, concert, Nixon restaurant.

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf college chapel services.

WCAU, Philadelphia, Pa. (Eastern, 278), 6 p. m., Meyer Davis Hotel Pennsylvania dance orchestra; 8, concert and short talks.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., home service, "Christmas Decorations," Betty Crocker; 2 p. m., woman's hour, "Famous Women of the Bible," Mrs. W. A. Buchanan; 2:30, matinee musical, Anoka, Minnesota program; 4, magazine hour, "The Man Nobody Knows," Bruce Barton; 5:30, children's hour, Alpha Stalson; 9, musical program, Chester Campbell, violinist; other artists to be announced; 10, dance program, Arnold Frank's Casino orchestra, St. Paul hotel; Fred Hughes and Bill Axtman, entertainers.

WCX, Detroit Mich. (Eastern, 517), 4:15 p. m., music; 6 p. m., dance music; 7, musical program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's string trio; 6-7, school of the air, piano tuning-in number on the Duo-Art; address, speaker, auspices Health Conservation association; speaker, auspices Meat Council of Greater Kansas City; the Tell-Me-a-Story lady; music, Hotel Muehlebach Trianon ensemble; 8-9:15, program broadcast from the home of C. W. Jenkins; 11:45-1 a. m., nighthawk frolic, the "Merry Old Chief" and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; 4:30, Marcella North, pianist; 7:30, Dream Daddy; 8, "Norristown Night;" talk, Dr. Raiguel; "Conversation Corner," Arnold Abbott; travel talk; 10:03, Arcadia cafe dance orchestra; Arthur Murray's daneing lessons.

WEAF, New York, N. Y. (Eastern, 492), 11-11:30 a. m., musical program; 12-12:30 p. m., chapel services, Columbia university; 6-7, dinner music, Waldorf-Astoria hotel; 7-7:30, United Synagogue of America.

WEEI, Boston, Mass. (Eastern, 303), 2 p. m., Happy Hawkins and his orchestra; 6:30, Dok-Eisenbourg and his orchestra; 7, cooking school; 7:10, Boston Edison Big Brother club; 7:40, a few minutes with Santa Claus; 8, Army night; 10, musicale; 11, Fenway theater organ recital, Lloyd D. Del Castillo.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, report, closing prices Chicago grain market; 3:05, program of Bach music, Jane C. McCurdy and Marguerite Mervine; "History of John Sebastian Bach," M. Grace Hauseman; "My Heart Ever Faithful," Amy Brumbaugh, contralto; "Air for G String," Ethel Walthers, cellist; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 7, Sunny Jim, the kiddies' pal.

WGR, Buffalo, N. Y. (Eastern, 319), 2:30-4:30 p. m., Buffalo Courier and Enquirer musical program; 6:30-7:30, dinner music, Vincent Lopez Hotel Statler dance orchestra, Harold Gleser, director; 8-8:15, lecture, "Pre-Historis Monstors of Western New York," William L. Bryant, Buffalo Society of Natural scineces; 9-11, musical program, Hoover Suction Sweeper company, Buffalo office; 11:30, supper-dance music, Vincent Lopez Hotel Statler dance orchestra, Harold Gleser, director.

WGY, Schenectady, N. Y. (Eastern, 380), 6:30 p. m., adventure story, Youth's Companion.

WHA, Madison, Wis. (Central, 275), 7:45 p. m., music, University School of music; "How Europe and How America Treat World War Veterans," Prof. Ralph H. Hess; "American Adjusted Compensation for World War Veterans," Prof. R. S. Owen.

WHAA, Iowa City, Ia. (Central, 484), 9-9:30 a. m., high school assembly program, "America," led by Rhoda Doolittle; Prof. Frank E. Kendrie, violinist; talk, Pres. Walter A. Jessup; 12:30-1, "The Value of Accounting to the General Public," S. G. Winter.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo theater orchestra, Harry S. Currie; 7:30-9, Keith Kannard and his Kentucky Ramblers, Keith Kannard, director; Marty Mennen, saxophonist; Gus French, banjoist; Billy Lippy, pianist; Bim Wilder, drummer; Kenneth Kannard, trumpeter; Warren Lane, trombonist; James Horine, sousaphonist.

WHB, Kansas City, Mo. Central, 411), 2-3 p. m., ladies' hour program, Sweeney Radio trio; 7-8, program by H. A. Parker, baritone; Helen Strohm, soprano; Leona Robinson, pianist; Alberta Davis, reader.

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m., Ponce de Leon orchestra, Herbert Hayward, director, Grebe's Hanna restaurant; sports, news, culinary recipes; 7, Ethel O. Hawes, bedtime story.

WHO, Des Moines, Ia. (Central, 526), 7:30-9 p. m., Bankers Life Radio orchestra, William L. Marsh, director; Christmas story, Santa Claus from Harris-Emerys company.

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Gimbel tea room orchestra; 3:15, concert, Temple university, direction, Thaddeus Rich; William Cocker, pianist; Bernice Russell, soprano; Joseph Lanza, violinist; F. Laurie Greene, pianist; Edwin Tamarin, violinist; 6:05, Art Coogan and his Club Madrid orchestra; 7, Uncle Wip's bedtime stories.

WJJD, Mooseheart, Ill. (Central, 278), Junior band at auditorium; pupils of Misses Geiss, Tillery, English.

WJZ, New York, N. Y. (Eastern, 455), 10-10:20 a. m., housewives league menu, Mrs. Julian Heath; 10:20-10:30, "The Sick Baby," Visiting Nurse service; 10:30-10:40, "Fall Planting—Flowers and Fruit," Edith Loring Fullerton; 10:40-10:50, "Be Your Own Decorator," Amy Mali Hicks; 10:50-11, fashion talk, Eleanor Gunn; 1-2 p. m., Hotel Belmont luncheon music; 4:30-5:30, Hotel Belmont tea orchestra; 7-8, Bernhard Levitow's Hotel Commodore orchestra; 8-8:10, Wall Street Journal review; 8:10-8:20, talk, N. Y. U. Air college; 8:30-9, Keith McLeod, pianist (request program); 10-10:30, Hotel St. George trio; 10:30-11:30, Billy Wynne's Greenwich Village Inn orchestra.

WKAQ, San Juan, P. R. (Intercolonial, 360), 8-9:30 p. m., municipal band, Jesus Figueroa, direetor.

WLW, Cincinnati, Ohio (Central, 423), 8 p. m., special concert, Syrian Temple Shrine band.

WMAQ, Chicago, Ill. (Central, 447.5), 1 p. m., speeches, weekly luncheon of the Association of Commerce; 4, beauty talk, Mme. Grace Earl; 4:30, program, Cosmopolitan School of Music; 5, fashions, Jean Mowat; 6, Chicago theater organ recital; 6:30, stories for children, Georgene Faulkner, the story lady; 8, weekly lecture, Northwestern university; 8:30, musical program; 9, WMAQ "play-night;" 9:45, talk, one of the Chicago charities.

WMH, Cincinnati, Ohio (Central, 309), 8 p. m., songs, Wright and Bessinger; soprano solos, Margaret Bronson, Mrs. George Dunning, accompanist; vocal duets, Ora Wall, Margaret Bronson; cello solos, Oscar Krisehe; reading, Sadie Stewart; bass solos, Chester Markward; talk, George W. Plutt; 10, Dugan's orchestra.

WNJ, Newark, N. J. (Eastern, 233), 10:30-12:30 a. m., Frank Daily and his Meadow Brook orchestra.

WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra, Robert E. Golden, director; 5:10, sports results and police reports; 5:15, organ recital, Mary E. Vogt; 7:30, A. Candelori and his ensemble from Hotel Adelphia; violin solos, A. Candelori; 8:30, WOO orchestra, Robert E. Golden, director; 9:30, recital, Harriette G. Ridley; 10:03, organ recital, Mary E. Vogt; 10:30, Vincent Rizzo and his Hotel Sylvania dance orchestra.

WOR, Newark, N. J. (Eastern, 405), 3:45-4 p. m., Dr. Leon Morles, talk; 6:15-7, Harry Lafferty's orchestra; 8-8:30, Gene Ingraham's orchestra; 8:30-9, Newark Police band; 9:15-9:30, talk, Dr. Jones; 9:30-10, Gurewich trio; 10-11, quartet orchestra.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., "Opportunities in the Winter Short Course," S. B. Shirkey; 8:15, "Rural School Supervision," Elizabeth L. White; 8:30 musicale.

WQJ, Chicago, Ill. (Central, 448), 11-12 m., "Linens for the Entire Household," Mrs. Wilbur E. Fribley; talk, Mrs. Mary Day Harris; "Holiday Desserts," L. L. Jones; 3-4 p. m., "Apples and Apple Desserts," Helen H. Downing; "Christmas Dinner," Martha Logan; 7-8, dinner concert, Ralph Williams and his Rainbo Garden orchestra; Lancaster Smith, bass; Mrs. Lancaster Smith, accompanist; Maxine Mordy, violinist; Dorothy Davie Dillow, soprano; 10-2 a. m., Ralph Williams and his Rainbo skylarks; Merrie Boyd Mitchell, soprano; James Mitchell, baritone; Rev. Karl Scheroffski, accompanist; Sandy Meek, Scotch tenor; Clarence Theders, tenor; Melodians, Laurie, Eddit, Bennie; Fred Jacobson, monologues.

WSB, Atlanta, Ga. (Central, 429), 5-6 p. m., bedtime story, Bonnie Barnhardt; 10:45, Vic Meyers melody orchestra.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m., Guy Lombardo's Royal Canadians orchestra; 8, program arranged by the Cleveland Plain Dealer.

WTAY, Oak Park, Ill. (Central, 286), 6:45-7:45 p. m., organ concert, Grace Episcopal church; George H. Clark, organist.

WWJ, Detroit, Mich. Eastern, 517), 3 p. m., the Detroit news orchestra; 8:30, the Detroit News orchestra; Paul A. Smith, baritone.

Thursday, December 18

Thursday, silent night for: CHNC, CNRT, KFAE, KFQX, KGW, KOB, KSD, WBAV, WHA, WHO, WJJD, WOS.

KFI, Los Angeles, Calif. (Pacific, 469), 5-5:30 p. m., Evening Herald: table talk, news; 5:30-6, Examiner: Anton Lada's Louisiana five; 6:45-7, Y. M. C. A. speaker; 7-8, dance orchestra; 8-9, Maria Mangano, dramatic soprano; Esther McElvain, pianist and instrumental trio; 9-10, Examiner program; 10-11, Syl Prior, piano-accordianist and others.

KFKX, Hastings, Nebr. (Central, 291), 9:30 p. m., danee program, Hastonians dance orchestra.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., concert from Wales, Rev. E. W. Griffiths, director.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-11:30 a. m., sunshine hour; 3:30-4:30 p. m., organ recital, Rey Reid Brignall; 7:30-9:15, auditorium service, Almee Semple McPherson, pastor and evangelist; 10-11, organ recital, Esther Fricke Green.

KGO, Oakland, Calif. (Pacific, 312), 8 p. m., program, Chevrolet Motor company; Viennese orchestra; George Anderson, baritone; Grace Le Page, soprano; "The Automobile," F. N. Coats; male quartet selections; Mazda Banjo quartet; Ruth Waterman, contralto; duets for steel guitars, Norman Dean, Gladys Steil; KGO mixed quartet; Carl Anderson, tenor; Richard Lundgren, bass; Julia Hannas Cochrane, violinist; "The Vocal Teacher and His Japanese Pupil," Carl Anderson, Al Evers; 10-1, dance music, Henry Halstead's orchestra.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., concert, Civic Music club; 5, children's program.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:30 p. m., program of news and music; 2:30-3:30, matinee musicale presented by Pacific States Electric company; 6-6:30, Art Hickman's concert orchestra; 6:30-7:30, Prof. Walter Sylvester Hertzog, stories American history, Henrietta Poland, 5-year-old reader, Uncle John; 7:30-7:45, Harold Swartz, talk on "Art;" 7:45-8, Dr. Lowell, talk on "Health;" 8-10, program, Hellman Commercial Trust and Savings bank; 10-11, Earl Burtnett's Biltmore hotel dance orchestra.

KJS, Los Angeles, Calif. (Pacific, 360), 8-9:30 p. m., organ recital, Alfred Butler, organist; soprano and baritone solos.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., morning prayer; 9, Town Crier, news; 10:30, Mrs. Kato Brew Vaughn, home economics; 11, Dr. Richard M. Scott, care of domestic pets; 6 p. m., closing markets; 6:30-7:30, dinner hour music; 8-9, feature program; 9-10, Paul G. Hoffman's Studebaker orchestra; 10-11, Abe Lyman's Cocoanut Grove dance orchestra from Ambassador hotel.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Selger's Fairmont hotel orchestra; 4:30-5:30, Rudy Selger's Fairmont hotel orchestra; 5:30-6:30, children's hour stories, Big Brother; 7-7:30, Rudy Selger's Fairmont hotel orchestra; 8-9, Theodore J. Irwin, organist; 9-10, instrumental and vocal program, Syl Burkenroad, bass; 10-11, E. Max Bradfield's Versatile band.

KYW, Chicago, Ill. (Central, 536), 10:30 a. m., Farm and Home service; 11:35, table talk, Mrs. Anna J. Peterson; 2:35-4 p. m., afternoon frolic; 6:35-7, children's bedtime story, Uncle Bob; 7-7:30, dinner concert, **WAAW, Omaha, Neb. (Central, 286),** 7:30-9 p. m., Congress hotel; 8-8:20, "Twenty Minutes of Good Reading," Rev. C. J. Pernin; 8:20-9:15, Lillian Hershfield, soprano; Irving Schuster, tenor; 10-11:30, evening at home; Coon-Sanders Original Nighthawks, bridge talk, Mrs. Guy U. Purdy; 8-9, educational program.

WBBR, New York, N. Y. (Eastern, 273), 9:10 p. m., violin and dulcet solos, Charles Kenny; 9:20, Kay Macrae, coloratura soprano; 9:35, International Sunday school lesson, S. M. Van Sipma; 9:55, Kay Macrao; 10:10, violin and dulcet solos.

WBZ, Springfield, Mass. (Eastern, 337), 6-7 p. m., dinner concert; 7:10, bedtime stories; 7:15, lecture; 7:30-10:30, classical concert.

WCAE, Pittsburgh, Pa. (Eastern, 462), 6:30 p. m., dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, special feature; 8:30, concert, Moores cafeteria, E. T. Moores, manager.

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf college chapel services; 9 p. m., Mrs. Charles Koella, contralto; Louise Wright Drake, pianist; Neil Kjos, clarinetist.

WCAU, Philadelphia, Pa. (Eastern, 278), 6 p. m., Meyer Davis Hotel Pennsylvania dance orchestra; 8, recital.

WCBD, Zion, Ill. (Central, 345), 8 p. m., cornet quartet; mixed quartet, Mrs. Mayfield, Mrs. Faassen, Maynard, Reid; Evelyn DeFew, contralto; P. B. Newcomer, cornetist; Carl Newcomer, saxophonist; Ida Peterson, soprano; piano duet, Mrs. Grace Lund, Erwin Rendall; Erwin Rendall, flutist.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., home service, "Menu for the Christmas Dinner," Betty Crocker; 2 p. m., woman's hour, "The Popular Concert," Agnes Fryberger; 4 p. m., magazine hour, "Now Consider Theresa," Eilzabeth Porter Wyekoff; 5:30 p. m., children's hour, Gold Medal Lady; 6 p. m., concert, Hotel Radisson ensemble; Fred Hughes & Bill Axtman, entertainers; 8 p. m., musical program, St. Paul Realty Board; 10 p. m., dance program, Dick Long's Nankin cafe orchestra; Fred Hughes & Bill Axtman, entertainers.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., music; 6, dance music; 7, musical program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's string trio; 6-7, school of the air, piano tuning-in number on the DuoArt; readings, Cecile Burton; the Tell-Me-a-Story lady; music, Hotel Muehlebaeh Trianon ensemble; 11:45-1 a. m., nighthawk frolic, the "Merry Old Chief and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanae; 12:02 p. m., Stanley theater organ recital; Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; "Care of Children," Mrs. Louis Love; 7:30, Dream Daddy.

WEAF, New York, N. Y. (Eastern, 492), 6-7 p. m., dinner music, Waldorf-Astoria hotel; 7-7:30, services, Greater New York Federation of churches; 8-8:30, "Touring in a Packard Eight" with George E. Cooley; 8:30-9, "Hohner Harmony Hour;" 11-12, Vincent Lopez and his Hotel Pennsylvania orchestra.

WEAO, Columbus, Ohio (Eastern, 294), 8 p. m., chimes, Prof. A. P. McManigal; recital, Lillian Wood, violin; David Lenhart, piano; classical selections; Radio talk, A. M. Rost.

WEEI, Boston, Mass. (Eastern, 303), 1 p. m., Boston Chamber of Commerce, address, "From Alchemy to Creative Chemistry," Francis P. Garvan; 6, Jack Benard and his Mansion Inn orchestra; 7, Boston Edison Big Brother club; 7:30-9, Gillette Safety Razor band; 10:30, Dok-Eisenbourg and his Sinfornlans; 11, Dok-Eisenbourg and his Sinfonians.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, report, closing prices, Chicago grain market; 3:05, Civic club concert; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 7, Sunny Jim, the kiddies' pal; 8, Boy Scouts Radio meeting.

WGN, Chicago, Ill. (Central, 370), 1:40 p. m., luncheon conceert, Drake concert ensemble, Blackstone string quintet; 2:30, Lyon & Healy artist series; 5:30, Skeezix time for the children, Sen Kaney; 6, organ recital, Lyon & Healy; 6:30-7, dinner concert; 8-9, classical program; 10-11, jazz dance program, Drake dance orchestra, Blackstone dance orchestra.

DANCING

(Central Time)

Saturday, December 1
6, Wjz; 8, Khj, Kn
Wbav, Wmaq, Wtan
8:30, Wgy, Wlw, Wq
9, Kfl, Wjjd, Wjz, Wo
9:30, Ckac, Wrc; 9:4
Wor; 10, Kfqx, Kp
Weaf, Wqj; 10:30, Wb
11, Ksd, Wfaa, Wml
11:15, Woaw; 11:4
Wdaf; 12, Kfkx, Kg
Kgw, Khj, Knx; 12:3
Wsai.

Monday, December 1
6, Kgo; 6:30, Kpo; 6:4
Woaw; 7:15, Wcae; 7:3
Wjz, Woo; 7:45, Wee
8, Wlw; 8:30, Wmh; 8:4
Wor; 9, Kpo, Weei, Wl
Wmh, Wor; 9:05, Wda
9:30, Wcae, Weei, Wo
10, Kfl, Kfqx, Wee
10:15, Wsai; 10:30, Wg
11:45, Wdaf; 12, Kfq
Kgo; 1, Knx.

Tuesday, December 1
6, Knx, Weaf, Wor; 6:1
Webj Wjz; 6:30, Kp
7, Webj; 7:30, Kfl;
Khj, Wsai; 9, Kpo, Wc
Weei, Wfl, Whb; 9:3
Ckac, Wnj; 10, Kfq
Wlw, Wqj; 11, Knx, Wj
Wmc; 11:45, Wdaf;
Kfqx, Kgo, Khj, Kn
1, Khj.

Wednesday, Decemb
17: 6, Knx, Wjz; 6:3
Kpo; 7, Wor; 7:3
Wcae, Who, Woo;
Khj; 9, Kpo; 9:03, Wda
9:30, Wjz, Wnj; 10, Kf
Kfqx, Wmh, Wqj; 10:3
Wgr; 11, Ksd; 11:4
Wdaf; 12, Kfl, Kfq
Knx, Kyw; 12:30, Khj.

Thursday, December 1
6, Wjax, Wjz; 6:30, Kp
8, Knx, Whb; 9, K
Kpo, Wjax, Wmh, Wo
9:30, Kfkx, Weei, Wl
10, Weei, Wqj; 11, Kn
Wmc, Woc; 11:45, Wda
12, Kgo, Khj, Knx.

Friday, December
6:30, Kpo, Webj, Wj
7, Whb; 7:15, Wjz
7:30, Wdar, Wjz, Wo
8, Weaf; 9, Weau; 9:0
Wdar; 9:30, Wgy, Wj
Wnj, Woo; 10, Kfl, Kfq
Wqj; 10:30, Wgr; 11:4
Wdaf; 12, Kfqx, Khj.

BROADWAY STARS VIA WJZ THURSDAY

Chester Campbell is one of the popular violinists of the Twin Cities, Minnesota. You may hear him Wednesday by dialing for WCCO, the Gold Medal station.

Where to Hear Talks

Central Standard Time

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

Saturday, December 13: 6, WDAF; **6:30,** WOAW; **7,** WFI, WIP; **8:20,** WOR; **8:30,** KHJ; **8:40,** WMAQ; **8:45,** KFI; **9,** KFSG, WSAI; **9:05;** KYW; **9:30,** WSAI; **10,** WMH.

Sunday, December 14: 7, WMH; **8,** WOC; **8:40,** KFGZ; **8:45,** KFI; **9,** KFAE, WJY.

Monday, December 15: 6, WDAF, WOAW; **6:45,** WCAE; **7,** WCAE, WEEI, WHB; **7:15,** WJZ; **7:20,** WOC; **8:30,** WJZ; **9:30,** WOC.

Tuesday, December 16: 6, WDAF, WEBJ, WJZ; **6:30,** WJAX; **6:50,** WDAR; **7,** KFI, WFI, WIP; **8,** WEAF, WHAA, WJY; **8:30,** KHJ, WIP; **9:05,** WIP; **9:30,** WIP.

Wednesday, December 17: 6, WDAF, WEEI; **7,** KFI, WDAR, WGR, WJZ; **7:10,** WJZ; **7:45,** WHA; **8,** WCAU, WOS; **8:15,** WOR; **8:30,** KHJ, KOB; **8:45,** KFI; **10,** KHJ; **10:45,** KHJ.

Thursday, December 18: 6, WDAF; **7,** KFI, WEAF, WFI, WGY, WIP, WJZ; **7:30,** WAAW; **8,** WAAW; **8:30,** KHJ; **8:45,** KFI; **9,** WJZ; **9:30,** KFSG, KHJ; **9:45,** KHJ.

Friday, December 19: 6, WDAF, WEBJ; **6:45,** WEEI, WGY; **7,** KFI, WCAE, WGR, WHB; **7:15,** WJY; **7:20,** WOC; **7:30,** KGO, WEAF; **7:45,** WJY; **7:50,** WEEI; **8:30,** KHJ, KOB, WCAL; **9:30,** KFSG.

DANCING

(Central Time)

Saturday, December 13: 6, Wjz; 8, Khj, Knx, Whav, Wmaq, Wtam; 8:30, Wgy, Wlw, Wqj; 9, Kfi, Wjjd, Wjz, Woc; 9:30, Ckae, Wrc; 9:45, Wor; 10, Kfqx, Kpo, Weaf, Wqj; 10:30, Wbz; 11, Ksd, Wfaa, Wmh; 11:15, Woaw; 11:45, Wdaf; 12, Kfqx, Kgo, Kgw, Khj, Knx; 12:30, Wsai.

Monday, December 15: 6, Kgo; 6:30, Kpo; 6:45, Woaw; 7:15, Wcae; 7:30, Wjz, Woo; 7:45, Weei; 8, Wlw; 8:30, Wmh; 8:45, Wor; 9, Kpo, Weei, Wlw, Wmh, Wor; 9:05, Wdar; 9:30, Wcae, Weei, Woo; 10, Kfi, Kfqx, Weei; 10:15, Wsai; 10:30, Wgr; 11:45, Wdaf; 12, Kfqx, Kgo; 1, Knx.

Tuesday, December 16: 6, Knx, Weaf, Wor; 6:15, Wobj Wjz; 6:30, Kpo; 7, Webj; 7:30, Kfi; 8, Khj, Wsai; 9, Kpo, Wcx, Weei, Wfi, Whb; 9:30, Ckac, Wnj; 10, Kfqx, Wlw, Wqj; 11, Knx, Wjz, Wmc; 11:45, Wdaf; 12, Kfqx, Kgo, Khj, Knx; 1, Khj.

Wednesday, December 17: 6, Knx, Wjz; 6:30, Kpo; 7, Wor; 7:30, Wcae, Who, Woo; 8, Khj; 9, Kpo; 9:03, Wdar; 9:30, Wjz, Wnj; 10, Kfi, Kfqx, Wmh, Wqj; 10:30, Wgr; 11, Ksd; 11:45, Wdaf; 12, Kfi, Kfqx, Knx, Kyw; 12:30, Khj.

Thursday, December 18: 6, Wjax, Wjz; 6:30, Kpo; 8, Knx, Whb; 9, Kfi, Kpo, Wjax, Wmh, Woc; 9:30, Kfkx, Weei, Wip; 10, Weei, Wqj; 11, Knx, Wme, Woc; 11:45, Wdaf; 12, Kgo, Khj, Knx.

Friday, December 19: 6:30, Kpo, Webj, Wjy; 7, Whb; 7:15, Wjid; 7:30, Wdar, Wjz, Woo; 8, Weaf; 9, Wcau; 9:03, Wdar; 9:30, Wgy, Wjz, Wnj, Woo; 10, Kfi, Kfqx, Wqj; 10:30, Wgr; 11:45, Wdaf; 12, Kfqx, Khj.

WMH, Cincinnati, Ohio (Central, 309), 8 p. m., organ recital, Kurt Henkel; songs, Wright and Bessinger; tenor solos, Carl R. Cornoelie; 9, Avon dance orchestra.

WOAW, Omaha, Nebr. (Central, 526), 6 p. m., every child's story hour, Grace Sorenson, editor and publisher of Every Childs magazine; 6:20, to be announced; 6:30, dinner program, Hugo Heyn's orchestra; 9, Radio drama, entitled, "The Scoop," written by Gene Rouse and Ed Williamson; 10:30, Wowi frolic, Frank Hodek and his Omaha nightingales.

WOC, Davenport, Ia. (Central, 484), 12 m., chimes; 7 p. m., sandman's visit; 9, Schuster Sister's orchestra; 11, Louis Connor and his LeClaire hotel orchestra; song and novelty numbers, Peter MacArthur.

WOI, Ames, Ia. (Central, 360), 8 p. m., Messiah.

WOR, Newark, N. J. (Eastern, 405), 6:15-6:30 p. m., "Radio for the Layman," Albert E. Sonn; 6:30-7:30, Tom Cooper's orchestra.

WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra, Robert E. Golden, director; 5:10, sports results; 5:15, organ recital, Mary E. Vogt.

WQJ, Chicago, Ill. (Central, 448), 11-12 m., "Planning the Christmas Dinner," Erna Bertrams; "Defining the Fashions of Today," Eleanor Chalmers; "Interior Decorating," Walter Murray; 3-4 p. m., "Things That Are Different," Agnes May Allen; 7-8, Ralph Willams and his Rainbo Garden orchestra; Sheppard Levine, tenor; Effie Overson, accompanist; Lydia Lochner, contralto; Marion Henry, pianist; Manuel Rodriguez, Spanish tenor; 10-2 a. m., Ralph Williams and his Rainbo skylarks; Will Rossiter; Grace Wilson, contralto; Rosemary Hughes, soprano; Axel Christensen, pianist; Edna Solomon, contralto; June Lee of Rainbo Greetings company.

WSAI, Cincinnati, Ohio (Central, 309), 10 p. m., special Cincinnati Enquirer program.

WSB, Atlanta, Ga. (Central, 429), 5-6 p. m., bedtime stories, Bonnie Barnhardt; 10:45, Charles A. Shelton, organist.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m., Guy Lombardo's Royal Canadians orchestra.

WTAY, Oak Park, Ill. (Central, 286), 6:45-7:45 p. m., Mrs. Anna Largent, violinist; Helen Rauh, pianist; Dr. Hugh B. Marshall, tenor; Ellen Converse, soprano; Roland Hinkel, tenor; Guyon's Paradise ballroom orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 3 p. m., the Detroit News orchestra; 8:30, Jean Goldkette's dance orchestra; Mrs. T. Earl Ouellette, soprano; 10, dance music, Jean Goldkette's orchestra; 11, the Detroit News orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 2:30-4:30 p. m., Buffalo Courier and Enquirer musical program; 6-7:30, dinner music, Hallpryd string quartet.

WGY, Schenectady, N. Y. (Eastern, 380), 2 p. m., "Good Times," Daniel Chase; 6:30, dinner music, Hotel Ten Eyck orchestra; 7:45, "A Few Moments with New Books," L. L. Hopkins; WGY orchestra; "Border Ballads," Dr. Charles Alexander Richmond; 8:15, "Wedding Bells," WGY players; 11:30, Stephen E. Boisclair, organist.

WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., "Kelly's Army in Iowa," D. L. McMurry; music; 7:15, Butler-Iowa basketball game.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo theater orchestra; "Just Among Home Folks;" 7:30-9, "Dix" Bluegrass Serenaders, Henry L. Dixon, director.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m.,

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m., Ponce de Leon orchestra, Herbert Hayward, director, Grebe's Hanna restaurant; sports, news, culinary recipes, 8, program arranged hy the Cleveland Press; WHK-Bellhops orchestra, Dean Smith, director.

ladies' hour program, Sweeney Radio trio; 8-9:30, St. Agnes Academy orchestra, playing "In Melody Land," "Imps and Spirts at Work," "Romance," "Dancing Dolls," "Song of Farewell," "Under the Double Eagle" and "Beneath the Holly;" violin-piano ensemble playing "The Hoop of St. Cecila" and Meditation;" Julia Combs and Florence Botdorf, piano duet, playing "Dawn," "The Gondolier," "Love Song" and "Good Night;" Catherine Costello singing "Thank God for a Garden and "Enchanted Glade;" Mary Anchors and Angellna Sirchia, piano duet, playing "Second Waltz;" Kenneth Jordan, violinist, playing "Polish Dance;" Margaret Mary McDonnel, pianist, playing "Minuet;" address, Rev. M. D. Tierney; Evelyn Collins and Alberta Nichols, piano duet, playing "Humeresque;" Helen Brady, violinist, playing "Canzonetta;" Thelma Kessler singing "The Nightingale's Song and "The Damsel;" Mary Elizabeth Clinton, pianist, playing Prelude in G minor; St. Agnes Academy chorus singing "Jesu Bambino."

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Gimbel tea room orchestra, Ray Steen, director; 3, Women's City club news; 3:15, recital, Mary Buchanan Wagoner, soprano; Harry A. Orr, pianist; G. Edwin Fredericks, violinist; Galilet Romanelli, baritone; 6:05, Art Coogan and his Club Madrid orchestra; 7, Uncle Wip's bedtime stories; 8, WIP magazine of the air; 10:30, Harvey Marburger and his Vaudeville orchestra.

WJAX, Cleveland, Ohio (Eastern, 390), 7 p. m., Austin J. Wylie's Golden Pheasant orchestra; 8 p. m., studio program, popular entertainers; 10-12, Austin J. Wylie and his Golden Pheasant dance orchestra.

WJY, New York, N. Y. (Eastern, 405), 8-9:45 p. m., "Wedding Bells," comedy presented by WGY players; 9:45-10:45, Wanamaker organ recital.

WJZ, New York, N. Y. (Eastern, 455), 10-10:20 a. m., housewives league menu, Mrs. Julian Heath; 10:20-10:30, review of reviews; 10:30-10:40, "Household Equipment," Ethel R. Peyser; 10:40-10:50, "Bride's Household Linen," Editor of Needle Art; 10:50-11, fashion talk, Eleanor Gunn; 1-2 p. m., Nathan Abas' Hotel Pennsylvania orchestra; 4:30-5:30, Bernhard Levitow's Hotel Commodore orchestra; 7-8, Bernhard Levitow's Hotel Commodore orchestra; 8-8:10, Wall Street Journal review; 8:10-8:30, N. Y. U. Air college; 8:30-10:30, American Orchestra society; 10:30-11:30, Waldorf-Astoria dance orchestra.

WKAQ, San Juan, P. R. (Intercolonial, 360), 8:30-10 p. m., musical concert, Cafe-Restaurant "La Cafetera."

WLW, Cincinnati, Ohio (Central, 423), 10 p. m., cello solos, Karl Kirksmith; Milnor instrumental trio, playing "Canzonnetta," "Bolero;" Doherty Melody boys.

WMC, Memphis, Tenn. (Central, 500), 8 p. m., bedtime story, Uncle Jerry; 8:30, classical program, Mrs. Louise Bowen.

WMAQ, Chicago, Ill. (Central, 447.5), 4 p. m., household hour, Mrs. Elizabeth O. Hiller, director; 4:30, Illinois Federation of Women's clubs; 6:30, Hotel La Salle orchestra; 8, Western Railways comm.; 8:15, to be announced; 9, lecture, University of Chicago; 9:15, program, Mr. and Mrs. Emerson Abernathy.

KFSG, Los Angeles, Calif. (Pacific, 278), 10:30-11:30 a. m., sunshine hour, Bible school of the air; 3:30-4:30 p. m., organ recital, Roy Reid Brignall; 7:30-9:15, talk, Judge C. S. Hardy; sermon, Aimee Semple McPherson; 9:15-10, Silver band, Temple choir, N. E. Brown, talk on radio; 10-11, organ recital, Roy Reid Brignall.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., concert, Original Serenaders; 5, children's program; story, Aunt Nell; 8, popular lecture, University of Oregon extension division; 10:30, Hoot Owls with Orioles of Salem.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:30 p. m., news and music; 2:30-3:30, program, Pacific States Electric company; 6-6:30, Art Hickman's concert orchestra, Edward Fitzpatrick, director; 6:30-7:30, "Sir" Richard Headrick, child movie star and Uncle John; 8-10, program, Newberry Electric corporation, arranged by J. Howard Johnson, 10-11, Earl Burtnett's Biltmore hotel dance orchestra.

KNX, Hollywood, Calif. (Pacific, 337), 8 a. m., inspirational talk; 9, Town Crier, news; 9:30, personal problems, Estelle Lawton Lindsey; 5 p. m., closing markets; 6-7:30, dinner hour music; 7:45, motorlogue for California tourists; 8-10, feature program; 10-11, Lindsey's Studebaker dance orchestra; 11-12, Abe Lyman's Cocoanut Grove dance orchestra.

KOB, State College, N. M. (Mountain, 360), 7:30-8:30 p. m., "The Prevention of Tuberculosis," Dr. Dwight Allison; gems from the college operetta, "Yokahama Maid."

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont hotel orchestra; 4:30-5:30, Rudy Seiger's Fairmont hotel orchestra.

KSD, St. Louis, Mo. (Central, 546), 8 p. m., program.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 6:35-7 p. m., children's bedtime story, Uncle Bob; 7-7:30, dinner concert, Congress hotel; Coon-Sanders Original Nighthawks; 7:30-8, program, Duncan Sisters Music Publishing company; 8, speeches, auspices American Farm Bureau federation; 9-10, midnight revue; 11-2:30, midnight revue; Coon-Sanders Original Nighthawks; W. Remington Welch, organist.

WAHG, Richmond Hill, N. Y. (Eastern, 316), 7:30-8:30, Del Sol Society orchestra, Helen Lynch, conductor; 8:30-8:45, Gene O'Sullivan, Irish tenor; 8:45-9, Norman Curtis, pianist; 9-9:15, WAHG Radio Santa Claus; 9:15-9:30, Dorothy W. Phillips, reader; 9:30-9:45, "The Canadian Rockies," Earl Hooker Eaton; 9:45-10, Gladys Armellini, lyric soprano; 10-10:15, Gene O'Sullivan, Irish tenor; 10:15-10:30, Norman Curtis, pianist; 10:30-10:45, Dorothy W. Phillips, reader; 10:45-11:15, Gene Napolitan and his orchestra.

WBAV, Columbus, Ohio. (Eastern, 423), 8 p. m., concert, Columbus Mandolinistica, Lynne W. Neereamer, director; Nana Burbridge, soprano soloist.

WBZ, Springfield, Mass. (Eastern, 337), 6-7 p. m., dinner concert; 7:10, bedtime stories; 7:30-8, university extension courses; 10-11:30, concert; 11:30-12, McEnelly's singing orchestra.

WCAE, Pittsburgh, Pa. (Eastern, 462), 6:30 p. m., dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 8, address, courtesy, Volunteers of America; 8:15, special feature; 8:30, musical program, Sequilla club.

WCAL, Northfield, Minn. (Central, 360), 8:30 p. m., book talk: some literary journals, Dr. George Weida Spohn.

WCAU, Philadelphia, Pa. (Eastern, 278), 6 p. m., Meyer Davis Hotel Pennsylvania dance orchestra; direction Louis Baer; 8, recital; 10, Meyer Davis dance orchestra.

WCCO, Minneapolis-St. Paul, Minn. (Central, 417), 10:45 a. m., home service, "Stuffing for the Christmas Bird," Betty Crocker; 2 p. m., woman's hour, "Why Not Be Healthy and Happy?" R. H. Combs, secretary Henn. County Health association; 2:30, matinee musical; 4, magazine hour, "With Dogs After Russian and Siberian Bear," W. Von Meck; 5:30, children's hour, Ellen Nye; 6:30, dinner concert, Hotel Radisson ensemble; 8:30, musical program, St. Cloud Chamber of Commerce.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., music; 6, dance music; 7, musical program; 10, dance program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's string trio; 6-7, school of the air, piano tuning-in number on the Duo-Art; address, speaker, Kansas City Children's bureau; the Tell-Me-a-Story lady; music, Hotel Muehlebach Trianon ensemble; 8-9:30, popular program, the Star's Radio orchestra; 11:45-1 a. m., nighthawk frolic, the "Merry Old Chief" and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, 395), 11:45 a. m., daily almanac; 12:02 p. m., Stanley theater organ recital; Areadia cafe concert orchestra; 2, playlet, students, National School of Elocution and oratory; Areadia cafe concert orchestra; 7:30, Dream Daddy's bedtime stories; 8, Walter Greenough—WDAR players; 8:30, Green Hills Farm hotel dance orchestra; 10:02, Arcadia cafe dance orchestra; Morning Glory club concert; songs by Herscher and Zoehrns; features from Philadelphia's leading theaters.

WEAF, New York, N. Y. (Eastern, 492), 6-7 p. m., dinner music, Waldorf-Astoria hotel; 7-7:30, children's stories, G. R. Kinney company story teller; 8-8:30, "The Happiness Candy Boys;" 8:30-9, style talk, Nat Lewis; 9-10, B. Fischer's "Astor Coffee" dance orchestra.

WEBJ, New York, N. Y. (Eastern, 273), 7-7:15 p. m., Blybrun's reviews of the new plays; 7:15-7:30, Edythe Traub; 7:30-8:30, Jimmy Clark and his White Way entertainers; 8:30-9, Sam V. Tunts.

WEEI, Boston, Mass. (Eastern, 303), 6:30 p. m., Dok-Eisenbourg and his Sinfonians; 7, Boston Edison Big Brother club; 7:30, "A Few Minutes with Santa Claus," courtesy of Houghton & Dutton company; 7:45, F. Kronenberg, president of the Neapolitan Ice Cream company, interviewed by Hap Myers; 8, program, Charles W. Pearson, director; 8:30, "Sportsmanship," Capt. Percy Redfern Creed; 9, Burns and Foran, clogg dancers.

WFI, Philadelphia, Pa. (Eastern, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 3, report, closing prices Chicago grain market; 3:05, spiritual analysis of Beethoven works; Beethoven string quartet, Thyrza S. Stein, Albert Berul, violinists; Jacob Moilin, viola; William Sheetman, cellist; "The Song of Penitence," Thyrza S. Stein, soprano; 4, feature from Zoo; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 7, Sunny Jim, the kiddies' pal.

WGN, Chicago, Ill. (Central, 370), 1:40 p. m., luncheon concert; 2:30, Lyon & Healy artist series; 5:30, Skeezix time for the children, Sen Kaney; 6, organ recital, Lyon & Healy; 6:30-7, dinner concert; 8-9, classical program; 10-11, jazz dance program, Drake dance orchestra, Blackstone dance orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 2:30-4:30 p. m., Buffalo Courier and Enquirer musical program; 6:30-7:30, dinner music, Vincent Lopez Hotel Statler dance orchestra, Harold Gieser, director; 8-8:15, Santa Claus of J. N. Adam & Company's "Toyland," talks to the children; 9-10, musical program, Buffalo Trust company, direction of Cecile Kertz; 11:30, supper-dance music, Vincent Lopez Hotel Statler dance orchestra, Harold Gieser, director.

WGY, Schenectady, N. Y. (Eastern, 380), 2 p. m., health hints, Dr. C. W. Woodall; 7:45, health talk; 7:55, program, Schenectady Salvation band; address, Warren C. Taylor; 10:30, Bulebird dance orchestra.

WHA, Madison, Wis. (Central, 275), 7:45 p. m., Messiah, University student choir, University league, director.

WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., "The Newspaper Comic," George H. Gallup; music.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo theater orchestra, Harry S. Currie, conductor; "Just Among Home Folks;" readings, Courier-Journal, Louisville Times; 7:30-9, concert, auspices Louisville and Jefferson County Children's Home Glee club, Grace Deppe, director.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program, Sweeney Radio trio; 7-8, address, S. F. Bencoter; music, Gilbert Jaffy's orchestra.

WHK, Cleveland, Ohio (Eastern, 283), 6 p. m., Ponce de Leon orchestra, Herbert Hayward, director, Grebe's Hanna restaurant; sports, news, culinary recipes; 7, Ethel O. Hawes, bedtime story; 8, musical program and educational forum; popular entertainers; WHK-Bellhops orchestra, Dean Smith, director.

WHO, Des Moines, Ia. (Central, 526), 7:30-8:15 p. m., May Viborg, violinist; Eva Winegarden, pianist; Marion Speer, contralto; 8:15-9, Monday Music club of Adel, Mrs. Jessie Rudrow, director.

WIP, Philadelphia, Pa. (Eastern, 509), 1 p. m., Gimbel tea room orchestra, Ray Steen, director; 6:05, Harvey Marburger and his Vaudeville orchestra; 7, Uncle Wip's bedtime stories.

WJJD, Mooseheart, Ill. (Central, 278), 7:15-8:15 p. m., novelty orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30-8:15 p. m., Billy Wynne's Greenwich Village Inn orchestra; 8:15-8:25, "Taxes," Frank Shevit; 8:25-8:45, Anne Tyndall, soprano; Keith McLeod, accompanist; 8:45-9, talk, Outlook magazine; 10-11, Abraham and Strauss choral society.

WJZ, New York, N. Y. (Eastern, 455), 10-10:20 a. m., housewives league menu, Mrs. Julian Heath; 10:20-10:40, "Books," Graee Isabel Colbron; 10:40-10:50, arts and decorations, Mrs. Mary Robert; 10:50-11, fashion talk, Eleanor Gunn; 1-2 p. m., Hotel Ambassador trio; 4:30-5:30, Fred Hall's Royal Terrace orchestra; 7-8, Savarin ensemble; 8:30-9, Ray Walker's Radiolians from the Chummy club; 9-10, U. S. Army band in Pan American program direct from WRC, Washington; 10-10:15, Loose-leaf Current Topics, William H. Allen; 10:15-10:30, Radio Franks—Wright and Bessinger; 10:30-11:30, Duke Yellman and his Irene Castle orchestra from Knickerbocker Grill.

WMAQ, Chicago, Ill. (Central, 447.5), 4 p. m., talk on English diction, Mrs. J. Elliott Jenkins; 4:30, pupils, Bush conservatory; 5, "The Lullaby Lady," Mrs. Gene Davenport; 6, organ recital, Chicago theater; 6:30, Hotel La Salle orchestra; 8, weekly wide-awake club program, Mrs. Frances M. Ford, director; 8:30, musical geography, Mr. and Mrs. Marx E. Oberndorfer; 9, musical program, Regal quartet.

WMC, Memphis, Tenn. (Central, 500), 8 p. m., bedtime story, Uncle Percy; 8:30, concert, Britling's Novelty orchestra, Frank Bracciante, director; 11, midnight frolic.

WNJ, Newark, N. J. (Eastern, 233), 10:30-12:30 a. m., Frank Daily and his Meadow Brook orchestra.

WOAW, Omaha, Nebr. (Central, 526), 6 p. m., "Uncle Ross" story hour, Doris Claire Secord; 6:20, to be announced; 6:30, dinner program, orchestra music.

WOC, Davenport, Ia. (Central, 484), 7:20 p. m., "Producing Beef for Profit," Prof. R. W. Snyder; 8, Carl Stoddard and his orchestra.

WOO, Philadelphia, Pa. (Eastern, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra, Robert E. Golden, director; 5:10, sports results and police reports; 5:15, organ recital, Mary E. Vogt; 7:30, A. Candelori and his Hotel Adelphia concert orchestra; 8:30, Erno Rapee's "Radio Gang" from Fox theater; 9:30, WOO concert orchestra; 10:03, organ recital, Harriette G. Ridley; 10:30, Vincent Rizzo and his Hotel Sylvania dance orchestra.

WOR, Newark, N. J. (Eastern, 405), 3-3:30 p. m., educational talk, Mr. Cullimore; 6:30-7, Man-in-the-Moon stories for children; 7:30-7:45, resume of the day's sports.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., "Farm Conversation on the New Federal Farming Census and What It Means," E. A. Logan.

WQJ, Chicago, Ill. (Central, 448), 11-12 m., Fred Mann and his Sunday dinner menu, Theodore Wilmus, chef at the Rainbo Gardens; 3-4 p. m., "Christmas Night Supper," Dorothy McLain Dicken; "The City of Hongkong," Mrs. Harry T. Sanger; 7-8, dinner concert, Ralph Williams and his Rainbo skylarks; Verdi trio; Nubs Allen, contralto; Rogers boys, Larry, Billy; Monogram trio.

WSB, Atlanta, Ga. (Central, 429), 5-6 p. m., bedtime story, Bonnie Barnhardt; 8, town students of Signor Emilio Vollis; 10:45, Radiowl entertainment.

WTAM, Cleveland, Ohio (Eastern, 390), 6 p. m., Guy Lombardo's Royal Canadians orchestra.

WTAY, Oak Park, Ill. (Central, 286), 6:45-7:45 p. m., Harry Sosnik, Ray Kroc, pianist; Sandy Meek, baritone; Black Cat orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 3 p. m., the Detroit News orchestra; 8:30, Jean Goldkette's dance orchesra; Three Knights of harmony, Norman Butterfield, baritone; Mrs. Claudine Secor, soprano; Anne Campbell, the Detroit News poet.

Friday, December 19

Friday, silent night for: CHNC, CKAC, KFKX, KGO, KPO, WAAW, WBBR, WCBD, WEAO, WHAA, WJAX, WKAQ, WLW, WMH, WOI, WRC, WSAI.

CNRE, Edmonton, Can. (Mountain, 450), 6-7:30 p. m., John Bowman and his dinner orchestra; 7:30-8, bedtime travel talk by the Farmer; 8:30-10:30, "The Trinity Minstrels," R. R. Couper, director.

CNRT, Toronto, Can. (Eastern, 400), 8:30 p. m., King Solomon Lodge A. F. & A. M. minstrel show, Gordon Griffiths, musical director; Frank Hill, interlocutor; "O Canada" and opening chorus, entire company; male quartet in Southern melodies, Walter Haines, first tenor; Theo. Prince, second tenor; Henry Milne, baritone; Arthur Vandervoort, bass; tenor solos, Theo. Prince, Walter Haines singing "Silver Threads Among the Gold," selections; Henry Milne singing "Carry Me Baek to Old Virginny," "Good Night, Sleep Tight," Arthur Vandervoort singing "Uncle Roome;" end songs, jokes, sketches, backfire, George Griffiths, Ernest Manifold, Bob Wilson, Charlie Kenney.

KFAE, Pullman, Wash. (Central, 330), 7:30 p. m., Jaroslav Sotola, violinist, playing "Bohemian Airs," "Rondo Capricioso;" "Essentials of Successful Farm Management," Prof. George Severance; "Berry Diseases in Washington," George L. Zundel; book reviews, Alice L. Webb.

KFDM, Beaumont, Tex. (Central, 306), 8 p. m., Refinery band.

KFI, Los Angeles, Calif. (Pacific, 469), 5-5:30 p. m., Evening Herald; table talk, news; 5:30-6, Examiner: news bulletins; 6:45-8, Aeolian residenee pipe organ recital, Dan McFarland, organist; 8-9, Evening Herald: Fisher's Melo-jazz orchestra; 9-10, Examiner program; 10-11, Frederick North Concert company.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., program, Consolidated school of Cromwell.

KFQX, Seattle, Wash. (Pacific, 238), 7:15-7:45 p. m., Aunt Vivien's bedtime story; 8-9, Earl Gray and his orchestra; 9-10, concert; 10-11, Earl Gray and his Butler hotel orchestra.

INTERNATIONAL TEST

(Continued from page 3)

ference from Texas and California stations and what appeared to be local amateur code."—Wm. Graymont, WHAA.

WHAZ, Rensselaer Polytechnic Inst., Troy, N. Y.

"No results reported as yet on transatlantic test November 24. Letters from Europe will not reach us until next week."—Station WHAZ.

WHO, Bankers Life Ins. Co., Des Moines, Iowa

"No report has been received of reception WHO in foreign countries. Very good reception in Des Moines from foreign countries was made by Jack Clemens."—Station WHO.

WIP, Gimbel Brothers, Philadelphia, Pa.

"We have no report yet of WIP being heard in Europe. A number of Philadelphia and vicinity fans heard the other side The names are too numerous to enumerate."—J. G. Pollock, WIP.

WJAS, Pittsburgh Radio Supply House, Pittsburgh

"WJAS was not included in the transatlantic trials, but W. E. Menges received test signals from Madrid, Spain, PTT; London, 2LO; Newcastle, 5NO; Cardiff, Wales, 5WA, and Paris (the Petit Parisiene). These were brought in on a loud speaker, using a four-tube SP2 De Luxe receiver."—Station WJAS.

WJAX, Union Trust Co., Cleveland, Ohio

"WJAX took small part in the international tests. Have received no replies from continent."—D. S. Knowlton, WJAX.

WLW, Crosley Radio Corp., Cincinnati, O.

"Need for super power station clearly demonstrated in transatlantic tests. Results next year will surpass present records.

"L. D Thieken, 3541 Bevis street, Cincinnati, with two-tube fifty-one, received Birmingham, England. Capt. John Bradley, Anglesea, N. J., heard 2ZY and 6BM with one-tube receiver. Mrs. Wm. Slowden, Rantoul, Ill., heard Eiffel tower with one tube. Newcastle, Aberdeen, Germany and Italy stations heard by many with Trirdyn receiver Alex Cassell, Morocco, Ind., used Trirdyn and loud speaker in receiving foreign stations.

"Reports from foreign fans not yet received. Opportunity is here for an international language such as Ilo. Radio is the greatest factor for harmonious understanding of all nations."—Station WLW.

WNYC, Municipal Station, New York City

"We have received no confirmation that our signals were heard across the Atlantic. Thousands accomplished successful foreign reception here."—C. R. Bohnsack, WNYC.

WOAW, Woodmen of the World, Omaha, Nebr.

"WOAW and Omaha Daily News working together received 652 communications reporting reception of foreign stations. Check showed 75 per cent gave call letters 2LO, London, Vox Haux, Berlin, 6LV, Liverpool, Petite Parisiene and PPT, Lyons, most popular. Dr. James H. Goetz, E. W. Arthur, G. O. Bartlett, M. A. Weeks regularly heard the five mentioned.

"W. O. Wiseman, Radio editor of the News, and myself heard 2LO on loud speaker. Monday and Thursday gave best reception here. No report received yet of our station received abroad."—Orson Stiles, WOAW.

WOC, Palmer School, Davenport, Iowa

"We have not been advised officially whether our signals were received in Europe. We were using more power than last year and were easily heard then.

"Many local listeners claim they heard foreign stations. L. P. Lewis, local dealer, is positive he heard 5SC, Glasgow. Interference from regenerative sets ruined reception generally. An educational campaign in this regard is needed bad."—Station WOC.

WOR, Bamberger & Co., Newark, N. J.

"We did not participate officially in the transatlantic tests. Several Newark fans received foreign stations successfully, among them Hollywood McClosker, who received 2LO very clearly."—J. M. Barnett, WOR.

WQJ, Calumet-Rainbo Station, Chicago

"Several fans report hearing PTT, France, acknowledging receipt of program broadcast from WQJ, November 28. Among the fans were A. Bansback, 10630 Vincennes avenue, Chicago; Harry W. Spingold, 853 Glengyle, Chicago, and Edwin Hall, Jr., 702 North Union street, Independence, Mo. All these reported hearing PTT at 10:45 C. S T."—J. Sullivan, WQJ.

WSAI, U. S. Playing Card Co., Cincinnati

"We have no reports as yet on WSAI programs received during transatlantic tests. Two reports from the British Isles on programs of October 14 and November 18 have been confirmed. Glasgow and York were places reporting on this occasion."—Station WSAI.

WSB, Atlanta Journal, Atlanta, Ga.

"No reports of European reception of WSB have reached us. Very few reasonably authentic receptions of Europe reported, all being fragmentary and unsatisfactory. Regenerative interference was terrific Mexican stations confused many listeners.

"M. J. Williams and Brook Arnold reported Madrid, PTT. Judge Ogden Persons of Forsyth, Ga., reported Copenhagen and Berlin. Consider test valuable only as stimulant to interest."—Lambdin Kay, WSB.

WWJ, Detroit News, Detroit, Mich.

"European and British broadcasting stations were heard consistently during the international tests by Radio listeners in Detroit. Rather poor Radio weather existed during the first night of the test, but on other nights reception was remarkably good. Thursday night was the best of the week, with Rome and French stations being reported by scores of fans in the city.

"The most unique feat was recorded by Frank H. Harvey, 4018 Pingree avenue, Detroit, when he listened to Lyons, PTT, until midnight Thursday and then, without touching his dials, KFI, Los Angeles, came rolling in, so Radio took him one-third the way around the world in a flash."—C. W. Kirby, WWJ.

TABLE FOR MAKING TIME TRANSITIONS

Eastern Standard Time	1	2	3	4	5	6	7	8	9	10	11	12
Central Standard Time	12	1	2	3	4	5	6	7	8	9	10	11
Mountain Standard Time	11	12	1	2	3	4	5	6	7	8	9	10
Pacific Standard Time	10	11	12	1	2	3	4	5	6	7	8	9

HOW TO USE. If a station is giving a program at 8 o'clock Mountain time and you wish to find what this is equivalent to in Central time, find 8 o'clock in the third of Mountain time row. Then immediately above it in the same vertical column will be found the figure 9 in the Central time row. This indicates that the program would be heard at 9 o'clock Central time.

Station KFDM Is Pleasing to Public

Received with Excellent Clarity and Volume in Chile—On Air Since October

BEAUMONT, Texas. — The Magnolia Petroleum company's recently established station, KFDM, has received the glad hand of applause throughout the United States, Canada, Mexico, Central America and the West Indies upon the class of entertainment given Radiophans since October 1, its official opening date.

KFDM had its inception in a trip made by the Magnolia Refinery band to the Dallas state fair last year. While in that city a program was Radiocast over the Dallas News and Journal station, WFAA. Seven thousand congratulatory letters and telegrams poured in asking for more. These requests were answered by the installation of KFDM and the Magnolia band and local artists have come into their own.

Thousands of letters and telegrams are being received, congratulating the station on its programs and the announcer, "Magnolene Mike." A letter of unusual interest was received November 7 from Mr. J. R. Seckman of Valpraiso, Chile, who reports the very interesting news that he heard our station very clearly during the band program of October 10. This sets a new long distance record for the Magnolia's new Radiocasting station.

The distance by air line from Beaumont to Valparaiso is approximately 4,500 miles. Using this distance as a radius and circumscribing circle, with Beaumont as the center, this circle would include nearly all of Alaska, the entire Dominion of Canada, and within fourteen degrees of the North pole, all of inhabited Greenland, and following around we come within a few miles of Iceland, would nearly skirt the coasts of Spain, Portugal and the western coast of Africa.

A ten-year concession for exclusive broadcasting privileges has been granted by Peru to the Peruvian Broadcasting company.

Demonstrating Radio Principles at Home

Chapter I—Application of Electricity to Radio

By J. E. Owen

RADIOPHANS inclined to experiment will find in this series of articles, directions for illustrating to their own satisfaction the underlying principles of Radio. They will be told how to set up the experimental apparatus, which will be simple and not so complicated as to require the equipment of a large laboratory, using odds and ends probably already at hand. Few new parts will be needed. The chapters to follow will be:

Chapter II—Induced Currents and Capacity.
Chapter III—Aerial Installations.
Chapter IV—Devising New Circuits.
Chapter V—Presenting the Experimenter Senior.
Chapter VI—Presenting the Experimenter Junior.
Chapter VII—Presenting the Experimenter Supreme.
Chapter VIII—Experimenting with Push Pull Amplifiers.

ELECTRICITY is atomic in structure in that it is composed of very small unit charges. These charges are termed electrons, and are so small that it would take 50,000 of them lined up side by side to reach across an atom. And an atom is so small that 1,000,000 of them side by side would not make a line as long as the thickness of a sheet of bond paper. However, as interesting as this may be, our chief interest from the viewpoint of Radio lies in the motion of these electrons, since it is electrons in motion that constitute an electric current.

Much of our elementary theory was devised before anything was known of the actual nature of electricity, consequently, there were made a few unfortunate errors that have left their influence even until today. One of the most significant of these is that the flow of current in an electric circuit is from the positive to the negative, while within the past few years it has been definitely proved that the flow is from the negative to the positive.

When rules of electro-magnetism were devised, the flow was considered to be from positive to negative. These same rules are still in use and when we use them, we should remember that the flow of current as indicated by the rule is opposite to the actual flow of electrons. If we disregard this relation, we will not be in a position to understand certain electrical effects, such as the flow of electricity across the space between the filament and plate in a vacuum tube.

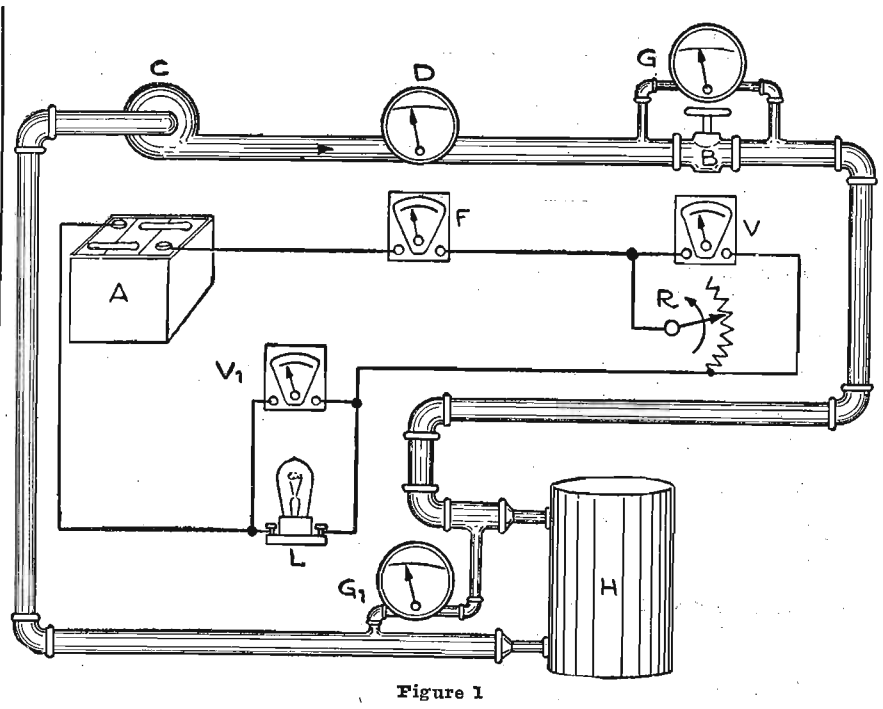


Figure 1

Electrical Terms

There are a number of electrical terms that perhaps should be defined before we go deeper into this work. These definitions, as you will find them here, will not be scientifically accurate in their entirety, but they will be sufficiently accurate for any work which is done or suggested in this series. More nearly accurate definitions would not only be unnecessary, but they would often be misleading, and furthermore, it is not within the scope of articles of this sort to attempt such detailed explanations.

Voltage refers to an electric pressure and corresponds very much to pressure in a water system such as is represented in Figure 1. C is a centrifugal pump which exerts pressure in the direction of the arrow. B is a throttle valve and G is a gauge which registers the difference in pressure in the water on both sides of the valve B. With the valve B completely closed, the gauge G will register the total head against which the pump will work.

We have inside the water circuit an electric circuit which is analogous to it. A is a battery and R is a rheostat which may be turned so that the circuit is completely broken. V is a voltmeter which is an electrical device for registering the difference in electrical pressure between the two terminals of the rheostat R. Now, as in the case of the water system, when the circuit is broken at R, there is no flow, and the voltmeter registers a difference in electric pressure between the terminals of R equal to the voltage of the battery, or the electrical pressure against which the battery A will work.

Amperage may be defined as the amount of current passing in a circuit at a given time. In other words, it refers to the number and quantity of electrons involved in the flow. It does not have reference to the amount of energy possessed by these electrons. Consider again Figure 1. D is a device designed to register the amount of water flow in the circuit and F is an ammeter, an electrical device designed to indicate the amount of electronic flow, or the amperage.

The study of the operation and control of electrical apparatus may be divided

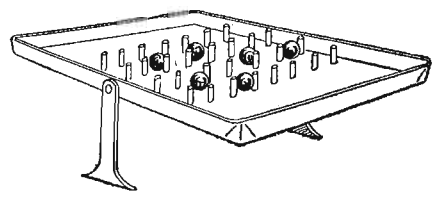


Figure 2

into three parts: namely, resistance, inductance and capacity.

Ohmic Resistance

Ohmic resistance is that opposition to electronic flow which is evidenced by

(Continued on page 24)

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Educating the Public

Poor Goods Drop Out as Sales Become Standardized

THE cut price Radio dealer, who sells poor supplies and equipment and unheard of receiving sets, is rapidly disappearing as the industry approaches stability. Standard sets operated by batteries and other accessories purchased from these dealers did not work properly, and sets assembled from the parts they sold gave, at best, an assortment of noises that was but a caricature of the program material sent out by the broadcasting stations. As a result, probably, Radio lost many devotees, but the situation is now much different, because the public is aware of the desirability, from the real standpoint of real economy, of purchasing only standard sets, supplies and parts.

There is still some indiscriminate price cutting to be observed and it is even indulged in by reputable dealers. There will, perhaps, always be reductions on sets at certain times, made with a view to attracting new customers. Whatever may be said as to the wisdom of this practice, there can be no question as to the false position taken by those who reduce prices on batteries and tubes below the level of reasonable profit. The men who make these reductions are blind to their own best interests as well as to the interests of the industry as a whole, for Radio in the future will depend to an increasing extent on the sale of replacements.

The public is now being educated in the judgment of the worth of Radio merchandise. Informative articles in the Radio magazines are serving excellently to bring this about, and the national advertising of the manufacturers is also helping. The better sort of sets and supplies is now becoming a matter of common knowledge and the time is near when a man who undertakes the purchase of a Radio set can be assured of the soundness of the manufacturing firm as is the buyer of an automobile.

Picked Entertainers

Progress of the Science Retarded

IN THE development of the motion picture business the country was held back many years because the industry was in the control of incompetent persons that placed on plays of the medicore class and very few of them that would reach the level where a person takes his hat off indoors.

Radio broadcasting seems to be threatened by the same fate and for somewhat the same reason. The new educational device has developed as a byproduct of industry and is very much in the hands of business men not only ignorant of its proper use but indifferent as to whether it is used properly or not. There are many exceptions but generally the making of programs is in the hands of underpaid individuals picked up haphazard, usually musicians or men whose primary interest is music. These persons are well fitted to assemble orchestras, but when it comes to lectures and addresses they are totally incompetent.

If broadcast directors and speakers are picked for their intelligence and education programs of higher quality may be expected and advertising propagandists banished from the studios.

Fisherman's Stories

Check Kept on You in DX Fishing

SOMEONE has likened the Radiophan to that of the fisherman. Both of them do fishing, and tell you great stories. There never has been much of a check put upon the fellow who angles for the finny tribe, but the Radiophan who angles for DX signals now must verify his claims and receive a stamp authorizing him to make his claims in truth.

The principle broadcasting stations in the country have launched a plan that promises to furnish a new hobby to the Radio public and the DX fan. By means of a stamp system the distance picked up by any person may verify his reception. To receive a stamp you must write to the station you have heard, giving details of reception and on the date and program heard and if it compares exactly with the station's list a stamp is sent to you. This shows that you have actually received a message from that station.

RADIO INDI-GEST

Willie's (?) Radioset

"Willie wants a Radio," his mother said one night.
"I know," his father then replied, "and it's no more than right
That the kid should have a set, when all the other boys
Each have a set of some odd type and partake of all their joys."

So dad hied himself into town to look the stores over,
And found that information was thicker than common clover;
But who was right, he couldn't find out quick enough, you know:
So he ordered from the first he'd seen, who said, "I toldya so!"

Then he had to stay at home to see the thing installed,
For he didn't want to miss a thing that could possibly have befalled.
And when the thing was finished quite, along about noontime,
He wanted to tune in some music from a foreign clime.

His disappointment he then concealed, and patiently awaited
The coming of the darkness, which he felt was sorely belated.
And when the night time finally came, with Willie standing by,
His father tuned the Radio until he made it cry.

Midnight came and Willie still was ignored standing by,
But now, instead, he snored as he softly sleeping lie.
While father tuned and tuned and muttered funny things,
Like, "Here is KDKA or PWX, as sings."

The next day came and father could hardly wait to leave
His business to tune in more on the pleasant eve;
But he got home and found the set'd been tuned all day,
And he warn't a bit at loss as just what words to say.

So, to boot, he locked up the set, to keep the child away;
For that was too expensive a toy with which a child should play. 5XV.

No, Only on February 30

Dear Indi: Turn on the loud speaker:
"On Thursday night ETAOIN.—Fort Madison, Ia., Evening Democrat."
Question: Doesn't this station, on Thursday, interfere with SHRDLU? J. E. R.

Why Do Doctors Make Good Radiophans?

They have lots of "patients,"
And are strong on "operating";
Are experts at "cutting out,"
Know something about "pulling wires"
And can use the stethoscope to get the "beats."
They are "positive" your blood test at times shows "negative";
Also test your "amperage" with (thermometer),
And when they put in the "charge" they usually get poor "reception." D. M. LOCKWOOD.

Mrs. Partington Speaks Out

Dear Indi:—Mizz Partington says her set was workin' mighty nice Sunday night and her listenin' was scattered right smart. She heard sermons and church services of several denominations and and some by Voliva at Zion. She also heard concerts, a heap, and all kinds; sacred, classical, popular, jazz, besides Henry Field and WTAS. WGY put out a late concert for the benefit of listeners who are tuning up across the ocean, and she knowed the furriners would love it for she's listened at WGY for more'n a year and they ain't broadcasted nothin' bad yet.

She heard Ed McConnel down to WSB, who announces in bass and sings in tenor purty good. 6KW, she says, also come in loud on Sunday night, but she couldn't make out the Wop talk. The "cuckoo" sounded natural. She says she seen in a Radio magazine where before long they are going to broadcast forty grafts of whole messages to onct instead of a letter at a time. She says she hopes no smart aleck will invent a picture attachment for receivers, for it would be too much trouble to put on your best looks every time you listened in. SIGNING OFF.

P. S. WOAI has just come in; and oh, boy, you just ought to have heard Mrs. Frank Jones, soprano. She must be kin to the Welch Jones'es family in Wales. MIZZ P.

P. S. 2. KGO just got here and what Rev. Philipps had to say about bootleggers would make their hair curl. P.

Three Cheers for—Mica!

Dear Indi, amuser of the great and near great. Peeking into the Radio section of the Oregon Sunday Journal, Portland, Ore., I chanced upon the following headline:

COMMON SENSE IS ALL THAT IS NEEDED TO MAKE PANEL BOARD

Sell your stock in Bakelite Limited and the Hard Rubber Trust quick! Or, perhaps, the headline writer intended spelling the last word "ore" instead of "oar"?

SPIDER WEBB.

Only a Question of Time

Condensed

By DIELECTRIC

Those in search of information about the stars and moon had only to tune to WBZ to get it. Mr. Patterson had a lot to tell on the subject, in fact, so much so, that it seemed almost to take his breath away. It is difficult, no doubt, to arrange material in the most interesting manner and present it with a Radio voice.

We had another chance to get outside the United States via Radiocast with the aid of KDKA. This time it was to visit Ceylon and to note the beauties of the surrounding country in that part of India. Our guide is a man who can picture scenery to a mute and hold the attention of a landscape gardener.

The Navy Band Orchestra is one of our splendid musical units in the service. It rendered a concert in the Marine barracks auditorium in Washington and WCAP Radiocast it. Most pleasing was the playing of the clarinet concerto. All the other selections were highly commendable, yet one disturbing element was there; the brass and strings were not in tune.

Never look to Jefferson City, Mo., to supply you with an evening of modern French music. It can't and won't be done. What they will do, however, is to render such numbers as bring a swarm of messages direct to the studio while you listen. That indicates their popularity.

I intend to camp on the trail of all stations within my hearing to see how many fail to respect the wishes of Radio audiences in regard to prompt announcing of call letters. In all cases where neglect to do this is chronic they will find mention in these columns not overly gentle. In three years' time the lesson should be learned.

Another opportunity to hear an unusual musical instrument came to those of us who listened to the Barrere Little Symphony orchestra concert Radiocast through WEAF. An old Haydn number called for a harpsichord as the solo instrument. Thank fortune we don't live in days when all our pianos sound as that forebear does! Some resemble it.

Down in Kaintuck one night WHAS had us all guessing as to whether it was Neverready entertainers, or not, on the air. Russell and Robinson, I believe those were the names, tried for all the world to give a typical plate battery song and dialogue. Even neutrodyne sets found it hard not to squeal while bringing it in.

Still another good program of chorus singing was that given by the Apollo club of Boston in Symphony Hall and WNAC sent it forth.

WEBH had a pianologue on one of their programs which bore the all-inclusive title of "If I Could Arrange It." What success the singer had in arranging any of the things mentioned would be interesting to know. I should like to know if he could arrange to meet Gloria Swanson. There was no mistaking the depth of feeling with which he sang of her.

WJZ manages to have something every so often sufficiently appealing to make us stop on 455 meters to pick it up. When you have a chorus of men trained as are the glee clubs of Yale and Harvard universities it is safe to listen, for singing such as theirs is a real joy. The spirit these two glee clubs put in their work one evening in New Haven made me glad I had not, as usual, turned past the RCA station.

How to Build the Simplest Possible Super-Het

Part V—Some More Questions and Their Answers

By John G. Ryan

IT SEEMS that Digest readers doubt the efficiency of the single step of audio frequency amplification which was provided in the original circuit of the simplest possible super-heterodyne. A number have written in inquiring as to the best method of adding another stage of audio amplification or a stage of push pull amplification. In Part IV, the writer made some suggestions as to the best means of adding push pull but did not include a wiring diagram as it was presumed that most of the fans were familiar with push pull from the numerous articles which have appeared in various magazines on such a piece of equipment. However, it seems that a number of those building this set want the wiring diagram for a push pull, so it is shown with this article as Figure 1.

There will be criticism of this diagram from a few advanced experimenters who will say that the rheostat should be in the negative filament lead and the 1½-volt drop across the rheostat added to the grid bias furnished by the C battery. The circuit has been drawn as shown so that varying the rheostat will have no effect on the grid bias and a point will be reached in the adjustment of filament brilliancy where this brilliancy and the constant grid bias furnished by the C battery are correctly balanced for clear reproduction. If the rheostat is placed between the plus C battery lead and the filament itself both the grid bias and the brilliancy will be varied when the rheostat is adjusted. Such an arrangement does not afford the flexibility and accuracy of control as is provided by the circuit shown.

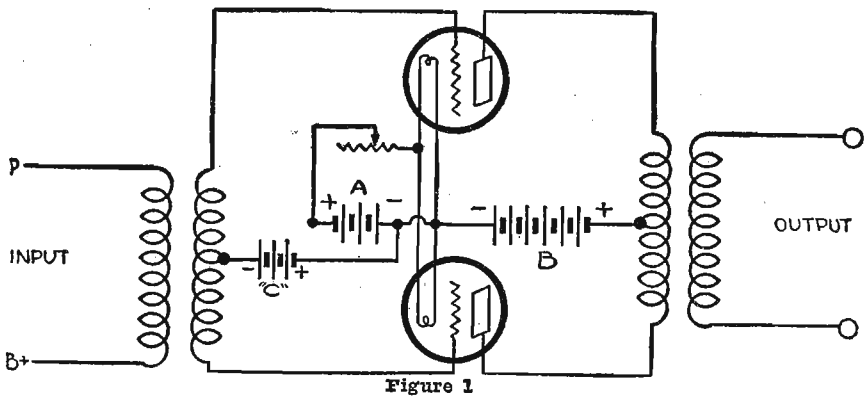


Figure 1

The 199 Tubes Will Work

M. B. R. of Chicago writes in to ask whether 199 tubes can be used in this set and we are advising him that they can be used but it will be desirable to have a second stage of audio frequency amplification. To accommodate the additional tube socket and audio transformer, the panel and baseboard should each be two inches longer and the transformer and socket placed at the right end of the baseboard. The grid return lead of this second stage of amplification can go to the C battery already provided for the first stage. The writer does not consider it good practice to use the standard size tube sockets with adapters if the 199 tubes are to be used in this set or any receiver embodying Radio frequency amplification. It has been proven much better to purchase and install tube sockets designed to accept the 199 tubes directly. If eight 199 tubes are used, the rheostat may be one of six ohms resistance which will take care of these tubes nicely, providing it will carry ½ ampere. The same voltages are applied to the plates of 199's as were shown for the 201 A tubes but the A battery should be of the 4½-volt variety instead of 6.

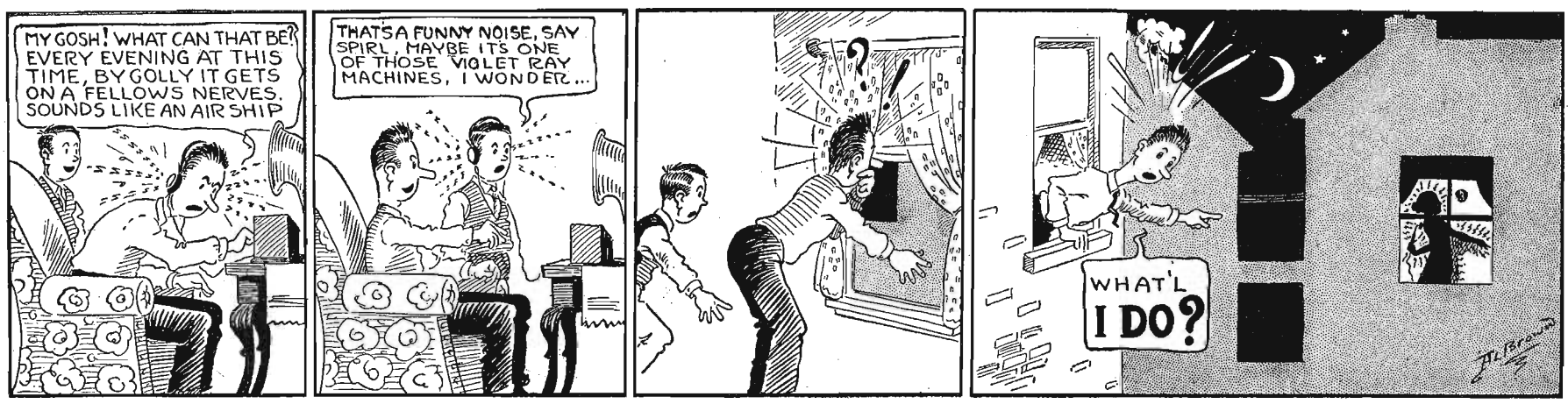
Error in Parts List

Our attention has been called by J. L. of Grand Rapids to the fact that there was an error in our list of parts. The list of parts called for a .0001 mfd. fixed mica condenser while the baseboard layout and wiring diagram showed no such condenser. The wiring diagram calls for a .00025 condenser across the secondary of the audio frequency transformer, which was not provided for in the list of parts. Needless to say, our parts list should have specified one fixed condenser of .00025 mfd. capacity in addition to the two called for to be used across the grid leaks.

Even the binding post strips came in for close scrutiny by Digest readers and an excellent suggestion in connection with these strips has been made by J. C. of Cairo, Ill. As shown in the baseboard layout the strip on which the loop binding posts are mounted has only two holes, and the brackets which support this strip

(Continued on page 22)

THE ANTENNA BROTHERS **Spir L. and Lew P.** **Pull Down the Blind**



SIMPLEST SUPER-HET

(Continued from page 21)

are held in place under the head of the machine screw that is part of each loop binding post. It is J. C.'s contention that in damp weather there would be leakage through the baseboard from one bracket to the other and that dust would form a leakage path between these supports.

In Figure 2, herewith, is shown the loop binding post strip with four holes, two of which are for the loop binding posts and two for the angle brackets. The bakelite or hard rubber of which this strip is made will provide much better insulation for the loop than did the first method shown. The longer binding post strip which carries the binding posts for A and B batteries has been made longer and its proper layout is shown in Figure 2 also. A hole has been added to each end for the angle brackets and there will be no leakage from the positive side of the B battery to any other part of the set through the baseboard.

There have been many requests for full size blueprints and the attention of the fans is called to the article in the issue of November 22. The baseboard layout shown in that article can easily be enlarged to full size by anyone with a rule, and the resulting diagram used as a drilling template. The book which is being prepared contains full size drilling templates but any reader who does not wish to wait for this book will not find it hard to make his own templates from these drawings.

"Matching" Tubes

J. F. of Irvington, N. J., wishes to know whether matched tubes are essential to successful operation. If your Radio dealer has a tube testing outfit, a number of tubes should be tested to determine their desirability as oscillators, Radio frequency amplifiers, detector or audio frequency amplifiers. If such an outfit is not available, but a number of tubes are, the tubes should be switched around in the sockets until those which function best for the various duties required have been determined. They should then be marked on the bottom between the pins with the number of the socket in which they function best.

Several Digest readers have written in and advised that they did not see where this hook-up has anything remarkable about it and they feel that it is just like many others. Nothing remarkable is claimed for this hook-up as this is a standard "super" circuit, but the design of the set is such that this receiver is very easy to lay out and construct, and standard parts, available anywhere may be used without the necessity of having any special parts made at a machine shop. Probably there are many other super-heterodynes that will give just as good results as will this one, but few of them are as easy to understand, build and operate.

(Mr. Ryan will continue to answer questions next issue. Write him.—Editor's Note.)

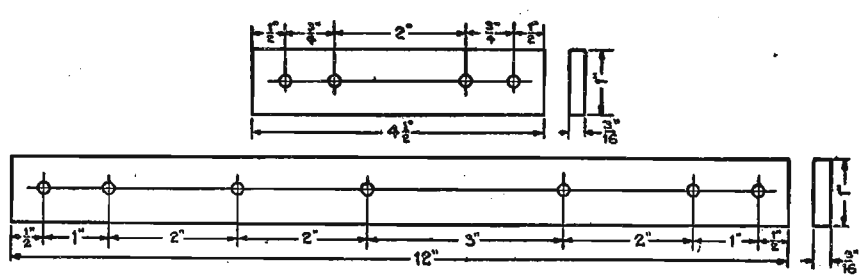


Figure 2

Carbon Sticks Make Ground

Most Radiophans advise the use of a good ground as one of the main things in the reception of Radio signals. I have a one-tube set that I made myself and I had a great time to obtain a good ground as there was no water pipe in the house, and in trying to drive a piece of pipe into the ground I struck a bed of rock that was impossible to penetrate. As I could not reach the depth desired, I tried out putting carbon stick in the ground. I obtained about fifteen carbon sticks from old dry cells and tied them in series and drove them in the ground up to the rock, which was about 1½ feet deep. This gave the ground I needed.—Clarence King, McGrann, Pa.

Save Wire Scraps

Never throw away short scraps of wire. They are of inestimable value when a new set or hook-up is tried out and when no new roll of wire is available. No attempt should be made to keep the pieces straight or in order. Simply throw them in a wide, shallow cardboard box under the table or in a drawer.

ow Loss," What It Is and Why

By Jacques Fournier

last installment of this dis- of low losses in Radio receiv- paratus we considered five of nown makes of condensers on t which seem to meet most

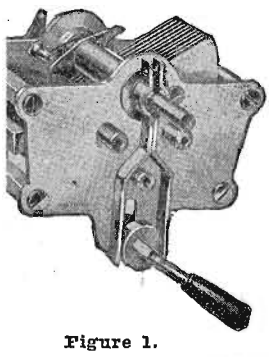


Figure 1.

uirements for low losses with high efficiency. There are so es of low loss condensers that impossible in this series to em all so we will take but five h will give the readers ten h to choose and surely one or hese makes are available any-

1/10 Ohm Absolute Minimum

e 1 is shown the popular con- le by Hammarlund Manufactur- ny in four capacities. This was tested in the Hartley Re- oratory of Columbia university port was that at 850 kilocycles ve resistance was within 1/10 1 of the standard quartz con- onging to the laboratory. The are of heavy aluminum while and stator plates are of hard e stator plates are placed in ass posts and soldered, which very low d.c. resistance. The s are attached to the shaft in nanner and a clock spring pig- tail connects the shaft to the rear end plate. When designing this condenser the Hammarlund company evidently kept in mind that there is a tendency with the average condenser for the low wave length stations to be rather crowded toward the minimum settings of the condenser, so they have designed the rotor plates in such a way that lower wave lengths will be spread out to some extent over the dial.

Any possible losses due to dielectric have been reduced to the minimum possible by using only two very small pieces of hard rubber to hold the stator plates in position. A unique vernier is incorporated which enables one to split a degree on the dial into more than fifty possible settings. There is no backlash and this vernier handle is adjustable for dials 3 inches, 3½ inches or 4 inches in diameter.

Continental Looks Good

Figure 2 shows the Continental condenser produced by Gardiner & Hepburn, Inc. A somewhat different method than

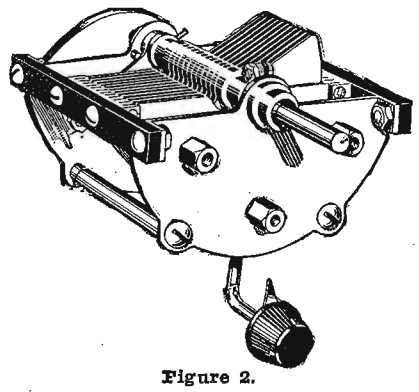


Figure 2.

usual of securing the stator plates is used in this condenser. A hole is drilled through all plates at each side of the assembly and the side bars to which these plates are attached are slotted. A long bolt goes all the way through the stator plates and the projections on the side bars, which, when it is tightened, gives

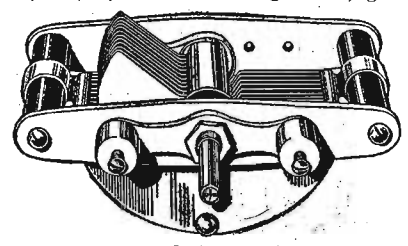


Figure 3.

a positive connection to all plates. As usual, a pigtail connection at the rear end of the shaft assures a positive connection from the end plate to the rotor plates. Vernier control is obtained in an improved and different manner instead of the old hollow shaft method which makes this assembly mechanically stronger and insures less losses. Attention is called to the length of the hard rubber supporting strips on each side which provide a very long leakage path between the grounded end plates and the stator plates. The Continental condenser is made in the usual four capacities of .00025, .00035, .0005 and .001 mfd., both with and without vernier.

The Dur-aluminum Lincoln

We now come to two condensers in which the method of supporting the stator plates is somewhat similar, and different from the usual construction. The first of these, shown in Figure 3, is the Lincoln condenser made by the Lincoln Radio corporation. A round rubber rod is placed at each side of the skeleton end plates and a strip of metal is tightened around each of these rubber rods at the center and used as a support for the battery of stator plates. A long bolt which passes entirely through each rubber rod gives very high mechanical strength and sturdi-

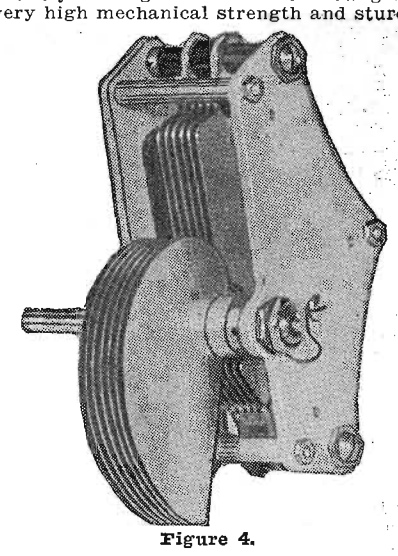


Figure 4.

ness. Like the Bradleydenser, this unit has a dust-proof shield around the stator plates and, if mounted with the stator plates up, no difficulty from dust will be

(Continued on page 24)

LOW LOSS—WHAT IS IT?

(Continued from page 23)

experienced. The plates of these condensers are made of Dur-aluminum, die-cast into a solid piece. A pigtail is provided at the rear end of the shaft inside of the end plate and the series resistance is very low. When this condenser was tested at Armour Institute, Chicago, the tests were made at 2,300 kilocycles and the report stated that the resistance exceeded the laboratory condenser by not more than .05 ohm. The point of convenience which should especially be noted is that only two mounting screws are used and both are in line with the shaft hole making the drilling of the panel remarkably easy.

Garod for Straight Line Wave Length

The second of the condensers referred to is shown in Figure 4. This is the Garod manufactured by the Garod corporation. Here again hard rubber rods are provided at each side of the end plates and the stator plates are suspended on these hard rubber rods. In this case the pigtail is outside of the rear end plate but this is due to the unusually efficient bearings provided. The bearings both front and rear contain several little metal balls on which the shaft rotates and as a result this condenser does not stick and is remarkably easy to turn. The plates, both rotor and stator, are of brass and therefore of low surface resistance. The rotor plates are made in an unusual shape which gives a straight line wave length curve. There are three possible ways of making rotor plates, one of which will give straight line frequency, the second gives straight line capacity, while the third type, of which this is an example, gives straight line wave length. Stations broadcasting on wave lengths 5 meters apart are evenly spaced around the dial. This excellent condenser is made in but one capacity, .0003 mfd., which size is especially suitable for use in neutrodyne receivers.

Crofoot the Radical

A condenser that is distinctly different in every feature is shown in Figure 5. This is the Crofoot made by the Premier Electric company. The end plates have been skeletonized to the lowest possible minimum and the dielectric takes the form of six short rods of hard rubber. The stator plates, while they have a semi-circular outer edge do not have a straight inner edge but this edge is curved inward. The rotor plates also have an unusual shape for the inner edge, and the curve which is made when tuning this condenser is known as the semi-straight line. It will separate the lower wave length stations considerably while the higher wave length stations will be spaced about the same way they are in the usual condenser. The effective plates are made of brass coated with a lacquer. This lacquer prevents the surface of the brass from corroding so that the skin resistance will not change. This construction gives an unusually wide tuning range, the ratio on the .0005 mfd. size being 1 to 74; the minimum is .000007 with the maximum of .0005. Fans will appreciate the fact that

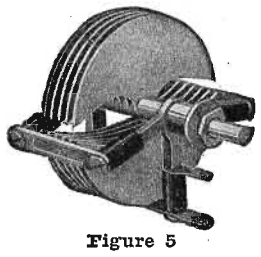


Figure 5

this condenser requires only one hole for mounting, as a large lock nut around the shaft at the front end may be tightened up against the panel and will hold the entire assembly firmly in place.

We have now considered both inductances and condensers in great detail and fans should have no difficulty in choosing apparatus or designing it so that low losses will result and sharp tuning be enjoyed. No attempt has been made to describe apparatus for any other circuit than the three-circuit regenerative. If readers desire to make inductances for other circuits it will usually be found that the number of turns stated in various articles for closely wound coils on tubing should be increased by about 10 per cent if basket coils are used of the same diameter as those described in these other articles. Basket-wound coils give less inductance per turn so more turns are required but the total losses are far less than those present in the usual closely wound coils on solid tubing. The 10 condensers which we have just finished describing may be used in any of the circuits which are now popular such as the neutrodyne, tuned Radio frequency, superheterodyne and reflex.

(CONCLUSION)

A panel should be virtually moisture-proof. If the panel absorbs moisture, dust and dirt will collect on the panel and provide a path for leakage of high frequency currents between terminals.

DEMONSTRATING RADIO

(Continued from page 19)

every known substance. Some substances have a very low resistance, while others offer a very high opposition to the flow of an electric current. As an illustration of resistance, consider Figure 2. The marbles are placed on one side of the tray, which is tilted, the marbles rolling towards the other side, but striking and bumping into the pegs which are in their paths. The pegs offer resistance to the flow of the marbles through the tray.

A similar condition exists when electrons flow in a wire. Their passage is opposed, due to conditions within the wire itself, these conditions varying with different kinds of wire. In fact, all matter is to a certain degree capable of conducting electricity. The difference between a good insulator and a poor one, between a good conductor and a poor one, is the difference in the amount of resistance offered to the flow of electrons.

Consider again Figure 1, in which we have the filament of a vacuum tube L, a voltmeter V_1 to register the difference in electric pressure, or voltage drop across the terminals of the filament at L. Corresponding to this, we have the tank H in which the water circulates around through a long tube of small diameter, and the pressure gauge G_1 which registers the difference in pressure in the water circuit between the terminals of the pipe in the tank H. The small piping in this tank offers quite a bit of resistance to a flow of water through it and in overcoming this resistance, the pressure in the water is reduced, so there will be a pressure drop across the tank H, which will be registered by G_1.

Similarly, due to the resistance of the filament at L, there will be a voltage drop across L which will be registered at V_1. If the circuit is turned on full, the total drop will be in G_1 and V_1. However, if B and R are turned only partly on, then there will be a pressure drop resistered at G and at V. The sum of the readings at G and G_1 or V and V_1 will always be the same regardless of the limits within which B and R are varied. As B and R are varied, however, there will be a change in the readings of D and F. Therefore, to control the voltage drop across the filament at L, and to control the amperage passing through the circuit, it is only necessary to control an external resistance such as R.

The law that expresses the relation between voltage, amperage, and resistance is:

$$E=IR$$

in which E is the voltage drop, I is the amperage, and R is the resistance, the unit of resistance being called an ohm.

The vacuum tube of the 201A type is rated for a draw of .25 ampere, with a voltage drop across the filament of 5. The source of current supply is usually a storage battery that at normal condition of charge registers a little over 6 volts. When it is taken fresh from the charger, it may have as high a voltage as 7½, consequently, in selecting a rheostat for use with any tube this high voltage must be taken into consideration. With the storage battery supplying at times as high as 7½ volts and the tube requiring 5 volts the drop across the rheostat must be as much as 2½ volts. Substituting in the above equation, we have

$$2\frac{1}{2}=.25R$$

and solving, we find R equals 10 ohms.

This is then the minimum value rheostat to use with this particular tube but 25 ohms is better. If two or more tubes are connected in parallel, the voltage drop will be the same, but the amperage will be the sum of the amperage drawn by each tube. Be sure that your rheostat is designed to carry the amperage required of it. Most 6-ohm rheostats will carry 1½ amps.

(Induced currents, transformers, self-inductance, tuners, choke coils, theory of condensers, losses, tuning and by-passing are the subjects to be covered next week by Prof. Owen.—Editor's Note.)

Variable Condensers

One of the most essential parts of a Radio circuit is the condenser. It is used primarily for tuning a circuit to resonance. There are two forms of condensers, namely, fixed and variable. The fixed condenser consists of two metal conductors separated by an insulator called a dielectric.

A variable condenser usually consists of two sets of metal plates, one set movable, the other fixed. The movable plates rotate inside of the fixed plates, but do not touch them. The air forms the dielectric between the plates. Variable condensers are used for changing the wave length of a circuit.

A variable condenser inserted in series with the antenna tuning coil or in series with the ground and the antenna tuning coil will reduce the wave length of the circuit. As a rule, if the wave length is to be reduced the variable is inserted in series with the ground. If it is desired to increase the wave length the variable condenser is connected across the coil and the movable plates should be connected to the ground side of the coil.

Helpful Hints to Get the Most from Radio

Chapter XIII—How to Tune for Maximum Reception

By Thomas W. Benson

AS THE last but by no means the least important factor in reception we come to a consideration of tuning, for it is upon the proper adjustment of the receiver that one must depend for the reception of distant stations and intelligible reproduction of the music. Also a proper handling of the apparatus increases the life of the parts of the set that require renewal such as batteries and tubes.

Possibly the most common offense in operating all types of receivers is that of forcing the tubes. Time after time the writer has seen persons turn their tubes on full and then wonder why the music is distorted and the tubes fail quickly. The usual excuse is it is the only way to get volume. There is something wrong if one has to apply the full six volts to the filament of a tube designed to work on five volts. When the trouble is located and remedied full volume will be obtained with the rheostat only partially turned on. The reproduction is clearer, the current consumption from A and B batteries is reduced and the tube life is increased.

Tuning to the Whistle

The next most common offense, chiefly against the receivers in the vicinity however, is that of tuning to the whistle, as it is termed by owners of regenerative sets. This means keeping the detector in oscillation while trying to pick up DX stations. Every time the wave length of the set approaches that of a broadcaster an audible whistle is heard but the trouble is that a whistle is also produced in sets in the neighborhood. Happily the golden rule idea is spreading and that, with the introduction of non-radiating sets, has greatly reduced this form of interference. Still much remains to be done. A good operator will keep his receiver from oscillating at all times and this condition is only achieved when one learns the tricks of his particular receiver.

It is manifestly impossible to give detailed instructions for handling every type of receiver in these paragraphs so we must confine ourselves to the general principles of tuning that are applicable to all receivers. There are basicly two controls on all receivers, one being the wave length or selector control, the other being for volume. The former control may require as many as three dials while the latter includes the regeneration control, filament rheostats and potentiometer if used. In addition we sometimes have a selectivity control as one might term a method of varying the coupling between aerial and secondary circuit. This is actually a volume control because it determines the proper coupling that will transfer the greatest amount of energy from the aerial to the set.

Factors in Tuning

The ideal set would be one in which the two chief factors in tuning would act entirely independent of each other, but this is rarely achieved in practice except with tuned Radio frequency amplification in which the circuits are neutralized. In a regenerative receiver we find that changing the regeneration affects the tuning and changing the coupling or varying the rheostats in turn affects the regeneration.

It is this interaction of controls that makes necessary a little practice before one can get the most out of any set. When first installed a set never seems to act properly but as one learns by experience just how to control the various functions of the set it becomes more flexible in operation and can be quickly tuned to any desired wave length.

The first requisite of satisfactory operation is to bring the set to the point of maximum sensitiveness. This condition is controlled usually by the rheostat settings and which in turn depends to a great extent upon the condition of the tubes. With hard tubes throughout the receiver, this adjustment is not critical but when a soft detector tube is used its rheostat setting is important and one should note the position at which best results are obtained by trial. When first installed it is usually necessary to make some adjustment of the B battery voltage and grid leak setting with a soft tube before its most sensitive condition is reached.

The problem then is to adjust the receiver to a certain wave length or frequency so it will respond to that frequency and no other. Its ability to do this will depend upon its selectivity and upon the aerial used. At first this adjustment must be made by trial till one learns the approximate settings for the different wave lengths. After this it is usually possible to tell where a certain station should come in when its wave length is known. The feature of logging can be applied satisfactorily to any receiver even though it is found that a certain station can be received on slightly different settings of the controls. A log can be kept of the setting at which it comes in best and at any future time it can be picked up by duplicating the adjustment.

Tuning in for Long Distance

Where tuning counts the most is in picking up DX stations. It is a waste of time to tune for distance unless one is sure everything is in perfect condition. Then it is simply a matter of patience. Remember that the energy received from distant stations is very small and it is very easy to pass over a station unless the tuning is done carefully and slowly.

The best rule for DX hunters to follow is to make no great change in adjustment. Thus with sets of the neutrodyne type rotate each dial in turn but a fraction of a degree at a time allowing for any variation in readings between dials. Then when the station is picked up it can be brought quickly to resonance.

With a regenerative receiver this process is more difficult because of the interaction of controls. Maximum range from a regenerator is obtained only when the detector is kept close to the point of oscillation but without permitting it to oscillate. Thus after bringing the detector to its most sensitive station with some regeneration present, the wave length adjustment of the set should be changed by small degrees readjusting the regenerator control to retain the sensitive detector condition. It will be found that as the shorter waves are tuned it requires less coupling between the tickler and secondary and this should be kept in mind to prevent the set going into oscillation.

With a tuned plate regenerative receiver the adjustment of the plate inductance is necessary with each movement of the main tuning control to retain the sensitive condition of the detector.

Potentiometer Control

With receivers employing transformer coupled Radio frequency stages with potentiometer control the changing of wave length of the receiver usually requires the readjustment of the potentiometer allowing of a more negative bias being used as the longer waves are tuned. Balancing up of these circuits is sometimes difficult for the potentiometer seems to tune the circuit and it requires more practice to get maximum results from this type of receiver.

Reflex circuits are not difficult to tune, it being usually sufficient to keep the circuit staple and to make very slow adjustment of the tuning dials.

The super-heterodyne receiver is coming into more common use and despite the fact that it has but two tuning controls, it takes time and patience to master it. The usual procedure is to turn the tuning dial a fraction of a degree and then slowly rotate the oscillator dial back and forth over five or ten degrees on dial. Meanwhile the intermediate amplifier tubes must be kept from oscillating but the negative bias kept as high as possible while retaining the stable condition.

It is only possible to get the most out of any receiver by studying its response to changes in adjustment. Experiment with the controls, play with them and study them. Out of the seeming maze of reactions one discerns the relation between cause and effect. And then like a musician intermingling musical notes to produce harmonies or an artist blending his colors, one balances the reactions in the receiver to produce maximum sensitivity and selectivity at all wave lengths and frequencies within the range.

(CONCLUSION)

HOW TO OPERATE SET

(Continued from page 11)

receiving set unstable and allow self-oscillation of the audio amplifier.

The Number 1-A neutrodyne receiver is provided with an accurate calibration curve which simplifies the locating of new stations. Take the published wave length of any desired station, say one of 380 meters and, by referring to the calibration curve attached inside the receiving set cover, find the dial settings as follows: (a) Follow the horizontal line from the left hand marking of the diagram corresponding to the desired station, say 380, to the point where this line intersects or meets the diagonal red line. (b) From this intersection point follow a vertical line downward until the marking at the bottom of the diagram is reached, say 36. (c) Now set dials, numbers 2 and 3, at this reading, say 36th division, and slowly rotate dial No. 1 from a point about 10 below that of dials numbers 2 and 3, say 26th division, to a point a few divisions above the settings of dials numbers 2 and 3, to determine whether there is any broadcasting on the desired wave length. Rotate dial number 1 slowly so as not to pass by the point at which the distant station tunes. (d) When the signals from the broadcast station are heard it is advisable to readjust all three of these large dials, so as to increase the intensity of the signals to the maximum response (loudest signal) for each dial setting. The action of the large dials are independent of each other, so a change in one dial will not disturb the tuning of the other two large dials.

As soon as the station is tuned in at the most satisfactory setting of the three dials, maximum response, make a record of the dial marking on the station log sheet, putting the dial readings down in their correct column.

When observing the dial divisions, always face each dial in turn and thereby obtain an accurate reading, which would not be possible if these dials were viewed from either side. If the pointer comes half way between two markings on a dial it will be advisable to so record the reading on the station log sheet, say 24½, when the pointer comes half way between 24 and 25 on the dial.

When maximum response is obtained for each of the three large dials, it will be found that dials numbers 2 and 3 are at approximately the same markings and that dial number 1 is slightly below. The settings of dial number 1 are influenced by the antenna used, the longer the antenna the greater the separation between the setting of dial number 1 and the other two large dials. If no antenna is used, all three large dials should read approximately alike. The closer all three dials are set for the loudest signal from the desired station, the sharper the tuning and the less the interference from a loud local station.

When using a head set for tuning always plug into the "Detector" jack first, and if the desired station does not come in with sufficient volume after setting dials, numbers 1, 2 and 3, to positions of maximum response, then change the plug to the "1st Audio" jack. The head set should never be used in the "2nd Audio" jack unless you are sure that the signal is very weak.

Most loud speakers are so constructed that the best results are obtained only when they are connected to the Radio receiving set in a certain way, that is, so that the flow of B battery current through the windings of the loud speaker will assist, rather than weaken, the sound reproducing action.

For this receiver, the correct connection is made when the terminal of the loud speaker, marked + (usually designated by a solid red or by a red thread tracer in the braiding of one of the cord conductors), is connected to the body of the Radio plug and the other conductor to the tip or ball end of the plug.

When using a loud speaker for tuning or selecting a new station it is advisable to plug into the second audio jack as the signals will be amplified.

Anti-Capacity Cage Coil Support

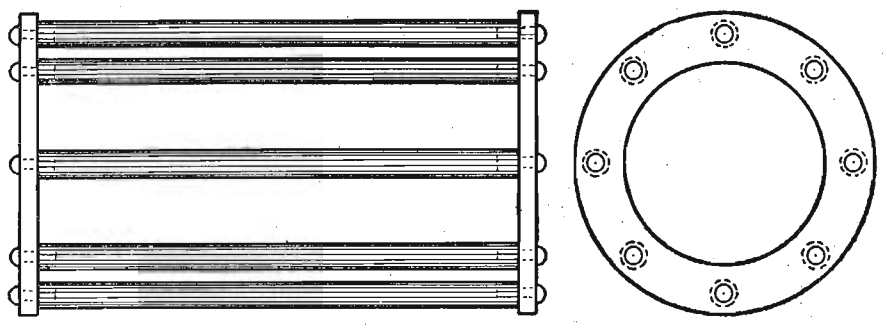
Winding of Coil Keeps Shape without Binding

One of the goals aspired for in the construction of tuning coils is the elimination of distributed capacity. This goal has been reached, or nearly so, in many coils now on the market. Self-supporting coils that require no tubing, shellac, etc., to hold them together are perhaps as near the goal as is possible at the present time. But there are some coils which the experimenter may wish to build that is next to impossible to make self-supporting.

The cage or frame shown in the illustration has proven very successful as a substitute for the usual type of coil tube. It is made up simply of two end pieces of bakelite and seven or eight round bakelite rods ¼ or 5/16 inch in diameter. These may be made of wood if boiled in paraffin to exclude dampness, but bakelite is preferable.

A hole is drilled in the ends of the rods and threaded so that when screws are run through the end pieces the ends and rods are held securely together. It makes a very neat appearing coil as well as a very efficient one. The rods should be at least ¼ inch in diameter so that there is room to accommodate the screws. The end pieces can be cut from some old panel material and may be square as well as round.—Arthur L. Kaser, Mishawaka, Ind.

RODS AND DISK ENDS MAKE FRAME



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

The Operating Ground

A good Radio ground is one which comes in electrical contact with a large surface area of moist earth, or a contact with a large area of salt water or in the case of installations aboard ships on inland waters, a large metallic surface in contact with the fresh water will serve the purpose. The ground connection is best made to the cold water piping at the point where it enters the building. If such a ground connection is not available a hot water or steam pipe may be employed. In general, grounding to gas pipes is not good practice.

Do not use a hot water or steam heating system for a ground connection if a cold water pipe is available.

An iron pipe or stake driven into the ground is usually not a good ground connection, but will serve where the ground is moist for a temporary installation. Such a ground connection should be preferably driven in some pool or depression where the pipe or stake will be most likely to come in contact with the most moist soil.

A sheet of metal placed in a cistern, or the piping or metallic pump of a drilled well will usually serve as an efficient grounding device. The ground rod which may be used for the house telephone is usually not a good ground connection for Radio purposes.

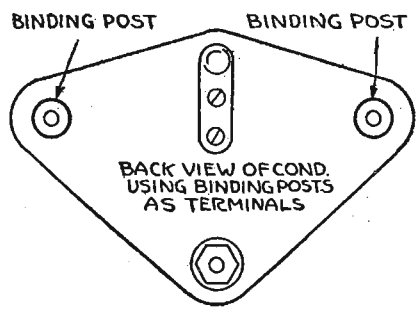
If difficulty is encountered in finding a good ground connection, one of the so-called antenna substitutes which connect in the electric light socket may be found to serve the purpose of the ground connection. To use such a device, run the grounding conductor from the ground terminal of the receiver to one or the other of the binding posts of the antenna substitute.

An approved ground clamp firmly tightened against a pipe or rod which has been thoroughly cleaned until the bright metal shows is considered a reliable connection. The metal may be cleaned with sandpaper or emery cloth, or by means of a file or other abrasive. Even this ground connection will in time corrode and at least once a year the ground clamp should be removed and thoroughly cleaned with emery cloth and replaced. The most permanent method is to solder the ground wire to the pipe.

The connection from ground clamp to the receiver should be made with a copper conductor not smaller than number 14 gauge run in as direct and short a line as possible.

Binding Posts on Condenser

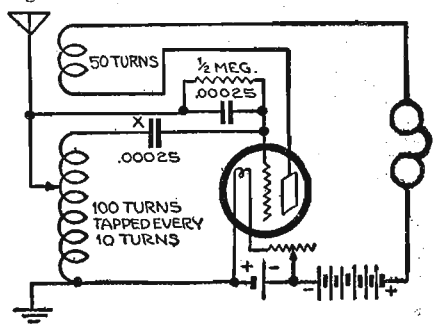
When a variable condenser is used for experimental purposes the soldered connections are a nuisance, but if binding posts are applied as shown in the accompanying illustration the changing of the condenser is easily affected.—Franklin Marshall, Chicago, Ill.



A five-grain Urotropin tablet lighted with a match will give a smokeless and odorless soldering flame.

Selectivity and Long Distance with This Set

I have been using a set which has a circuit as shown in the illustration and find that it gives very good results. When the .00025 mfd. condenser marked X is removed the set will not work. It is nothing unusual for me to hear WFAA and WBAP at any time. Sometimes Schenectady comes in very loud, sufficient to work a loud speaker. The set is fairly selective.—R. E. Nevett, London, Ont.



Homemade Variable Grid Leak

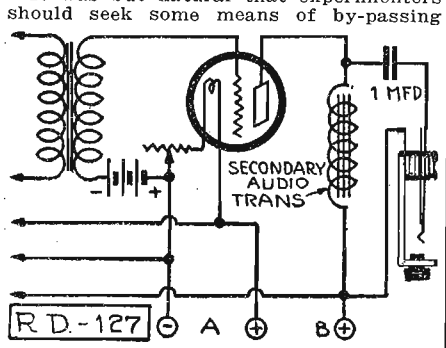
The materials necessary are two clip connectors, two small binding posts and one piece of graphite taken from a lead pencil. The construction is very simple. The binding posts are fastened in the holes of the clips and the graphite, or lead of the pencil, is put under the springs in the place of the wire. Use small clips with a weak spring to prevent breaking the lead. The wires that are ordinarily fastened to the grid leak are fastened to the binding posts and one of the wires should be flexible. To vary this grid leak, simply move one of the connectors back and forth until the right value is found.—Robert Snyder, Wakonda, S. Dak.

An ordinary glass bottle firmly wedged between two blocks of wood at its base make a cheap and efficient insulator for Radio. It can support fairly heavy antenna wires.

R. D. HOOK-UP 127

VERY few fans are, seemingly, aware of this very easy method of clearing up part of the objectionable distortion in a receiving set. The diaphragm of a loud speaker is designed to vibrate on each side of an absolutely flat plane; with the 90-120 volts of the B battery causing a steady pull on the diaphragm and causing it to assume a dish shape before programs are tuned in, this is impossible and distortion is bound to be present.

It was but natural that experimenters should seek some means of by-passing



the B battery current around the speaker, much as we by-pass Radio frequencies around an audio transformer with condensers, and this is the result. The stage shown is either the second or third, the input being at the left from a first or second stage.

The choke coil used in the plate circuit is the only new piece of apparatus there, and it may be the primary of a bell ringer transformer, the secondary of a spark coil or, preferably, the secondary of an audio frequency transformer. In any case, the other winding is not used or connected in any way. The insertion of a coil offering such a large impedance, in no way affects the B battery current which is d. c., but the audio frequency variations imposed on that current cannot pass. These variations have many of the characteristics of a. c. and therefore choose the route through the 1 mfd. condenser to get back to the filament, which takes them through the loud speaker.

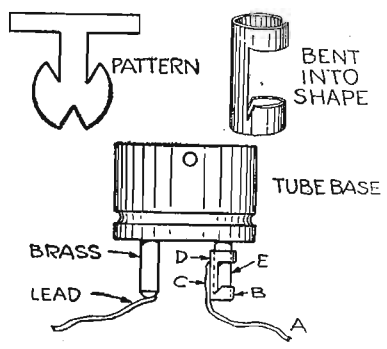
Label the Leads

Mistakes in making connections which often result in the burning out of tubes is a failing common to Radio beginners. A good idea, and one that will prove a reminder in making connections, is to have the leads from the A batteries and B batteries tagged with little tags marked with the voltage and polarity for each lead.

How to Prevent Flickering

Durlng the past few years I have been bothered greatly by the flickering of my tubes. Every Radio operator knows how disagreeable it is to have his tubes flicker, knows what terrible noise it causes in the phones, and how reception can be completely spoiled by such trouble. Experience has taught me that this flickering is generally the result of a poor contact between the prong of the tube and the spring of the socket. The solder that covers the bottom of the prong has become dirty and the flow of current will no longer be constant. A little filing helps for a while but soon the prong is dirty again. Repeated filing of this solder is necessary to keep the set working, and this is both bothersome and dangerous. Too much filing at the bottom of the prong is liable to loosen the small wire leading to the interior of the tube. Of course, this trouble is not experienced in sockets that have side-wipe springs, but a larger number of sockets have bottom contact.

Finally I hit upon the idea of slipping a sort of shoe over the prong of the tube and now I have no more trouble with flickering. Many others may be having the same trouble and will find this simple device useful. These shoes are made out of thin sheet brass that has considerable spring to it. They are cut according to the diagram and are then shaped to fit the prong of the tube. Leader A may be used instead of socket. The upper part must fit snugly as that is the point of contact through which the current will flow. The lower part B fits over the base of the prong and should be made somewhat cup-shaped with a blunt punch.



When a lead A is used it is soldered on at C. It is unnecessary to give dimensions as anyone can estimate the size to make the shoes. If proper care is taken to have D of the shoe fit tightly over E good results will surely be obtained.

Since the grid and plate contacts will also be bettered by this device increased amplification will result. I doubt if there is as poor a contact allowed any place in the set as the tube prong contact.—Raymond M. Moore, Tucson, Ariz.

Inspect Aerial and Ground

Because winter storms mean heavy strains on aerial and ground installations, now is the time to make a thorough inspection of the outdoor wiring system. See if the guy wires holding the aerial masts and the aerial wires are in place and all taut and tight. Look over all soldered connections and try to determine if they have become corroded during the hot summer months.

Questions and Answers

Antenna Problems

(10676) CIW, Washburn, N. Dak.

My present location is surrounded on three sides by direct current generators, as well as high tension line, nearest generator being about thirty feet. I believe a counterpoise will remedy this, but desire directions for constructing this.

Is it permissible or practical to have my lead-in parallel the 110-volt alternating current light wire?

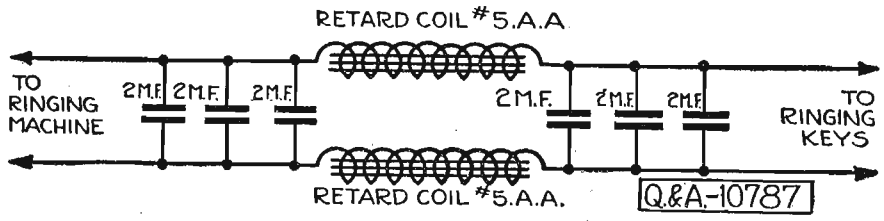
A.—A counterpoise is probably the only solution at your command for eliminating the interference to which you are subjected.

The area of the counterpoise should be as great as possible. It should be placed as nearly under the antenna as can be and should extend well out beyond the antenna's projection on the earth. The number of wires should be as large as convenient and can be bound together frequently with cross jumpers. The height is governed by several conditions, the most important being the separation of the wires in the network, the evenness of the ground and its character. If the height is small compared with the distance between the wires in the net, there will be a tendency for concentration of the current immediately under them. Wooden stake supports, wet rope, poor insulators and their like are detrimental. Short poles used for support should be placed at a distance from the margin equal to several times its height, with a good grade of glass or porcelain used for insulation.

Duo-Reflex Three Tube Set

In your issue of August 9, (7999) D. J. W., Atlanta, Ill., writes about trouble he is having with his Duo-reflex three tube set. I had what seems to me exactly the same trouble and I shall be glad if my experience will help him. I had several Radio friends check up my circuit and the wiring was O. K., but after several weeks of disappointment it was pointed out to me that I had the two reflex transformers reversed. The number 2 transformer should be placed after the first tube and the number 1 after the second tube. This is a very easy mistake to make as diagram accompanying the transformers shows the figures very small.

The tuning coil I am using is about 4 inches in diameter, stagger wound with 6-turn untuned primary, and 48-turn secondary tuned by the 23-plate condenser. First I wound on the pegs 24 turns of the secondary, then without cutting the wire I wound the 6-turn primary without any space in between and then finished winding the other 24 of the secondary. I used number 18 dcc. which after being tied together with cotton twine stays rigid after the pegs are taken out leaving an absolute air core with low capacity. This I find is a great improvement over the variocoupler.—J. S. Kay, Montreal.



Telephone Bell Ringer

(10767) CWF, Wilton, N. D.

Is it possible to cut out the interference caused by the ring motor of a telephone office? If so, how?

The set is in a drug store and we have trouble with our own malted milk shaker. How can this be remedied if it is possible?

Will a three circuit regenerative set with two stages of Radio frequency between the variocoupler and the first variometer, feedback onto the antenna?

What would be the best kind of an inside aerial to be used on a Zenith set? We would prefer something in the form of a loop as the set is to be taken through the country and be set up for short periods.

A.—The interference from a bell ringer in a telephone exchange must be eliminated at its source by means of a simple system of condensers and chokes and involves the co-operation of the telephone company. We are presenting herewith a description and diagram for your convenience.

Electrical devices which in operation produce induction in a Radio receiver are necessarily completely shielded with shield grounded.

Radio frequency amplification minimizes any tendency to radiation from an improperly tuned regenerative circuit.

It is probable that a single lamp cord antenna of about 100 feet in length affords the best reception when limited in the matter of an elevated system. However, a loop of average ability is accomplished in winding a 3-foot square frame with 8 or 10 turns of flexible wire spaced at ½ inch between turns.

Joints of an antenna should be first soldered and then wrapped with several layers of tinfoil and then a layer of water-proof tape.

The Reader's View

Small Number of High Power Stations

At the invitation of "Dielectric" to express opinion as to broadcasting, I am doing so.

It seems to me that with the perfection of receiving sets so that distance up to 500 or even 1,000 miles counts for little, the usefulness of the little station has largely passed away. Beyond doubt, when receiving sets had but short ranges it required many stations, widely scattered, in order that the whole country might enjoy Radio at least in some degree. But the coming of better receivers has largely changed this and the near future will see it changed still more.

Would not the best interests of the Radio world be better served by a smaller number of high powered stations, appropriately scattered over the country and operating on wave lengths sufficiently far apart to facilitate easy tuning?

I have at hand a list of broadcasting stations in which are enumerated upwards of forty operating on a wave length of 360 meters and with power of 500 watts upward. If there is any method by which satisfactory selectivity can be made when numbers of these stations are operating at the time I have failed to gain knowledge of it.

With this thought in mind it seems to me that along with the development of better broadcasting apparatus and better receivers, there might well walk with it hand in hand a program looking to the reduction of excessive broadcasting stations—the separation of their wave lengths sufficiently to facilitate ready tuning—and their appropriate distribution over the country.

Properly considered, private right begins where public interest leaves off, and just as boys may be rightfully prohibited from running bicycle races in the heavy traffic of city streets, so it is permissible to reduce confusion in the ether by limiting and co-ordinating the use of it.—B. A. Chase, Attalla, Ala.