How to Make New Singing and Talking Suitcase; Advance Programs; Installing Radio in a Chevrolet; Wiring and Tuning the Super-Heterodyne

Radio Digest

EVERY WEEK PROGRAMS Illustrated TEN CENTS

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

Vol. IX SATURDAY, MAY 24, 1924 No. 7

WHO'S BEST ANNOUNCER?

MAKE PROGRESS TO BROADCAST SENATE

TAKE SURVEY OF CHAMBER TO ESTIMATE COST

Radio Experts of Army and Navy to See What Changes Will be Necessary

WASHINGTON, D. C.—The Senate last week passed the resolution introduced some weeks ago by Senator Howell of Nebraska, calling upon the Secretaries of War and Navy to have their Radio experts make a survey of the Senate chamber to see what changes, if any, would have to be made to have the debates of the upper House broadcast to the country.

In bringing up his resolution some weeks ago Senator Howell asked for its immediate consideration, but it was blocked by Senator Lodge of Massachusetts, majority leader of the Republican party, and a number of other conservative senators.

The resolution was referred to the rules committee of the Senate, from which it was reported back favorably. The Senate action followed. A survey of the Senate chamber will now be made by government Radio experts to ascertain the practicability of broadcasting from the Senate chamber. An estimate of the cost will be made.

FANS' VOTES TO PICK MIKE KING OF 1924

Radio Digest Gold Cup Award to Go to Most Popular

Golden Trophy Is Annual

Competition Opens at Once—Results Will Show More than Most-Liked "Voice"

Who is the world's most popular Radio announcer?

Radiophans far and wide will be given an opportunity to answer this much-debated question. With this issue is inaugurated a competition open to every broadcasting station announcer in the world, and to be decided entirely by the balloting of Radiophans in the Radio Digest First Annual Gold Cup Award.

Radio Digest, realizing that no one is so close to the invisible audience as the announcer, will endeavor to determine by an international vote who is world's champion master of Radio ceremonies. Listeners in of the United States, Canada, Mexico, Hawaii, Great Britain, in fact, of every country in the world, are invited to join in the election of the man or woman to be "king" announcer for 1924 and recipient of the Radio Digest Gold Cup Award.

(Continued on page 2)

NEXT IS AIRPHONE WAR, SAYS EXPERT

Norse Inventor Would Sell U. S. "Mechanical Soldier" Remote Controlled by Radio

NEW YORK.—That the next war will be fought in the air by Radio electric methods is the conviction of the Norwegian inventor Niels Aasen, who is now submitting to the United States his "mechanical soldier"—a series of underground bombs which can be controlled from a subterranean Radio transmitting set, so that they will explode at the moment when attacking troops pass over them.

Colorado Senator Saves Fans' Wires

Broadcast Telegram from KFAF Telling of Pledge to Oppose Proposed Radio Tax

DENVER.—That at least one Senator paid heed to the demands of Radiophans is shown by the splendid response and support of Senator Phipps of Colorado against the now defeated Radio tax of ten per cent recently proposed in the Senate.

Senator Phipps made clear his position by a telegram broadcast from Station KFAF, Western Radio Corporation, here. Unable to begin even to answer the thousands upon thousands of letters and telegrams addressed him by anxious listeners in, the Senator relied on the means most sure of reaching the invisible audience: broadcasting. His telegram also served to save further Radiophans the expense of telegraphing him, urging the removal of the tax.

Jane Burns Albert (above), soprano who recently gave a recital from Station KGW, Portland. Clarice Balas (right), solo pianist, who took part in the first program to be broadcast from the new WJAX studio on the twentieth floor of the Union Trust Building, Cleveland. This exceptionally gifted young lady is soloist for the St. Louis and the Cleveland Symphony Orchestras. Helen Abbott Byfield (left) soprano, is a frequent entertainer on the programs of the Chicago Daily News Station WMAQ.

No. 1 OFFICIAL BALLOT

Announcers' Contest

RADIO DIGEST FIRST ANNUAL GOLD CUP AWARD

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

Please credit this ballot as one vote for:

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

Signed .....

Address .....

5-24-24 City ..... State .....

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

.....

WHO'S BEST ANNOUNCER?

(Continued from page 1)

Aims and Purpose of Award

It is believed by Radio Digest that not only will the favorite announcer be elected by this listener vote, but that the standard of quality of announcer's work, already high, will be raised even higher. From the results of the balloting will come deductions as to what characteristics are essential to the successful announcer. What holds for announcers also will be to an extent true of all other microphone speakers.

Radio Digest believes that the Annual Gold Cup Award will stimulate the development of Radio personality. Unencumbered by precedent, the announcers' contest is expected to divulge much of interest to listeners, broadcast stations, their artists and the Radio industry in general.

Announcer Stands for Station

Broadcast announcers are a big factor in the success of each and every station. No single person appearing before the microphone is so representative of what a station stands for in the minds of the Radiophans as the man who arranges and announces the program, who tells what will be broadcast next, and what station is doing the broadcasting. Many of these men and women have become known internationally because of vocal mannerisms and intonations coupled with charm of wit or philosophy.

Gold Cup to Be Annual

Radio Digest Gold Cup Award will be an annual trophy to be presented to the most popular Radio announcer in the world. Each year Radiophans will be given the opportunity to select a new "king."

The golden trophy that will be given to the victor selected by listeners' ballots' in the 1924 competition is depicted on page fourteen of this issue. The design of this beautiful gold cup is based on the microphone, symbolic of the gateway to the listening world. Its dignity of line and grace of symmetry are truly worthy of the winner.

All of Family Can Vote

On page fourteen is given the regulations governing the balloting and a nomination certificate by which the Radiophan may enter his favorite announcer in the contest. On page two is the first official ballot form.

The ballot form on page two will appear for sixteen consecutive weeks. There is no limit to the number of ballots sent in by anyone. This provision is made to allow all members of the family an equal opportunity of voicing their approval of their candidate for the Radio Digest Gold Cup Award.

Why Sixteen Ballots

Some Radiophans may be undecided as to their choice. Three or four announcers may come to their mind as the most popular. In this case the sixteen ballots will afford an opportunity of splitting the vote among the three or four announcers.

The rules provide bonus votes when consecutive ballots are saved and sent in together.

The world's most popular Radio announcer will be decided entirely by the highest number of votes received.

Who May Be Nominated

Any broadcast station announcer is eligible to be nominated in the Radio Digest First Annual Gold Cup Award.

Any Radiophan anywhere is eligible to do the nominating. All that is necessary is for the Radiophan to clip, fill and send in the nomination certificate appearing on page fourteen.

Every listener in has one or more well-liked announcers in mind. But internationally the question of popularity has never before been decided. Radio Digest believes the invisible audience will welcome this opportunity to express their collective applause of their favorites.

Be sure to read carefully the rules on page fourteen and the ballot on this page.

Reveal Origin of Mothers' Day Through Station WJZ

NEW YORK.—Where, when and how Mothers' Day originated, and how it came to be a national institution, was a particularly interesting story Station WJZ told recently in commemoration of that day.

Don't rush the construction of a set by making poor connections and using no solder, and then blame the originator of the circuit if it fails to come up to your expectations.

Advance Amateurs' Time One Hour for Operating

Gives Broadcast Listeners Chance to Hear without Interruption

WASHINGTON, D. C.—Broadcast listeners throughout the country will be glad to know that the time for evening amateur transmission has been moved forward an hour during the period of "daylight saving," by a new order of the Department of Commerce.

The nine district supervisors of Radio have been instructed to advise all general, restricted and special amateurs that they are required to observe a silent period from 7:00 p. m. to 10:30 p. m., local standard time, or from 8:00 p. m. to 11:30 p. m. daylight saving time, and on Sundays during church services, from May 1 until October 1, 1924. Copies of the above order will be sent to all licensed amateurs by the district supervisors of the department as soon as they are received.

The above order was not issued by the department until the approval of the American Radio Relay league was received. Credit is reflected on that organization for its offer to co-operate with the department in the effort to prevent a repetition of the confusion and increased complaints of last year following the adoption of daylight saving time in many sections of the country.

Civil Service Holds Quiz to Fill Inspector Vacancy

WASHINGTON, D. C.—The United States Civil Service Commission has announced that it would hold an examination on May 21 for Radio inspector, Signal Service at large, at an annual salary of $2,400.

HOOVER WILL CALL NEW RULES CONFAB

NEED ONE REGARDLESS OF LEGISLATION, BELIEF

Will Consider Wave Re-allocation of and Time Division to Clear Tangled Ether

By Carl H. Butman

WASHINGTON.—Secretary of Commerce Hoover will call a general Radio conference in Washington soon after the adjournment of Congress in an effort to secure coöperation of all Radio interests in clearing up the ether and solving the problem of distributing wave lengths. A conference will be called whether or not new legislation is enacted.

The conference will be similar to those in the springs of 1922 and 1923, at which representatives of the manufacturers, broadcasters, engineers, amateurs, commercial operators, and broadcast listeners aided in drawing up voluntary regulations under which Radio has been supervised ever since.

Present indications are that broadcasting stations will continue to increase, although wave lengths available for this use are practically exhausted and stations are doubling up. Even time allotments in congested sections are becoming difficult to make.

Secretary Hoover believes congested conditions and interference are getting worse. If present conditions continue, he is unable to see how we could operate five years from now, and as a consequence he intends taking advantage of such suggestions from representatives of the allied Radio art and industry as may be made.

CONTENTS

Radio Digest, Illustrated, Volume IX, Number 7, published Chicago, Illinois, May 24, 1924. Published weekly by Radio Digest Publishing Company, 510 North Dearborn Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign Postage One Dollar additional; single copies Ten Cents. Entered as second-class matter at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

Looking Ahead

Installing a Radio Set in Your Dodge and further details of the automobile type of set, will be told by H. J. Marx in the next issue. This series will continue to cover all the popular makes of cars.

Details of the Singing and Talking Suitcase will complete S. R. Winters' article upon the construction of a novel portable receiving set for the outdoorsman. The circuit used and directions for the assembly will be given.

What Radio Shorthand Means is the title of the next article by P. E. Edelman who will describe just what all the little figures in various circuits signify. Did you ever think of the symbols as Radio stenography?

A Combination Radio Frequency and Regeneration Circuit by Brainard Foote, a popular eastern writer will start soon. Don't miss it.

Picked Your Favorite Announcer? Remember the balloting begins this week and continues for sixteen issues. Who do you want to get the Radio Digest First Annual Gold Cup Award?

LANGUAGE GROWING BECAUSE OF RADIO

MANY NEW WORDS ADDED DURING PAST YEAR

Lexicographer Claims Our Speech Has Been Enriched as a Result of Broadcasting

NEW YORK.—Nearly 5,000 new words have been added to the English language by the advent of Radio, declares Dr. Frank H. Vizetelly, lexicographer of many years' standing. To be exact, the eminent authority states that 4,998 words, from "heterodyne" to "variocoupler," equally scientific and usually of Latin derivation, are used by laymen generally as a result of the influence of Radiophone broadcasting.

"Radio has not only precipitated the exchange of ideas," Dr. Vizetelly said, "but it also has enriched our very speech with a vocabulary indispensable to those that would understand mechanism.

War Added Many Words

"The English language has been growing at the rate of 5,000 words a year. Certain years the increase is less. Other years it grows with leaps and bounds as a direct result of some world event, libe Radio, or the war.

"The war gave rise to approximately 6,000 new words. These were not merely military. They added to the chemical, political and social vocabularies as well.

"Every season brings in new styles, colors and trade marks. The number of actual new words each season—well, their name is legion. There are many that are coined and thrown away forty-eight hours afterward.

"We collect all the new words and then have to wait for the public to judge it. Once the public has put its stamp on a word, and its usage, even misusage, we put it into the dictionary."

Station WGY Wins First Place, Say Bostonians

Programs Excellent, Splendid Volume, Very Little Fading

BOSTON.—During a canvass of Radio listeners throughout the state of Massachusetts for the purpose of ascertaining the favorite broadcast station of the Radiophans it was found that first honors go to Station WGY of Schenectady, while the local standby, WNAC, runs second.

From this it is taken that the Bay Staters as a whole depend upon WGY for their evening's entertainment. In a city picked at random by the investigators, WGY received fully eighty per cent of the popular votes because of the fact that the programs were excellent and the volume splendid.

DEALER'S SUPER-HET LOCATES NOISY LINES

Red Bank, N. J. Fans Learn Source of Interference

RED BANK, N. J.—Local fans had just ceased complaining about the amount of static mixing up with their reception when "a worse calamity befell them." Even WEAF, the nearest powerful station, could not be had through an interference which puzzled everyone for a time, then the trouble-maker was found and corrected.

J. C. Gregory, local Radio dealer, placed a super-heterodyne in his auto and started out to locate the offender. He soon found that the wires in a steel light pole on the main street were responsible for it all—poor insulation, the repairing of which brought peace to the regular listeners-in.

Don't, if you expect to get best results, charge your A battery at the same time you are listening in.

GIFT OF PEANUTS TO BAND; PUT ON MIKE

DAVENPORT, IA.—One evening not long ago an orchestra playing from Station WOC here, found a basket of roasted peanuts waiting for them as an appreciation from a Davenport grocer. So that everyone would have the benefit of the peanuts, several were cracked before the microphone. Reports came from coast to coast, and from Texas to Canada, that the peanuts sounded very good.

BUGGY BUG LECTURE FOR WJY RADIO BUGS

NEW YORK.—Radio bugs and others listened to a talk given here recently by Dr. Frank E. Lutz of the Museum of Natural History on the subject of bugs. He told why it was that a "cootie" stuck closer than a brother, describing their quaint customs and manners, as well as their outstanding business methods and religious rites. An itchy time was had by all.

LISTENING IN FOR HER DADDY

Little Helen Marie Ludgate is listening in for her daddy who is an operator at Station KSD. Although only two years of age, she is an ardent Radiophan and listens in every night, especially when her dad's station is on the air. I wonder what is on now to make her smile?

Marconi Gets Concessions

WASHINGTON, D. C.—Control of Radio broadcasting in Portugal is being sought by the British Marconi company, which has obtained a concession from Portugal to operate broadcast stations. Reports reaching the Department of Commerce also state that this company is already active in Spain, and Radio interest at Lisbon is growing rapidly.

CINCINNATI SUMMER OPERAS NOW ON AIR

SEASON OPENING JUNE 23 CONTINUES TO AUGUST

Cincinnati Zoological Park Association to Give Shut-Ins Opportunity to Enjoy Performances

CINCINNATI.—Operas to be given this summer at the Cincinnati Zoo will be broadcast, beginning June 23, through WLW, the Crosley Radio Corporation station here, each Monday evening during the season. The Radio audience will hear the operas through the courtesy of the Cincinnati Zoological Park Association, which hopes to give the shut-ins an opportunity to enjoy the performances, which are attended by thousands every summer.

Although no definite schedule has been arranged, the operas to be given will include the first presentation here of Donnizetti's "The Elixir of Love"; while "Martha," "Lakme," "Manon," "Barber of Seville," "Rigoletto," "Mefistofeles," "Lohengrin," and two by Puccini, are the old stand-bys.

Artists Who Will Sing

They will be directed by Ralph Lyford. William Kopp will lead the large orchestra, composed of players from the Cincinnati Symphony Orchestra.

The principal artists will be Edith deLys, dramatic soprano; Josephine Luchese, coloratura soprano; Stella deMette, mezzo-soprano; Anita Klinova, mezzo-soprano; Regelio Baldrich, lyric tenor; Ludivico Tomarehio, dramatic tenor; Murio Valle, baritone; Millo Picco, baritone; Italo Pacchi, basso; Natale Cervi, basso-buffo. A fine chorus will augment the soloists.

It is also possible that some of the band music and other features which precede and follow the opera season will be broadcast through Station WLW.

Premiere of Play Goes on KYW Before Stage

Innovation Presented in Opening of Comedy "Easy Street"

CHICAGO.—An innovation in the premiere of a theatrical performance was given Radiophans tuning in Westinghouse Station KYW recently when the new play, "Easy Street" broadcast its first public presentation prior to the openins of the play at the Playhouse theater here.

"First nighters" were not limited by this procedure except by the qualification that a receiving set was required. Ralph Thomas Kettering, of Chicago, author of the play, introduced the players to the invisible audience.

The innovation of a Radio opening night is said to have had its reflection in a completely sold out house for the actual opening of the comedy at the Playhouse.

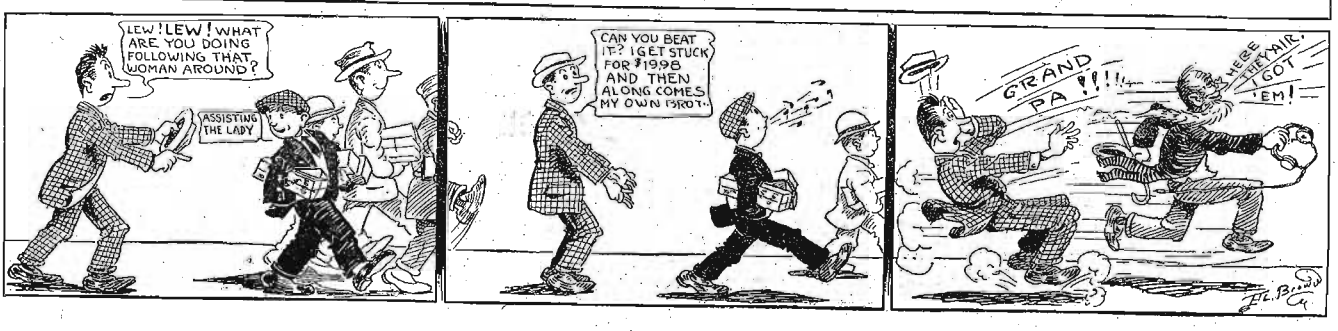
WGY PLAYERS ON WJZ VIA CONNECTING WIRES

First Time Schenectady Program Goes on New York

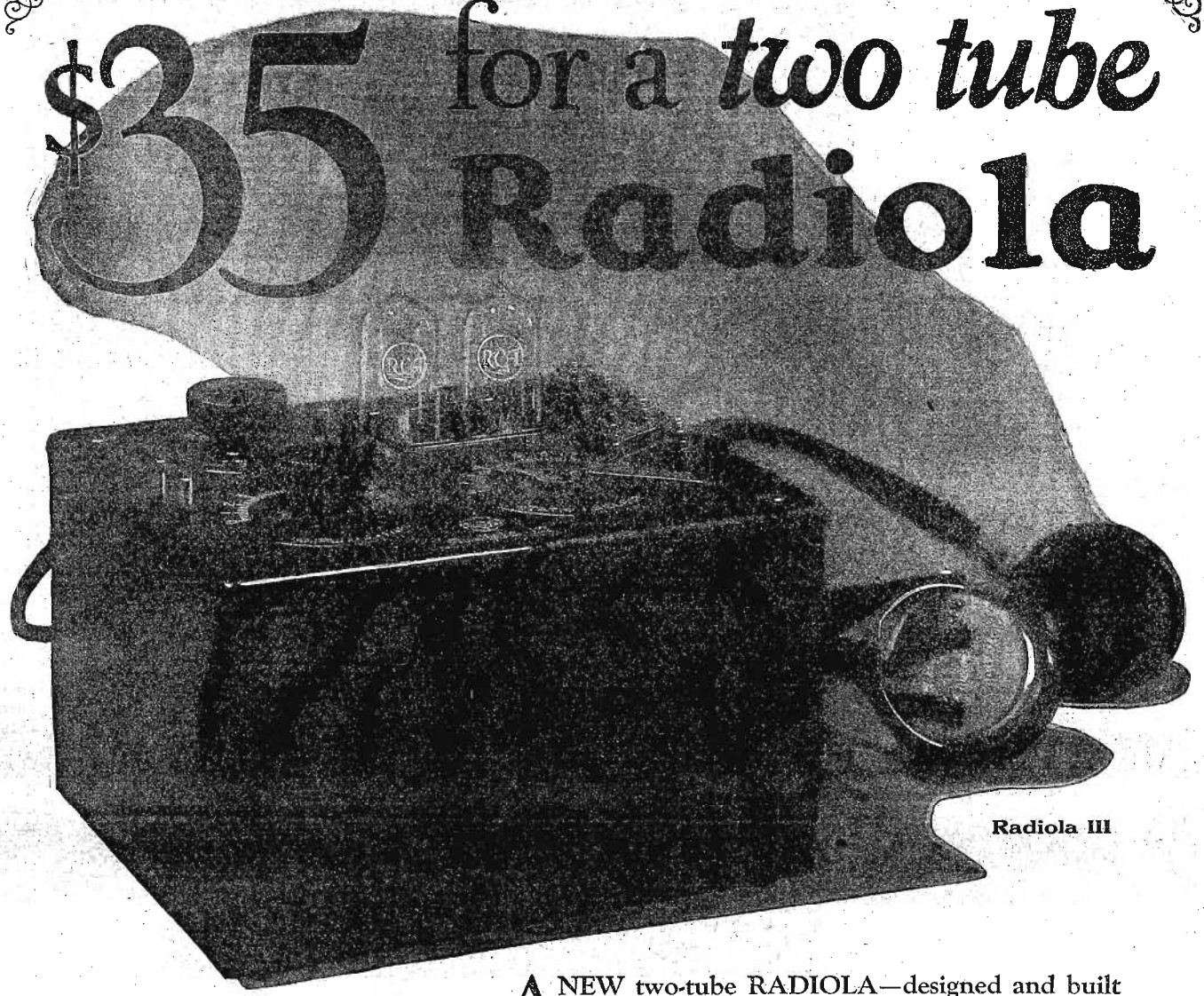
NEW YORK.—The nationally famous "WGY Players" were heard for the first time through Station WJZ here recently, when the drama "Billeted" was simultaneously broadcast by the two stations.

The direct-wire connection between Station WJZ, Radio Corporation of America in New York, and Station WGY, General Electric Company in Schenectady, has linked the two stations many times during the past season for the joint broadcasting of major events occurring in New York, but the recent presentation of the famous Radio dramatists through both stations was the first instance where the proceeding has been reversed and the New York station has rebroadcast a program sent from Schenectady.

THE ANTENNA BROTHERS Spir L. and Lew P. Part III—Even Grandpa Succumbs



$35 for a two tube Radiola



Radiola III

A NEW two-tube RADIOLA—designed and built by world-famed engineers in the great RCA laboratories—priced at less than you could build it for at home! A real RADIOLA—including the tubes and the headphones. A new model. Improved in sensitivity and selectivity. Getting distance on the headphones, and near stations on a loudspeaker. Receiving clearly—reproducing truthfully. Its thirty-five dollar price means at last that every home everywhere can tune in on the fun with a small receiver built for big performance.

"There's a **Radiola** *for every purse"*

At $35

Radiola III. Two Radiotrons WD-11. Head telephones. In brief, everything except the dry batteries and the antenna.

You Can Add

Radiola Loudspeaker . . $36.50

Radiola Balanced Amplifier (push-pull) to get long distances with a loudspeaker. Including two Radiotrons WD-11 . . $30

Or Buy Complete

RADIOLA III-A, the amplifier combined with Radiola III in one cabinet; with four Radiotrons WD-11, head telephones and Radiola Loudspeaker $100

Operates on Dry Batteries

There are many Radiolas at many prices. Send for the free booklet that describes them all.

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433 California St., San Francisco, Cal.

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RCA — This symbol of quality is your protection.

Name

Street Address

City R. F. D.

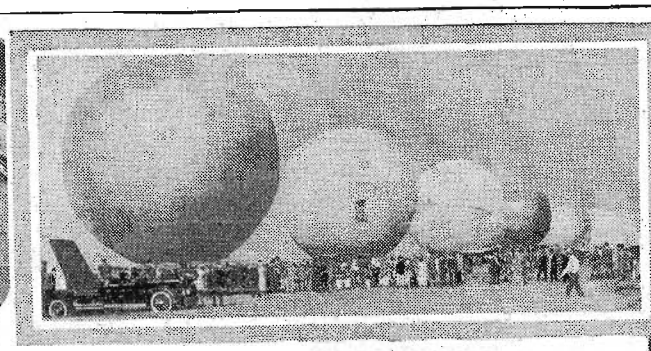
State

Radiola

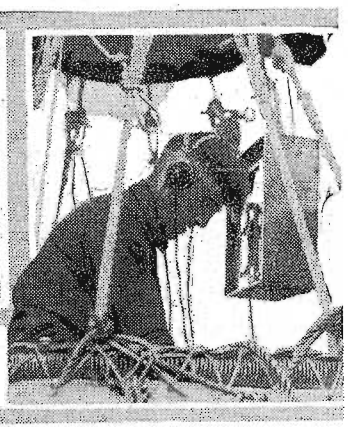
REG. U. S. PAT. OFF.

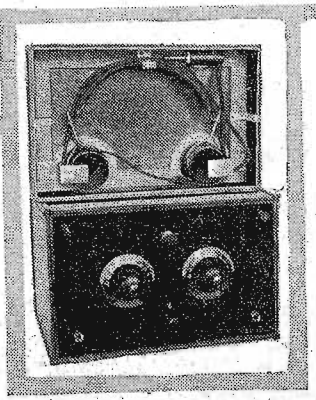
WINS BALLOON RACE AIDED BY RADIO

Mrs. Van Orman, wife of the pilot spoke to her husband from WTAM, Cleveland. He received her message while traveling northward over Oklahoma.



Ready for the hop-off. Van Orman's baloon, Goodyear III, in the foreground. It landed at Rochester, Minn., covering a distance of 1100 miles from the starting point. Photo at the right shows Ward T. Van Orman, pilot of the Goodyear III, tuning in before the ascent at Kelly Field.





Van Orman's set was made by himself. It enabled him to get weather reports which were of advantage in winning the race.

Weather Reports Help Goodyear III

Winning Pilot Thanks Broadcast Stations Much for Success—Music Helps Break Monotony

By H. G. Wilson

FOR the first time in the history of free ballooning, Radio reception proved its value to pilots high in the air and drifting with the winds.

Ward T. Van Orman, pilot of the Goodyear III, winning entry in the National Elimination Balloon race, April 25, says that Radio played an important part in the victory of the Goodyear III over seven contestants for first honors.

Van Orman, veteran pilot of five national and two international races, and C. K. Wollam, his aide, who has spent thousands of hours in the air, flying both lighter and heavier-than-air craft, said that Radio added a new thrill to balloon racing besides keeping them in touch with advantageous weather currents and giving them the positions of the other contestants.

Receiving Set Designed by Pilot

The receiving set of the Goodyear III weighs exactly nineteen pounds. It is all contained in a cabinet less than a foot high and eight inches square. Van Orman tested the outfit which he himself built, over a period of six months to get the results he was after. The set is a four-tube dry cell outfit, the last two of which are reflexed back upon themselves, giving the volume output of six tubes. The antenna system used on the balloon consisted of two wires, each 200 feet long, suspended half-way up the sides of the balloon and opposite each other. The two wires were fifty-three feet apart, the diameter of the balloon envelope.

Because the balloon had no ground contact, use of this type of antenna system was necessitated, one of the wires acting as a counterpoise, and the other serving as aerial.

Sixteen stations, including Los Angeles, Springfield, Mass., Chicago and Davenport, the stations farthest away from the start of the race at Kelly Field, San Antonio, were picked up. Reception from every station was both clear and strong—stronger than with sets that are on the ground, Van Orman said. The stations were heard at levels varying from 2,000 to 10,000 feet.

Weather Reports Aid to Navigation

By means of the frequent weather reports broadcast from stations all over the country, Van Orman was able to pilot the Goodyear III into air currents that carried him around or over storm areas and helped him select the most favorable winds both for direction and for speed.

The Radio receiving set also served a purpose in detecting storm areas and giving advance information about both snow and thunderstorms by picking up the static generated.

Programs broadcast during the flight from WTAM, Cleveland, under the auspices of the Goodyear Radio club, were distinctly heard by the pilots who were traveling at that time over Oklahoma at an elevation of about 2,000 feet. During the evening, Mrs. Van Orman, wife of the pilot, spoke to her husband through the microphone, and Goodyear company officials also sent greetings to the balloonists. Every station that was broadcasting reports or messages to the balloonists at specified times was distinctly received.

Locate Other Balloons by Broadcasting

A coincidence of the trip came while the balloons were passing over Kansas City low enough to have been seen. R. S. Herman, manager of The Goodyear Tire & Rubber Co. branch in that city was speaking over the microphone at WHB and sending his regards to the balloonists. This Radio contact from WHB gave the Goodyear III men information about the landings made by two contestants in the race and the positions of the others as observed at other points.

"In the old days of ballooning," said Van Orman, "when the balloon was going along at a good rate of speed and there was nothing particular to do for the moment, a fellow got pretty lonesome and fell to wondering what the folks on the earth were doing. But now, with Radio contact with any number of points on the ground, not only the portion directly above the balloon's course, but the old home town as well, the pilot's morale is buoyed up to a considerable extent.

"We give Radio a good share of the credit in the winning of this race," he continued. "Knowing about the conditions ahead and being able to figure out a course in advance was a decided advantage."

Balloon Acts as Loop Aerial

Among the Radio observations made by the Goodyear III pilot were the directional features of his antenna system. He discovered that, when the plane of the wires, which hung from the opposite sides of the balloon was perpendicular to the direction in which the sending station was located, the receptive properties were at the maximum, while the swinging of the balloon into another position diminished the set's receptibility. Checks of this were made with the craft's compass so that the pilots found this to be an invariable rule.

Van Orman and his aide, Wollam, as winners of the American contest this year, are placed as entries in the International Free Balloon Race to be held in Brussels, Belgium, in June. They will sail for Europe on May 28.

Following are the stations which Van Orman and Wollam heard.

WOAI, San Antonio; WHAZ, Troy, N. Y.; WDAP, Chicago; WFAA, Dallas; WOC, Davenport; KHJ, Los Angeles; WTAM, Cleveland; KDKA, Pittsburgh; KSD, St. Louis; WBZ, Springfield; WHN, Akron (code); WNC, Memphis; WGY, Schenectady; WJAX, Cleveland; WHB, Kansas City.

DRY LAW HITS HIS TRADE, SAYS SOUSA

John Takes Crack at Volstead and Dill Bill for American Society When Heard Before Committee

WASHINGTON, D. C.—In a declaration before the House patents committee here recently, John Philip Sousa stated that the eighteenth amendment had sent the light opera industry to the "bow-wows." His reason, upon being questioned, was that people wanted the old time drinking songs, but the inspiration to the writers of said songs was lacking.

No longer do the trumpeter and the fellow who works the slide trombone look with longing eyes at a glass of ancient amber fluid, thinking that after the song they could go out and quaff a tank or two. Ah, no, "them days are gone forever," says John. And John Philip himself ought to know.

Both Mr. Sousa and Victor Herbert were in Washington as "star" witnesses of the American Society in opposition to the Newton bill, which would relieve the broadcasters from the payment of unnecessary royalties to the owners of musical productions.

Mr. Herbert said sales of sheet music was decreasing at an alarming rate. He also said the poor "renders" of such music at present was getting on the nerves of the people.

DEALERS BROADCAST TO SELL EQUIPMENT

ORGANIZATION FORMED TO BENEFIT PEOPLE

Keep Stores Open Evenings so that Prospective Purchasers Can Have Demonstration

BUFFALO, N. Y.—"Open Evenings" signs on the business places of some of the Radio dealers of Buffalo have incidentally done the broadcast listeners of the vicinity considerable good.

It all came about this way:

There was a time in the good old, bad old days when Radio parts and equipment could be sold because of the novelty of the thing. But gradually things changed and the public began to demand to be shown concerning the capabilities of Radio apparatus. Now, everyone knows that it is rather difficult to show off Radio equipment if there is little or nothing on the air.

Moreover, the Radio dealer in the outlying sections of the city was getting a lot of business because he saw fit to keep his shop open evenings. In fact, if the truth was known, that is practically the only way some of these people could "make a go of it."

Dealers Put On Paid Talent

The result of this was for the bigger dealers' to start something in order to land more business. So they formed the Radio Dealers' Association of Western New York, composed of about seventy-five members. Someone conceived the bright idea of putting on programs from Station WGR in the afternoons and giving them a real chance to demonstrate their wares.

To the credit of the Radio dealers it may be said that from the first the programs which they put on have been of a high-grade nature and the people have benefited thereby. The programs run from 2:30 to 4:00 every afternoon except Sunday. Only paid talent is used, and a program director, A. J. Erisman, spends his entire time arranging programs. The programs are a hit. Incidentally, they sell Radio equipment.

DAILY FINANCIAL DATA ARE VACATIONISTS' AID

New Service by WJZ Is Valuable Summer Feature

NEW YORK.—Starting recently, Station WJZ here began broadcasting a daily financial summary feature of particular appeal to business men throughout the country.

The summary, which bears the title, "The Day's Financial Developments," is compiled by the financial specialists of the Dow and Jones company, and gives Radio listeners the closing stock market, exchanges, money, and cotton quotations, the standardized Dow and Jones Averages, and a brief digest of the important occurrences on "the Street."

The service, is particularly suited to summertime Radio as it enables men to whom happenings of the financial world are of first importance, to keep in close contact with the movements of the market even though they be far removed from the city. The service is broadcast from 7:20 to 7:30 p. m., Eastern daylight saving time, every night except Saturday and Sunday.

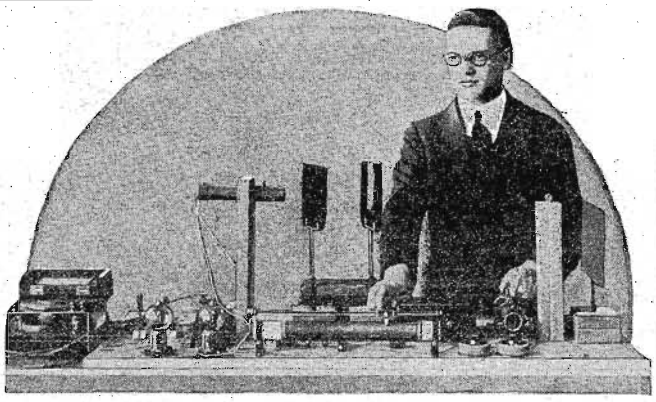
Church Attendance Not Hurt by Broadcasting

CKY Check Shows Even More People at Worship

WINNIPEG, MAN.—CKY, here, was the first station in Canada to broadcast a service from a church and claims the record in the number of services broadcast from various Canadian churches to date. Over twenty churches of the principal denominations are connected with CKY by special wire and a service is broadcast from a different one each Sunday evening.

Often two services in a day are broadcast, and occasionally three. If Radio adversely affects church attendance, as it has been claimed to do, Winnipeg churches should be suffering more than those in any Canadian city. According to local newspapers, however, church attendance on a recent Sunday exceeded that of any previous year. Churches of all denominations were crowded to the doors on the Sunday in question. Certainly it has been demonstrated in Winnipeg that the churches have nothing to fear in broadcasting their services.

PREDICTS VISION USING RADIO



Prof. Arthur C. Hardy, of the Massachusetts Institute of Technology, Boston, who recently predicted to a large audience of engineers that movies would soon be sent by Radio, is here seen with a small working example of what the future machine will be based on. ©Keystone Photo

French Like KFKX Plan

PARIS. — Suggestions are being advanced at the moment in France to organize a system of broadcasting stations to carry the Paris programs clearly over the entire country. The system would resemble somewhat the plan of the American relay station at Hastings, Neb.

BUFFALO FLAT HAS SETS FOR TENANTS

"Cliff-Dwellers" De Luxe Get Six-Tube Sets with Their Rent

BUFFALO, N. Y.—The modern apartment house! Cliff-dwelling, de luxe! It isn't de luxe any more unless it is Radio equipped.

By Radio equipped is meant just that; individual equipment for each apartment. It is that sort of equipment which has been installed in Buffalo in the recently completed exclusive North Court apartments.

There are twelve six-tube Radio sets and twelve separate concealed aerials. Each set is incased in a special mahogany cabinet which also contains the A and B batteries and recharging equipment. Several tests were made before the installation was made and the set manufacturer has made a guarantee to the installing firm that there will be no interference between the sets.

The experiment was tried one night of placing two of the sets side by side and running aerials to opposite ends of the building. On one receiving set they tuned in WDAP, Chicago, and on the other, WHAS, Louisville, without the slightest trace of interference. At the same time WGR, Buffalo, was putting a concert on the air but there was no interference from that in any way.

It is estimated roughly that $175,000,000 was spent during 1923 by Radiophans for sets and accessories, including batteries.

BEFORE THEY THOUGHT OF "MIKES"

This is one of the greatest announcers (in size, at least) in the middle west. He is worshiped by thousands of children.

Fred Smith (right) announcer at Station WLW, Cincinnati. Eugene S. Goebel (below), one of the announcers at WDAR, Philadelphia, was the youngster shown last week, sitting in the late model automobile.

This youngster, hardly able to walk is now announcer at Station W—, owned and operated by a large newspaper.

Eugene S. Goebel, WDAR

THE middle initial stands for Shallcross; just what he shall cross we don't know—but he shall. Born in the quiet old Quaker city of Philadelphia in 1902, he had a fine start for a Radio man.

From 1902 until he was sixteen he did about everything that any other kid would do, then he decided to become a Radio operator on a merchant ship. As a result, he spent about two-and-one-half years cruising around the world, visiting among other places the bund at Yokohama, Iceland, Mexico and all points east.

After listening to a recruiting officer for about an hour, he was strong for joining the Navy during the war, so that he could pick up German SOS signals, but the powers that be ruled him out as too young, so he spent his time teaching the sea-going gobs around Boston the way to "pound brass."

Among other things Mr. Goebel possesses a fine baritone voice. It is reported that during a typhoon in the China Sea the captain of the ship he was on asked him to come out on deck one morning to sing to the wayes.

He is credited with being the originator of dual broadcasting via telephone, that is, the singing voice of a person in one outlying place is joined to the accompaniment of music from another.

Fred Smith, WLW

YES, it WAS Fred Smith; the chubby-faced youngster who founded his baby talk vocabulary on the word "good-night"; to hear him repeat it night after night, thousands of Radiophans remain tuned in to WLW till he signs off.

To some, perhaps, Smith's "good-night" may sound different now, for he went off and got married the other day after he had assured the girls that he wouldn't do anything of the kind.

At the age of 21 he was the victim of a nervous breakdown resulting from overstudy. Impaired sight, almost to the degree of blindness, followed his recovery, and he set out for a tour of Europe. He spent five years in Spain and three years in France, Belgium, Holland, Germany and England.

When America entered the war, Smith went to Paris and offered his services to his native country. Because of his knowledge of Spanish he was sent back to Barcelona and placed in charge of transportation for the purchasing department.

Before leaving Germany at the close of the war he submitted to an eye operation and his vision was restored to normal, practically. Upon his return to America he started out for a Radio career by producing the first Radario, a short play designed especially for Radio production. Up to the time of going to press Smith had not told when that baby picture was taken out in California.

WGY EXPERIMENTAL STATION PROPOSED

RESEARCH WORK REQUIRES LARGER QUARTERS

General Electric Company Will Erect Special New Structure to Improve Broadcast Transmission

SCHENECTADY.—A large new experimental station will be built here shortly by the General Electric company for use in the research of Radio phenomena. It will be located on land recently acquired by the company and will cost approximately $150,000 to construct.

While no plans have been drawn for the new experimental station, it is understood the General Electric company will build a powerhouse capable of delivering higher power at various frequencies, and antenna structures will be erected for a wide range of wave lengths so that systematic investigation can be made of the advantages of various wave lengths in solving the many problems with which Radio now has to deal.

Present Space Limited

The requirements of the present-day broadcast program, including stock reports at noon, an afternoon program for those at home, evening stock and market quotations, weather reports, musical programs, plays, and religious services, have filled up the available time. It has also been found that the space available in the power house and operating section of the big broadcasting station is not sufficient to permit experimental work without interfering with the regular programs. On this account a new station was considered necessary for experimental work.

The broadcast station now known the world over as WGY was originally built several years ago for experimental purposes. Operating under the experimental license 2XI, it had conduoted various Radio experiments and added materially to the fund of available knowledge. It is known by those familiar with the workings of the station that the regular programs have been broadcast for many months at two wave lengths—the regular wave length of 380 meters available to those using standard receiving outfits and also a lower wave length of 107 meters, well adapted to rebroadcasting.

RELEASES OFFICIAL STATEMENT

H. B. Thayer, president of the American Telephone and Telegraph company, when interviewed recently relative to Radio broadcasting, said: "We intend to develop Radio transmission and in connection with that development, we shall continue to broadcast. But, until regulations have been established we shall not encourage the multiplication of broadcast stations." ©United

Booksellers See Sales Aided by Broadcasting

Hoxie Neale Fairchild Addresses Book Men at Convention

NEW YORK.—"Broadcasting Books," was the subject of a talk by Hoxie Neale Fairchild, lecturer of English at Columbia University, at the recent convention of the American Booksellers association here.

Mr. Fairchild has been broadcasting Browning for some time, and said that he has found that his Radio talks have resulted in countless and immediate sales. The booksellers feel with Mr. Fairchild that broadcasting books increase sales.

COURT GIVES DE FOREST RIGHTS

JUSTICE SAYS PRIORITY NOT ARMSTRONG'S

"Father of Radio" Comes into Own Finally After Seven Years' Battle

Decision Revolutionary

(*By Special Correspondence*)

NEW YORK.—"It took seven years, but truths and justice have triumphed at last." Such was the brief reply of Dr. Lee De Forest to the inquiry of your reporter who had asked the famous inventor what it felt like to be entitled to legal priority as the inventor of the audion or regeneration as a means of producing sustained electrical oscillations in Radio reception and transmission or otherwise.

The doctor, truly father of broadcasting, was delivering a Radio lecture before the student body of his Alma Mater, Yale, when he was informed of the court's decision favoring him.

Takes Victory Quietly

Elated, but quiet withal, Dr. De Forest, whose hair is now white from his years of experimenting and litigations seeking to defend his rights, told of the important legal victory and his future plans.

The far-reaching decision, so important to the Radio industry, was that made May 5, by Justice Van Orsdel of the District of Columbia Court of Appeals. In it Dr. De Forest was declared entitled to priority as inventor of regeneration in transmitting and receiving and the oscillating audion.

Major Edwin H. Armstrong was declared to have conceived regeneration several months after Dr. De Forest had actually put the principle into practice as vouchsafed by documentary evidence.

Strips Armstrong of Glory

The opinion of the appellate court reverses the finding of the commissioner of patents, who had awarded priority to Edwin H. Armstrong. Claims to be the inventor had also been made by Dr. Alexander Meissner of Germany and Irving Langmuir.

In reaching the decision Justice Van Orsdel said the question was one of fact merely as to whether De Forest, who admittedly first conceived the idea, had not abandoned it after reducing it to practice.

As neither Meissner nor Langmuir could go back as far as October, 1912, when Armstrong evinced to have conceived regeneration, the two were eliminated, leaving the question merely between Dr. De Forest and Armstrong. The eminent doctor had reduced his invention to practice in August, 1912, and testimony failed to disclose that he abandoned it, Justice Van Orsdel found.

Counts De Forest's Suit Included

The case which brought forth the final decision from the court of appeals, was brought by Dr. De Forest, Langmuir and Meissner from the decision of the commissioner of patents, which had awarded priority to the invention to Armstrong. There were also appeals by De Forest against Meissner and Langmuir jointly, and against Langmuir individually on the following counts:

"1.—Means for producing sustained electrical oscillations comprising an oscillatory circuit having two electrodes in an exhausted receptacle and a second circuit coupled thereto having a conducting body interposed between the electrodes.

"2.—Means for producing sustained electrical oscillations comprising an oscillatory circuit having two electrodes, a second circuit coupled thereto having a conducting body interposed between the electrodes, and means for varying the frequency of the produced oscillations.

"3.—The method of producing electrical alternating currents which consists in causing currents to flow in one of two coupled circuits and varying the flow of current in the first circuit by impressing the potential induced in the second circuit upon a conducting body interposed between two electrodes in the first circuit."

Basis of Revolutionary Decision

"De Forest was the inventor of the epoch-making invention, the audion, which he patented both as an amplifier and a detector," the decision stated. "Prior to 1912, he had devoted much of his time to experiments on the audion, and to the various uses to which it might be put. At the time he discovered the oscillating audion, he was investigating telegraphone recording, the telephone two-way repeater and the amplifier for Radio work.

"It appears from his note book records that the first discovery of the feedback circuit occurred in connection with his work on the amplifier. There is some testimony that prior to August, 1912, the oscillating properties of the audion were discovered by De Forest. It is unnecessary, however, to go beyond the written records of August 6, 1912. This record, with the accompanying drawing, clearly shows a feed-back circuit.

De Forest Undeniably the Inventor

"It is generally conceded, indeed it must be, that this drawing and the notes, not only disclosed the invention, but disclosed it in a clear, workable manner. It matters little whether the case be disposed of upon the theory that what was done in August, 1912, amounted to reduction to practice or merely conception of the invention. In either event De Forest must prevail.

"The decisions of the commissioner of patents are reversed and priority awarded to De Forest."

While no information is available at this time, an appeal to the decision of the court of appeals by the Radio Corporation of America or allied interests is believed inevitable. However, the case presented by Dr. De Forest is believed to be so strong that no such appeal can hope to reverse Justice Van Orsdel's decision.

"It has been a long fight," Dr. De Forest said, "and I am, of course, highly gratified over the outcome." He would make no further statement.

Fought Against Big Interests

The history of the litigation reads like a romance. The Westinghouse company had long ago acquired Armstrong's claim to the invention, which, until now, had been upheld. Dr. De Forest, struggling against untold disadvantages and powerful financial backing, hung on doggedly, always asserting he was right. Now he has, at last, and for all time, been awarded at least the credit to which he is entitled, and for which he has fought for over seven years.

It will be remembered by Radiophans that Radio Digest over a year ago assailed Major Armstrong's title to another patent, that on super-regeneration. This principle, it is believed, belongs by priority to Charles V. Logwood, another Radio pioneer whose work helped the art make the strides it has.

It is interesting to note also that Harry Houck and Armstrong, who developed the super-heterodyne receiver while in the service of the United States Army, may lose the title to this patent owing to a claim of the government that inventions made by its employees belong to the government.

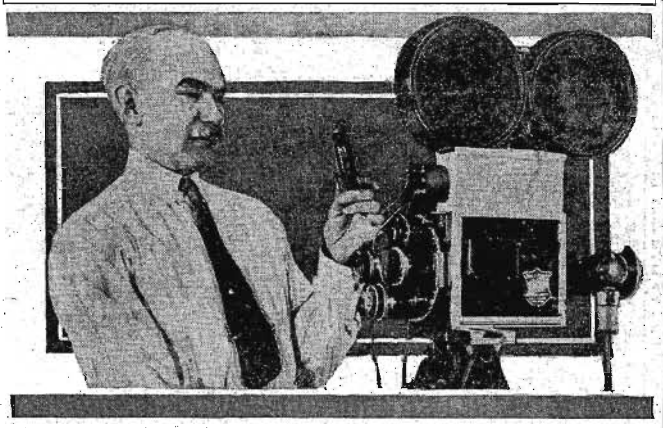
Futuro Plans of De Forest

While undecided definitely what the next step will be, Dr. De Forest, speaking for the De Forest Radio Telephone and Telegraph company, holder of the disputed patent, stated that an effort would be made to get patent papers on the sixty claims awarded by the decision and request that the Armstrong patents be set aside.

No difficulty in accomplishing this is anticipated and it seems certain that regeneration in all forms for both transmission and reception will be taken away from Armstrong and given the De Forest organization. The award of Justice Van Orsdel is so broad, it is claimed, that the patent may also cover the neutrodyne principle.

The Radio Corporation of America and allied interests will make no statement regarding the decision so unfavorable to them, or what their plans are.

TRUE INVENTOR OF REGENERATION



Dr. Lee De Forest, often known as "Father of Radio," inventor of the vacuum tube in use by millions of Radiophans today, was recently awarded legal priority as and declared to be the true inventor of regeneration in Radio receiving and transmitting. The patent, now held by Major E. H. Armstrong, will be set aside, it is believed. Dr. De Forest is here shown with one of his first and latest inventions, the tube and the phonofilm respectively. ©Fotograms Photo

Hear Station WEAF in Apia, Says American Vice-Consul

NEW YORK.—American Vice-Consul Quiney F. Roberts, at Apia, Samoa, 7300 miles from here, reports the reception of Station WEAF's program from 7:18 to 7:50 p. m. on Friday evening, March 14, which was from 1:48 to 2:20 a. m. New York time. A special program by Paul Whiteman was being broadcast on this occasion. The equipment used by Vice-Consul in Charge Roberts consisted of a single-circuit regenerative set with two stages of audio frequency amplification.

RADIO ON CABLES IF SQUIER PLAN COMES

FAMOUS ENGINEER WOULD RAISE EFFICIENCY

Believes Submarine Telegraph Lines Would Benefit by Application of Ether Principles

NEW YORK. — Outlining what he termed the "Key Plan," applying Radio to cable operations, Major General George O. Squier, until recently chief signal officer of the Army, said a short time ago that Radio engineering was approaching a phase of development which would eventually give a speed and accuracy heretofore unthought of in cable communication.

By adapting the basic principles of Radio communication to the sub-audible band of frequencies, which apply principally to ocean cable practice, General Squier said Signal Corps experiments on the new Seattle-Alaskan cable have already shown marked progress. At the laboratory of William M. Bruce, Jr., a cable engineer, at Springfield, O., a universal automatic telegraph transmitter, applicable to Radio, land lines and submarine cables, has been developed and tested under the newly devised "key plan." An improved form of rectified received record has also been developed and tested, he announced.

May Revolutionize Cable Operation

An entirely new range in cable efficiency will be opened up by the use of electron tubes, which will amplify the cable signals several times, just as amplifying tubes increase incoming broadcast signals, General Squier predicted, adding that with properly designated signals, such amplification has already been demonstrated as practical in laboratory work.

Following up his application of Radio to wires in 1910, which made possible the employment of an unused band of frequencies between 15,000 and 100,000 per second, and resulted in the use of multiplex telephony and telegraphy on wire circuits, General Squier now proposes a second fundamental step, which may revolutionize cable operation.

How Squier Would Do It

By utilizing the special means of transmitting and speeding up the Morse code alphabet, as demonstrated by General Squier last year, he now proposes to hook up his cable transmitting and receiving system as follows: First, the generator of the carrier wave, and the modulator; then the transmitting cable, on the opposite end of which is connected the sub-audio amplifier, followed by the detector unit, and finally the interpreter, which makes the message legible.

The key plan, through the powerful amplification made possible by electron tubes, should logically become a vital step in the reception of long, submarine cable signals, the general points out. In the near future cable practice, he believes, will include several bands of sub-audible signal frequencies.

SELECTED TO HEAD WORLD RADIO MEET

Hiram Percy Maxim, famous inventor, who has been elected president of the International Radio Congress, which will be held in Europe next year. Mr. Maxim is one of the best friends the Radio amateur in this country has. ©Wide World

How to Make a Talking and Singing Suitcase

Part I—A Convenient Container for Radio Set

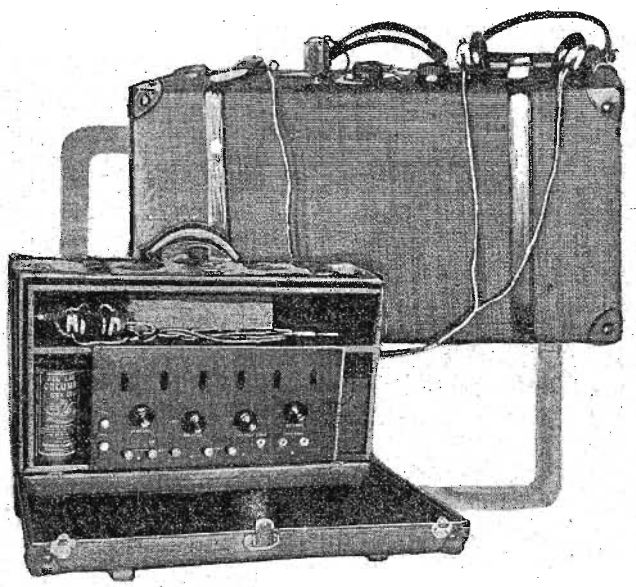
By S. R. Winters

THE phonograph, victrola and graphophone are frequently referred to as talking machines. These instruments have long been standardized in the capacity of reproducing speech and music. The talking and singing suitcase, however, is a comparatively recent invention, which term implies that a complete Radiotelephone receiving equipment for the reception of speech and music is contained in an ordinary suitcase. This self-contained, portable Radio receiving set was devised and perfected by P. D. Loweil and Brent Daniel, both of whom were formerly identified with the Radio Laboratory of the Bureau of Standards. It has been recently standardized and the talking and singing suitcase is a catch phrase that may eventually be bandied about with quite the frequency of the term "talkiug machine."

Suitcase an Appropriate Container

The conversion of a suitcase into a container for batteries, head telephone, loop antenna, condenser, vacuum tubes, and other units comprising a Radio telephone receiving outfit, clearly is a perversion of the original intent of the leather-made container. However, when speech or music is heard coming forth from a closed suitcase the popular imagination is arrested and the lay mind is prone to doubt the hearing faculty. The magic wand is completely enthroned for the moment! Aside from the capactty of a suitcase transformed iuto a miniature Radio telephone receiving station to stimulate our imagining faculty, a receiving set in this form personifies compactness and ease of transportation from place to place. The suitcase continues to represent the embodiment of convenient carriage whether the thing to be transported is a suit of clothes or a quart bottle from the illicit stock of the "bootlegging" industry.

The talking and singing suitcase lends itself to a multitude of uses in the out-of-doors—it may be carried as a novelty along the streets of a city, conducted far afield in woods or on plains by means of the automobile, removed from land by boat, or taken in the open spaces by hand. Weighing approximately forty pounds, this self-contained Radio set for the reception of speech and music is not a staggering burden for carriage from one point to another. When taken afield, if there is a broadcasting station within one hundred miles of its location, the offerings of the ether may be heard by an adjustment of two knobs near the handle of the suitcase, when the head telephones are clamped on the eardrums. The programs of broadcasting stations within a range of ten miles of this novel Radio telephone receiving unit can be heard with remarkable clarity, while the distance between



New York City and Washington, D. C., has been bridged by a communication received by this talking and singing suitcase.

Product of the Bureau of Standards

The conception of enclosing Radio instruments in a leather-made container is not novel of itself, the suggestion having been first given tangible shape by experimental efforts at the Radio Laboratory of the Bureau of Standards about two years ago. Lately, however, this self-contained unit for the reception of music and speech has emerged from a laboratory experiment into a full-fledged standardized product. The development of electron tubes susceptible to operation through the use of dry-cell batteries, instead of the necessity for using storage batteries, has hastened the practical realization of the advantages of this and similar compact receiving outfits. In this instance, six UV-199 vacuum tubes are employed in the amplifying circuit, comprised of a detector, three stages of Radio frequency and two stages of audio frequency amplification. The filaments and plates both derive their electric energy from dry-cell batteries, 60 volts being used for the plates. The original design of the talking and singing suitcase involved the use of bulky storage batteries, these then being necessary to keep the filaments lighted for any considerable period of time, which heavy batteries contributed to the weight of the portable outfit.

Loop Aerial Used

The use of a towering antenna or external aerial is dispensed with in this self-contained Radio receiving equipment. Instead of such a more or less cumbersome form of antenna, a loop 12 by 21 inches in dimension is employed. Of course, the larger the loop the greater relatively will be the range of the reception of the signals. Button-like knobs under the leather handle of the suitcase afford means for adjusting the tuning condenser and for stabilizing the instruments to their greatest sensitivity. A single-action electrical switch, on the outside of the suitcase, is a means for introducing and suspending the filament current. These knobs are visible when the leather container is closed, but they are not conspicuous enough to identify the cleverly concealed conversion of a common suitcase into a miniature portable station for the reception of music and speech.

This portable receiving outfit also has the advantage of assisting in the location of a Radio broadcast station, a loop antenna having directional characteristics. Also, indicative of its variable uses, a plug may be arranged on the suitcase so that a telephone receiver can be connected in place of the amplification horn. Thereby, when held in front of a Bell telephone landline transmitter, conversation may be relayed to a person at some distant point. Practical tests have included a realization of this feat.

Recent experiments have determined the adaptability of this compact Radio receiving outfit to reception on an automobile. It was adjusted in resonance with WCAP, the transmitting station of the Chesapeake and Potomac Telephone Company, while the receiver was on the fourth floor of a building. The suitcase was carried to an automobile without once interrupting the reception of the strains of music. Subsequently, the automobile carried the outfit from Washington, D. C., to Hyattsville, Md., during which time the musical program from the local broadcasting station was heard without interruption. After reaching Hyattsville the talking and singing suitcase was installed on the floor of the laboratory of Dr. J. Harris Rogers, the noted inventor, which placement en-

(Continued on page 12)

AN EVENING AT HOME WITH THE LISTENER IN
(SEE INSTRUCTIONS FOR USE BELOW)

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCN, Calgary, Alta.	370	Silent	12:30- 1:30	Silent	Silent	Silent	11:00- 1:00	Silent
CKAC, Montreal, Que.	370	Silent	6:00-10:30	Silent	6:00-10:30	Silent	6:00-10:30	3:30- 4:30
CKCD, Vancouver, B. C.	370	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30	Silent	Silent
CKY, Winnipeg, Man.	370	Silent	8:15-10:00	Silent	8:15-10:00	8:15-10:00	Silent	7:00- 8:00
CYB, Mexico City, Mex.	370	Silent	7:00- 8:30	Silent	7:30- 9:30	Silent	7:00- 8:30	Silent
CYL, Mexico City, Mex.	510	Silent	8:30-10:00	Silent	Silent	8:30-10:00	Silent	Silent
KDKA, E. Pittsburgh, Pa.	326	5:00- 9:00	5:00-11:30	5:00- 9:00	5:00-11:30	5:00- 9:00	5:00- 9:00	6:30- 7:30
KFAE, Pullman, Wash.	330	10:30-11:30	Silent	10:30-11:30	Silent	10:30-11:30	Silent	Silent
KFAF, Denver, Colo.	360	9:00-10:00	9:00-10:00	Silent	8:30- 9:00	9:00-10:00	9:00-10:00	Silent
KFOA, Seattle, Wash.	455	10:30-11:30	Silent	10:30-11:30	Silent	10:30-11:30	Silent	Silent
KFI, Los Angeles, Calif.	469	12:00- 1:00	8:45- 1:00	9:45- 2:00	8:45- 1:00	8:45- 2:00	8:45- 2:00	8:45- 1:00
KFNF, Shenandoah, Ia.	265	Silent	7:30-8:30	7:30- 9:00	7:30- 8:30	7:30- 8:30	7:30- 9:00	6:30- 7:30
KGO, Oakland, Calif.	312	Silent	10:00-11:00	Silent	10:00-11:00	Silent	10:00-11:00	Silent
KGU, Honolulu, Hawaii	360	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30	12:00- 1:30
KGW, Portland, Ore.	492	10:00-11:30	9:45-10:30	10:00-12:00	10:00-12:00	10:00-12:30	12:00- 2:00	9:00-10:00
KHJ, Los Angeles, Calif.	395	8:30- 1:00	8:30- 1:00	8:30- 1:00	8:30- 1:00	8:30- 1:00	8:30- 1:00	9:00-12:00
KLX, Oakland, Calif.	509	10:00-12:00	Silent	10:00-12:00	Silent	10:00-12:00	Silent	Silent
KPO, San Francisco, Calif.	423	10:00- 1:00	10:00- 1:00	10:00- 1:00	10:00- 1:00	Silent	10:00- 2:00	10:30-12:00
KQV, Pittsburgh, Pa.	270	8:00- 9:00	Silent	8:00- 9:00	Silent	8:00- 9:00	Silent	Silent
KSD, St. Louis, Mo.	546	8:30- 9:30	8:00- 9:00	7:00-10:00	Silent	8:00- 9:00	9:00-10:00	Silent
KYW, Chicago, Ill.	536	Silent	7:00- 9:30	7:00- 2:00	7:00- 9:30	7:00- 2:00	7:00- 9:30	7:00- 8:00
NAA, Radio, Va.	435	5:45- 7:20	6:05- 7:20	6:25- 7:40	5:45- 7:40	7:05- 7:40	Silent	Silent
PWX, Havana, Cuba.	400	Silent	Silent	7:30-10:00	Silent	Silent	7:30-10:00	Silent
WBAH, Minn. Minn.	417	7:00-10:45	7:00- 7:30	7:00- 7:30	7:00-10:45	7:00- 7:30	7:00- 7:30	Silent
WBAP, Fort Worth, Texas.	476	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:00- 7:30	11:00-12:00
WBAY, Columbus, O.	390	7:00- 9:00	Silent	Silent	Silent	7:00- 9:00	Silent	Silent
WBBR, Staten Isl., N. Y.	244	6:30- 8:30	Silent	6:30- 8:30	6:30- 8:30	6:30- 8:30	6:30- 8:30	6:30- 8:30
WBT, Charlotte, N. C.	360	5:30- 6:30	5:30- 9:30	5:30- 6:30	5:30- 9:30	5:30- 6:30	5:30- 6:30	6:30- 7:30
WBZ, Springfield, Mass.	337	6:00- 9:00	6:00- 9:00	6:00- 9:00	6:00- 9:00	6:00-12:00	Silent	6:45- 9:00
WCAE, Pittsburgh, Pa.	462	6:30- 7:30	6:30- 7:30	6:30- 7:30	6:30- 7:30	6:30- 7:30	6:30- 7:30	4:30- 5:30
WCAJ, Univ. Place, Neb.	360	Silent	7:00- 8:00	Silent	7:30- 8:30	Silent	Silent	Silent
WCAL, Northfield, Minn.	360	Silent	Silent	Silent	9:00-10:00	8:30- 9:30	12:00- 1:00	8:30- 9:30
WCAP, Washington, D. C.	469	7:00- 8:00	Silent	6:45- 8:45	Silent	6:40- 7:00	Silent	6:20- 9:00
WCBD, Zion, Ill.	345	8:00-10:15	Silent	Silent	8:00-10:15	Silent	Silent	2:30- 5:30
WCX, Detroit, Mich.	617	7:30- 9:00	7:30-11:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	Silent	6:15- 7:15
WDAF, Kansas City, Mo.	411	8:00- 1:00	11:45- 1:00	8:00- 1:00	11:45- 1:00	8:00- 1:00	11:45- 1:00	4:00- 5:00
WDAP, Chicago, Ill.	360	Silent	7:00- 1:00	7:00- 1:00	7:00- 1:00	7:00- 1:00	7:00- 1:00	9:15-11:15
WDAR, Philadelphia, Pa.	395	5:30- 9:15	5:30- 6:30	5:30- 9:15	5:30- 6:30	5:30- 9:10	5:30- 6:30	6:30- 7:30
WEAF, New York, N. Y.	492	5:30- 8:00	5:30- 8:00	5:30- 8:00	5:00-10:00	5:30- 8:00	5:30- 9:00	5:20- 8:00
WEAY, Houston, Texas.	360	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	8:00-10:00	8:00-10:00	8:00-10:00
WFAA, Dallas, Tex.	476	8:30- 9:30	8:30-12:00	Silent	8:30- 9:30	8:30- 9:30	8:30-12:00	6:00-11:00
WFI, Philadelphia, Pa.	395	Silent	5:00- 9:00	Silent	5:00- 7:00	Silent	5:00- 9:00	5:30- 6:30
WGI, Medford, Mass.	360	Silent	5:30- 8:00	5:30- 8:00	5:30- 8:00	5:30- 8:00	5:30- 8:00	6:30- 8:00
WGN, Chicago, Ill.	370	Silent	7:00-10:30	7:00-10:00	7:00-10:30	7:00-10:00	7:00-10:00	6:00- 9:00
WGR, Buffalo, N. Y.	319	5:30-11:00	5:30- 6:30	5:30-11:00	5:30- 6:30	5:30-11:00	5:30- 6:30	3:00- 4:00
WGY, Schenectady, N. Y.	380	6:45- 9:00	6:45- 9:00	Silent	6:45- 9:00	6:45-10:30	8:30- 9:30	6:30- 7:30
WHA, Madison, Wis.	360	7:30- 8:30	Silent	7:30- 8:30	Silent	7:30- 8:30	Silent	Silent
WHAA, Iowa City.	484	Silent	8:00- 9:30	Silent	Silent	Silent	7:30- 9:00	9:00- 9:30
WHAS, Louisville, Ky.	400	Silent	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	4:00- 5:00
WHAZ, Troy, N. Y.	380	8:00-10:00	Silent	Silent	Silent	Silent	Silent	Silent
WHB, Kansas City, Mo.	411	7:00- 7:45	7:00-10:00	7:00- 7:45	7:00-10:00	7:00- 7:45	Silent	8:00- 1:00
WHK, Cleveland, O.	283	4:30- 5:00	4:30- 5:00	4:30- 5:00	4:30- 5:00	4:30-10:00	4:30- 5:00	5:00- 9:00
WHN, New York, N. Y.	360	5:30- 1:00	5:30-10:00	5:30- 8:30	7:30-10:00	7:30-10:00	5:30-10:00	7:30-10:00
WHO, Des Moines, Ia.	526	7:30- 9:00	Silent	7:30- 9:00	Silent	7:30- 9:00	Silent	Silent
WIP, Philadelphia, Pa.	509	5:00- 6:30	5:00-11:00	5:00- 6:30	5:00-10:00	5:00- 6:30	5:00-11:00	8:30-11:00
WJAR, Providence, R. I.	360	Silent	6:00- 7:00	6:00-11:00	Silent	6:00- 9:00	Silent	Silent
WJAS, Pittsburgh, Pa.	286	6:30- 9:00	6:30- 9:00	6:30- 9:00	6:30- 9:00	6:30- 9:00	Silent	Silent
WJAX, Cleveland, O.	390	Silent	6:30- 8:30	Silent	7:00- 9:30	Silent	Silent	Silent
WJY, New York, N. Y.	405	Silent	5:45- 7:00	Silent	5:30- 8:30	5:30- 9:30	Silent	6:15- 6:45
WJZ, New York, N. Y.	455	5:00- 9:30	5:00- 9:00	5:00- 9:30	5:00- 9:30	5:00- 9:30	5:00- 9:30	5:00- 9:30
WKAQ, San Juan, P. R.	360	Silent	7:00- 8:30	Silent	Silent	7:00- 8:30	Silent	Silent
WKAR, East Lansing, Mich	280	Silent	Silent	7:00- 8:00	Silent	Silent	Silent	Silent
WLAG, Minn.-St. Paul.	417	6:15- 7:00	6:15- 7:00	9:30-10:45	6:15- 7:00	9:30-10:45	9:30-12:30	7:45- 9:15
WLAX, Bellows Falls, Vt.	280	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00
WLS, Chicago, Ill.	345	Silent	5:30-12:00	5:30-11:00	5:30-12:00	5:30-10:00	7:00-11:00	5:30- 7:00
WLW, Cincinnati, O.	309	7:00- 9:00	9:00-11:00	7:00- 9:00	9:00-11:00	Silent	Silent	6:45- 8:15
WMAK, Lockport, N. Y.	360	Silent	7:00- 8:00	Silent	Silent	Silent	Silent	Silent
WMAQ, Chicago, Ill.	448	Silent	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	Silent
WMAV, Auburn, Ala.	254	Silent	Silent	Silent	8:00- 9:00	Silent	Silent	Silent
WMC, Memphis, Tenn.	500	8:30- 9:30	8:30-12:00	Silent	8:30- 9:30	8:30-12:00	9:30- 9:30	Silent
WNAC, Boston, Mass.	278	5:00- 9:00	7:00- 9:00	5:00- 9:00	7:00- 9:00	5:00- 9:00	8:00- 9:00	6:30- 8:30
WOAI, San Antonio, Texas.	385	9:30-10:30	9:30-10:30	Silent	7:30- 8:30	Silent	Silent	9:30-10:30
WOAW, Omaha, Neb.	526	6:00-11:00	6:00-11:00	Silent	6:00-11:00	6:00-11:00	6:00-11:00	9:00-11:00
WOC, Davenport, Ia.	484	8:00-11:00	Silent	8:00- 9:00	9:00-10:00	8:00- 9:00	9:00-10:00	7:00-11:00
WOO, Philadelphia, Pa.	509	5:30- 9:00	Silent	5:30- 9:00	Silent	5:30- 9:00	Silent	Silent
WOQ, Kansas City, Mo.	360	Silent	8:00- 9:30	Silent	8:00- 9:30	Silent	8:00- 9:30	7:00- 7:45
WOR, Newark, N. J.	405	4:15- 9:00	4:15- 5:30	4:15- 9:00	4:15- 5:30	4:15- 5:30	5:15- 9:00	Silent
WOS, Jefferson City, Mo.	441	8:00- 9:30	Silent	8:00- 9:30	Silent	8:00- 9:30	Silent	7:30- 8:30
WRC, Washington, D. C.	469	Silent	4:15-10:00	Silent	4:15-10:00	Silent	4:15-10:00	Silent
WRM, Urbana, Ill.	360	Silent	7:00- 9:30	Silent	8:30- 9:30	Silent	Silent	Silent
WSAI, Cincinnati, O.	309	Silent	7:00-10:00	Silent	8:00-10:00	Silent	10:00- 1:45	Silent
WSB, Atlanta, Ga.	429	8:00-12:00	8:00-12:00	Silent	8:00-12:00	8:00-12:00	8:00-12:00	7:30- 2:00
WSY, Birmingham, Ala.	360	Silent	Silent	Silent	Silent	Silent	Silent	8:00- 9:00
WTAM, Cleveland, O.	390	5:00- 6:00	5:00- 6:00	5:00- 9:00	5:00- 6:00	5:00- 6:00	5:00-10:00	Silent
WTAS, Elgin, Ill.	286	8:15-12:00	8:15-12:00	8:15-12:00	8:15-12:00	8:15-12:00	8:15-12:00	8:15-12:00
WTAY, Oak Park, Ill.	283	Silent	7:15- 9:15	7:15- 9:15	7:15- 8:15	7:15- 9:15	7:15- 9:15	Silent
WWJ, Detroit, Mich.	517	7:30- 8:30	7:30- 8:30	7:30- 8:30	7:30-11:00	7:30- 8:30	6:00- 7:30	6:30- 7:30

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. If in addition, your city uses daylight saving time, add one hour to this result. This table includes only the evening broadcasts, 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
244	WBBR	330	KFAE	360	WKAQ	395	WFI	440	CFCN	492	WEAF
254	WMAV	337	WBZ	360	WLAK	400	PWX	441	WOS	500	WMC
265	KFNF	345	WCBD	360	WMAK	400	WHAS	448	WMAQ	509	KLX
270	KQV	345	WLS	360	WOQ	405	WJY	450	CKY	509	WIP
278	WNAC	360	KFAF	360	WRM	405	WOR	455	KFOA	509	WOO
280	WKAR	360	KGU	360	WSY	410	CKCD	455	WJZ	510	CYL
283	WHK	360	WBT	370	WGN	411	WDAF	462	WCAE	517	WCX
283	WTAY	360	WCAJ	380	WGY	411	WHB	469	KFI	517	WWJ
286	WJAS	360	WCAL	380	WHAZ	417	WBAH	469	WCAP	526	WHO
286	WTAS	360	WDAP	385	WOAI	417	WLAG	469	WRC	526	WOAW
309	WLW	360	WEAY	390	WBAV	423	KPO	476	WBAP	536	KYW
309	WSAI	360	WGI	390	WJAX	425	CKAC	476	WFAA	546	KSD
312	KGO	360	WHA	390	WTAM	425	CYB	484	WHAA		
319	WGR	360	WHN	396	KHJ	429	WSB	484	WOC		
326	KDKA	360	WJAR	395	WDAR	435	NAA	492	KGW		

A SINGING SUITCASE
(Continued from page 11)

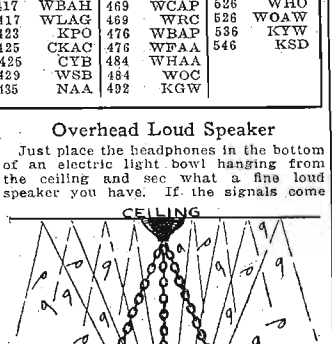
abled the reception of signals from WHAZ, broadcasting station in Troy, N. Y. The difficulty of reception ordinarily experienced during the summer months from atmospheric disturbances was negligible by virtue of the use of a loop antenna, which reduces extraneous noises to a minimum compared with those encountered when employing an overhead antenna.

This self-contained outfit lends itself to a variety of "stunts." Its conversational powers—parrot-like, of course—are quite varied. The grocer may be given an order, in the event that a particular broadcasting station or transmitting outfit is issuing instructions. Imagine the consternation of being approached on the street and engaging in a conversation with a suitcase, which event is not unlikely provided that a neighboring transmitting station is sending out messages.

(The second and final part of this extremely opportune article by Mr. Winters will not only give the hook-up used but will tell how to assemble and wire the suitcase set.—Editor's

Overhead Loud Speaker

Just place the headphones in the bottom of an electric light bowl hanging from the ceiling and see what a fine loud speaker you have. If the signals come



in loud the sound is thrown up against the ceiling where it is reflected down into the room with pleasing results.—A. A. Jones, Chicago, Ill.

How to Install a Radio Set in Your Automobile

Part III—Chevrolet Installation and Panel Layout

By Harry J. Marx

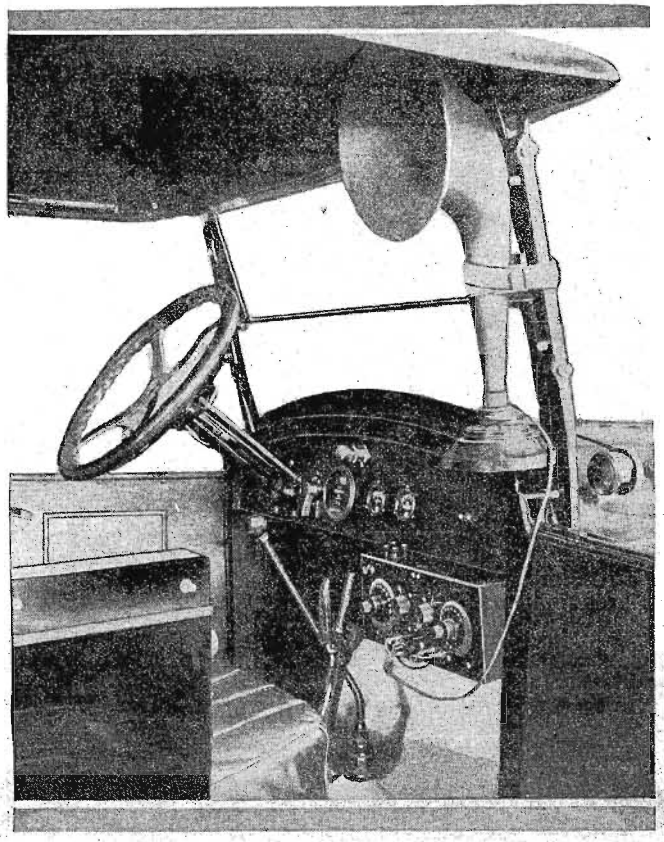


Figure 1

THE Chevrolet Motor company has a descriptive circular with the following caption on the front: "Will Your Family Be Happy This Spring?" The answer is: "Yes—if the Chevrolet is equipped with a Radio set!" No, the firm does not deliver the car with this set installed; but there is no reason why any regular Radiophan cannot make this set himself and then install it in his car with satisfying results.

The illustration (Figure 1) shows the portable Radio receiver installed in the Chevrolet touring car, 1924 model. This portable receiver is the one at present being described in this series. The dashboard in this model of the Chevrolet car is straight along the lower horizontal edge, making it a simple matter to fasten the set directly underneath it. A small box containing the B batteries was bolted to the wall underneath the dashboard.

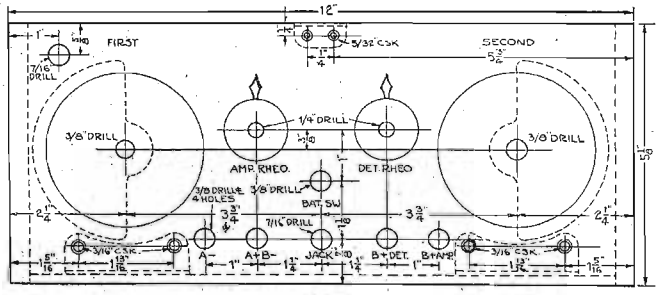


Figure 2

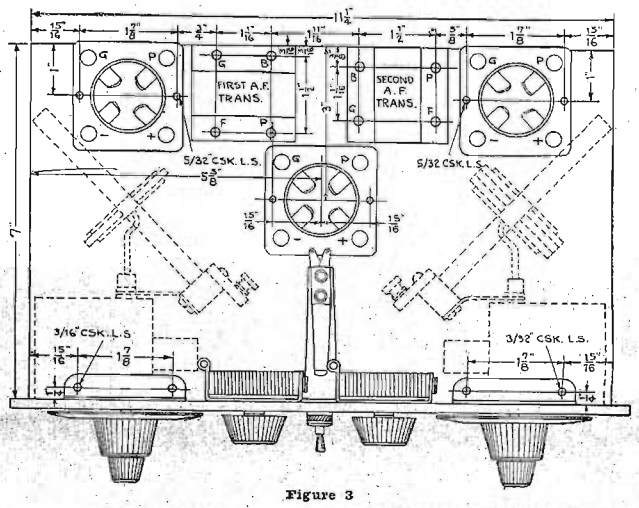


Figure 3

Antenna System

Both the four-wire antenna described in Part I of this series and a loop aerial were tried out, and with very satisfactory results. When the loop aerial was used the base was fastened to the top of the upper edge of the front seat. The loop was one with 20 turns wound helically on two sides of a crossed pole frame, each side of the square being 18 inches.

The four-wire aerial inside the top

(Continued on page 24)

ANNOUNCERS' CONTEST

Radio Digest First Annual

Gold Cup Award

THIS beautiful GOLD CUP will be awarded by Radio Digest to the World's Most Popular Broadcast Announcer.

You are invited, together with Radiophans all over the world, to help us select the man or woman who will receive this priceless trophy. You will find a ballot on page two of this issue which you can use to vote for your favorite announcer.

RADIO Digest GOLD CUP AWARD will be an annual trophy presented to the most popular Radio announcer in the world. Every year Radiophans will be given the opportunity to select the announcing "King." Everybody is invited to vote for their favorite announcer. It is up to you who will be the winner in the 1924 competition. Send your ballots in early.

ENTER YOUR FAVORITE'S NAME

How to Nominate and Vote

ON THIS page will be found the rules and regulations governing the Radio Digest First Annual GOLD CUP AWARD to be given to the world's most popular broadcasting station announcer in a competition which starts with this number and will continue until the issue of September 6th. Below will be found a nomination certificate. All that is necessary for you to do to place your favorite announcer in the contest is to fill out this certificate with your candidate's name and the broadcasting station call letters. Write in your name and address and mail to GOLD CUP AWARD Editor of the Radio Digest. This will place your choice of announcers in nomination. If you will then turn to page two of this issue you will find a ballot with which you can vote for your candidate. These ballots, numbered consecutively, will appear in each issue of the Radio Digest until the close of the contest, with the September 6th number. Each of these ballots will count for one vote when sent in separately. You can hold these ballots until you have four that are consecutively numbered, and when they are sent in, a bonus of ten votes will be allowed for your favorite announcer. For each eight consecutively numbered ballots your candidate will receive a bonus of twenty-five votes. For each twelve consecutively numbered ballots fifty votes, and for each sixteen consecutively numbered ballots—seventy-five votes will be allowed. Who will be the winner of the Radio Digest first annual GOLD CUP AWARD is a matter entirely in your hands.

Send in Your Nomination Certificate and Ballot Today

NOMINATION CERTIFICATE

Announcers' Contest

Radio Digest First Annual GOLD CUP AWARD

GOLD CUP AWARD Editor, Radio Digest,
510 N. Dearborn St., Chicago, Ill.

Dear Sir:

I nominate.....

Station .....
Broadcasting Station

Signed .....

Address .....

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

Rules and Regulations

1. Radio Digest offers its first annual GOLD CUP AWARD to the most popular broadcasting station announcer. This popularity to be determined by the balloting of the readers of Radio Digest, and the winning announcer will be the one polling the largest number of votes.

2. All broadcasting station announcers are eligible to enter. Nominations can be made either by the announcer or any Radiophan. Nominations should be made by using the "Nomination Certificate" appearing in the issues of Radio Digest. The names of the announcers entered in this contest will be published from time to time in Radio Digest. The progress of the voting for the announcers will be published frequently during the contest at the discretion of the GOLD CUP AWARD Editor.

3. Effective with May 24th issue a ballot will be printed in each issue of this publication on page 2. These ballots will be numbered consecutively from one to sixteen. The voting officially opens with the publication of ballot No. 1 in May 24th issue. The contest closes with ballot No. 16 published in September 6th issue of Radio Digest, and the official closing date of this contest is midnight, September 8th, 1924.

4. Voting will consist of filling in these ballots with the name, initials or nickname of the announcer and the station and mailing to the GOLD CUP AWARD Editor.

5. Ballots when sent in separately will count for one vote. Bonus votes will be allowed during the contest according to the following schedule:

For each four consecutively numbered ballots sent in at the same time a bonus of ten votes will be allowed.

For each eight consecutively numbered ballots sent in at the same time a bonus of twenty-five votes will be allowed.

For each twelve consecutively numbered ballots sent in at the same time a bonus of fifty votes will be allowed.

For each sixteen consecutively numbered ballots sent in at the same time, being a complete set, a bonus of seventy-five votes will be allowed.

6. The broadcasting station announcer polling the largest number of votes in the contest will be awarded the Radio Digest GOLD CUP. In the event of a tie for the GOLD CUP AWARD each tying contestant will receive the same identical award.

7. Anyone may vote for their favorite announcer with ballots clipped from Radio Digest.

8. All votes to be credited must be mailed on or before midnight, September 8th, 1924.

9. The Radio Digest first annual GOLD CUP AWARD will be made by a committee appointed by the publication.

10. Any question that may arise during the contest will be decided by the GOLD CUP AWARD Editor and his decision will be final.

11. These Rules and Regulations are complete and cover the awarding of Radio Digest First Annual GOLD CUP AWARD.

66 STATIONS' ADVANCE PROGRAMS

Tuesday, May 20

CKAC, Montreal, Can. (Eastern, 425), 7:00 p. m., Kiddies' stories in French and English; 7:30, Mount Royal dinner concert; 8:30, English program, White Star Dominion Steamship "Regina"; 10:30, Mount Royal Dance Orchestra.

CKY, Winnipeg, Can. (Central, 450), 8:15 p. m., Concert, J. J. H. McLean Music Company.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., Howard E. Webb, organist; 5:30 p. m., Dinner concert, Grand Symphony Orchestra; 6:30, Children's period; 7:15, "The Contemporary Novel: Sea, Pirates and Swordplay," Prof. Percival Hunt; 7:30, "The Fortieth Anniversary of the Westinghouse Company"; Concert, KDKA Woodwind Choir; 10:30, Special concert.

KFAE, Denver, Colo. (Mountain, 360), 8:00-9:30 p. m., NEAP Gloom Busters; Talk, Denver Real Estate Exchange.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal concert; 8:00-9:00, Ambassador Max Fisher's Cocoanut Grove Orchestra; 9:00-10:00, Examiner concert; 10:00-11:00, Concert, Harry Porter, director.

KFKX, Hastings, Neb. (Central, 341), Rebroadcasts program of KDKA.

KFSG, Los Angeles, Calif. (Pacific, 278), 3:30-4:00 p. m., Organ recital 4:00-5:30 p. m., Vocal and instrumental concert; 6:30-7:30, "Kozy Hour," program of vocal and instrumental numbers by children; 8:00-10:00, Speaking; "The Suwanee Jubilee Singers; vocal selections; Talk; Aimee Semple McPherson.

KGO, Oakland, Calif. (Pacific, 312), 4:00-5:30 p. m., Concert orchestra, Hotel St. Francis; 8:00, Radio play, "Seven Keys to Baldpate," KGO Players; Arion trio; 10:00-1:00 a. m., Hotel St. Francis Dance Orchestra, Henry Halstead, leader.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Concert, Civic Music Club; 3:30, Talk, Jeannette P. Cramer; 7:15, Talk for farmers, Oregon Agricultural College Extension Service.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Program, Tenore Kullian, soprano; Claire F. Crane, pianist; White's Californians; 2:30-3:30, Matinee musicale; 6:00-6:30, Art Hickman's Concert Orchestra; 6:30-7:00, Music memory contest, Fitzgerald Music Company, Raymond Harmon, director; 7:00-7:30, Children's program, Stories of American History, Prof. Walter Sylvester Herring; Weekly visit of the Sandman and Queen Titania, Minnie Ekman, pianist, 12 years old; Sarah Gordon, reader; Bedtime story, Uncle John; 8:00-10:00, Dolinsa program; 10:00-11:00, Art Hickman's Dance Orchestra.

KJS, Los Angeles, Calif. (Pacific, 360), 8:00-9:00 p. m., Concert program of vocal and instrumental selections; other features.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Theodore J. Irwin, organist; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour stories, Big Brothers of KPO; 6:30-7:00, "Cleveland Six"; 7:00-7:30, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-10:00, Richard Jose, Islam Joseans; 10:00-11:00, E. Max Bradfield's Versatile Band.

KQV, Pittsburgh, Pa. (Eastern, Daylight Saving, 270), 5:00-5:30 p. m., "Twilight Tale and Diary of Snubs, our Dog," for the Kiddies.

KSD, St. Louis, Mo. (Central, 546), 6:30 p. m., Alcegh's Concert Ensemble; 9:00, Program, Western Military Academy Orchestra and Glee Club; "Aluminum," O. H. Pierce; 11:00, Hotel Statler dance music, Rodemich's orchestra.

KYW, Chicago, Ill. (Central, Daylight Saving, 536), 10:35 a. m., Table talk, Mrs. Anna J. Peterson; 1:35-3:00 p. m., Studio program; 5:45, Children's bedtime story; 6:00-8:30, Dinner concert, Jesha De Bubary's orchestra; Paul Whiteman's "Collegians"; St. Olaf College Chapel services.

WCX, Detroit, Mich. (Eastern, 517), 6:00 p. m., Dinner concert; 10:00, Red Apple Club.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Joseph Black's Sexton Cafe Orchestra; 6:00-7:00, School of the Air, piano tuning-in number, Duo-Art; Address, speaker from the National Livestock and Meat Board; Address, Clerin Zumwalt, M. A.; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon Ensemble; 11:45 p. m.-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:00 p. m., Drake Concert Ensemble and Blackstone String Quintette; 8:00-8:30, Baritone, played by Ralph Emerson; 10:00, C. Louis Green, Laugdon Bros., Rosemary Hughes, Fred W. Agard, Vera Worthley, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy with boys and girls; 7:55, Play review by Arnold Abbott.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 11:15 a. m., Gertrude Evelyn, soprano; Orion Rose, pianist; 11:35, Motion Picture talk; 3:30 p. m., Sara Setti, soprano; 4:20, Plaza Grill Orchestra; 5:00, C. Baldwin Allen, baritone; 5:30, Children's program; 6:00-7:30, Dinner music from Waldorf Astoria; 7:30, Thornton Fisher; 7:40, Lilli Offen, soprano; 7:50, Sophie Irene Loeb; 8:00, Corn Products Orchestra; 8:30, Brooklyn Eagle News Review; 9:00, Guiseppe Lombardo, tenor; 9:20, Talk on Blue Ribbon Mayonnaise; 9:30, Everyady Minstrels.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University faculty.

WFAA, Dallas, Tex. (Central, 476), 12:30-1:00 p. m., Address, DeWitt McMurray; 8:30-9:30, Varied program by performers from Frost, Tex.; 11:00-12:00, Musical recital, Miss L. Mabel Cranfill and assisting artists.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis' Bellevue Stratford Concert Orchestra; 3:00, "Romance of Solid Silver," A. Alvin; 6:00, Sonny Jim, the Kiddies' Pal; 6:30, Meyer Davis' Bellevue Stratford Concert Orchestra; 8:00, "Miniature Lady" operetta, conducted by R. M. Stults; 9:45, Four-Leaf Shamrock Concert; 10:15, Charlie Kerr and his Symphonic Dance Orchestra.

WGN, Chicago, Ill. (Central, 370), 7:00-10:00 p. m., Gertrude Griffiths, soprano; Bess Ferguson, pianist; Mary Louth, violinist; Ramon Biondi, violinist; Dance music, Oriole Orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, the Radio Dealers' Musical Program; 6:30-7:30, Dinner music.

WGY, Schenectady, N. Y. (Eastern, 380), 1:00 a. m., "The May Party," Mrs. C. W. Ashworth; 5:30, Dinner music, Instrumental Trio of Hotel Ten Eyck; 7:45, "The Future Developments in Metals," Prof. Mortimer F. Sayre; 8:00, Program, Union College Musical Clubs, Howard Hall, A. H. Abell, Jr., pianists; Address, "College Athletics and Education," Prof. Charles N. Waldron; "Musical Saws and Humorous Songs," F. M. Bishop, S. M. Bishop, Jr., E. C. Schroedel, F. R. Sheehan, H. M. Weymuth, Jr.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; Alamo Theater Orchestra; 7:30-9:00, Concert, Dixie Stars Orchestra; Reading, Mrs. Cordia Greer Pettie, Bending, An Interesting Historical Episode.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour program, Sweeney Radio Orchestra; 7:00-7:30, Popular dance numbers, Sweeney Radio Orchestra; 8:00-10:00, Program, Hotel Ricardo, Mr. William Goetz, of St. Joseph, Mo., will entertain the Radio artists of WHB; Numbers, Sweeney Radio Orchestra; Solos by popular WHB artists.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 2:15-2:45 p. m., Edw. B. Marks Music Co.; 2:45-3:15, Jess Stern's Dance Orchestra; 3:45-4:30, Bob Schaefer and His Entertainers, assisted by the Original Georgia Five; 4:30-4:45, Jack Morrison and Lucile Dumont, in songs; 4:45-5:00, Sammy Harris in songs; 5:00-5:30, Louie Cohen's orchestra; 9:30-9:45, "Anniversary of the Signing of the Mecklenburg Declaration of Independence," by George N. Sage of the National Security League; 9:45-10:30, Ace Brigode and His Fourteen Virginians from the Monte Carlo; 10:30-11:00, Program of classical songs by the All Nations' Association, Henry Tutor Mason, founder; 11:00-12:00, Benjamin J. Goodman's orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Organ recital, Karl Breuwitz; 3:00, Popular program by Cameo Trio, direction Harry Link; 6:15, "A Strong Baby—a Good Citizen," Talk by Edith Y. Clifton; 6:05, Dick Regan and his Wyn LitUe Symphony Orchestra; 7:00, Uncle Wip's bedtime stories; 8:00, Concert, Philadelphia Police Band; 8:30, Willy Lamping, violoncello virtuoso, Helen Buothroyd Buckley, piano accompanist; 9:00, "Jollies of 1924," Shanahan Catholic Club; 10:00, Ted Weems and his Victor Recording Orchestra.

WJAX, Cleveland, O. (Eastern, 390), Program arranged by Cleveland News-Leader; 7:30 p. m., Bedtime story, E. G. Johnson; Radio Talk Cartoon, Don Palmer; Selections, Lee Smith-Martha Lee Club Orchestra; Playlet, Thimble Theater Guild; Selections, Martha Lee Club Mandolin Club; Vocal numbers, Carrabelle Johnson, soloist; Hardshoe dancing, members Martha Lee Dancing Club; Monologue, Roy Lewis.

WJY, New York, N. Y. (Eastern, Daylight Saving, 405), 7:30 p. m., "Building and Loan Associations," George H. Woodruff; 7:45, Ralph W. Tag, baritone; 8:00, Broadcasting Broadway, Bertha Brainard; 8:15, Mildred Delna, soprano; 8:30, "The Art Museums of England," M. Rose Catling; 9:00, Mildred Delna, soprano; 9:15, the Original Manford Aces, John J. Lisko; 10:00, Field and Stream, sport talk; 10:15, Mario Caiati, cellist; Keath McLeod, accompanist; 10:30, Ruth Bortz, soprano; Virginia Fenwick, soprano; 11:00, Mario Caiati, cellist.

(Continued on page 16)

Headliners of the Week

THIS WEEK might be called "Variety Week." It begins with a prize fight broadcast by WSB. Tune in *Tuesday* and you will hear all the gory details of the fight between Young Stribling and Dan Oswod. For those unable to stand such recreation WIP offers one of Europe's greatest violincellists, Willy Lamping. Better not miss this, he will only be here three months.

Wednesday night is Kids' night for WTAM. Two of the performers, Jack and Loretta Clemens, are first cousins of that great writer of kids' books, Mark Twain. The Cincinnati Conservatory of Music will award a Radio Scholarship through Station WLW to the winner of a unique educational contest. Tune in, musicians, and see how keen your ears are.

WAAW offers a very unusual talk *Thursday*, when Rev. Edgar Brown will tell about his experiences hunting "dope" in Omaha. His disguise was so complete that none of his flock would have recognized him.

Every *Friday* night bridge fans have tuned in to WAAW to listen to Mrs. Guy U. Purdy's bridge lessons. No doubt, you will be interested to know that Mrs. Purdy is a pupil of Hubert Work, New York international bridge authority.

Saturday, tune in for WRC, first because Honorio Pueyrredon, the Ambassador of Argentine, will speak and second because the United States Marine Band will be broadcast.

Did you know that a band could consist of one man? Frank G. Robertson is called the champion one-man band artist and will be heard over WOS *Monday*. While you are tuning in this particular locality get KFNF and hear the gang from Harley Bartles' garage. Normally these men adjust spark plugs for their every day vocation, but they are going to try their band at entertaining the Radio public.

WGY is a Station always up to stunts. *Tuesday*, if you live on a farm and are tired of the early morning crow of the rooster, tune in for this Station and listen to the voice of the city. You will hear the calls of the peddlers, sounds of the traffic, and music of the hurdy-gurdy, and will, no doubt, be more than pleased with your lot.

Three members of Roxie's Gang which is noted for the wonderful concerts which are broadcast every Sunday evening from the Capitol Theater, through Station WEAF, New York City. Eugene Armandy (above) is the concert master of the Capitol Grand Orchestra which is an outstanding feature of each concert. Susan Dunbar (right) is a recent addition to the Gang and Phil Ohman (extreme right) is the clever manipulator of the "ivories" and a member of the popular team of Ohman and Arden.

WEEKLY BRIDGE LESSONS AT WAAW;

Where to Hear Concerts

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.

Tuesday: CKAC, CKY, KDKA, KFI, KFSG, KGO, KHJ, KJS, KPO, KSD, KYW, WAAM, WAAW, WBAH, WBAP, WBZ, WCAE, WCX, WDAF, WDAP, WDAR, WEAF, WFAA, WFI, WGI, WGN, WGY, WHAS, WHB, WIP, WJAX, WJY, WJZ, WLAG, WLS, WLW, WMAQ, WMC, WOAW, WOO, WOR, WRC, WSAI, WSB, WTAS, WWJ.

Wednesday: CFCN, CKAC, CKCH, KDKA, KFAE, KFI, KFNF, KFOA, KGW, KHJ, KJS, KPO, KSD, KYW, PWX, WAAM, WAAW, WBAP, WBZ, WDAF, WDAP, WDAR, WCAE, WCAP, WCX, WEAF, WEAO, WFAA, WFI, WGAZ, WGI, WGN, WHAS, WHB, WIP, WJZ, WKAQ, WLAG, WLW, WMAQ, WOC, WOO, WOR, WOS, WSB, WTAM, WTAS, WWJ.

Thursday: CKAC, CKY, KDKA, KFI, KFKX, KFNF, KFSG, KGO, KGW, KHJ, KJS, KLZ, KPO, KSD, KYW, WAAM, WBAH, WBAP, WBZ, WCAE, WCBD, WCX, WDAF, WDAP, WDAR, WEAF, WEAO, WFAA, WFI, WGI, WGN, WGY, WHAS, WHB, WIP, WJAX, WJZ, WLAG, WLS, WLW, WMAQ, WMC, WOAW, WOC, WOO, WOR, WSB, WRC, WSAI, WTAS, WWJ.

Friday: CKAC, CKY, KDKA, KFAF, KFI, KFNF, KFOA, KFSG, KHJ, KGW, KPO, KQV, KSD, KYW, WBAH, WBAP, WBAV, WBZ, WCAE, WCAP, WCX, WDAF, WDAR, WEAF, WEAO, WFAA, WFI, WGAZ, WGI, WGN, WHAS, WHB, WHK, WIP, WJY, WJZ, WKAQ, WLAG, WLS, WMAQ, WMC, WOAW, WOC, WOO, WOR, WRC, WSB, WTAS, WWJ.

Saturday: CKAC, KDKA, KFI, KFNF, KFOA, KFSG, KGO, KHJ, KPO, KSD, KYW, PWX, WBZ, WCAE, WCX, WDAF, WDAP, WDAR, WEAF, WFAA, WFI, WGI, WGN, WHAS, WHK, WIP, WJZ, WLAG, WLS, WMAQ, WMC, WOAW, WOC, WOO, WOR, WRC, WSAI, WSB, WTAM, WTAS, WWJ.

Sundays: CKAC, CKY, KDKA, KFI, KFNF, KFSG, KGO, KGW, KPO, KHJ, KYW, WBAP, WCAE, WDAP, WDAR, WEAF, WFAA, WGI, WGN, WGY, WHAS, WHK, WIP, WLAG, WLW, WOC, WOO, WSAI, WSB, WTAS.

Monday: CKAC, KDAK, WFAA, KFAE, KFI, KFKX, KFOA, KGW, KPO, KQV, WAAM, WAAW, WBAH, WBAP, WBAV, WBZ, WCAE, WCBD, WCX, WDAF, WDAR, WEAF, WFAA, WFI, WGAZ, WGY, WHAZ, WIP, WLW, WMC, WOAW, WOC, WOO, WOR, WOS, WRC, WSB, WTAS, WWJ.

Tuesday: CKAC, CKY, KFSG, KGO, KJS, KPO, KYW, WBAP, WCX, WHAS, WOAW, WAAW, WDAF, WDAR, WEAF, WFAA, WIP, WJAX, WLW, WGN, WGY, WHAS, WOO, WOR, WRC, WSB, WTAS, WWJ.

Frederic W. Wile of the Frederic W. Wile News Service, broadcasts a talk on "The Political Situation in Washington Today" every Thursday evening at 9:00 p. m. eastern standard time, from Station WRC, "The Voice of the Capitol," Washington, D. C.

Laura Broderick, coloratura soprano, who will appear on the program of KGO, the Pacific Coast broadcasting station of the General Electric Company, Oakland, California, on Thursday evening, May 22, at 8 p. m., Pacific time.

Tuesday, May 20

(Continued from page 15)

WJZ, New York, N. Y. (Eastern, Daylight Saving, 455). 1:00 p. m., Henri Van Der Zanden's Hotel Ambassador Trio; 3:00, Afternoon concert, Wanamaker Auditorium; 4:00, Fashion talk, Eleanor Gunn; 4:15, Eva Syfert, soprano; 4:35, "Editors and Poets," Roselle Mercier; 5:00, Rose Keesler, soprano; 5:15, Alex Aranyossy, violinist; 7:00, "Dogs—Boston Terriers," Frank Dole; 7:30, Specht's Alamac Orchestra; 8:15, "George Westinghouse," C. A. Torry; 8:30, Paul Morenzo, tenor; Alice Buckley, soprano; Keath McLeod, accompanist; 8:55, Allan Gleason, pianist; 9:15, "Business of Good Citizenship," Russell R. Whiteman; 9:30, Allan Gleason, pianist; 9:40, "How It Feels to Write Letters a Mile Long and Two Miles High," Capt. Cyril Turner; 10:00, Fisk University Jubilee," F. A. McKenzie; 10:30, Hotel Astor Dance Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 2:10-2:30 p. m., Women's Club Hour—talk for League of Women Voters; 2:40-4:00, Daylight concert; 4:00-4:30, Playlet, WLAG Players; 5:30-6:00, Children's stories, Robert Whitcomb; 6:00-6:15, "High Diving," E. H. Rawson; 6:15-7:00, Dinner hour concert, Sam J. Heiman's Grand Cafe Orchestra; 7:30-8:15, Address, Matilde E. Holtz.

WLS, Chicago, Ill. (Central, Daylight Saving, 345). 1:00-2:00 p. m., "Growing Corn," Sam Jordan; "The Future of Dairy Industry," John Cunningham; 3:45-4:45, "The Value of Home Owning," Barbara Van Heulen; "A Visit to a Textile Laboratory," Elizabeth S. Weirick; 6:30-8:00, Frank Westphal Orchestra.

WLW, Cincinnati, O. (Central, Daylight Saving, 309). 10:00 p. m., Concert, Dorothy Stevenson, Dora Kidwell, Christ Gottschalk, Roy Rutller, soloists; Master Freddie Morgan; slide-whistle; 11:00, Kidwell's Orchestra; 12:00, Special midnight concert, Chubb-Steinberg Orchestra.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 447.5). 4:00 p. m., Boys' Week program; 4:20, Items of interest to women; 4:30, Pupils, Glenn Dillard Gunn School of Music; 5:00, Weekly Child Life Stories for Children; 6:00, Chicago Theater organ; 6:30, Hotel La Salle Orchestra; 8:00, Talk, Harry Hansen; 8:20, French lesson; 8:40, Boys' Week program; 8:55, Lecture from University of Chicago, Dr. Fred Conrad Koch; 9:15, Lyon & Healy program.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, South Side High School students; 11:00, Midnight frolic, Pappalardo's Society Orchestra.

WOAW, Omaha, Neb. (Central, 526), 6:00 p. m., Program arranged by H. Kononovitch; 6:30-7:30 p. m., Dinner program by Ken Baker's Omahans; 9:00-11:00, Program, Hotel Fontenelle Concert Trio.

WOC, Davenport, Ia. (Central, 484), 12:00 m., Chimes; 3:30, "Valvular Defects of the Heart," A. G. Hinrichs; 5:45, Chimes.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509). 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

WOQ, Kansas City, Mo. (Central, 360), 8:00-9:30 p. m., Program of classical music, Samuel Adair, director.

WOR, Newark, N. J. (Eastern, Daylight Saving, 405), 2:30-2:45 p. m., Jack Dalaney; 2:45-3:00, Harry J. Caffrey, tenor; 3:30-3:45, Harry J. Caffrey; 3:45-4:00, Solos by Elizabeth Leahy, whistler; 6:15-6:30, "Music While You Dine," Halsey Miller and his orchestra; 6:30-7:00, Man in the Moon Stories; 7:00-7:30, Music While You Dine.

WRC, Washington, D. C. (Eastern, 469). 6:00 p. m., Stories and songs, Peggy Albion, Marguerite Meakin; 8:00, Songs, Marie Koontz, contralto; 8:15, Charles T. Ferry, pianist; 8:30, Concert, University of Maryland Glee Club and Dance Orchestra; 9:15, Trio from Irving Boernstein's Wardman Park Hotel Orchestra; 9:40, J. E. S. Kinsella, baritone.

WSB, Atlanta, Ga. (Central, 429), 8:00-9:00 p. m., Atlanta Music Club Women's Chorus; 9:30, Ringside, Young Stribling vs. Dan Oswod, prize fight.

WTAS, Elgin, Ill. (Central, 286), 7:30-12:00 midnight, Lee Sims, organist; Jules Berbuveaux's orchestra; Songs, Will Rossiter; Popular WTAS artists, Joseph Mertz, Bert Davis, Eddie and Fanny Cavanaugh, Betty Holmes; Eddie Fitch, organist.

Wednesday, May 21

CFCN, Calgary, Can. (Mountain, 440), 9:00 p. m., Mrs. Milton Davies, soprano; W. G. Newton, bass; J. L. Leask, violinist; Georgie Dey, contralto; Anna Fraser, reader; E. Glassford, soprano; J. L. Leask, violinist; D. Farrie, baritone; Mrs. Milton Davies, soprano.

CKCH, Montreal, Can. (Eastern, 435), 8:00 p. m., Concert, Regimental Band of the Governor General's Foot Guards; Songs, William Nixon; "The Canadian National Railways and the Y. M. C. A.," J. M. Dudley; Popular dance selections, Chateau Laurier Orchestra.

CKY, Winnipeg, Can. (Central, 405), 1:00 p. m., "Seasonal Insects of Economic Importance," Prof. A. V. Mitchener.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., Concert, Daugherty's orchestra; 5:30 p. m., Pittsburgh Athletic Association Orchestra; 6:30, Children's period; 7:00, Program, United Synagogue of America; 7:30, Address, John Duss, celebrating the 100th anniversary of the Harmony Society; 8:00, Concert, Black Cat Orchestra.

KFAE, Pullman, Wash. (Pacific, 330), 8:30-9:30 p. m., "Forage Crops," Prof. O. E. Burbee; Margaret Rawson, pianist; "Phipps," one-act play, students of Mrs. D. C. Miller; "Individuality in Dress," Helen K. Robson; "Weeds on the Farm," Prof. Leonard Hegnauer; Muriel Holloway, soprano.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Nick Harris' Detective Stories and concert; 8:00-9:00, Evening Herald concert; 9:00-10:00, Examiner concert; 10:00-11:00, Hollywoodland Community Orchestra; 11:00-12:00, Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KFKX, Hastings, Neb. (Central, 341), Rebroadcasts program of KDKA.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., Stunt night by the "Garage Bunch" of Shenandoah, Harley Bartles, director.

KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m., Program, Franklin-Wicks Company: Air Cooled Quartet, R. H. Vivian, Frank M. Moulton, William H. Butt, David Brown; Carl Reiter, reader; "The Future Automobile," W. A. Wicks; Syd Jones, piano wizard; Mrs. Romeyn Jansen, contralto; Katherine Robinson, accompanist.

KGO, Oakland, Calif. (Pacific, 312), 3:00 p. m., "What Is the Social Instinct," Louis L. de Jean; 4:00-5:30, Concert orchestra, Hotel St. Francis, Fermin Cardona, leader.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Darby's Orchestra; 3:30, Children's program; 8:00, Concert, B. P. O. E. Band, Lodge No. 142; 9:00, Business talk, James Albert, Alexander Hamilton Institute; 10:00, Dance music, George Olsen's Metropolitan Orchestra; Rosarian Quartet.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Altheda Oliver, soprano; Irene Hays, pianist; Garden talk, Fred C. NcNabb; 2:30-3:30, Matinee musicale; 6:00-6:30, Art Hickman's Concert Orchestra; 6:30-7:00, Music Memory contest, Fitzgerald Music Company; 7:00-7:30, Children's program, stories of American history, Prof. Walter Sylvester Hertzog; the Payne children; Bedtime story, Uncle John; 8:00-10:00, Pomona College Studebaker Radio Orchestra; Dr. Mars Baumgardt, lecturer; 10:00-11:00, Art Hickman's Dance Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Jack Fait's Entella Cafe Orchestra; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour stories, Big Brother of KPO; 7:00-7:30, Rudy Seiger's Fairmont Hotel Orchestra; 8:00-11:00, E. Max Bradfield's Versatile Band; Whistlers, Blanch Adella Hawkins, director.

KQV, Pittsburgh, Pa. (Eastern, Daylight Saving, 270), 5:00-5:30 p. m., "Twilight tale," and "Diary of Snubs, Our Dog," for the kiddies; 9:00-10:00, Program, studio of Frances Thomas Edwards; Egon Pesson, tenor; Esther Evans, soprano; August Fischer, accompanist.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Program, Advanced Music Dept. of St. Louis Public Schools, orchestra of 500.

KYW, Chicago, Ill. (Central, Daylight Saving, 536), 10:35 a. m., Table talk, Mrs. Anna J. Peterson; 5:45 p. m., Children's bedtime story; 6:00-6:30, Dinner concert, Joska DeBabary's Orchestra; Paul Whiteman's "Collegians"; 7:00-7:58, Margaret Martin, soprano; C. A. Johnson, tenor; Rev. A. Pliskin, baritone; Sallie Menkes, accompanist; O. H. Davis, reader; Jasha Schamdlin, accompanist; Dick Lloyd, the Singing Electrician; 8:15, "Good Roads," Chicago Motor Club; 9:00-1:30 a. m., Midnight revue.

PWX, Havana, Cuba (Eastern, 400), 8:30 p. m., Concert, General Staff Band of the Cuban Navy, Lieut. Juan Iglesias.

WAAM, Newark, N. J. (Eastern, Daylight Saving, 255), 7:00-7:15 p. m., "Star Spangled Banner," Ben Jacobs, tenor of the N. Y. Police Dept. Glee Club; 7:15-7:30, Harry Hoch Cameo Record Review; 7:30-7:45, "My Opinion of Current Books"; 7:45-8:00, Harry Hoch; 8:00-8:15, L. Wolfe Gilbert, song writer; 8:15-8:30, Richard Douglas, baritone; 8:30-8:45, Gotham's K.I.K. Entertainers; 8:45-9:15, Edward A. Sussman and His Original Memphis Syncopators; 9:15-9:30, Harry Wallace Lund; 9:30-9:45, Phil Moore & Blanche Vincent, singing; 9:45-10:00, Herbert Spencer, Judith Roth, Al Wilson and Oscar Taylor, song review; 10:00-10:15, Frederick and Viola C. Henze, singing; 10:15-11:00, Walter Brown's Singing Entertainers; 11:00-11::15, Geo. Roberts and Jimmy Doyle singing.

WBAP, Fort Worth, Texas, (Central, 476), 7:30-8:30 p. m., Concert, Sam S. Losh, baritone and pianist, and assisting artists; 9:30-10:45, Concert, Dick Gaines Orchestra.

WBAV, Columbus, O. (Eastern, 390), 12:00 m., Piano music, Ila Lorbach Owens.

WBZ, Springfield, Mass. (Eastern, Daylight Saving, 337), 6:00 p. m., Dinner concert, WBZ String Orchestra; Alice A. Mikus, harpist; 7:30, Bedtime story for the kiddies; 7:40, Chamber music, WBZ String Orchestra; Alice A. Mikus, harpist; Robert T. Canning, tenor; 8:30, Concert, Perry's "Ye Old New England Choir," Frances Perry, soprano; Gertrude Greeley, contralto; Everett Cutler, tenor; Frederic Perry, baritone; 11:00, Summary of Day's Events at the General Conference of the Methodist Episcopal Church; 11:30, Weekly Midnight Boston Dance Concert, Leo Reisman and his orchestra; Songs, Bill Coty, Jack Armstrong; Don Ramsey, pianist.

WCAE, Pittsburgh, Pa. (Eastern, Daylight Saving, 462), 3:00 p. m., Fred Rosenfeld, pianist; 4:30, Uncle Kaybee; 6:30, Dinner concert, William Penn Hotel; 7:30, The Sunshine Girl; 7:45, Vocal selections, Joe Jacobson, character singer; 8:30, Yankee Harmonizers, J. J. Kraus, manager.

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

WCAP, Washington, D. C. (Eastern, 469), 7:30-9:15 p. m., Program, incidental to the Convention of the National Elec. Light Association; 9:15-10:00, A "Bob" Lawrence Community Concert.

WCX, Detroit, Mich. (Eastern, 517), Oriole Terrace Orchestra; 6:00, Dinner concert; 7:00, Musical program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Geary's Missourian Orchestra; 6:00-7:00, School of the Air, piano tuning-in number, Duo-Art; address, weekly health talk given under the auspices of the Health Conservation Association; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Classical program arranged and presented, Miss De Lores Dobyns; 11:45 p. m.-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone String Quintette; John Stamford, R. V. Thomas, Barton Organ, Ralph Emerson, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 4:30, Piano recital, Edna Finestone; 7:30, Dream Daddy's bedtime stories; 8:00, Arcadia Cafe Concert Orchestra; 8:30, "Care of Children," Mrs. Louis Love; 10:00, Howard Lanin's Arcadia Cafe Dance Orchestra.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 11:00 a. m., Young Mothers' Program; 11:15, N. Y. Tuberculosis Society; 11:30, Gertrude Casriel, pianist; 4:00 p. m., Beatrice Godwin, soprano; 4:30, Nathan Gluck Orchestra; 6:00-7:00, Music from Waldorf Hotel; 7:00, Synagogue Services; 7:30, Thornton Fisher; 7:50, American Agriculturist; 8:00, Columbia University; 8:20, Mary Cantor and Sarah Alter, piano duets; 8:30, Meeting of National Electric Light Association from Atlantic City.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University Faculty; 4:00 p. m., Agricultural lecture, faculty member; music, university artists.

WFAA, Dallas, Texas. (Central, 476), 12:30-1:00 p. m., Musical recital, The Red-Head Girl.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, "Baby Welfare Association" Talk; 6:00, Sunny Jim, the Kiddies' Pal; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00, Songs by Billy James and Jack Harris.

WGN, Chicago, Ill. (Central, 370), 7:00-10:00 p. m., Bessie Kuhlman, pianist; Emma Starman, contralto; Louis Perlman, violinist; George Lavemore, baritone; Dance music, Oriole Orchestra; 12:00 midnight, program for Dr. Donald B. MacMillan.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, The Radio Dealers' Musical Program; 6:30-7:30, Vincent Lopez Hotel Statler Orchestra; 9:00-11:00, Concert, Imlay, Cushman & Co., of Niagara Falls, direction of Robert Imlay; 11:30, Supper-dance music, Vincent Lopez Hotel Statler Orchestra.

WGY, Schenectady, N. Y. (Eastern, 380), 5:30 p. m., "Adventure Story," Youth's Companion.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., "The French in Wisconsin," Louise P. Kellogg.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Alamo Theater Orchestra; Walnut Theater Orchestra; 7:30-9:00, Agricultural Tabloid talk; Concert, auspices Bernice Lake.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour program, Sweeney Radio Orchestra; arranged by George Parrish; 7:00-8:00, Program of popular dance music, Sweeney Radio Orchestra.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 2:15-2:30 p. m., Ben Jacobs, tenor; 2:30-2:45, L. B. Curtis, tenor; 2:45-3:00, Fred Whitehouse Revue; 3:15-3:30, Jack Lauria in songs; 3:45-4:30, Tom Reilly's Kings of Syncopation; 5:15-5:30, Ross Fowler, baritone; 7:30-7:35, Avy La Skere, singing; 7:35-7:45, Mal Hallett's Roseland Orchestra; 8:00-8:30, Operatic program by artists of Prof. Geo. Vignetl; 8:30-8:45, Program by Union of Orthodox Jewish Cong. of America; 8:45-9:00, Victor Wilbur, baritone; 9:00-9:30, Dan Gregory's Dancing Carnival Orchestra; 9:30-10:00, M. Whitmark Black & White Program; 10:00-10:30, Fletcher Henderson's Alabam Club Orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Gimbel Brothers' Tea Room Orchestra; 3:00, Artist recital, Hilda Reiter, coloratura soprano; Laura T. Bast, contralto, Raymond Vetter, violinist; Emilie Loeben, pianist; 6:05, St. James Hotel Dinner Dance Orchestra; 7:00, Uncle Wip's bedtime stories.

WJZ, New York, N. Y. (Eastern, Daylight Saving, 455), 1:00 p. m., Schrafft's Tea Room Orchestra; 3:00, Brooklyn String Quartet; 3:15, Cathleene Strickland, soprano; 3:30, Brooklyn String Quartet; 3:45, "What to Plant"; 4:00, Fashion talk, Eleanor Gunn; 4:30, Hotel Commodore Tea Music; 7:00, Story for boys and girls, Florence S. Vincent; 7:30, Selzer's Cafe Boulevard Orchestra; 7:45, "Aims and Objects of English Speaking," John Daniel; 8:00, Selzer's Cafe Boulevard Orchestra; 8:35, City Official Series talk, Hon. Edward T. O'Laughlin; 8:50, Marion F. Ledos, soprano; 9:05, "Reminiscences of a Reporter," William H. Crawford; 9:25, "An Evening at Log Tavern"; 10:00, "Bace"; 10:30, Emil Coleman's Trocadero Orchestra.

WKAQ, San Juan, P. R. (Central, 360), 6:00-8:00 p. m., Famous Municipal Band of San Juan.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 2:10-2:30 p. m., "The Woman Beautiful," Maude Hart; "Self-Government in Public Schools," Ella M. Probst; 2:40-4:00 p. m., Agnes Thompson, reader; J. F. Vrenger, tenor; Bernice Darling, cornetist, pianist; Gerald Osborn, cornetist and pianist; 4:00-4:30, Magazine reading; 5:30-6:00, Children's stories, Alpha Stalson; 6:00-6:30, "Athletics at Macalester College," R. W. Phacker; 7:30-8:15, "Genetics and Eugenics," H. E. Brewbak, farm lecturer; 10:45, Dance concert, Sam J. Heiman's Casino Orchestra.

WLW, Cincinnati, O. (Central, Daylight Saving, 309), 4:00 p. m., Wurlitzer concert for shut-ins; 8:00, Instrumental trio, Mary May Jones, violinist, Mary Kathryn Cates, cellist, Mildred Schalk, pianist; Vocal duet, Carrie Schaefer, Russell Simmons; Piano solo, Dorothy O'Brien; 9:00, Pumpkin Vine Orchestra.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 447.5), 1:00 p. m., Speeches, Chicago Association of Commerce luncheon; 2:35, Lyon & Healy program; 4:20, Items of interest to women; 4:30, Pupils, Cosmopolitan School of Music; 5:00, Boys' week program; 6:00, Chicago theater organ; 6:30, Georgene Faulkner, story lady; 7:30, Weekly program, Northwestern University, Candle-lighting ceremony, 8:30, Program, Hyde Park Post, American Legion.

WOC, Davenport, Iowa. (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Extracts from Webster's Reply to Hayne," C. A. Russell; 6:30, Sandman's visit; 7:44, "Building an Automobile for the Public," H. C. Snow; 8:00, Musical program, Troy Laundry Machinery Co. Band.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt; 7:30, Havana Casino Orchestra, from Hotel Sylvania, Vincent Rizzo, director; 9:00, WOO Orchestra, Robert E. Golden, director; 10:00, Walter Miller and his Ritz Carlton Orchestra.

WOQ, Kansas City, Mo. (Central, 360), 7:30-8:00 p. m., Musical and feature program, Liberty Theatre stage; Liberty Theatre Orchestra.

WOR, Newark, N. J. (Eastern, Daylight Saving, 405), 2:30-2:45 p. m., Talk on Gardening by Mr. Rockwell, courtesy of Charm Magazine; 2:45-3:05, Orchestra of S. S. Leviathan; 3:05-3:20, Advertising Lady; 3:20-3:40, Orchestra of S. S. Leviathan; 3:40-3:45, Ethel Hargreaves, sopr.; 6:15-7:00, "Music While You Dine," Bandistel's Olympic Park Orchestra; 8:00-8:15, Dr. Thayer, "Is Our Criminal Lawyer a Failure?"; 8:15-8:30, Marie Rothman, lyric sopr.; 9:15-9:30, Marie Rothman; 9:30-9:45, Talk by Wales on "Norway"; 10:00-11:00, Jaines Caruso and His Concert Ensemble.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m., "Raising Ton Litters of Pork," J. W. Burch; 8:20, Program, old time fiddling tunes.

WRC, Washington, D. C. (Eastern, 469), 3:00 p. m., Fashion Developments of the Moment, Women's Wear; 3:10, Songs; 3:45, Eleanor Glynn, pianist; 3:50, Current topics, Editor of The Outlook; 4:00, Songs; 6:00, Stories for children, Peggy Albion; 6:15, Talk, auspices of the Smithsonian Institute.

WSB, Atlanta, Ga. (Central, 429), 10:45 p. m., City Hall Democrats entertainment.

WTAM, Cleveland, Ohio. (Eastern, 390), 8:00 p. m., Cleveland Plain Dealer program; 9:00 p. m., Children's Night at WTAM; Selections, Edwards' Jolly Five Juvenile Orchestra; North East Y. M. C. A. Boys' Minstrel Troupe; Reading, Dorothy Smith; Xylophone solo, Alice Flayharen; Mouth-harp solos, Carl Knoch, Fred Perfors; Choral numbers, Y. M. C. A. Boys' Chorus of 30, W. G. Schneider, director; Violin solos, Ed. Schneider, Mildred Kelly, accompanist; Boy soprano, Lynn McLean, 12 years old; Boy baritone, Joseph Kuhn, 15 years old; Mary Tucker,

DANCING

WHERE and when to dial to dance:

Tuesday: CKAC, KDKA, KFI, KHJ, KPO, KYW, WDAP, WEAF, WFI, WGN, WHN, WIP, WJZ, WLW, WMAQ, WOR, WTAS, WWJ.

Wednesday: CKAC, KDKA, KFI, KGW, KHJ, KPO, KSD, KYW, WBAP, WDAP, WDAR, WEAF, WFI, WGN, WHN, WIP, WJZ, WMAQ, WOO, WOR, WOS, WTAS, WWJ.

Thursday: CKAC, KDKA, KFI, KGW, KHJ, KPO, KYW, WDAP, WEAF, WFI, WGN, WHN, WIP, WJZ, WMAQ, WOC, WTAS, WWJ.

Friday: CKAC, KFI, KHJ, KPO, KYW, WDAP, WDAR, WGN, WEAF, WFI, WHK, WHN, WJZ, WMAQ, WOO, WTAS, WWJ.

Saturday: CKAC, KFI, KHJ, KPO, KGW, KYW, WDAP, WFAA, WFI, WGN, WGY, WHN, WIP, WJZ, WLAG, WLS, WOC, WOR, WTAM, WTAS, WWJ.

Monday: CKAC, KPO, KQV, WDAR, WEAF, WFI, WHAZ, WOO, WOS, WTAS.

Tuesday: CKAC, KYW, WDAR, WFI, WIP, WTAS.

ᴧW; ONE-MAN BAND ARTIST AT WOS

Sandy Meek, baritone, who has appeared a number of times at all of the Chicago stations, will be heard from Station WDAP, The Drake Hotel, on Saturday evening, May 24.

Bernice Bell who broadcasts the household hints every morning at 10:45 a. m. from Station WLAG, Twin City Radio Central located at Minneapolis and St. Paul.

Where to Hear Talks

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

Tuesday: CKY, KDKA, KFAF, KFSG, KGW, KYW, WAAM, WCAE, WDAF, WDAR, WEAF, WFAA, WGI, WGY, WHAS, WIP, WJY, WJZ, WLAG, WLS, WMAQ, WOC, WOR, WRC, WSB.

Wednesday: KDKA, KFAE, KFKB, KFOA, KFSG, KGO, KGW, KHJ, KPO, KYW, WAAM, WBAH, WBZ, WCX, WDAF, WDAR, WEAF, WEAO, WGI, WHA, WHAS, WJZ, WLAG, WMAQ, WOC, WOR, WOS, WRC.

Thursday: KDKA, KFSG, KYW, WAAW, WAAM, WAAW, WBZ, WCAE, WDAF, WDAR, WEAF, WEAO, WFAA, WGY, WHAA, WHAS, WHB, WIP, WJAX, WJY, WJZ, WLAG, WLS, WLW, WMAQ, WOC, WOR, WRC.

Friday: CKY, KDKA, KFAE, KFOA, KFSG, KGW, KHJ, KLZ, KYW, WAAW, WBZ, WCAP, WDAF, WEAF, WEAO, WFAA, WGI, WGY, WHA, WHB, WJY, WJZ, WLAG, WLS, WLW, WMAQ, WOC, WOR, WOS.

Saturday: KDKA, KYW, WBAH, WBAP, WDAF, WFAA, WFI, WGI, WHAA, WIP, WLAG, WMC, WOAW, WOC, WRC.

Monday: CKY, KDKA, KFAE, WAAM, WBZ, WDAR, WEAF, WEAO, WFAA, WRG, WGY, WHAZ, WLAG, WOC.

Tuesday: KFSG, KGO, KGW, KYW, WDAF, WDAR, WEAO, WGY, WHAA, WHB, WIP.

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accompanist; Cornet solo, Willie Kell, Mildred Kelly, accompanist; Vocal duet, Gerald Forstner, baritone, Tom Lidyard, soprano; Soprano solo, Jack Clemens, 14 years old, Loretta Clemens, accompanist; Mouth-harp duet, Carl Knoch, Fred Perfors; Trombone solo, Gertrude Kneebusch, Mildred Kelly, accompanist; Baritone solo, Gerald Forstner.

WTAS, Elgin, Ill. (Central, 286), 7:30-7:45 p. m., "Olivia," only child broadcaster in the world telling bedtime stories to children; 7:45, Lee Sims, pianist; 8:00-12:00 midnight, Jules Herbuveaux's Orchestra; Songs, Will Rossiter; Joseph Mertz and other WTAS artists.

WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton; 12:00 noon, Goldkette's Orchestra; 3:00 p. m., Detroit News Orchestra; 8:30, Detroit News Orchestra; Mrs. May D. McCoy, soprano; Mrs. Thelma Weiderman, soprano.

Thursday, May 22

CKAC, Montreal, Can. (Eastern, 425), 8:30 p. m., Canadian National Railway Entertainers; Windsor Trio; Margaret L. Moody, soprano; H. Harry Salter, violinist; Salvatore Cibelli, baritone; Address, C. Price Green.

CKY, Winnipeg, Can. (Central, 450), 8:00 p. m., Canadian National Railway's program.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., Howard R. Webb, organist; 5:30 p. m., Dinner concert, KDKA Little Symphony Orchestra; 6:30, Children's period; 6:45, "The Back Yard a Part of the Home," Radio Garden editor; 7:15, Farm program, National Stockman and Farmer; 8:00, Concert, KDKA Little Symphony Orchestra; Mrs. T. C. Donavan, soprano; Amelia Donavan, contralto; 10:30, One-act play, Norman H. Porter, director.

KFAF, Denver, Colo. (Mountain, 360), 7:30-8:15 p. m., Classical music.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Y. M. C. A. concert and lecture; 8:00-9:00, Ambassador Hotel concert; 9:00-10:00, Examiner concert; 10:00-11:00, Electa Ferry and Georgia Star in concert.

KFKX, Hastings, Neb. (Central, 341), 9:30 p. m., Camp and Barrack Life, Hastings Post of the American Legion.

KFNF, Shenandoah, Ia. Central, 260), 7:30 p. m., Program of old fashioned music, Henry Field Seed Company employes.

KGO, Oakland, Calif. (Pacific, 312), 4:00-5:30 p. m., Concert Orchestra of the Hotel St. Francis; 8:00, Program, Tracy High School; Tracy High School Orchestra; "Education of the Future," H. O. Williams; Xylophone trio, Lawrence Moore, Celestyne Richards, Louverne Richards; Eleanore Moore, pianist; Robert Chrisman, violinist; Helen Rittenhause, flutist; Georgia Pressey, cellist; Edna Linkowski, pianist; Laura Brederick, soprano; James E. Ziegler, baritone.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Concert, Seiberling Lucas Music Co.; 3:30, Woman's story program, installment of "The Midlander"; 8:15, Studio program, dance music, George Olsen's Metropolitan Orchestra; 10:00, Dance music, George Olsen's Metropolitan Orchestra; Mrs. C. L. Neilson, soprano.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Elizabeth Monson Biehl, contralto; Oakmont Country Club Orchestra; 2:30-3:30, Matinee musicale; 6:00-6:30, Art Hickman's Concert Orchestra; 6:30-7:00, Music memory contest, Fitzgerald Music Company; 7:00-7:30, Children's program, stories of American history, Prof. Walter Sylvester Hertzog; weekly visit, Dickie Brandon; Norman Emert, 12 years old; Betty McDougal, 13 years old, readers; Charles Tousing, 13 years old, violinist; Bedtime story, Uncle John; 8:00-9:00, Program, Fitzgerald Music Company; 9:00-10:00, Program, Jose Arias and his orchestra; 10:00-11:00, Art Hickman's Dance Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Theodore J. Irwin, organist; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra; 5:30-6:30, Children's hour stories by Big Brother; 8:00-9:00, Program, Ruth Sterner, director; 9:00-10:00, Neyda Houx, soprano; Anna K. Blecty, contralto; Jule Routbert, pianist; J. O. Greenwell, tenor; Theodore J. Irwin, accompanist; 10:00-11:00, E. Max Bradfield's Versatile Band.

KQV, Pittsburgh, Pa. (Eastern, Daylight Saving, 270), 5:00-5:30 p. m., "Twilight Tale," and "Diary of Snubs, Our Dog."

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Operatic program, G. Mario Lanza, tenor; Helen Stephens-Phillips, soprano; Arthur Koch, pianist; Chorus of 30 voices.

KYW, Chicago, Ill. (Central, Daylight Saving, 536), 10:35 a. m., Table talk, Mrs. Anna J. Peterson; 5:45 p. m., Children's bedtime story; 6:00-6:30, Dinner concert, Joska DeBabary's Orchestra; Paul Whiteman's "Collegians"; 7:00-7:20, "Twenty Minutes of Good Reading," Rev. C. J. Pernin; 7:20-7:30, Songs, Miss Meyers; 8:30, Speeches, Credit Men's Association.

WAAM, Newark, N. J. (Eastern, Daylight Saving, 253), 7:00-7:30 p. m., "Star Spangled Banner," Orchestra of Dixon High School of Jersey City; 7:30-7:45, "Etiquette of the Dining Table," Capt. Geo. E. Fahys of the Alvin Silver Co.; 7:45-8:00, Puritan Trio; 8:00-8:15, Rose Ann, sopr.; 8:15-8:30, Alice B. Evans of the Natl. Committee for Better Films; 8:30-8:45, Lillian Spitzer, pianist; 8:45-9:00, Sam Taub, boxing critic; 9:00-9:15, Ruby O. Heritage, sopr.; 9:15-9:30, Rev. Dr. Arthur W. Brooks, scientific astrologist; 9:30-9:45, E. M. Shoemaker, radio doctor; 9:45-10:00, Antler Male Quartet; 10:00-10:30, Chas. M. Sanders Sterling Dance Orch.; 10:30-10:45, Sterling Saxophone Sextet; 10:45-11:00, Sterling Dance Orch.; 11:00-11:15, Talk by Lyon Mearson of "Metropolitan Magazine."

WAAW, Omaha. (Central, 360), 8:00, Educational program: Talk, R. A. Smith, Union Pacific System; Sunday School lesson, Rev. Edgar Merrill Brown; "Narcotics," Rev. Mr. Brown.

WBAP, Fort Worth Texas. (Central, 476), 7:30-8:30 p. m., Concert, Artists of the Business and Professional Women's Club; 9:30-10:45, Concert of Spanish and Hawaiian music by artists of Thorp Spring, Texas, Christian College.

WBAV, Columbus, O. (Eastern, 390), 12:00 m., Religious service, Columbus Council of Churches, Rev. Harold Cooper, pastor Mayflower Congregational Church, speaker; Sacred music.

WBZ, Springfield, Mass. (Eastern, Daylight Saving, 337), 6:00 p. m., Dinner concert, Leo Reisman ensemble; 6:30, Dinner dance music, Leo Reisman and his orchestra; 7:30, Bedtime story for the Kiddies; 7:40, Musical program, Charles S. Hector with his St. James Theater Orchestra; 8:20, Program, General Conference, Methodist Episcopal Church; 9:30, Harmonic Male Quartet, Daniel Herlihy, 1st tenor; Victor Wrenn, 2nd tenor; Joseph T. Lopez, baritone; Genero d'Allessandro, bass; William Lapp, accompanist; 11:00, Summary of Day's Events, General Conference of the Methodist Episcopal Church.

WCAE, Pittsburgh, Pa. (Eastern, Daylight Saving, 462), 4:30 p. m., The Sunshine Girl; 6:30, Dinner concert, William Penn Hotel; 7:30, Uncle Kaybee; 7:45, Ben Field's WCAE's own entertainer; 8:30, W. E. Stevenson, tenor; Eugene Garmony, violinist; Margaret Fisher, pianist; Katherine Boggs, soprano; Raymond Grimm, accompanist; 11:00, Late concert, Boyd's Cameo Six Orchestra.

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf College Chapel services; 9:00 p. m., Esther Erickson, soprano; Alma Olson, contralto; Marie Steen, pianist.

WCBD, Zion, Ill. (Central, Daylight Saving, 345), 8:00 p. m., Zion band; Quartet, Mrs. Mayfield, Florence Farrar, Sparrow, Bishop; Dorothy Bull, soprano.

WCX, Detroit, Mich. (Eastern, 517), 2:20 p. m., Sunday school lesson, Rev. Gaius Glenn Atkins, D. D.; 6:00, Dinner concert; 7:00, Musical program.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., D. Ambert Haley's Dance and Concert Orchestra; 6:00-7:00, School of the Air, piano tuning-in number, Duo-Art; address, speaker from the William Jewell College, Liberty, Mo.; reading, Miss Cecile Burton from the works of local and Missouri authors; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon Ensemble; 11:45 p. m.-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:00 p. m., Drake Concert Ensemble and Blackstone String Quintette; 8:00-8:30, Barton Organ, Ralph Emerson; 10:00, Northwestern Music School, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 2:30, "The Market Basket," Mrs. Anna B. Scott; 5:30, Answer Corner by Pierce School Faculty; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 11:10 a. m., Mrs. F. A. Harris on Maltomilk; 11:30, Talk on Blue Ribbon Mayonnaise; 11:40, Michael Lamberti, cellist; 3:30 p. m., Maude Alyse Herring, soprano; 4:00, Blue Bird Dance Orchestra; 5:00, Children's Hour Program; 6:00-7:00, Music from Waldorf Astoria Hotel; 7:00, N. Y. Fed. of Churches; 7:30, Thornton Fisher; 7:40, Eleanor Gray, pianist; 8:00, Harold Hansen, tenor;; 8:20, Bank of America; 8:30, Hunter College Musical Program; 9:30, Gladys Durham, soprano; 9:55, Leslie Arnold, baritone; 10:20, Adelaide DeLoca, contralto; 11:00, Vincent Lopez Orchestra.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University faculty; 8:00 p. m., Concert, Delta Kappa Theta fraternity artists, including orchestra and vocal, saxophone, piano and violin solos.

WFAA, Dallas, Texas. (Central, 476), 12:30-1:00 p. m., Address, "The Church as It Was and as It Is," Epps G. Knight; 8:30-9:30, Recital, W. H. Dawson and assisting singers and players from Rockwall, Texas; 11:00-12:00, Mustang Serenaders.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, "Eighteenth Century Decorations in America," by J. Frank Copeland; 6:00, Sunny Jim, the Kiddies' Pal; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra; 8:50, Talk, W. Carson Ryan.

WGN, Chicago, Ill. (Central, 370), 7:00-10:00 p. m., Marion Raymond, pianist; Prudence Neff, pianist; Emelinda Sievers, contralto; Florence Stevenson, soprano; Dance music, Oriole Orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, The Radio Dealers' Musical Program; 6:30-7:30, Dinner music.

WGY, Schenectady, N. Y. (Eastern, 380), 11:00 a. m., Comedy, Prince Pat McCoy; 5:30 p. m., Dinner music, Instrumental trio, Hotel Ten Eyck; 7:45, "A Few Minutes with New Books," L. L. Hopkins; 8:00, "The Mikado" or "The Town of Titipu," WGY Light Opera Company; WGY Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra, Walter Davison, director; Alamo Theater Orchestra; 7:30-9:00, Concert, auspices Carolyn Pell; Four minute Radio Forum Boy Scout talk; Reading, Mrs. Corida Greer Petrie.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour Program, direction of George Parrish; 7:00-7:30, George Parrish, pianist, Floyd Estep, saxophonist; "Most Striking Features of the Moon," Dr. E. G. Davis, president of the K. C. Astronomical Society; 8:00-10:00, Violin choir, direction of William A. Toplicker; Special "request" program; Sweeney Radio Orchestra, George Parrish, director.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 2:15-2:30 p. m., Jack Morisse and Lucille Dumont in songs; 3:30-4:15, Leo Feist Program; 9:30-9:35, Judith Roth, songs; 9:40-9:45, Oscar Taylor, songs; 9:45-10:00, Wigwam Club Orch.; 10:00-11:00, Program by All Nations' Assn.; 11:00-11:30, Fletcher Henderson's Alabam Club Orch.; 11:30-11:45, Flo Williams, sopr.; 11:45-12:00, Ross Fowler, baritone.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Gimbel Brothers' Tea Room Orchestra; 3:00, Artist recital, Mrs. Ross Mills-Welsh, soprano, Ruth Rile, contralto, Florence Novor, pianist, Emilie Loeben, accompanist; 6:05, Harold Leonard and his Redjackets from Club Madrid; 7:00, Uncle Wip's bedtime stories; 8:00, "Timely Tips for Motorists," Eugene Gogle, Secretary Automobile Club of Philadelphia; 8:15, Pennsylvania Assembly No. III of Artisans, minstrel show, interlocutors: Perry T. McCluskey and Arthur M. Bowker. Songs: "Somebody Stole My Gal," George M. Gallagher; "June's the Time for Roses," Albert Ockenlander; "Waitin' for the Evenin' Mail," John T. Kennedy; "I'm Just A Little Blue," by quartet; "Sleep," Thomas G. Hunter; "Sunrise and You," Roland Erskine; "Linger Awhile," George W. Brown; "Gypsy Sue," George A. Ehrenzeller; "Not Here, Not There," Alfred E. Clymer; "The Big Bass Viol," George Taylor; "Does the Spearmint Lose Its Flavor," C. E. Roberts; 9:15, "Life in Hollywood," Lotta Woods, scenario writer for Douglas Fairbanks; 11:15, Ted Weems and his Victor Recording Orchestra.

WJAX, Cleveland, Ohio. (Eastern, 390), 8:00 p. m., Concert program, Hotel Cleveland Orchestra, Ivan Francisci, director; 9:00 p. m., Dance program, Hotel Hollenden Orchestra, Carl Rupp, director.

WJY, New York, N. Y. (Eastern, Daylight Saving, 405), 7:30 p. m., "Kipling"; 8:00, "Golf," Innis Brown; 8:15, West End Choral Club; Esther Wilson, soprano; Wilfred Glenn, baritone; 10:00, "King Edward As I Know Him," George L. Chesterton.

WJZ, New York, N. Y. (Eastern, Daylight Saving, 455), 12:45 p. m., Pennsylvania Hotel Luncheon music; 3:00, Afternoon concert, Wanamaker Auditorium; 4:00, Fashion talk, Eleanor Gunn, 4:25, "Eating to Keep Young," Winifred S. Gibbs; 4:35, Peeps at People, Edythe H. Browne; 4:45, Harper's Bazaar Fashion talk, Lucy Park; 5:00, Briggs Hubbell, baritone; 5:15, Emma Ahlers, soprano; 7:00, Jack Rabbit Stories, David Cory; 7:30, Specht's Lido Venice Orchestra; 8:30, Wanamaker Organ recital; 9:15, Debate: "Political Situation," American Whig Society vs. Cliosophic Society of Princeton University; 10:30, Hotel Majestic Dance Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 2:10-2:30 p. m., "Forty Wiggles," Tess J. Cooperman; 2:40-4:00, Bryant Junior High School Orchestra; 5:30-6:00, Children's hour, Antoinette Zwinggi; 6:15-7:00, Dinner hour concert, George Osborn's Golden Pheasant Orchestra; 7:30-8:15, Farm lectures.

WLS, Chicago, Ill. (Central, Daylight Saving, 345), 1:00-2:00 p. m., "Farmers' Organizations," Sam Jordan; "The Farmer and Pure-Bred Dairy Cattle," Frank Price; 3:45-4:45, "Making the Purchase of a Home Secure," Barbara Van Heulen; "Spice Box Stories," Ellen Rose Dickey; 6:30-7:00, Frank Westphal Orchestra; "Future Winners," Sam Jordan; "Boys' Night at Home with Dad and Radio," Judge K. M. Landis; 10:15-1:00 a. m., Herald-Examiner program.

WLW, Cincinnati, O. (Central, Daylight Saving, 309), 10:00 p. m., Times-Star World Radio Club; 10:10, Concert, Trirdyn Trio, Eleanor Walker Makay, vocalist, Frances Bejah, pianist, William C. Stoess, violinist; 11:00, Doherty's Orchestra, Mildred Brooks, soloist.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 447.5), 4:00 p. m., Lessons in household arts, Mrs. Elizabeth O. Hiller; 4:30, Illinois Federation of Women's clubs, Mrs. H. B. Marryott; 6:00, Chicago theater organ; 6:30, Hotel LaSalle Orchestra; 8:00, Talks, Rockwell R. Stephen, John D. Emrich; 8:45, Talk, Royal F. Munger; 9:00, Lecture, U. of Chicago, Samuel N. Harper; 9:15, Program, Rudolph E. Magnus.

WMO, Memphis, Tenn. (Central, 500), 8:30 p. m., Chisca Hotel Philharmonic Orchestra.

WOAW, Omaha, Nebr. (Central, 526), 6:00 p. m., Speakers' Half-hour; 6:30-7:30, Piano recital, pupils of Miss Eleanor Rentz; 9:00-11:00, Program, courtesy of Woman's Woodmen Circle Federation.

WOC, Davenport, Iowa. (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Pathological Structure of Tumors," Karl G. Stephan; 5:45, Chimes; 6:30, Sandman's visit; 9:00, The Palmer School Radio Orchestra; Ralph W. Fuller, baritone.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

WOQ, Kansas City, Mo. (Central, 360), 8:00-9:30 p. m., Popular music, Hanley Photo and Radio Shop; Paul Hickman's Orchestra; Comedians, Hallet and Fleming, popular local entertainers.

WOR, Newark, N. J. (Eastern, Daylight Saving, 405), 2:30-2:45 p. m., Wm. J. Brown; 2:50-3:05, Marie Langdon Andrews, sopr.; 3:05-3:15, Readings and Monologs by John Healy; 3:25-3:40, John Healy; 3:45-4:00, Marie Langdon Andrews; 6:15-6:30, Albert E. Sonn, Radio for the Layman; 6:30-7:25, "Music While You Dine," Tom Cooper's Country Club Orch.; 7:25-7:45, "Resume of the Day's Sports," Courtesy of Newark Morning Ledger.

WRC, Washington, D. C. (Eastern, 469), 6:00 p. m., Children's hour, Peggy Albion; 8:00, Piano recital; 8:15, Talk on Motoring, auspices American Automobile Association; 8:30, T. Edmund Boyer, tenor; 8:45, Dance program, Pete Macins' L'Aiglon Orchestra; 9:30, "The Political Situation in Washington Tonight," Frederick William Wile; 10:00, Concert, Mandolin, Guitar, Banjo music, Walter T. Holt studio.

WSB, Atlanta, Ga. (Central, 429), 8:00-9:00 p. m., John McCrindle, Scotch balladist; Walter L. Dun, pianist; 10:45, Dr. Charles A. Sheldon, organist.

WTAS, Elgin, Ill. (Central, 286), 7:30-7:45 p. m., Bedtime stories, "Olivia"; 7:45, Lee Sims, pianist; 8:00-12:00 midnight, Jules Herbuveaux's Orchestra; Songs, Will Rossiter; Joseph Mertz.

WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton; 3:00 p. m., Detroit New Orchestra; 8:30, Detroit News Orchestra; Fred Walters, baritone; Marjorie C. Lucas and Gladys Caldwell, piano and banjo; 10:00, Goldkette's Orchestra; 11:00, Detroit News Orchestra; Bud Peltier, baritone; Mrs. Emily Schierlinger, pianist.

Friday, May 23

CKAC, Montreal, Can. (Eastern, 425), 1:45 p. m., Rex Battle and his Mount Royal Hotel Concert Orchestra; 4:30, The dansant orchestra.

CKY, Winnipeg, Can. (Central, 405), 1:00 p. m., "Home Gardens," J. H. Almey.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., Broudy's Orchestra; 5:30, Paul Fleeger, organist; 6:15, "Jeremiah and the Babylonian Crisis," Dr. R. L. Lanning; 6:30, The Children's period; 8:00, Concert, Carnegie Tech Glee Club, Edward Riehl, director.

KFAE, Pullman, Wash. (Pacific, 330), 8:30-9:30 p. m., "Training for Agriculture," Dean E. C. Johnson; "What Sodatol Meant to Washington Farmers," R. M. Turner; Anita White, soprano; "New Books to Read," Alice L. Webb.

KFAF, Denver, Colo. (Mountain, 360), 8:00-9:00 p. m., Program, Darrow Music Company.

KFI, Los Angeles, Calif. (Pacific, 469), 8:00-9:00 p. m., Evening Herald concert; 9:00-10:00, Examiner concert; 10:00-11:00, Pupils, Myra Belle Vickers; 11:00-12:00, Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KFKX, Hastings, Neb. (Central, 341), Rebroadcasting program of KDKA.

KFNF, Shenandoah, Ia. (Central, 266), 3:00 p. m., Straham (Ia.) Orchestra; 7:30, Straham (Ia.) talent in musical program.

KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m., Program, Metropolitan Building Company; Fur talk, A. A. Bass.

KGO, Oakland, Calif. (Pacific, 312), 3:00 p. m., Original poems, Clara Dolliver Burtchaell; 4:00-5:30, Concert Orchestra, Hotel St. Francis.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Peck Holton's Orchestra; 3:30, Lecture, Jesse D. McComb; 8:00, Oratorical contest, auspices U. of O. division of Public Speaking; 10:30, Hoot Owls.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Program, Arthur Raymond Hill, tenor; Bill Hatch, pianist; 2:30-3:30, Matinee musicale; 6:00-6:30, Art Hickman's Concert Orchestra; 6:30-7:00, Music memory contest, Fitzgerald Music Company; 7:00-7:30, Children's program, Prof. Walter Sylvester Hertzog; Richard Headrick, screen juvenile; Bedtime story, Uncle John; 8:00-9:00, Program, Myra Belle Vicker; 9:00-10:00, Hatch Graham, singer and banjolist, Lylion W. Sarno, reader; 10:00-11:00, Art Hickman's Concert Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Theodore J. Irwin, organist; 4:30-5:30, Rudy Seiger's Fairmont Hotel Orchestra.

KQV, Pittsburgh, Pa. (Eastern, Daylight Saving, 270), 5:00-5:30 p. m., "Twilight tale" and "Diary of Snubs, Our Dog"; 9:00-10:00, Program, Music Box Sextette; Irene Jageman, soprano; Mary C. Soberry, reader; Joseph E. O'Brien, baritone.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Program, Advanced Music Dept. of the St. Louis Public Schools, orchestra of 500, chorus of 800 voices.

KYW, Chicago, Ill. (Central, Daylight Saving, 536), 10:35 a. m., Table talk, Mrs. Anna J. Peterson; 5:45 p. m., Children's bedtime story; 6:00-6:30, Dinner concert, Joska DeBabary's Orchestra, Paul Whiteman's "Collegians"; 7:20-7:45, Talks, auspices American Farm Bureau Federation; 9:00-1:30 a. m., Midnight revue.

WAAW, Omaha. (Central, 360), 8:05 p. m., Weekly bridge lesson, Mrs. Guy U. Purdy.

WBAP, Fort Worth, Texas. (Central, 476), 7:30-8:30 p. m., Concert, First Methodist Church Choir of Cleburne; 9:30-10:45, Concert, Dot Echols McCutchan's Orchestra.

WBAV, Columbus, O. (Eastern, 390), 12:00 m., Piano music, Ila Lorbach Owens; 8:00 p. m., Concert, Capital University talent; Overture, Orchestra; Violin solos, Fred Almendinger; Violin duet, Andrew Bradowa and Fred Billing; Violin quartet, Billing, Almendinger, Bradowa and Al Germanson; Vocal solos, Ellis Snyder and Ralph Ground; Cornet solo, Wilber Crist; Instrumental trio, Billing, Calvin Risch and Hans Knauer.

WBZ, Springfield, Mass. (Eastern, Daylight Saving, 337), 8:30 a. m., Morning Devotional Service, General Conference, Methodist Episcopal Church; 6:00 p. m., Dinner concert, WBZ Orchestra; 7:00, "Sand in the Gears," dramatized story, Youth's Companion; Current Book review, R. A. MacDonald; 7:30, Bedtime story for the Kiddies; 10:00, Harrison Crawford, baritone and reader; Helen Broderick, cellist; J. Albert Baumgartner, accompanist; 10:00, Summary of Day's Events, General Conference of the Methodist Episcopal Church; Chamber music, WBZ Orchestra.

WCAE, Pittsburgh, Pa. (Eastern, Daylight Saving, 462), 4:30 p. m., Special children's program, Sunshine Girl; 6:30, Dinner concert, William Penn Hotel; 7:30, Uncle Kaybee; 8:30, Musicale.

WCAP, Washington, D. C. (Eastern, 469), 7:00-7:20 p. m., Children's stories, Violet Warren Pierson; 7:20-

(Continued on page 18)

Friday, May 23

(Continued from page 17)

8:00, Music; 8:00-8:20, "Sparks from the Political Wheel," Frank R. Kent; 8:20-9:45, Cantata, "Creation," Mt. Vernon M. E. Church, South; 9:45-[illegible], Talk, Evelyn Hunt; 10:00-12:00, Dance music, Wardman Park Hotel Orchestra.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., Music; 6:00, Dinner concert; 7:00, Concert, Elvin Singer, director.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., regular "request" program by the Leo R. Davis Orchestra; 6:00-7:00, School of the Air, piano tuning-in number, Duo Art; address, speaker from the K. C. Children's Bureau; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Program, Barstow Glee Club, direction of Allen Hinckley; 11:45 p. m.-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone String Quintette; 10:00, E. Oliver Chapleau; Barton Organ, Ralph Emerson; Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 6:45, Sol Zaleb and his Rose Tree Theater Cafe Orchestra; 7:30, Dream Daddy's bedtime stories; 8:10, Book review, Arnold Abbott; 10:00, Howard Lanin's Arcadia Cafe Dance Orchestra; songs by Harry Glyn, Carl Zoehrns; "Morning Glory Club" program; musical comedy stars from Philadelphia's leading theaters.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 11:15 a. m., Mildred Rose, soprano; Cameron Rogers of World's Work; 4:00 p. m., Two 15 minute talks for women; 4:30, Buddie Stevens, baritone; 4:50, Charles Schwartz, violinist; 5:05, Clara Micoll, soprano; 6:00-7:00, Music from Waldorf Astoria Hotel; 7:00, Rose Tovar, pianist; 7:30, Thornton Fisher; 7:40, "Milkaipie Stories" for children; 7:50, Morris Goodman, violinist; 8:00, Billie Jones and Ernest Hare; 8:30, Viola Silva, contralto; 9:00, Astor Coffee Dance Orchestra; 10:05, Mendelssohn Quartet.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University faculty; 4:00 p. m., Agricultural lecture, faculty member; music, university artists.

WFAA, Dallas, Tex. Central, 476), 12:30-1:00 p. m., Address, Dr. Robert Stewart Hyer; 8:30-9:30, Concert, W. B. Chenoweth and his Cornfield Symphony Orchestra.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis' Bellevue Stratford Concert Orchestra; 6:00, Sunny Jim, the Kiddies' Pal; 6:30, Meyer Davis' Bellevue Stratford Concert Orchestra.

WGN, Chicago, Ill. (Central, 370), 7:00-10:00 p. m., F. G. Bordner, baritone; Miriam Kornmann, contralto; Irma Stoub, soprano; Ruth Lustgarten, pianist; Alfred Lustgarten, violinist; Dance music, Oriole Orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, the Radio Dealers' Musical Program; 6:30-7:30, Vincent Lopez' Hotel Statler Orchestra; 9:00-10:30, Concert, Buffalo State Normal School, direction of S. C. Clement; 10:30-10:45, Joseph Miranda, violin, and Henry Balencia, guitar; 10:45-11:00, Gertrude Zimmerman, soprano; 11:30, Supper-dance music, Vincent Lopez' Hotel Statler Orchestra.

WGY, Schenectady, N. Y. (Eastern, 380), 1:00 p. m., "The June Bride of 1924," Fashion talk; 5:30, Children's program; 5:45, Children's story in French, Frederic Duclert; 7:45, String Trio, Margaret DeGraff, harpist; Ernest Burleigh, cellist; Robert Torney, violinist; Irene Cooley, accompanist; Mardi Kenny, soprano; "The Year's New Game Laws; Llewellyn Legge; 10:30, Radio drama, "Cosy Corners," WGY Players, WGY Orchestra.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., Readings from Literature, Prof. R. W. West.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Alamo Theater Orchestra, Harry S. Currie, director; Walnut Theater Orchestra; 7:30-9:00, Concert, Helen I. Mitchell, director; "Child Welfare," Frank Radnour Lutz.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour program, direction of George Parrish; Solos by every member of the Sweeney Radio Orchestra, including almost every popular instrument in use by jazz orchestras; 7:00-8:00, Program of semi-classical music, Sweeney Radio Orchestra; "Building a Better Agriculture," Paul V. Naylor.

WHK, Cleveland, O. (Eastern, 283), Concert program arranged by Wm. Taylor, Son & Co.; 9:00 p. m., Louis Rich and his orchestra.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 3:00-3:15 p. m., Al Novins and Clint Sommer in songs; 3:45-4:15, Original Indiana Five, Tom Norton, leader; 4:30-5:30, Snappy Trio in dance music; 9:30-10:00, Michael Speciale and his Hotel Carlton Terrace Orchestra; 11:00-11:15, KIK Entertainers; 11:15-11:30, Fred Whitehouse in songs; 11:30-12:00, S. S. City of Seattle (Atlantic City Line) Orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Gimbel Brothers' Tea Room Orchestra; 3:00, Recital, Frank Oglesby students, Lois Kershaw, soprano; Viola Hoffman, soprano; Lymore McNulty, mezzo soprano; William Clark, tenor; Frank Oglesby, pianist; 4:00, Mah Jongg lesson by Mr. and Mrs. Wei-Lum Wong; 6:05, Jordan Lewis' Dance Orchestra; 7:00, Uncle Wip's bedtime stories.

WJY, New York, N. Y. (Eastern, Daylight Saving, 405), 7:40 p. m., May Mahoney, pianist; 8:15, the Lincoln Trio; 9:00, Dundee-Bernstein boxing bout, word picture, J. Andrew White.

WJZ, New York, N. Y. (Eastern, Daylight Saving, 455), 1:00 p. m., Henri Van der Zanden's Hotel Ambassador Trio; 3:00, Hotel Astor Organ concert; 4:00, Fashion talk, Eleanor Gunn; 4:25, "Fashions of Stage," Cora Moore; 4:40, Kandy Kiddies, Sarita MacLeary; 4:50, Arts and Decorations; 5:15, Arts and Decorations; 7:00, Jack Rabbit Stories, Thornton Burgess; 7:10, "What Motor Campers Should Pack," A. H. Van Doran; 7:30, French lesson; 8:00, "Current Events Bee"; 9:30, Hennessey's orchestra; 10:00, "When Touring in Italy," Fred E. Emmons; 10:30, Specht's Alamac Orchestra.

WKAQ, San Juan, P. R. (Central, 360), 6:00-8:00 p. m., WKAQ Orchestra; Artists.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 2:10-2:30 p. m., "Warm Weather Care of the Baby," Helen C. Peck; "Stage and Screen Review," Lester Rees; 2:40-5:00, Jennie Anderson, soprano; Clara Wellman, violinist; 5:30-6:00, Weekly meeting Children's Radio Health and Toothbrush Club of America, Dr. F. W. Pepper; 6:00-6:30, "Golfing," Roy R. Sweet; "Conservation of Fish in Minnesota," Albert C. Klancke; 7:30, "Use of Annual and Flowering Plants," L. Sando; "Cows Plus Accounting," George A. Pond; 9:30, Program, American Glass Machine Co.

WLS, Chicago, Ill. (Central, Daylight Saving, 345), 1:00-2:00 p. m., "Raw Materials," Sam Jordan; "Observations of a Farm Adviser," J. H. Checkley; 3:45-4:45, "Clothes and Health," Elizabeth S. Weirick; "Simple Ways of Purifying Drinking Water"; 6:30-8:00, Frank Westphal Orchestra; 8:00-9:00, "Stabilizing Prices," Sam Jordan; "Co-operative Marketing and Country Schools," Dr. C. H. Lane; 9:00-11:00, Herald-Examiner program.

WLW, Cincinnati, O. (Central, Daylight Saving, 309), 4:00 p. m., Lecture, "Practical Newspaper Writing," T. C. O'Donnell.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 447.5), 2:35 p. m., Concert, Lyon & Healy Concert Hall; 4:20, Items of interest to women; 4:30, Pupils, Bush Conservatory; 5:00, Boys' Week program; 6:00, Chicago Theater organ; 6:30, Hotel La Salle Orchestra; 8:00, Weekly Wide-Awake Club program, Mrs. Frances M. Ford; 8:30, Chicago Christian Endeavor Union biweekly program; 8:45, French lessons; 9:00, Weekly lecture, Field Museum, John D. Zimmer; 9:15, Young People's Council in Church Federation.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Maude Moreland and residents of Marianna, Ark.; 11:00, Midnight frolic, Bob Miller's Steamer Idlewild Orchestra.

WOAW, Omaha, Neb. (Central, 526), 6:00-7:30 p. m., Pro- Community program by Stanton, Ia.; 9:00-11:00, Program under auspices of Hannon-Van Brunt Company, Omaha.

WOC, Davenport, Ia. (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Construction and Function of the Human Foot," R. G. Maybach; 5:45, Chimes; 6:30, Sandman's visit; 7:00, "Citizens' Military Training Camps," Floyd E. Summers; 8:00, Juvenile artists from the tri-cities and vicinity; 9:00, Weekly Tourists' Road Bulletin.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt; 7:30, Adelphia Hotel Concert Orchestra, A. Candelori, director; 9:10, Harriet G. Ridley, pianist; 10:00, William Bove and his Royal Palm Orchestra.

WOQ, Kansas City, Mo. (Central, 360), 7:30-8:00 p. m., Program for the members of the Radio Club of Kansas City; Talks on matters of interest to Radio fans; Musical numbers and selections on the Edison Recreation phonograph.

WOR, Newark, N. J. (Eastern, Daylight Saving, 405), 2:30-3:00 p. m., Program of popular music by Orestes' Peek Inn Orchestra; 3:30-4:00, Orestes' Peek Inn Orchestra; 6:30-6:45, Agnes Leonard in songs for children; 6:45-7:00, Man in the Moon Stories for children; 7:15-7:45, Gertrude Bryan.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m., Program, Jefferson City Association for the Blind.

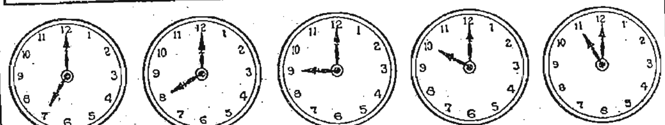
WRC, Washington, D. C. (Eastern, 469), 3:00 p. m., Fashion developments, Women's Wear; 3:10, Arthur McCormick, baritone; 3:20, "Beauty and Personality," Elsie Pierce; 3:25, Current Topics, Editor of "The Review of Reviews"; 3:35, Ethel Grant, pianist; 4:00, Songs; 6:00, Stories and songs for children, Peggy Albion and Mary Frances Glenn.

WSB, Atlanta, Ga. (Central, 429), 8:00-9:00 p. m., Kimo Kalohis' Hawaiian Moonlight Five; 10:45, Colored Postman's Quartet.

WTAS, Elgin, Ill. (Central, 286), 7:30-7:45 p. m., Bedtime stories, "Olivia"; 7:45, Lee Sims, pianist; 8:00-12:00 midnight, Jules Herbuveaux's orchestra; Songs, Will Rossiter; Joseph Mertz.

WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton; 12:00 noon, Goldkette's orchestra; 3:00 p. m., Detroit News Orchestra; 8:30, Detroit News Orchestra; Anne Campbell, Detroit News poet; Emma O. Hope, soprano; safety talk.

FROM ONE TIME TO ANOTHER



Pacific | Mountain or Pacific Daylight Saving | Central or Mountain Daylight Saving | Eastern or Central Daylight Saving | Eastern Daylight Saving

THE above clock dials are shown to clear up the misunderstanding which the various time bands and the Daylight Saving plan are creating. Although each dial registers time one hour ahead or behind of its neighbor, the exact period indicated on each dial is the same as that on every other. This chart will aid in the use of the advance programs and the schedules in the Radiophone Broadcasting Station Directory, both of which state the hours in the particular kind of time in use at each station. Below is given time for other broadcasting localities. The time is based on the same hour as indicated above, i.e., when it is any one of the times indicated above (considering them all to be p. m.) it is:

3:00 a. m. the day following in London, England.
10:35 p. m. in San Juan, Porto Rico.
9:30 p. m. in Havana, Cuba.
8:24 p. m. in Mexico City, Mexico.
4:29 p. m. in Hawaii.

Saturday, May 24

CKAC, Montreal, Can. (Eastern, 425), 7:00 p. m., Kiddies' stories in French and English; 7:30, Rex Battle and his Mount Royal Hotel Concert Orchestra; 8:30, La Presse Studio entertainment; 10:30, Joseph C. Smith and his Mount Royal Hotel Dance Orchestra.

KFAF, Denver, Colo. (Mountain, 360), 8:00-9:00 p. m., KFAF Gloom Busters.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal concert; 8:00-9:00, Crosby sisters, Sigma Pi Violin Trio; 9:00-10:00, Examiner concert; 10:00-11:00, Popular song concert; 11:00-12:00, Ambassador-Max Fisher's Cocoanut Grove Orchestra.

Where to Hear Dramas

DRAMAS, humorous, serious, musical comedies and even operettas are broadcast during the week and below are the stations and dates.

Tuesday: KGO, "Seven Keys to Baldplate," KGO Players. WLAG, Playlet, WLAG Players.

Wednesday: KFAE, "Phipps," 1-act play, students Mrs. D. C. Miller.

Thursday: WGY, "The Mikado," or "The Town of Litipu," WGY Light Opera Co.; KDKA, 1-act play, Norman H. Porter, director.

Friday: WGY, "Cosy Corners," WGY Players.

Saturday: WGN, Playlet, members of Dramatic Art Class of Louise Suess.

Tuesday: WGY, "The Milliner's Bill."

KFKX, Hastings, Neb. (Central, 341), Rebroadcasts program of KDKA.

KFNF, Shenandoah, Ia. (Central, 266), 3:00 p. m., Mineola, Ia., musicale; 7:30, Smith-Belding Trio of old-time fiddlers, assisted by Henry Field Seed Co. employes.

KGO, Oakland, Calif. (Pacific, 342), 4:00-5:30 p. m., Concert Orchestra of the Hotel St. Francis; 8:00, McClymonds High School Band; Mrs. J. H. Keyser, soprano; Elsbeth Dove, accompanist; McClymonds High School Saxophone Quartet; Lauren Wilson, baritone; Paper, "Pictures and Picture Hanging," Helen Parker; Frank Mueller, tenor; Douglas Soule, pianist; Marguerite Weaver, soprano; Address, "Humors of the Law," Archibald Treat Songs, Marie Wallman; Milton Barnes, cornetist; McClymonds High School Brass Quartet; 10:00-1:00 a. m., Hotel St. Francis Dance Orchestra.

KGW, Portland, Ore. (Pacific, 492), 3:00 p. m., Children's program, story by Aunt Nell; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Program, Mrs. A. R. Price, soprano; Vera H. White, pianist; 2:30-3:00, Matinee musicale; 6:00-6:30, Art Hickman's Concert Orchestra; 6:30-7:00, Music memory contest, Fitzgerald Music Company; 7:00-7:30, Children's program, Prof. W. H. Hertzog; Georgie Pepper, 7-year-old violinist; Helen Pirie, screen juvenile; Mrs. George L. Charotte, soprano; 8:00-10:00, Program, Beatrice Fenner, composer; 10:00-11:00, Art Hickman's Dance Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1:00-2:00 p. m., Rudy Seiger's Fairmont Hotel Orchestra; 2:30-3:30, Program, members of the San Francisco Police Department; 3:30-5:30, Tea dansant, E. Max Bradfield's Versatile Band; 8:00-12:00 midnight, Art Weidner and his popular artists; KPO Trio, Bennie Berman, Jimmie Raymond, Harry Hume.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Missouri Theater Orchestra.

KYW, Chicago, Ill. (Central, Daylight Saving, 536), 10:35 a. m., Table talk, Mrs. A. J. Peterson; 5:45, Children's bedtime story; 6:00-6:30, Dinner concert, Joska DeBabary's orchestra, Paul Whiteman's "Collegians"; 7:00-7:58, Musical program, Sherwood Music School, Ruth H. Lathrop, director; 8:00, Talk Vivette Gorman; 8:15, Youth's Companion; 9:15-12:30 a. m., Late show.

PWX, Havana, Cuba (Eastern, 400), 8:30 p. m., Cuban concert, Prof. Roger de Brand; Jose Valls.

WAAM, Newark, N. J. (Eastern, Daylight Saving, 235), 8:00-8:15 p. m., "Star-Spangled Banner," Wells and Fain; 8:15-8:30, Marjorie Beyer and Spencer Kohler; 8:30-8:45, Edith Yeager, of the A. E. F. Entertainers; 8:45-9:00, Leo Friedman and Ray Klages, song writers; 9:00-9:15, "How to Come to New York," by Arthur L. Lee, of the Hotel McAlpin; 9:15-9:45, Fred Burton's Amberal Serenaders; 9:45-10:00, Jean Herbert's Radio Reel; 10:00-11:15, Fred Burton's Amberal Serenaders; 10:15-10:30, Jean Herbert, singing; 10:30-10:45, Albert Demmitt, pianist; 10:45-12:00, Midnight concert by the Universal Novelty Orchestra, assisted by the Stylish Syncopators Glee Club.

WAAW, Omaha (Central, 360), 8:00 p. m., Carl Peters' Blue-Jay Orchestra in fourteen popular numbers.

WBAP, Fort Worth, Tex. (Central, 476), 7:00-7:40 p. m., Radio Bible class and Sunday school lesson, Mrs. W. F. Barnum.

WBAV, Columbus, O. (Eastern, 390), 12:00 m., Piano music, Ila Lorbach Owens.

WBZ, Springfield, Mass. (Eastern, Daylight Saving, 337), 6:00 p. m., Dinner concert, Leo Reisman Ensemble; 7:30, Bedtime story for the kiddies; 7:40, Hotel Kimball Trio; Jan Geerts, violinist; Angela G. Longergan, cellist; Paul Lawrence, pianist; 8:30, Concert, Massachusetts Division of the Sons of Veterans, Post No. 26 Band of the G. A. R., Hazel Beers, soprano; Mrs. Nellies Thomas, reader; Martha Peterson, Mrs. Emma Weston, pianists; Sons of Veterans Chorus; Addresses, Hon. James M. Curley, Mayor of Boston; William L. Anderson, National Patriotic Instructor of the Sons of Veterans; Percy G. Bolster, division counselor; Wilfred Wetherbee; Fred T. Waughm, cornetist; 11:00, Summary of the day's events at the General Conference of the Methodist Episcopal Church.

WCAE, Pittsburgh, Pa. (Eastern, Daylight Saving, 462), 3:00 p. m., Billy Zoffer's Music Box Cafe Orchestra; 6:30, Dinner concert, William Penn Hotel; 7:30, Uncle Kaybee; 7:45, Songs, Lew Kennedy; 8:30, Mrs. George A. Macredie, Mrs. Roy Noll, pianists; Margaret Ulbegkin, soprano.

WCAL, Northfield, Minn. (Central, 360), 9:45 a. m., St. Olaf College Chapel services; 12:00 midnight, concert.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., Music; 6:00, Dinner concert.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Riley-Earhart Orchestra; 6:00-7:00, School of the Air, piano tuning-in number, Duo-Art; Address, Edgar A. Linton, writer-lecturer of Kansas City; The Tell-Me-a-Story Lady; Music, Fritz Hanlein's Trianon Ensemble; 11:45 p. m.-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:30 p. m., Drake Concert Ensemble and Blackstone String Quintette; 10:00, Harmony Girls, Bob Brown, Betty Holmes, Walter Peterson, Jack Chapman's orchestra.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 4:30, "Cotton Pickers" Dance Orchestra; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 4:00 p. m., Greenwich Village Orchestra; 5:00, James J. Sheeran, reader; 5:15, Daisy Soffer, soprano; 6:00-7:30, Dinner music from Waldorf Astoria; 7:30, Vee Lawnhurst, pianist; 8:00, Bedtime story; 8:10, Dr. W. E. Fitch; 8:30, Louise Decker Scanlon, soprano; 9:00, Antoinette Goldwater, reader; 9:20, Wright Symons, baritone; 9:50, Maj. Gen. Lea Bullard; 10:00, Ruth Ryan, pianist; 10:30, Redferne Hollinshead, tenor; 11:00, Vincent Lopez' orchestra.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University faculty.

WFAA, Dallas, Tex. (Central, 476), 12:30-1:00 p. m., Address, Hugo Swan, manager Dallas Better Business Bureau; 8:30-9:30, Dramatic and musical recital, faculty of North Texas State Teachers' College, Denton, Tex.; 11:00-12:00, Dance music, Adolphus Hotel Orchestra, Lawrence Morrell, director.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis' Bellevue Stratford Concert Orchestra; 4:00, Ray Miller's Melody Boys' Orchestra; 6:00, Sunny Jim, the Kiddies' Pal; 6:30, Meyer Davis' Bellevue Stratford Concert Orchestra; 8:00, Medical talk, Dr. James H. McKee; 8:15, Recital, Edward Barnes, baritone; Mary Matthew, violinist; Irene Miller, soprano; 9:00, "Interior and Exterior Decoration of Home," by Capitola W. Ashworth; 10:15, Charlie Kerr and his Symphonic Dance Orchestra.

WGN, Chicago, Ill. (Central, 370), 7:00-10:00 p. m., Playlet, members of Dramatic Art Class of Louise Suess; Fred W. Agard, tenor; Langdon Brothers, steel guitarists; Sandy Meek, tenor; Barry Geise; Cambridge Trio; Oriole Orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, The Radio Dealers' Musical Program; 6:30-7:30 p. m., Dinner music; 9:00-10:00, Victoria Day celebration, Canadian Club of Buffalo.

WGY, Schenectady, N. Y. (Eastern, 380), 8:30 p. m., Dance music, Blue Bird Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; Alamo Theater Orchestra; 7:30-9:00, Concert, auspices Ben Alley Vocal Studio; Reading, An Interesting Historical Episode.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour program, direction of George Parrish; Instrumental numbers by members of the orchestra.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 12:00-1:00 p. m., Radio Shack Orchestra; 2:45-3:15, Tom Banks' Orchestra; 4:15-4:30, Ary La Skere, singing; 4:30-4:45, Frank Butler, boy soprano; 4:45-5:30, Melo Club Orchestra, with Beulah Wolf, jazz singer; 7:30-8:00, Al Reiser and his Dancing Carnival Orchestra; 8:00-8:15, Jimmy Flynn, tenor; 8:15-8:30, Tom Bracken in songs; 8:30-9:00, Broadway Jones and his Royal Fonclanna Orchestra from the Club Tennessee; 9:15-9:30, Jos. C. Wolfe, baritone; 10:00-10:15, Fitzpatrick Bros.; 10:45-11:00, Irving Berlin Music Company.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Organ recital, Karl Bonawitz; 3:00, Cameo Trio, direction Harry Link; 6:05, Harold Leonard's Redjackets from Club Madrid; 8:00, "A Bit of Food Chemistry," Dr. J. W. Sturmer, Philadelphia College of Pharmacy and Science; 8:15, Frederick E. Hahn, student symphony orchestra, and soloists; program: G Minor Symphony, Mozart; E Minor Concerto, Mendelssohn; Impressionistic Suite, Minuet in G, Gavotte Miniature, Ripocenus Mazurka, Mon Desir, Chants San Paroles, Festival March; Russian Airs, Wieniawski; William Tell Overture, Rossini; 9:50, "Highlights of Dawes Report," J. Henry Scattergood; 10:15, Harold Leonard's Redjackets from Club Madrid.

WJZ, New York, N. Y. (Eastern, Daylight Saving, 455), 3:00 p. m., Second annual Radio shorthand contest, auspices of Gregg Shorthand Teachers' Association; 3:15, Inez Giglio, pianist; 3:30, Chet Frost's Bostonians; 4:00, Wilmot Pratt, boy soprano; 4:10, Estrella Mandolin Club; 4:25, "Cowed by a Code," Alfred S. Myers; 4:40, Estrella Mandolin Club; 5:00, Landau and his Harbor Inn Serenaders; 7:00, "Boys," Clarence J. Harris; 7:15, Waldorf Astoria Grill Orchestra; 8:15, Talk, Fiorello La Guardia; 8:30, Anne B. Tyndall, soprano; 8:45, "Radio Service; Its Several Varieties," Dr. Alfred N. Goldsmith; 9:05, Anne B. Tyndall, soprano; Margaret Ludwig, contralto; 9:30, Helen Ruoss, harpist; 10:00, "Kipling"; 10:15, Mrs. Vera Stiles Richards, soprano; Vere Stiles Richards, tenor; Keath McLeod, accompanist; 10:45, Club Lido Venice Orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 11:35-12:00 m., Weekly meeting of Postcard Club; 9:15, Twin City Lines Trainmen's Band, Harry Larusson, director; 10:30, George Osborn's Golden Pheasant Orchestra.

WLS, Chicago, Ill. (Central, Daylight Saving, 345), 8:00 p. m.-1:00 a. m., National Farm Barn Dance Night.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 477.5), 6:30 p. m., Hotel LaSalle Orchestra; 8:00, Orchestra, Blanche Blood, director; 8:50, Boys' Week program; 9:00, Weekly Balaban & Katz Chicago Theater revue.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Mrs. Edw. Neal and Forrest City, Ark., residents.

WOAW, Omaha, Neb. (Central, 526), 6:00-7:30 p. m., Dinner program, First Christian Church Orchestra, Joseph F. Weelery, director; 9:00-11:00, Program, Artist pupils of Stanley Jan Letovsky, pianist.

WOC, Davenport, Ia. (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Chemistry of Fats and Oils," C. C. Hall; 5:45, Chimes; 6:30, Sandman's visit; 9:00, The Palmer School Radio Orchestra; Ralph W. Fuller, baritone.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

WOQ, Kansas City, Mo. (Central, 360), 7:00-7:30 p. m., International Sunday School Lesson, Dr. Walter L. Wilson; 8:00-9:30, Dance music program; Kansas City Orchestra; 11:00-11:30, Special religious service, Unity School of Christianity.

WOR, Newark, N. J. (Eastern, Daylight Saving, 405), 2:30-3:00 p. m., Recital by Nelle Wing, soprano; Lucy Case, contralto, assisted by Georgia Wing, accompanist; 3:30-4:00, Nelle Wing and Lucy Case; 6:15-7:15, Music While You Dine, Ernie Krickett's Cinderella Orchestra; 7:15-7:30, Resume of the day's sports, courtesy of Newark Morning Ledger; 8:00-8:55, Gene Ingraham's Bell Record Orchestra; 9:00-9:45, Gertrude Hale Trio; 9:45-10:00, Englewood High School; 10:00-11:00, Manhattan Serenaders.

WRC, Washington, D. C. (Eastern, 469), 6:00 p. m., Children's hour, Peggy Albion; 7:45, Bible talk, auspices of the Men's Organized Bible Class Association; 8:00, Songs, Carolyn Manning, contralto; 8:15, Talk on the United States Coast Guard, Oliver M. Maxam; 8:30, Ruth Peter, soprano; 8:45, Talk, Honorio Pueyrredon, the Ambassador of Argentina; 9:00, Concert, United States Marine Band.

WSB, Atlanta, Ga. (Central, 429), 8:00-9:00 p. m., Clark University Colored Glee Club, in plantation songs; 10:45, Songs, Mary Lansin.

WTAM, Cleveland, O. (Eastern, 390), 9:00 p. m., Dance program, WTAM Dance Orchestra, Everett Jones, director; Solo numbers, popular entertainers.

WTAS, Elgin, Ill. (Central, 286), 7:00-7:45 p. m., Bedtime stories, "Olivia"; 7:45, Lee Sims, pianist; 8:00-12:00 midnight, Jules Herbuveaux's orchestra; Songs, Will Rossiter; Joseph Mertz.

WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton; 3:00 p. m., Detroit News Orchestra.

Sunday, May 25

CKAC, Montreal, Can. (Eastern, 425), 4:30 p. m., Vocal and instrumental concert.

KFI, Los Angeles, Calif. (Pacific, 469), 10:00-10:45 a. m., L. A. Church Federation Service; 4:00-5:00, Matinee musicale; 6:45-7:30, Sylvia Marotta, pianist, and pupils; 8:00-9:00, Ambassador Hotel concert; 9:00-10:00, Examiner concert; 10:00-11:00, Packard Six Orchestra.

KFNF, Shenandoah, Ia. (Central, 266), 3:00 p. m., Religious services by students of Tabor, Ia., College; 6:30, Sacred song service.

KGO, Oakland, Calif. (Pacific, 312), 3:30 p. m., Concert, KGO Little Symphony Orchestra.

KGW, Portland, Ore. (Pacific, 492), 6:00 p. m., Church services, Rev. A. B. Snider; 7:00, George Olsen's Concert Orchestra.

KYW, Chicago, Ill. (Central, Daylight Saving, 536), 10:00 a. m., Central Church service, Dr. F. F. Shannon, pastor; Daniel Protheroe, musical director; 1:30 p. m., Studio chapel service, Chicago Church Federation; 6:00, Preliminary service, Chicago Sunday Evening Club; Talk, Clifford W. Barnes; 7:00, Regular meeting, Chicago Sunday Evening Club, address, Hon. Thomas R. Marshall.

WBAP, Fort Worth, Tex. (Central, 476), 11 a. m.-12:15 p. m., Church services, First Presbyterian Church, Rev. J. K. Thompson, pastor; 4:00-5:00, Organ recital, Miss Marguerite Agnew White; 5:00-6:00, Concert, Sallie Belle Matthews' Orchestra; 7:00, Sport Review; 11:00-12:00, Popular program, Crockett's Texans Orchestra.

WCAL, Northfield, Minn. (Central, 360), 11:00 a. m., Services, St. John's Lutheran Church of Northfield; 8:30 p. m., Sacred program; Dr. Martin Hegland, speaker; Luella Thygesen, soprano; Kenneth Onsgard, bass; College Quartet: Osgood Westley, Obed Grinder, Matthew Lyders, Kenneth Onsgard.

WCX, Detroit, Mich. (Eastern, 517), 4:00 p. m., Radio chapel services, Free Press Studio; 7:30, Services Central M. E. Church, Dr. Lynn Harold Hough, pastor; Hudson quartets.

WDAF, Kansas City, Mo. (Central, 411), 4:00-5:00 p. m., Program, Choir of the Maywood Baptist Church.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 5:00-6:00 p. m., Barton Organ, played by Ralph Emerson; 9:15, Alexandra Nakutin, Drake Concert Ensemble.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 2:30 p. m., Arcadia Cafe Concert Orchestra, Feri Sarkozi, director.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 3:00-5:00 p. m., Federation of Churches program; 7:20-9:00, Capitol Theater Orchestra, Roxy and His Gang; 9:00-10:15, Skinner Organ Recital; 10:15, Talk by Edwin Franko Goldman.

WFAA, Dallas, Tex. (Central, 476), 6:00-7:00 p. m., Radio Bible Class, Dr. William M. Anderson; 9:00-10:00, Vocal recital, Netto Male Quartet; 10:00-11:00, Concert, City Temple Orchestra, Prof. A. Cruz, director.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 7:30, Services, Arch Street Presbyterian Church.

WGN, Chicago, Ill. (Central, 370), 6:00-9:00 p. m., Florence Simmons, soprano; Roberts-Brown Trio; Stella Roberts, violinist; Genevieve Brown, cellist; Marion Roberts, pianist; Oriole Orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 3:00 p. m., Vesper service, Rev. B. J. Davies, South Side Baptist Church; 4:00, Organ, Lawrence H. Montague.

WGY, Schenectady, N. Y. (Eastern, 380), 9:30 a. m., Services, First Baptist Church, Rev. Gordon H. Baker, pastor; 2:30 p. m., WGY Symphony Orchestra; Asa O. Coggeshall, tenor; 6:30, Services, First Baptist Church.

WHAS, Louisville, Ky. (Central, 400), 9:57 a. m., Organ music; 10:00, Church services, auspices Methodist Temple, Rev. Charles S. Humphrey, pastor; Jane Graves, choir director; 4:00-5:00, Concert, A. Y. B. Sherlock, director.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Program of religious numbers, Sweeney Radio Orchestra; 7:00-10:00, Church service from a Kansas City church; Religious and classical numbers by the Sweeney Radio Orchestra; 12:00 p. m.-1:00 a. m., Program for the listeners-in of the far west.

WHK, Cleveland, O. (Eastern, 283), 6:00 p. m., Chapel service, auspices Cleveland Federated Churches; 6:30, News summary, baseball; 8:00 p. m., Concert program, WHK Concert Orchestra; solo numbers, popular artists.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 3:00-4:00 p. m., Queens County C. E. Union; 5:00-5:15, Frank S. Hackett of the National Security League, in a talk on "The Difference Between Patriotism and Nationalism"; 5:30-6:00, Program by Music Students' League.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 4:30 p. m., Services, Dr. B. G. Wilkinson; 7:30,

(Continued on page 22)

30 Minute A-B-C Lessons for Radio Beginners

Chapter X—What a Vacuum Tube Does

By P. E. Edelman

IN THIS series of articles the story of Radio is told in so simple a manner that the uninitiated can follow theory and practice whether he knows anything about electricity or its application to broadcasting and reception or not. The series consists of twenty-five chapters, of which the five next will be:
Chapter XI—The Shorthand of Radio—Diagram Reading.
Chapter XII—Catching Radio Waves.
Chapter XIII—The Radio Detective.
Chapter XIV—Tuning In.
Chapter XV—Working Through Interference.

MODERN Radio apparatus is centered around the device called a vacuum tube. Its function is to convert, change, or amplify electrical energy.

It consists, Figure 93, of three elements in a tube or evacuated container. The

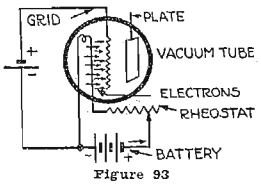
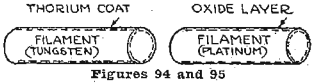


Figure 93

filament or heater serves as an electron emitting surface. The grid is spaced theretrom and serves as a control member or valve to govern the electron flow from the filament. The plate is placed outside of the grid and is a piece of metal

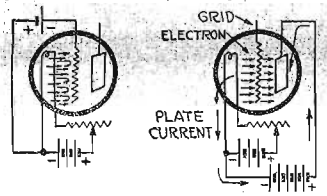


Figures 94 and 95

which can receive the electrons coming from the filament.

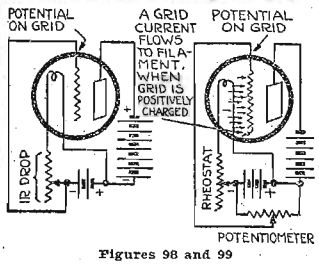
Vacuum Tube Action

The filament, Figures 94, 95, consists of a fine resistance wire which heats up upon passage of a current through it. Most



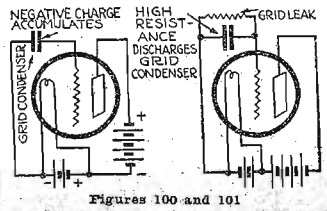
Figures 96 and 97

filaments in use today are treated to increase the electron emission. The well-known type illustrated by Figure 94 consists of the metal tungsten fused with a small portion of the element thorium. The thorium is then driven to the surface by heat treatment. A thoriated filament has the same electron emitting ability as a



Figures 98 and 99

common tungsten wire of greater diameter which requires more current for heating. The type of filament of Figure 95 comprises a platinum ribbon coated with oxides, baked thereon. Electrons are better able to escape from such an oxide coat than from the surface of the platinum



Figures 100 and 101

wire alone. The heating pushes the electrons out from the surface of the wire.

As shown in Figure 93, the tube is using the grid as a plate because the grid has a positive battery connection. Electrons are negative electricity and are attracted

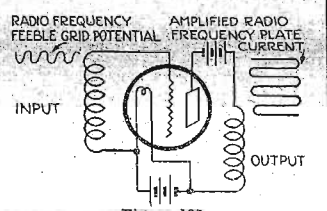


Figure 102

to a positively charged surface or repelled by a negative charge.

It is necessary to recognize what goes on in a vacuum tube to comprehend the action in a receiving set.

Figure 96 shows the grid negatively charged and returning or pushing electrons back to the filament.

Figure 97 illustrates the grid without charge from external circuit, so that electrons reach the plate. Then a battery connected to the plate can supply a current which will flow through the space between the plate and filament, now filled by electrons. This plate current will increase if the emission of electrons from the filament is increased, or vice versa. This plate current will also be controllable by applying a smaller or larger charge either negative or positive to the grid, because this will then control the electron flow.

Putting Potential on Grid

A simple way to put potential on the

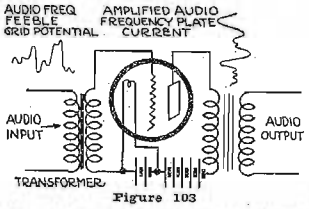


Figure 103

grid is to let the rheostat controlling the filament current be included in the grid circuit. A so-called IR drop or potential, set up by the current flowing through the rheostat, can then reach the grid. Such a potential is used as a control for the action of the vacuum tube. It could be obtained from a grid-leak resistance or from a potentiometer or a separate battery. This is shown in Figures 98 and 99.

Figure 100 shows how a grid condenser lets a negative charge accumulate on the grid from the electrons, by condenser action. Figure 101 shows how a high resistance called a grid leak is used to allow such a charge to disperse away slowly.

Alternating Potential Applied to Grid

If then the potential applied to a grid controls the electron flow to the plate, what will alternating potential do? From Figure 102 it will be seen that an alternating input potential or frequency will cause the plate current to vary at the same frequency. The plate current, however, gets energy from the local battery and will

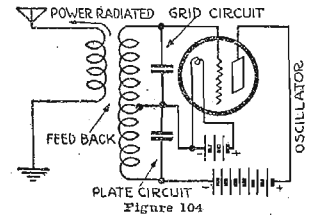


Figure 104

contain greater energy at this same frequency than was applied to the grid. This is amplifier action. Also if a fluctuating potential is applied to the grid (Figure 103) the plate current will repeat the same fluctuations.

Oscillations

By coupling back the plate circuit to

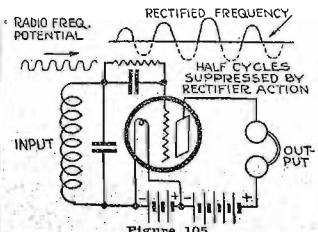


Figure 105

the grid circuit regeneration sets up oscillations. Power can be radiated from such

(Continued on page 28)

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Political Significance of Radio

It Will Be Easy to Reach the Multitudes

THE old time political meeting is doomed. Men came together to be told about issues and men because the candidates could not be transported to each voter. The latter now will forego actually seeing the candidate and will listen to what he has to say over the Radio.

Already some politicians have adopted Radio as the best means of reaching their constituency. All others to be successful will have to meet this competition. The change has come almost over night.

In the political gathering the voter was subjected to the mob influence. The lights, the crowds, the pushing and pulling, the flags, the old veterans holding down the front rows, the flowery references to the "Grand Old Party of ——, and —— and ——," the bands, all this will be missing as so potent an element and factor in the future for most of us. We'll be at home, listening in.

The personal bodily appearance of the candidates is bound to suffer in this development. The big man will have to show something better than a large frame. His personality also will not have the opportunity to impress itself as formerly on his hearers.

It is true that the written word—newspapers, magazines, mail matter campaign literature, heretofore supplemented the meeting. But the people demanded the personal touch and were willing to transport themselves to get it. Now, folks are staying at home more because of the Radio, and they will compromise between their natural desire to actually see their candidate and their more natural liking for home. They will use their ears instead of their eyes. Incidentally they will be better rounded individuals for this evening up of the use of the senses.

Politicians will have to give us hereafter a more straight-forward story. Removed from the influences that interfere with reasoning, in the quiet of the home and the circle of family and friends, which things are usually seen as they are, calm analyses will meet the offerings of the spell-binders. And woe unto them, if they continue the bunk which has regularly characterized the conventional political meeting.

The broadcaster has no comeback. He must "produce." And the politician, being the most discerning of the race, will meet the occasion by supplying an improved brand of wares.

It will not be long until the sessions of the legislative and judicial bodies will be available over the Radio. This phase of the problem is important because so much time is now wasted in just plain "talk." What is said will have to have some meat. That will cut the mass quite a bit. The raucous roar of the political lightweight will find too little encouragement.

The leading men of each part will sense the value of this method of setting forward its principles, with the result that only the best men will be given the fullest privilege to speak. Part disciplino will take care of this. Perhaps we shall see a finer type striving for office, in view of the greater facilities now at hand for influencing large numbers of people. In opposition to this view it is useless to say that the newspapers now offer this opportunity: too much is printed these days; the people rarely read a paragraph through. Radio is yet a novelty and folks will listen, for the additional reason that listening is less work than reading.

Who Will Pay the Broadcaster?

If Advertisers Hold Sway, Interest Will Be Lost

ONE of these days we are going to come face to face with the problem of who is to pay for broadcasting. The financing of broadcasting stations is steadily becoming more difficult, with the public demanding better programs, the performers demanding pay for their services, and the overhead costs mounting. A high-power station nowadays is coming to be a kingly luxury, even for publicity purposes.

The Radiophone, with its millions of nightly listeners is obviously well adapted to publicity and propaganda effort of many kinds, yet if that side of the game were overdone, patrons would lose interest, just as they would in a newspaper that was nearly all advertising.

RADIO INDI-GEST

The Ear Marks of a Wise Crack

Manager Indi-Gest(ion) Dept.: I failed to get any limericks when I sent in a batch sometime ago so it is plain to be seen that Indi-Gest readers do not want heavy stuff. Now I am sending something new and I believe I am the discoverer of this terrible condition which is doing more to bring us all to one level than all the preachments of Carl Marx, Mike Rofarad, Neut R. O'Dyne or any other pioneer. Is this a symbol of universal brotherhood or is it to be held up to scorn because the poor can afford a mark as distinct as that worn by the aristocrat? I'll leave it to the readers of this column. Here is the situation:

THE "EAR MARKS"

You will always know a tradesman,
An artist or a lord;
An actor or a preacher
Or the man who wields the sword;
The man who drives or shovels,
Or drives the ship of state,
Each has some tell-tale marking
Which sticks to him like fate.

But the markings are peculiar
To the class which they adorn,
Each depicts a man's vocation
More than all the clothes that's worn.
In the masses or the classes,
Pick them out by special mark,
As you would a type or species,
Or a tree just by the bark.

A new mark now is growing common,
Which adorns in every class,
High or low, rich or poor,
The one thing common to the mass.
It's the mark on Radio listeners
Who've grown legion in recent years,
You can always tell a brother
By the callous on his ears.

H. ED FONES.

The Old Dogs Will Appreciate This

Dear Indi: At last, I, Prof. Hoozzlegoozzle, have perfected my Shingle Circuit Receiving Set which at any time will pick up any flee's speech. I find that conversation between two flees is most interesting, presenting at times a scratching sound, especially when mother flee and daughter flee flee. You will find the hook-up in the upper right corner of page 33. You're welcome! PROF. HOOZZLEGOOZZLE.

Mrs. Partington Speaks Out

Dear Indi: Mrs. Partington says she heard Mr. K. D. K. A. Radio casting a lecture of the Travel Explorer, and Big Story Hunter, who was telling his unvisable and innocent audience about fishes climbing tres, and birds fishing big snakes out of the sea, and she sez, sez, she, ain't inventions wonderful since the 18th commandment was elected and unforced.

SIGNING OFF.

Click! Click! Keys!

Walt Whitman gets the sympathy this time.

Click! click! keys!—hum! cws! hum!
Through the windows—through doors—burst like a ruthless force,
Into the neutrodyne, and scatter the concert heard,
Into the shack where fellow ham is working;
Leave not the super quiet—no happiness must he have with his loop,
Nor the cheerful child any peace, receiving with crystal, gathering the static,
So fierce you thump and pound, you keys—so low you cws hum.

Click! click! keys!—hum! cws! hum!
Over the traffic of messages—over the rattle of jazz in the air;
Beds are prepared for sleepers at night in the houses. No broadcast is heard through your drone.
All BCL's argue by day—no pleasure or speculation—will you continue?
Would the talkers be talking? Had you not interfered with a song.
Shall a lawyer rise in court to plead your case before a judge?
Then thump faster, nimble keys—you cws louder hum.

Click! click! keys!—hum! cws! hum!
Make no parley—stop for no expostulation,
Mind not the others—mind not complainer or justness,
Mind not the old man beseeching you, young man,
Let not the fau's voice be heard nor your true friends' entreaties.
Make even your own death with your clamor, while without, the awaiting hearses,
As strong you thump, O terrible keys—while loud you cws hum.

5XY.

Business Is Picking Up

Dear Indi: I see by the papers that they caught a man acting suspicious in one of the large Radio stores. Upon questioning him and examining him at the office, 25 tubes were found concealed upon his person in specially made pockets.

Wonder if he could be a representative of some of the tube manufacturers drumming up business? SPIDER WEBB.

"Shoot If You Must—"

Condensed

By DIELECTRIC

Next in order will be an investigation at Washington to find those responsible for the "propaganda" against the inclusion of a tax on Radio in the new tax bill. There are several millions of us ready to admit our share of the guilt in putting this brilliant (?) idea to death. Senator Smoot was not far wrong in considering the large Radio manufacturers monopolistic, yet the cure for that does not lie in taxing consumers. What struck me forcibly was the avalanche of protests aimed at the "August chamber" by listeners in. We can repeat, too.

You need not walk very far away from your set to find someone ready to shout at you about the damage Radiophony has done to this and that industry. A little patience and they would discover that both the industry in question and Radio itself prosper under wise procedure. The phonograph business suffered as a consequence of the advent of Radio—at first, but now the two are inseparable companions. It will be the same with this music snarl; eventually broadcasting will be regarded as a prime requisite to insure large sales of sheet music. Let 'em holler!

A great many fans think the air is overladen with programs as sent out by the five hundred odd broadcasting stations now operating, though that is a matter of opinion. Some of the features have a very limited appeal, it is true, but much that comes into the receiving set is welcome. Just how many of us would take the trouble to tune in on a station broadcasting the heavy-side of a Senator's thoughts is somethiug for statisticians to determine. The War and Navy departments have been asked to decide the feasibility of broadcasting proceedings in the Senate through government stations. They might need both branches of the service to stand ready for action, if they get going too strong.

Another attempt to make use of the new method of covering our country via Radio was successfully carried out recently and should leave no doubt as to the effectiveness of the short-wave scheme. WJZ held the stage from which music and speeches were broadcast to listeners tuning in KDKA, WGY, KFKX and KGO. Each of these stations, excepting the first and last mentioned, used two transmitters, one working at the regular frequency while the other at a special frequency to be picked up by the next station along the line. More of this might be done.

In December of last year, station WOR made a special effort to reach Japan with a program of dance music supplied by Paul Whiteman's orchestra. It got across all right, but the record made last month by this station is heralded by the owners as something to brag about. A speech was made in Esperanto by James Sayers before their mike at 6:15 p. m., Eastern standard time. Mr. Ando, a famous Japanese Radio engineer, heard first the music then the talk in the international language. No special effort was being made at the time to reach so far.

Most broadcasting studios are things of ornate design, furnished rather elaborately at quite some cost. Naturally you don't expect Chippendale chairs to serve as speakers' rostrums, nor a mike that can be raced from one position to another in the studio—at least we didn't until WMC started us questioning. That popular southern station had "Billy" Sunday as a guest one day, during his stay in Memphis, and I never heard of his preaching from a given spot nor of a dislike for standing on chairs. Perhaps he can flay us just as well while standing on the floor, stationary.

How to Construct a Super-Heterodyne Receiver

Part IV—Wiring and Tuning the Set

By Allen C. Forbes

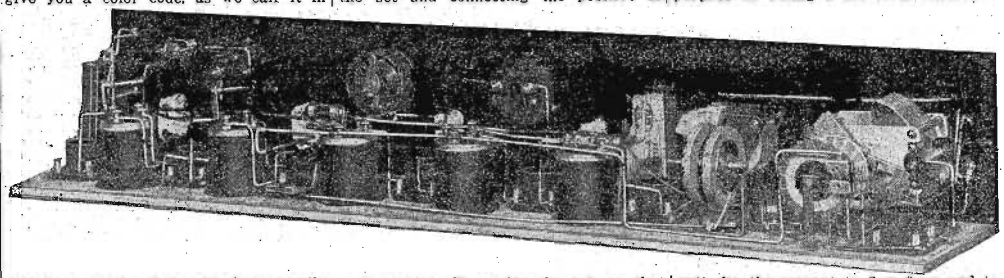
THE wiring of the super-heterodyne set can be made simple or hard, depending entirely upon the person making the set. If the apparatus has been laid out as recommended in the previous articles, you can start right in by screwing the panel to the base board. A small angle of brass should be shaped and fastened on the rear of the .001 condenser (if of the mechanical geared type) and resting on the baseboard. This will assist in supporting the panel and holding it rigid.

Your next step is to commence wiring. First look over the assembled set and compare the placed apparatus with the circuit diagram, noting mentally how the wires will fit in and where they will go. Now wire up the filaments of the tubes and the rheostats, then tackle the oscillator circuit, then the intermediate frequency transformers, then the audio frequency to the jacks and the job is done.

Wire Filament Circuit First

The writer always figures out the longest leads first, but then this is no criterion because it is very doubtful if any two men will wire up a set the same way or go about it in the same manner. However, that is not of any great importance. It isn't going to affect the operation of the set a great deal or even in the slightest degree as to which piece of apparatus is wired up first. Experience has shown, however, that by wiring up the filaments first the chances of making a wrong connection to the B battery are greatly reduced. It is also a fact that there are a number of returns to filament and these can be connected at once when working on them if the filament leads are already in.

The question of whether to use square brass, square brass tinned, number 12 round or number 14 round tinned wire, is mostly one of convenience and individual taste. If you think square brass makes a neater job and looks better to you, use it. On the other hand, if you wish a "classy" job as well as one that is of real service, use number 14 round and cover it with genuine varnished cambric tubing. Get five colors; yellow, black, red, brown and green. Put black tubing on all negative and yellow on all positive six-volt leads. Use the red on all plate connections and 90-volt B positive leads—except the two detectors. Use the brown on the plate leads of the two detectors, and wherever the 22½ B positive goes. Use the green on all grid leads for all tubes. This will give you a color code, as we call it in telephone work, that will improve the looks of your set a thousand per cent, as well as enable you to wire it absolutely correct. It will be hard for you to make a mistake in wiring if you stick to the color code, because it acts as a check on your wiring.



Advantages of the Color Code

The writer recommends using the color code for all inexperienced as well as experienced men. It is only slightly more expensive than doing without, and the check that it holds on the making of mistakes is more than worth the extra cost. It is surprising how few of the average laymen there are that will take the little extra time and place "spaghetti" on the leads, using different colors to distinguish the leads and denote what they carry and where they go. The writer doesn't claim originality on the introduction of this method, but just wants to call it back to memory so as to make the wiring of the super just as easy as possible. Try this method once in making your next set, whether it's the super or some other kind. Note with what ease you can trace the wiring and how sure you are of where the correct connections for each lead go.

The great trouble in wiring a set with a lot of connections is liability to connect grids where plates should go, and often the fatal mistake of connecting 90-volt B positive to the negative A somewhere in the set and connecting the positive A and negative B outside the set, so that when it comes time to insert the tubes preparatory to turning on the "juice" eight tubes will be burned out slick as a whistle. Using a color code, this kind of a wrong connection cannot happen, because in making the final trace to see if everything is O. K. you would notice the red to black and would know it was wrong immediately. You wouldn't have to guess. And by the way, let us mention right now: don't ever guess where a lead goes in a super-heterodyne set, or for that matter, in any other set—know where each lead goes. Guessing has blown more tubes than any other indoor sport.

Use Lugs for Solder Connections

Get yourself a small box of tinned copper or brass flat lugs and insert these lugs under the binding posts on the various pieces of apparatus, then solder all wires to these lugs. The writer never recommends soldering direct to any piece of apparatus if it is at all possible to avoid it. One of the most important reasons for so doing is that unless—and even with extreme care—soldering paste will run down and into the case.

Keep the leads off the base board as much as possible. Run each lead direct and short. Don't try to see how many fancy square corners you can make. The purpose in wiring a set is to furnish a path for the current to flow from and to. It is not placed in the set to see how fancy it can be made to look. First on the program in wiring is efficiency. Second is looks. If a particular lead can be made extremely short, but you don't think it will look good, take my advice and run it short.

Get all your wires in first, then put in your fixed by-pass condensers. Remember this, do not solder wires direct to the fixed condensers. All of them are fitted with holes. These holes are not there for ornaments, they are placed there so that a 6-32 screw goes in nicely. Just get yourself a 6-32 machine screw, round head, and a nut, then insert it in the hole on the condenser and slip one of the aforementioned tinned lugs under the nut and tighten up on it, then solder the wire to this lug. Better practice would be to solder the lug to the wire before mount-

(Continued on page 26)

ADVANCE PROGRAMS

(Continued from page 18)

Services, Holy Trinity Church, Rev. Floyd W. Tompkins, D.D., rector; 9:30, Symphonic Concert, Bed Stad's WIP Little Symphony Orchestra and Karl Bonawitz, organist.

WLW, Cincinnati, O. (Central, Daylight Saving, 309), 9:30 a. m., Sunday school; 11:00, Services, Church of the Covenant, sermon, Rev. Frank Stevenson; 7:00 p. m., Services, First Presbyterian Church of Walnut Hills, sermon, Rev. Frederick N. McMillin; 3:15, Little Symphony Orchestra.

WOAW, Omaha, Neb. (Central, 526), 9:00 a. m., Radio Chapel Service, conducted by Rev. R. R. Brown; 2:00-3:30 p. m., Matinee program by First Christian Church Orchestra; 9:00-11:00, Musical chapel service by Calvary Baptist Church.

WOC, Davenport, Ia. (Central, 484), 9:00 a. m., Sacred Chimes concert; 1:30 p. m., the Palmer School Radio Orchestra; 7:00, Organ recital; 8:00, Church service; 9:30, the Palmer School Radio Orchestra.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 10:30, Services, Bethany Temple; 2:30 p. m., Sunday school services from Bethany Temple; 3:15, Organ recital, Clarence K. Bawden.

WOQ, Kansas City, Mo. (Central, 360), 11:00-11:30 a. m., Religious service, Unity School of Christianity; 7:00-7:45 p. m., Religious service, Unity School of Christianity; 8:00-9:15, Religious service, Dr. I. M. Hargett, at the Grand Avenue Temple, Methodist Episcopal Church.

WOS, Jefferson City, Mo. (Central, 440.9), 7:30 p. m., Religious service, Central Evangelical Church, Rev. E. W. Berlckamp, pastor; Prof. F. J. Ziesberg, organist.

WSB, Atlanta, Ga. (Central, 429), 11:00 a. m., Presbyterian Church service; 5:00-6:00, Dallas M. E. Church choir; 7:30, Wesley Memorial Church service.

WTAS, Elgin, Ill. (Central, 286), 2:00-5:00 p. m., Concert; 7:30-7:45, "Olivia," bedtime stories; 7:45-12:00 midnight; Leo Sims, pianist; Jules Herbuveaux's orchestra; Songs, Will Rossiter; Joseph Mertz.

WWJ, Detroit, Mich. (Eastern, 517), 11:00 a. m., Services St. Paul's Episcopal Cathedral; 2:00 p. m., Detroit News Orchestra.

Monday, May 26

CKAC, Montreal, Can. (Eastern, 425), 1:45 p. m., Mt. Royal Hotel luncheon concert; 4:30, Mt. Royal Hotel The Dansant.

CKY, Winnipeg, Can. (Central, 405), 1:00 p. m., "Value of Recreation," Wray Youmans.

KFAE, Pullman, Wash. (Pacific, 330), 8:30-9:30 p. m., Raymond Howell, violinist; "Chemistry Applied to Agriculture," Prof. J. L. St. John; Percy Severance, flutist; "Value of Cow Testing Tours," Don G. Magruder; Vay Kerns, soprano; Ivor Melander, pianist.

KFAF, Denver, Colo. (Mountain, 360), 8:00-9:00 p. m., Bohemian Dance Orchestra.

KFI, Los Angeles, Calif. (Pacific, 469), 8:00-9:00 p. m., Evening Herald concert; 9:00-10:00, Examiner concert; 10:00-11:00, Ambassador-Max Fisher's Cocoanut Grove Orchestra.

KFKX, Hastings, Neb. (Central, 341), 9:30 p. m., Hastings College Conservatory of Music.

KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m., Recital, James Hamilton Howe, Dean of the American College of Music, director.

KGO, Oakland, Calif. (Pacific, 312), 3:30 p. m., "The Health of the Child"; 4:00-5:30, Hotel St. Francis Dance Orchestra; 8:00, Educational program, courses in Agriculture, Spanish, Music, Economics and Literature.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Literary program, Portland Library Association; 8:00, Official Rose Festival Invitational program; 9:30, Program, Gul Reazee Grotto.

WAAM, Newark, N. J. (Eastern, Daylight Saving, 255), 7:00-7:15 p. m., "Star Spangled Banner," James Y. Moore and His Clover Club Entertainers; 7:15-7:30, Marcia Paquita, singing; 7:30-7:45, Victor Wilbur, baritone; Jos. Macy, pianist; 7:45-8:15, Nelson Rogers' WAAM Dance Orch.; 8:15-8:30, Arthur Sorenson, pianist; 8:30-9:00, Nelson Rogers' WAAM Dance Orch.; 9:00-9:15, "New Eyes for Old," talk by Mrs. Winifred Hathaway; 9:15-9:30, Austin & Bergere; 9:30-9:45, Bob Schafer & Dave Ringle, singing; 9:45-10:00, "Fit as a Fiddle," talk and demonstration of McFadden's Simple Six System of Exercise; 10:00-10:30, Original Santa Fe Five; 10:30-10:45, Frank Bessinger, tenor; 10:45-11:00, Ross Fowler, baritone; 11:00-11:15, Bedtime Stories for Adults, Mildred E. Phillips; 11:15-11:45, Nickerbocker Nifties song review.

WAAW, Omaha. (Central, 360), 7:30 p. m., Mrs. R. J. Hudson, pianist; Miss Verna Hansen, soprano; Chinese fiddle solos, Arthur Franks; Mrs. Pearl Pike, reader; Robert Hudson, vocalist; Miss Cleo Fayo, pianist; Miss Esther Cole, elocutionist; Mrs. V. J. Meyer, Mrs. Lee Thomas, violinists; Leonard Nicely, popular songs; Mrs. Gladys Blanchard Hicox, reader; and Miss Roberta Shipton, soprano.

WBAP, Fort Worth, Texas. (Central, 476), 7:30-8:30 p. m., Concert, Carl Venth Club of Texas Woman's College; 9:30-10:45, Concert, Roanoke Fiddle Band, B. F. Hambright, director.

WBAV, Columbus, O. (Eastern, 390), 12:00 m., Piano music, Ila Lorbach Owens; 8:00 p. m., Concert, WBAV Orchestra, Frances Handibeau, director.

WCBD, Zion, Ill. (Central, Daylight Saving, 345), 8:00 p. m., Junior Choir; Cornet quartet, Newcomer, Mason, Wedekind, Stewart; Male quartet, Hendricks, Mehaffey, Bagg, Neave; Erwin Rendall, flutist; Mrs. Mary Oakes Bagg, reader; Mary Ross, pianist; Chester Bagg, baritone.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., Music; 6:00, Dinner concert; 8:30, Musical program, Harry Bond, director.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Milo Finley's Dance and Concert Orchestra; 6:00-7:00, School of the Air, piano tuning-in number, Duo-Art; Address, speaker from the University of Kansas; Weekly "request" story night by the Tell-Me-a-Story Lady; Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Fritz Hanlein's Trianon Ensemble and the Plantation Players; 11:45-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 2:30, Piano solos, Edna Finestone; 4:30, Talk, Betsy Logan; 7:30, Special features from Stanley Theater; 9:30, Stanley Symphony Orchestra, direction Joseph Pasternack; 10:00, Howard Lanin's Arcadia Cafe Dance Orchestra; vaudeville features.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 4:00 p. m., Alberta Kawashima, violinist; 4:30, Mina Kiss, soprano; 5:00, Women's Program; 5:30, Joel Coffey, pianist; 6:00-7:00, Dinner music from Waldorf Astoria; 7:00, Phil Baker, accordionist; 7:10, Edith Lamberti, soprano, and Michael Lamberti, cellist; 7:30, Thornton Fisher; 7:40, Francis May, violinist; 8:00, Mears & Company; 8:10, Alfred Y. Cornell and group of artists; 9:30, Gypsy String Ensemble, Eveready Entertainers.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University faculty.

WFAA, Dallas, Texas. (Central, 476), 12:30-1:00 p. m., Address, Dr. Ellis W. Shuler, on "Rocks and Fertility; 8:30-9:30, Concert, W. B. Chenoweth and his Cornfield Symphony Orchestra.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Piano recital, Caroline Hoffman; 6:00, Sunny Jim, the Kiddies' Pal; 6:30, Meyer Davis' Bellevue Stratford Concert Orchestra; 7:00, Music Lessons by Elsie Alexander.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, The Radio Dealers' Musical Program; 6:30-7:30, Dinner music, Vincent Lopez Hotel Statler Orchestra; 9:00-10:00, Concert, auspices Buffalo Trust Company, direction Cecile Kurtz, featuring Miss Kurtz (herself), contralto; 10:00-10:30, Walter Bates, tenor soloist of Central Presbyterian Church, and assisting artists; 10:30-11:30, Concert, Ray Klein's Orchestra; 11:30, Supper-dance music, Vincent Lopez Hotel Statler Orchestra.

WGY, Schenectady, N. Y. (Eastern, 380), 1:00 p. m., "The Woman in the Country," Mrs. Julius J. Turner; 7:15, Address, "American Farm Bureau Federation," Frank M. Smith; 7:25, "The Apple and Thorn Skeletonizer," E. P. Felt; 7:35, "What's the Matter with Agriculture?" M. V. Atwood; 7:45, Musical program, Women's chorus, N. Y. State College for Teachers, T. Frederick H. Candlyn, director; Edna Shafer, contralto.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Alamo Theater Orchestra; Walnut Theater Orchestra.

WHAZ, Troy, N. Y. (Eastern, 380), 9:00 p. m., Dance music, Campus Serenaders; Talk, Chemical Engineering.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour program, direction of George Parrish; 7:00-8:00, Program of semi-classical and light operatic airs, Sweeney Radio Orchestra.

WHN, New York, N. Y. (Eastern, Daylight Saving, 360), 2:15-2:30 p. m., Irving Berlin Music Co.; 3:45-4:00, Al Novins & Clint Sommer; 4:30-4:45, Harry Hock Entertainers; 7:30-8:00, Brasfield's Orch. and Entertainers from the Club De Luxe; 8:15-9:00, Bway Jones and His Royal Poinciana Orch. from the Club Tennessee; 9:00-9:30, Dan Gregory and His Dancing Carnival Orchestra; 9:30-10:00, Michael Speciale and His Hotel Carlton Terrace Orch.; 10:10-11:00, Radio Shack Orch.; 11:15-12:00, Intermission; 12:00-2:00 a. m., Midnight Bohemia Show.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Gimbel Brothers' Tea Room Orchestra; 4:00, Mah Jongg Lesson, Mr. and Mrs. Wei Lum Wong; 6:05, St. James Hotel Dinner Dance Orchestra; 7:00, Uncle Wip's bedtime stories.

WLW, Cincinnati, Ohio. (Central, Daylight Saving, 309), 8:00 p. m., Program, Cincinnati Alumni Chapter of the Mu Phi Epsilon Sorority; Vocal selections, Mrs. Anna von Unruh Wooley; Mrs. H. R. Wilson, pianist; Voice, Mrs. Charles Geiser; Songs, Edna Innes; Mrs. Arthur Broomell, pianist; Mrs. Lizette L. Gantenberg, violinist; Vocal duet, Mrs. John Strubbe, Mrs. Elmer Randle; Voice, Mrs. James Hughes; 8:30, "Dixie Stars," Al Bernard and Russel Robinson; 9:00, Talk, "Citizens' Training Camp," Father O'Connor; 9:15, Woody Meyer's Cincinnati Orchestra.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 447.5), 4:20 p. m., Items of interest; 4:30, Program.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Request night, Hotel Gayoso Orchestra, Gasper Pappalardo, director.

WOAW, Omaha, Nebr. (Central, 526), 6:00 p. m., Piano recital by pupils of N. S. Whitt; 6:30-7:30, Dinner program, Randall's Royal Orchestra; 9:00-11:00, Program, courtesy of Benevolent and Protective Order of Elks, featuring the Omaha Elks Band, Henry Cox, director.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt; 7:30, Hotel Adelphia Concert Orchestra, A. Candelori, director; 8:15, Weekly Health Talk, Bureau of Health of Phila.; 9:10, Fox Theater Grand Orchestra, Erno Rapee, director; 10:00, Organ recital, Mary E. Vogt; 10:30, Havana Casino Dance Orchestra from Hotel Sylvania.

WOQ, Kansas City, Mo. (Central, 360), 7:30-8:00 p. m., Popular music program, Liberty Theater Orchestra; Classical music, pipe organ.

WOS, Jefferson City, Mo. (Central, 440.9), 6:00 p. m., Feature program novelty numbers, Frank G. Robertson, champion one-man band artist.

WRC, Washington, D. C. (Eastern, 469), 3:00 p. m., Fashion Developments of the Moment, Women's Wear; 3:10, Songs; 3:25, Current topics, Editor of The International Interpreter; 3:35, Piano recital; 3:50, "What Women Are Doing Today," Mrs. William Atherton Du Puy; 4:00, Songs; 4:10, Book review, auspices of the League of American Penwomen; 6:00, Stories for Children, Peggy Albion; 6:20, Talk on Education, National Education Association.

WSB, Atlanta, Ga. (Central, 429), 8:00-9:00 p. m., Bell Brothers Chicken Pickers Quartet, Darky Harmonists; 10:45, Atlanta Junior Chamber of Commerce entertainment.

WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton; 3:00 p. m., Detroit News Orchestra; 7:00, Detroit News Orchestra.

Tuesday, May 27

CKAC, Montreal, Can. (Eastern, 425), 7:00 p. m., Kiddies' stories in French and English; 7:30, Rex Battle and his Mt. Royal Hotel Dinner Concert Orchestra; 8:30, English musical program, White Star Dominion Liner "Canada" Orchestra; 10:30, Joseph C. Smith and his Dinner Dansant Orchestra.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal concert, Gage Christopher; 8:00-9:00, Ambassador-Max Fisher's Cocoanut Grove Orchestra; 9:00-10:00, Examiner concert; 10:00-11:00, Fullerton Radio Broadcasters.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m., Women's Christian Temperance program of Shenandoah.

KGO, Oakland, Calif. (Pacific, 312), 4:00-5:30 p. m., Concert Orchestra Hotel St. Francis; 8:00, Arion Trio; California Ladies Quartet; Marion Vecki, baritone; Claire Harsha Upshur, soprano; Joyce Holloway Batheison, pianist; Guy B. Kibee, reader; E. Scott Beebe, bass; Ruth Waterman, contralto; Laura Broderick, soprano; "The Science of Properly Raising Children," Max Horwinski; Eva Gruninger Atkinson, soprano.

KGW, Portland, Ore. (Pacific, 492), 12:30 p. m., Concert, Civic Music Club; 3:30, Talk, Jeanette P. Cramer; 7:45, Talk for farmers, Oregon Agricultural College extension service.

WAAM, Newark, N. J. (Eastern, Daylight Saving, 255), 7:00-7:30 p. m., "Star Spangled Banner," James F. Gregory's University Club Orch.; 7:30-7:45, Arline Felker; 7:45-8:00, John O'Malley, tenor; 8:00-8:15, Piedmont Trio; 8:15-8:30, Arundel Cotter in Talk on Men of Prominence in Finance and Industry; 8:30-8:45, Esther M. Knox, whistler; 8:45-9:15, Mount Vernon Male Quartet; 9:15-9:30, Rose Shelby, sopr.; 9:30-9:45, Rudolph Lorbach, saxophonist; 9:45-10:00, Figures Famous in History, Ulysses S. Grant, by Elizabeth Burt; 10:00-10:15, American Warblers' Harmony Aggregation; 10:15-10:30, Chas. Oetjen, Robert G. Evans, Oscar Holden, assisted by the Trianon Melody Ensemble; 10:30-11:15, Erv Bradley's Zippy "Melody Boys."

WAAW, Omaha. (Central, 360), 8:05 p. m., Religious services, St. John's Lutheran Church of Florence, Nebr., Rev. George Kupke, pastor.

WBAV, Columbus, O. (Eastern, 390), 12:00 m., Piano music, Ila Lorbach Owens.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., Music; 6:00, Dinner concert; 10:00, Red Apple club; barn dance.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Joseph N. Black's Saxton Cafe Orchestra; 6:00-7:00, School of the Air, Piano tuning-in number, Duo-Art; address, speaker from the National Livestock and Meat Board; address, Cleirn Zumwalt, M. A.; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon Ensemble; 11:45 p. m.-1:00 a. m., Nighthawk Frolic, the Plantation Players.

WDAP, Chicago, Ill. (Central, Daylight Saving, 360), 7:00-8:00 p. m., Drake Concert Ensemble and Blackstone String Quintette; 8:00-8:30, Barton Organ, Ralph Emerson; 10:00, Marie Kelly, Rosemary Hughes, Fred W. Agard, Frank Greif, Jack Chapman's Orchestra.

WDAR, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., Organ recital, Stanley Theater; 12:30, Arcadia Cafe Concert Orchestra; 2:00, Piano solos, Edna Finestone; Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, Daylight Saving, 492), 11:15 a. m., Rita Rotermel, pianist; 11:35, Motion Picture Talk; 4:00 p. m., Harry Shafron, violinist; 4:15, Francis E. Sims, Jr., baritone; 4:30, Ethel L. Harrison, soprano; 5:00, Children's Program; 6:00-7:00, Dinner Music from Waldorf Astoria; 7:10, "The Brownie Ice Cream Man"; 7:20, Manly Price Boone, tenor; 7:30, Thornton Fisher; 7:40, Harry Roser, banjoist; 8:00, Corn Products Orchestra; 8:30, Brooklyn Eagle News Review; 9:00, Gladys Garreau, violinist; 9:20, talk on Blue Ribbon Mayonnaise; 9:30, Myrtle Essex, soprano; 9:50, Adolph Snyder's Orchestra.

WEAO, Columbus, O. (Eastern, 360), 1:30 p. m., Garden talk, member Ohio State University faculty.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Address, DeWitt McMurray; 8:30-9:30, Musical recital; Mozart Choral Club, Earle D. Behrends, director; 11:00-12:00, Popular music recital, The Texans, R. L. Keith, directing.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, WFI Male Quartet; 6:00, Sunny Jim, the Kiddies' Pal; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra; 10:15, Charlie Kerr and His Symphonic Dance Orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight Saving, 319), 12:30-1:00 p. m., Organ, George Albert Bouchard; 2:30-4:00, The Radio Dealers' Musical Program; 6:30-7:30, Dinner music.

WGY, Schenectady, N. Y. (Eastern, 380), 1:00 p. m., One act play, "The Milliner's Bill," G. W. Godfrey; 7:00-7:30, "The Voice of the City," WGY will introduce to its listeners the peculiar calls of the peddlers, the sound of traffic, music of hurdygurdy, etc.; 7:45, "The American Language," Prof. George Dwight Kellogg; 8:00, Harold Mays Orchestra; "Historical New England," Sidnery W. Ashe; James C. Morton, tenor; "Artificial Lightning," Giuseppe Faccioli.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; Alamo Theater Orchestra; 7:30-9:00, Agricultural Tabloid talk; Earl Elliott's Falls Cities' Serenaders.

WHB, Kansas City, Mo. (Central, 411), 2:00-3:00 p. m., Ladies' Hour program, direction of George Parrish; 7:00-7:30, Semi-classical music, Sweeney Radio Orchestra; 8:00-10:00, Dance music, Sweeney Radio Orchestra.

WHN, New York, N. Y. (Eastern Daylight Savings, 360), 2:15-2:45 p. m., Edw. B. Marks Music Co.; 2:45-3:15, Jess Stern's Dance Orch.; 3:45-4:15, Bob Schaefer and His Entertainers assisted by the Original Georgia Five; 4:30-4:45, Three Ward Children; 5:00-5:30 Louie Cohen's Orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 1:00 p. m., Organ recital, Karl Bonawitz, Germantown Theater; 6:05, Dick Regan and his WIP Concert Orchestra; 7:00, Uncle Wip's bedtime stories; 8:00, Philadelphia Police Band, direction Lieut. Joseph Kiefer; 10:00, Ted Weems and his Victor Recording Orchestra.

WJAX, Cleveland, Ohio, (Eastern, 390), Program arranged by Cleveland News-Leader; Bedtime story, E. G. Johnson; Radio Talk Cartoon, Don Palmer; Selections, Ashland (Ohio) Mandolin Club; Selections, Baker & Kimball's Old-time Orchestra; Talk, Joe Bolo, Golf expert; Dance program, Spitalny's Hanna Bldg. Restaurant Orchestra.

WLW, Cincinnati, Ohio. (Central, Daylight Saving, 309), 10:00 p. m., Special concert, Starr Piano Company; Harry Frankel and other Genette Record artists; Women's Club Quartet, Mrs. Frank Shattuck, Beatrice Tutman, Katherine Dineen, Mary Louise Hand; Songs, Harry L. Riggs; William G. Stoess, violinist; Dixie Stars, Al. Bernard and Russell Robinson; 12:00, Chubb-Stenberg Orchestra.

WMAQ, Chicago, Ill. (Central, Daylight Saving, 447.5), 4:20 p. m., Items of interest; 4:30, Glenn Dillard Gunn School pupils; 5:00, Child Life stories; 8:00, Chemistry lecture; Harry Hansen, literary editor; Hotel La Salle Orchestra; Lecture, U. of Chicago; 9:30, Lyon & Healy concert.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Mrs. David Wayne Naxwell, director; 11:00, Midnight frolic, Burk's Dance Orchestra.

WOAW, Omaha, Nebr. (Central, 526), 6:00 p. m., Program by Saunders Grade School Orchestra; 6:30-7:30, Dinner program, Pat's Melody Boys; 9:00-11:00, Program, courtesy of Midland College.

WOO, Philadelphia, Pa. (Eastern, Daylight Saving, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45, Organ recital, Mary E. Vogt.

WOQ, Kansas City, Mo. (Central, 360), 8:00-9:30 p. m., Program of classical music, Samuel Adair, director.

WOR, Newark, N. J. (Eastern, Daylight Saving, 405), 2:30-2:45 p. m., Talk thru Courtesy of Charm Magazine; 8:00-8:15, "I See by the Papers," says McCosker; 8:15-9:00, Program under direction of Harold Flammer.

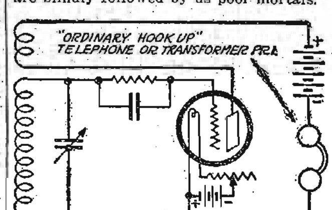
WRC, Washington, D. C. (Eastern, 469), 6:00 p. m., Children's stories and songs, Peggy Albion and Marguerite Meaking; 7:00, Musical program, Crandall's Tivoli Theater; 8:00, Walter O'Leary, baritone; 8:30, Verona Horen, soprano; 9:00, "The Political Situation in Washington Tonight," Frederic W. Wile; 9:20, Trio, Irving Boernstein's Wardman Park Hotel Orchestra.

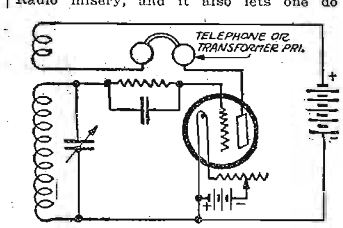
WSB, Atlanta, Ga. (Central, 429), 8:00-9:00 p. m., Vick Myers Melody Orchestra; 10:45, Rainbow Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 8:00 a. m., Setting-up exercises, R. J. Horton; 9:45, Fred Shaw, pianist; 3:00, Detroit News Orchestra; 7:00, Detroit News Orchestra.

Tickler Feedback Connection

Pick up any book or publication that gives a diagram of a circuit using tickler feedback and the majority of them will show the plate connected directly to the tickler coil and some of these diagrams are blindly followed by us poor mortals.





Now instead of connecting the plate to the tickler if you will connect the plate to the transformer primary or phones you will get distinct voice and music (good modulation), and as you build up one or two steps of audio amplification you will still get clear, natural tones instead of the usual sharp and tinny tones.

I have not see the circuit yet that beats or equals three honeycomb coils, for I have heard with them from Canada to Brazil (Rio de Janeiro), using three steps of amplification, one VT and three 216 A tubes.

If some one had told me of the simple change I have referred to above I would have had at least three years less of Radio misery, and it also lets one do considerable DX, even if the static is using this country for a frying pan at this time of the year.

What these brainstorm diagrams showered over the world need is some hard, cold facts that hit the same nail every time.

Radio has plenty of griefs without giving the apprentice a left-hand monkey wrench to start with.—Geo. Tate, Dallas, Tex.

How to Make a Superdyne 4-Tube Wonder Set

Simple Construction of the Popular Receiver of Today

By Lewis A. Morrison

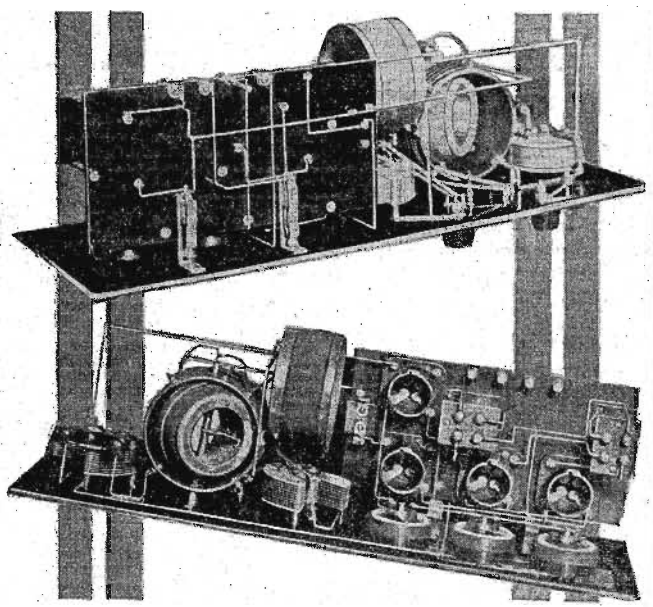
THE superdyne circuit is becoming popular every day with Radiophans because it is a comparatively easy set to build; gives remarkable volume and clear speech, and produces DX results with a short indoor aerial that here-to-fore have only been accomplished with a good out-door antenna system.

While admitting that Radio is far from perfect, the superdyne is a great step toward that end. However, we cannot approach perfection without some saerifices and the superdyne is no exception. It is to help the novice over the bumps that this article is written.

Although easy to build, there is no set which reflects the care and pains of the builder with more satisfaction than the superdyne. You cannot throw this set together as you can some others and expect results. This has been the reason for many experimenters discarding the circuit with the excuse of "well it may work some plaees but not in my location." Superdyne will work in practically any location and without an aerial at that.

Laying Out Panel

In laying the set out on a panel, the most satisfactory arrangement is to mount the coupler between the condensers with the plate coil at right angles to the coupler and behind the plate condenser. A small piece of bakelite can be attached to the first or grid condenser for the aerial and ground binding posts, as shown in the photograph. A neat back panel arrangement, is to attacb the jacks as low as possible to the main panel and by drilling holes in the body of the jacks, use them as angles for the support of the back panel. In placing the tube sockets, permit the grid condenser, (a .00025 mfd.) to come as close as possible to the grid terminal of the detector or second tube. Best results will be obtained by using a separate



rheostat for the Radio frequency tube which will necessitate three rheostats for the complete set. The two audio frequency tubes are controlled by a single rheostat.

Although not shown in many diagrams of this circuit a grid leak is strongly advised. However, it should not be used across the grid condenser, but rather from the grid of the detector tube to the positive filament. This gridleak is not critical but will vary with the type of tube used. It should be placed close to the grid of the detector tube socket.

Now a word about the selection of parts. Be sure the coils are wound to specifications and although in contradiction to previous articles, these specifications can be altered slightly with good results. However, it is best for the novice to have them correct.

The coupler should be wound with 42 turns number 22 dsc wire tapped at the 20th turn. On top of this winding and spaced approximately ¼-inch, wind 4 turns of a somewhat heavy insulated stranded wire such as lamp cord. This is to act as the untuned aerial circuit. Have these terminals come on the left side of the stator. The ball rotor should have 36 turns of the same wire. The plate coil, 46 turns, tapped at the 21st turn. The bakelite tubing should be 4 inches in diameter. The taps can be elliminated if the builder so desires and the set will tune as low as 300 meters without them. Two separate tap switches may be used, but a double pole double throw switch is better and with the push-pull type of switch now on the market, makes an attractive arrangement.

Variable Condensers

This is a delicate subject. Too much stress can not be laid on the necessity for good condensers. This does not mean the most expensive condenser, but it does mean that they must be of good material, preferably bakelite and most important of all, the bearings of the movable plates should be constructed to give a minimum electrical resistance. The superdyne set is peculiarly sensitive to resistance in condenser bearings. Do not use vernier condensers of a type that employ an extra movable plate, unless the plates are joined by pigtails. Vernier condensers are not necessary, but if they are desired, use a type that em-

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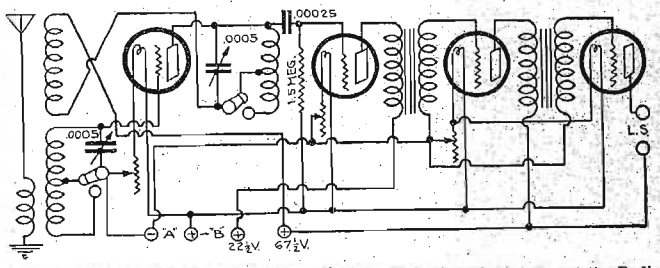
4-TUBE WONDER SET

(Continued from page 23)

ploys a reduced ratio movement of the main shaft.

UV-201A and C-301A are excellent Radio frequency tubes with a 30-ohm rheostat on negative filament; however, there is a marked difference in individual tubes, a small percentage being much better Radio frequency amplifiers than the general run. Any good soft tube will answer for a detector. A VT-1 or J tube being exceptionally good in this circuit. The detector plate voltage will make a



marked difference in the sweetness of musical tones, but is not very critical.

Amplification

The audio amplifier follows the general outline of any good two step, except that it is advisable to use transformers of a low or medium ratio. Because of the great volume this set gives, a small fixed condenser of .001 or .002 mfd, as the case may be, placed across the secondary of the last transformer, will greatly soften and improve the quality of the tone produced, but this is optional.

Now a word about operating this circuit. Many a good superdyne has been tried and discarded because the operator had not acquired the knack of tuning. The writer himself, an experienced Radio man, was quite disappointed with the first night's results, but once the trick is accomplished it becomes a simple matter. It has been said that the superdyne is not selective and such will be the case if it is not handled properly. However, with proper operation the writer has on numerous occasions brought in WDAP, Chicago, 800 miles distant, right through WHN, less than 3 miles distant, both stations scheduled to operate on 360 meters. That is selectivity enough. The first thing to determine on completion of the set is, does it "superdyne?" This circuit has the peculiarity of producing some results even though not wired correctly and is apt to fool the novice into believing that the set is wired correctly but N. G. This can best be determined by lighting the filaments of all four tubes, and with the taps in position for long wave lengths, rotate the ball rotor to a horizontal position, making mental note of which face of the rotor is up. By operating both condensers in unison as though they were geared together, one of two things will happen. Either a beat note or squeal will be produced or a station will be tuned in. If the first takes place, turn out the Radio frequency tube, when it should be possible to tune in the station on three tubes. This position of the ball rotor is that of the positive feedback. If the second condition takes place, and a station is tuned in, turn the Radio frequency tube out, when the signals should disappear. This position of the ball rotor is that of negative feedback and the proper position for superdyne. Now with the ball rotor in the negative feedback position and all tubes going, rotate both condensers until a station is heard, then turn the ball rotor toward the vertical, when a position will be found that will produce a sharp snap in the horn, showing that the oscillating point is reached. Now, by operating the grid coil or first condenser against the ball rotor, a combination will be reached that will produce clear and loud results. The finer this adjustment, the more sensitive and louder the signals will come in. This last adjustment is quite critical and when mastered will produce great selectivity.

Of course, these tests should be made when a near-by station is known to be on the air. Variations from this rule will be developed by the individual as he acquires skill in tuning, but if everything is as it should be, they will not fail to produce results.

The superdyne circuit embodies qualities which make it the best circuit so far produced for the broadcast listener. It will take summer weather for its real worth to be appreciated, for then with a small indoor aerial or no aerial at all, thus reducing static, volume and DX results will be a surprise to all who try it.

Coast to coast Radio reception is now possible for us all without the outlay of a king's ransom, proving that:

All things come to him who waits, but here's a rule that's slicker: He who goes after what he wants, will get it all the quicker.

PORTABLE SET FOR AUTO

(Continued from page 13)

cover gave slightly better results. The framework of the car was used for a ground connection when running, while a stake driven in the ground, when stopping anywhere, gave considerably better results.

Loud Speaker

The loud speaker was very conveniently strapped to the side frames of the windshield. Some pieces of large, heavy rubber bands were used to cushion the loudspeaker against the metal framework of the windshield wherever they came in contact.

A pair of headphones should be kept in some convenient spot, preferably the pocket in the front door, as tuning in on a loudspeaker when car is in motion is by no means a simple matter.

As the depth of this set is only 5⅛ inches below the lower edge of the dashboard the passenger next to the driver will experience no discomfort in placing the feet underneath the set. With a set not properly designed the position of the set might make it decidedly uncomfortable for this passenger.

The Auto-Portable Receiver

In last week's article of this series the hook-up diagram of the circuit was shown and a list of parts required was given. In this article, Figure 2, is the panel layout and Figure 3 is the baseboard layout.

Front Panel

The front panel requires a piece of ⅜-inch stock measuring 12 by 5⅛ inches. The two tuning condensers are mounted on the left and right hand sides. Only the shaft holes are indicated, the mounting holes depend on the type of condenser used and should be added as required.

The two knobs in the center are the two rheostat controls, the left one being used for the two amplifier tubes and the right for the detector tube. The hole in the center just under the two knobs is for the battery switch. The one directly beneath that is for the single-circuit jack.

The four holes, two on each side of this jack, are for the battery connections.

The small single-connection jacks were used so that connections can be made by just pushing in the small tip plugs fastened to the battery leads.

The hole in the upper left-hand corner is for the switch controlling the connections for loop aerial use. This was indicated as a four-spring jack switch in the circuit diagram.

In the center at the top and on the right and left sides of the lower edge of this panel layout are indicated in dotted lines some angle plates that were used to fasten the top panel and baseplate to this front panel. These pieces will be detailed later.

Base Layout

Figure 3 serves a double purpose. It gives the size and drilling layout of the baseboard and also gives the apparatus layout inside of the set. This baseboard can be made of wood, but it is advisable that panel stock be used. The size should be 7 by 11¼ inches.

The tube sockets in the upper left and right hand corners are the two amplifiers, while the one in the center is the detector. This corresponds to the arrangement in the circuit diagram of last issue.

The first audio frequency transformer in this base layout is the lower one shown

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An Easy Way of Charging Storage B Batteries

Connections for Bulb Rectifiers as Charging Units

By A. R. Leinbach

DOUBTLESS every possessor of a storage B battery has tried the electrolytic rectifier method of recharging it and found it rather unsatisfactory and bothersome. A much simpler and more convenient method is to use the bulb rectifier that is used to charge the A battery. All that is necessary is to make a slight change and addition to the wiring. The writer has been using this method for over a year with excellent results and has changed quite a number of rectifiers for friends.

In the diagram 1, a bulb rectifier schematic diagram is shown of the internal connections. The same thing with the necessary changes made is shown in 2. The standard connections of the old type charger is shown in 3 and the revised connections are given in 4.

Although the diagrams tell the whole story, a step by step description of the necessary changes will be given.

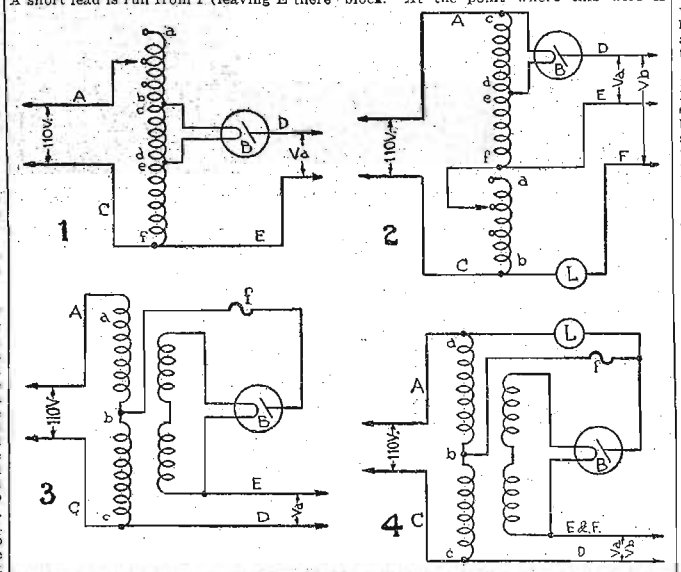
Making the Change

If it is desired to charge a battery of about 60 to 70 volts or less, it is only necessary to add one wire to the diagram 1. This wire should be attached to the 110 volt feed wire marked A, the other end being attached to the positive or plus side of the battery, making sure to connect a lamp in the series of about 100 watts. The negative side of the battery is connected to the wire marked D, which is the lead with the black or unmarked lead. The battery lead with the red mark or red lead marked E on the diagram is not used when charging the B battery. Leads D and E, the leads equipped with clamps, may be used as before for charging the A battery. Caution—Do not attempt to charge both A and B batteries at the same time, as that will put alternating current through the B battery and probably ruin it. This method will provide about 60 volts direct current reading on a direct current voltmeter when no battery is connected. When charging a higher voltage will be obtained. It is not necessary to trace out any wires or even remove the charger from its case to get this connection. Merely attach the wire specified for attaching to A one of the 110 volt leads and connect to the battery as directed above. If the battery starts gassing, the right wire was selected. If not, change to the other wire. No diagram is given for this case.

If it is desired to charge a battery of 90 to 100 volts or less the schemes shown in 2 and 4 should be used. These may also be used for larger batteries by dividing it into two or more parts and connecting them in parallel. To change from 1 to 2, disconnect A from a, b from c, and C from f. A should then be connectd to c, one side of the tube socket. C goes to b with another wire attached at the same point, which is connected to a lamp socket and from there (wire F) to positive B battery. A short lead is run from f (leaving E there also) to a, the connection block provided at the top for taking care of different alternating current voltages of 105, 115, and 125. Va, the voltage between D and E, is the supply for charging the A battery (these are the same leads as previously used, the ones provided with clamps) and the black lead D and the new lead F are used for the B battery, D being negative or minus and F positive or plus. Vb, the voltage between D and F, is used for charging the B battery, the black lead D going to the negative side of the battery. The same caution given for the previous case applies here for both A and B batteries cannot be charged at the same time.

In the case of the old style rectifier, considerably less work is required. In this, as in the one above, the case should be removed. A wire will be seen running from the plate (top) of the tube to a fuse block. At the point where this wire is attached to the latter, attach another wire which should go to a lamp socket. From the lamp socket, this wire should go to the 110-volt lead A. As in the first case, it is not necessary to trace out the 110-volt leads in order to find the correct one (though it will probably be most convenient to attach same inside of the case), but it can be attached to one of the leads and the battery connected. If the battery gasses, it is O. K. If not, change to the other 110-volt lead. When charging the A battery, the lead marked E and F with the red lead and clamp should be connected to positive and D, the black lead to negative, with no lamp in the socket. To charge the B battery, remove the fuse and put a lamp in the socket just provided for it. Never try to charge either battery with both a lamp and a fuse in circuit. A lamp and no fuse for the B and a fuse and no lamp for the A is required.

It will be noted that a 100-watt lamp was specified in the first case. This is not an iron-clad rule, as any suitable size lamp may be used. When charging a large battery in several parallel sections, a larger lamp will be required. The author, for example, is using a bulb charger connected like the circuit 2 to charge a 108 cell (approximately 150 volts) battery in two parallel sections, using a 200-watt lamp. The best charging rate to use is one-quarter ampere, though it is only necessary to adhere closely to this value for lead plate batteries, as the batteries composed of Edison elements are practically impossible to injure. If the battery gasses moderately but not violently, the charge is about right.



SUPER-HET DETAILS

(Continued from page 21)

ing on the condenser. The thing to bear in mind is the avoidance of the paste running into the condenser.

I do not want to get borcsome on the subject of short leads, but if all of you who are reading this could have seen the simple regenerative receiver made by E. T. Flewelling and exhibited at the Chicago Radio Show last November you would never again run a lot of unsightly looking leads all over the set.

Most of us run in ruts and follow precedent. We make a set with a cabinet and binding posts and square turns only because it is customary to do so. Then someone comes along and tells you to use no wire at all, or something else, and the first thing you think of is that the set won't look good. What are you making? An ornament, or a Radio set that will work better than the ordinary? Make your ornament out of the cabinet, but for goodness' sake don't try to make an ornament out of the insides!

Set Ready to Operate

Now that you have the set all wired up according to instructions, it should be ready to operate. The first thing to do is to connect up the loop and the A battery, then insert one (one only) tube in any of the sockets. Pull the switch and see if the voltmeter reads correctly. It should. If it does, then turn the rheostat controlling the current to the tube you have in the socket. The tube should light. If it doesn't, the trouble is probably in the prongs on the tube not making good contact with the prongs in the socket. Fix this, then try the tube in each socket, testing the rheostats and satisfying yourself that the tube makes good contact in the socket.

This completes the testing of the individual tube sockets. Now remove the tube and leave the A battery connected. Get an ordinary 110-volt lamp such as you use for lighting purposes in the house. Connect a short length of wire to the 90-volt binding post on the set. Now connect the negative terminal of the B battery to the set at its proper binding post. Now hold the bulb in your right hand with the bottom contact on the 90-volt terminal of the B battery. Then touch the short lead from the set to the side contact on the lamp. If the lamp lights you have a short circuit in the wiring of the set. If you have the set wired correctly the lamp will not light. Assuming that you have it correct, then remove the short lead from the binding post and connect the B battery, both the 22½-volt and the 90-volt terminals to their respective binding posts. Now connect the C battery in place but be sure you have the polarity correct.

You can now feel safe in inserting the tubes in the sockets. After putting in the tubes, plug in the loud speaker, set the oscillator condenser on or between 20 and 30 and set the wave length condenser at 20 or 25, place the wave change switch on long, adjust the rheostats on all tubes, then vary the potentiometer. If the set is correctly wired you will cause it to howl or stop howling by varying the potentiometer. If the set doesn't howl in this condition readjust the rheostats with one hand, at the same time varying the potentiometer. If this doesn't help, then try pressing down on the tubes in the sockets. It may be that they are not making good contact. Assuming that you have wired the set correctly and get the howl, then swing the potentiometer around until it stops howling and let it stay there. Now go to the oscillator condenser and as you move it one way or the other over the scale you will get a series of whistles. This will tell you plainly that the set is working.

Tuning-in Stations

To tune in a station for the first time requires a great deal of patience, as the tuning of a super is a knack that is acquired with practice only. You must learn it yourself. No one can teach it to you. It's like playing a piano—the instructor can show you how you can get music out of it, but if you don't learn how yourself you will never be able to play. Set the potentiometer at a point where the tubes almost howl, then vary the oscillator slowly with the vernier; start at about 15 on the dial and go up the scale. If you hear the station at all you can hear them on the loud speaker.

Let the potentiometer alone when you are varying the oscillator condenser. While you are adjusting the oscillator condenser, move the wave length condenser along with it. When you have picked up a station get its best point on the oscillator condenser, then vary the wave length condenser to its loudest point, then swing the loop so as to bring it in best, then, lastly, readjust the potentiometer to its best point.

After you have operated the set for a while you will discover that the loop direction and the wave length condenser are not so critical as you thought they were. You will also find a number of places on the oscillator dial where you can pick up the same station without changing any other control. There is one pair of points where you will get the station loudest, and even one of these is the louder. The rest of the points are due to harmonics and are not discussed here.

You will find in operating that all you have to do is adjust the oscillator condenser, as the setting of the wave length condenser can be approximated closely enough. You will also find that once the rheostats and potentiometer are adjusted you won't have to bother about them again.

After the set is going and you have learned how to adjust and bring in stations you can try changing the tubes around. Sometimes it happens that certain tubes are noisy. If you find any that are, it is best to take them out of the set entirely or use them as detectors, because sometimes the noisy tubes are only noisy on the higher plate voltages, and using them as detector tubes on lower plate voltages cuts out the noise and enables you to use the tubes.

I do not advocate shielding the set, as if it is wired correctly the body capacity effect is negligible. The set made by the writer has absolutely no body capacity at all and is not shielded.

(THE END)

Review of Books

The Radio Amateur's Handbook. By A. Frederick Collins. A new revised edition of this book is just out. It is complete, authentic and informative work on Radio. Fully illustrated. Price, $1.50.

Vacuum Tube Receivers. By O. F. Heslar. A book that tells how to make a simple set. How to make the cabinet. It includes a 27 by 36-inch layout blueprint. Price, 75 cents.

How to Retail Radio. A new book telling of tested plans and methods and policies for the dealer in Radio. Financing, location, store equipment and arrangement. Price, $2.

Home Radio—How to Make It. By A. Hyatt Verrill. This book is particularly adapted for the amateur who desires to know how to make Radiophones. Twelve full page illustrations and diagrams. Price, 75 cents.

Radio for the Amateur. By A. H. Packer and R. R. Haugh. The underlying principles of Radio thoroughly explained in simple language and understandable illustrations. This book will teach you how to construct and operate a receiving set successfully. Price, $1.50.

Amateur Radio Call Book. We have a few copies of this valuable book of the fourth edition. It contains a list of amateurs, special amateurs, technical and training stations. Tells how to construct a Reinartz tuner, detector and amplifier. A two-color map comes with it. Original cost, $1. While they last, 50 cents.

Radio Reception. By Harry J. Marx, Technical Editor Radio Digest Illustrated, and Adrian Van Mufflin. A simple treatise on Radio reception. Beginning with the elementary principles of electricity it carries the reader on into the essentials of Radio telephony. The most successful methods of Radio reception are explained and special attention given to practical tuning. Price, $2.00.

Elements of Radio Communication. By Ellery W. Stone. A splendid, well connected, complete, accurate and up-to-date discussion of every phase of Radio telegraphy and Radio telephony. Written in simple language. The subject is presented from the physical rather than from the mathematical staudpoint, avoiding the use of higher mathematics. Price, $2.50.

The A. B. C. of Vacuum Tubes. By E. H Lewis. It is a book for beginners who hav no knowledge of either Radio or electricity and sets forth the elementary principles of theory and operation of the vacuum tube. No attempt has been made in this book to describe all the possible circuit arrangements, but those shown may servo as suggestions to experimenters who desire to evolve their own circuits. Price, $1.00.

Idcas for the Radio Experimenter's Laboratory. By M. B. Sleeper. This book tells in a simple way the how and why of Radio apparatus. Comprehensive data are given on such necessary laboratory instruments as the oscillator, wavemeter, direction finder, Radio compass, vacuum tube, charactoristic measuring set and detailed advice given on the winding of various kinds of standard inductance coils. Priee, 75 cents.

The book department of the Radio Digest is prepared to send you any of the books on Radio published, whether listed in our Book Review or not. Let us know what book you want, send us your check and we will see that the book is mailed to you. Postage stamps in payment for books not accepted. Send money order or check. Radio Book Department, Radio Digest, 510 N. Dearborn St., Chicago, Ill.

Two Simple Coils Add Greatly to Set

Range Increased with The Additional Coils

Everyone possessing receiving sets of the three-circuit type, employing two variometers and a variocoupler, should try this simple addition to their sets. Only two coils are required, these being preferably of the honeycomb type. You will need one of about 50 turns and the other of about 75; however, it would be better to experiment with different sizes to see which will give the best results. The method of connecting these coils in the circuit is shown in the diagram, a switch lever being used to short them when it is desired to throw them out of the circuit. You will also note that the negative of the B battery connects to the positive of the A, and the negative of the A connects to the variocoupler. I have found that this method is far the best of the others.

The adding of the two honeycomb coils does not seem to change the wave length of the set in any way, but greatly increases the volume and makes the tuning much easier; also they bring in many stations that cannot be heard otherwise. By the addition of the coils to a set of standard instrumeuts (which will tune up to 600 meters), stations on all wave lengths from 200 up to 600 meters can be heard more loudly than before and many stations can be heard that were impossible to hear before their addition. These coils, besides making the set more easily to tune, make the stations more easily to be held, and fading is hardly noticeable.—Evermont Fisel, Lebanon Junction, Ky.

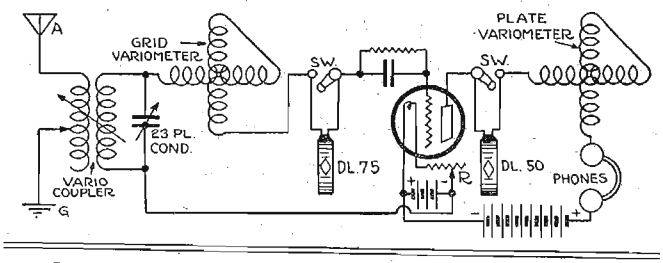
A vacuum tube is fragile; do not handle it like an ordinary incandescent lamp.

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.

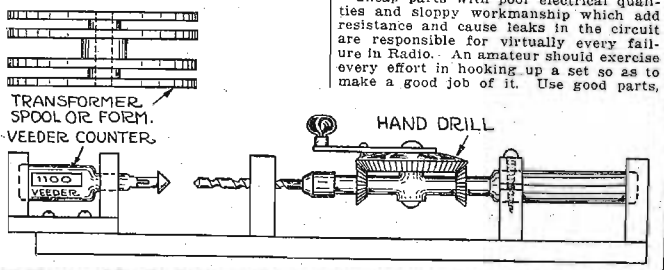
RADIO KINKS DEPARTMENT,
Radio Digest,
510 North Dearborn St., Chicago

POSITION OF HONEYCOMB COILS



Homemade Coil Winder

Usually the maker of home built apparatus has a hand or breast drill. This handy tool can be used for a number of things besides just drilling holes. The illustration shows a way in which coils may be wound for the Radio apparatus by the application of this drilling tool.



No dimensions are given as these will depend on the hand drill used. Three standards mount the drill on a base that is long enough to mount a small numbering machine or shaft revolution counter. A drill point may be used for turning the coil core.—H. K. Mayer, Ft. Collins, Colo.

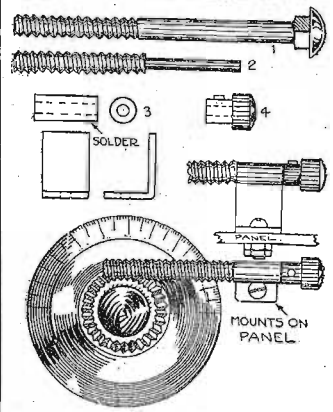
Rules for Efficiency

Cheap parts with poor electrical qualities and sloppy workmanship which add resistance and cause leaks in the circuit are responsible for virtually every failure in Radio. An amateur should exercise every effort in hooking up a set so as to make a good job of it. Use good parts, arrange them neatly and efficiently in the cabinet, keep all wires well separated and exercise great care in soldering connections. If these rules are followed, success is almost sure to follow.

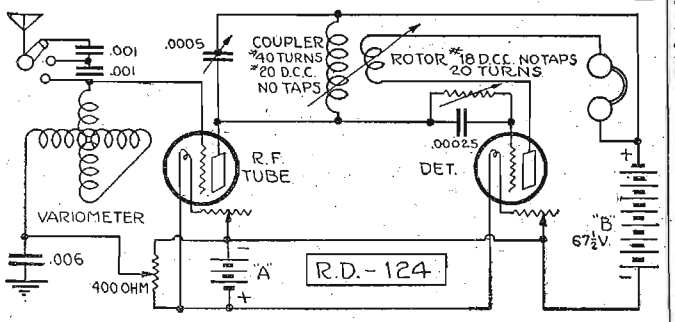
Vernier Attachment for Regular Dial or Knob

The vernier attachment shown can be applied to any one of the different types of knobs and dials in use. It is simple in construction and efficient in operation and can be made without the purchase of any parts.

The device consists of a bolt (1), which is cut off and turned down, as shown in sketch 2. The bracket and knob for this bolt are shown in 3 and 4. The bracket holding the bolt mounts on the panel in such a position where the threads will come in contact with the ribs of the knob or dial. The illustration is self-explanatory.—John Schute, S. Boston, Mass.



REGENERATIVE RADIO FREQUENCY



HERE is another English circuit, R. D.-124, with one stage of Radio frequency amplification and a regenerative detector. There are three major and five minor dial controls. The operation of these controls is very simple and the fan need not worry about any difficulties in tuning.

Audio frequency amplification can be added by inserting the primary of the transformer in place of the phones. The use of A tubes is recommended.

The capacity switch in the antenna lead takes care of all possible variations of antenna wave length. This control does not require much variation once the best setting is determined.

Tuning Instructions

Turn the rotor of the coupler, so that it is at right angles to the outside tube. Turn variometer dial to the left from its zero position. Ten to fifteen degrees will bring in stations in the neighborhood of 360 meters and the condenser dial must now be moved to bring the circuit in to resonance. The rotor of coupler is slightly turned, which gives the regeneration and increases the volume. If turned too far distortion results, and it will be easily learned just how much regeneration can be successfully employed. It will be apparent that tuning is accomplished by the use of two controls, and when hunting for a station both the variometer and variable condenser must be moved together.

The potentiometer should be set with the lever approximately in the center and need not be readjusted once the proper setting is ascertained.

As tuned Radio frequency is indicated the volume and sensitivity of the one stage will equal the volume of three stages of uutuned transformers.

The selectivity is superior to that of a single circuit, as the Radio frequency circuit must also be tuned. It is possible that there will be some difficulty in separating two stations operating on a small difference in wave length, particularly if the set is fairly close to two such stations. This, however, is true of practically any other receiving set regardless of the circuits in the tuner.

THIRTY MINUTE A-B-C

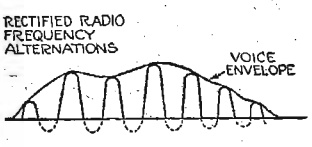
(Continued from page 19)

a circuit combination. This is shown in Figure 104.

Detector Action

The circuit of Figure 105 illustrates detector action. The Radio frequency current from the tuner sets up a Radio frequency potential on the grid. The function of the grid leak condenser is to maintain an initial potential on the grid favorable to the detector action.

Detecting means rectification. The vacuum tube must let one-half cycle pass better than the next half cycle, otherwise the tube will only amplify the Radio frequency input. That is what a tube connected for detector action does, as the reversing frequency finds a good path in one direction and a very poor path back. The plate current then gets a series of half cycles at Radio frequency, which means current flowing in one direction. The windings of the phones then smooth this out into a voice current as originally carried by the incoming frequency. This is illustrated in Figure 106.



DETECTOR ACTION
Figure 106

With a soft tube or a tube containing some gas such rectifier action is possible without the use of a grid condenser. Or with hard tubes, sufficient plate current will permit detector action without the grid condenser.

Other Forms of Vacuum Tubes

Special types of vacuum tubes are used for power purposes, for rectification only, for special circuits, etc. Figure 107 shows a tube with plate but no grid. It can act as a rectifier.

Figure 108 diagrams a tube with two grids, so that all three actions, detection, audio amplification, and Radio amplification occur together in the one unit.

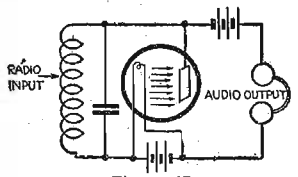


Figure 107

The essential points are that a potential can be applied to a grid as a steady potential or a fluctuating one, or as a frequency, Radio or audio, to control local energy supplied as plate current.

Practical Pointers on Vacuum Tubes

The sensitive tubes used as detectors mean that a very small incoming Radio frequency impressed on the grid can control the plate current. Poor detector tubes require a much larger initial energy to operate the grid.

If the plate battery is connected to the filament, it will send a large rush of current through and burn it out. Don't!

A soft tube means one containing some gas. It will work better as a detector because more critical, so that smaller grid energy is necessary for operation.

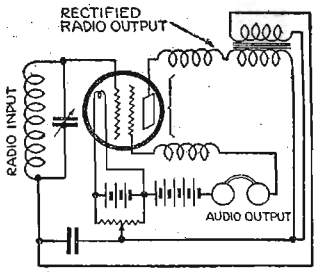


Figure 108

Vacuum tubes on the market, even of the same type and make, vary considerably from one another, due to variations in manufacture, but on the average, perform with reasonable uniformity. Sometimes changing tubes around in a set will improve the operation. Do not have the battery ON while changing tubes as this may result in burned-out filaments.

(Is your wife an ex-stenographer—or did you ever form "pot hooks?" Mr. Edelman will devote next week's lesson to "What Radio Shorthand Means."—Editor's Note.)

PORTABLE SET FOR AUTO

(Continued from page 24)

in the hook-up diagram. The second audio frequency transformer of the base layout is the upper right side one of the circuit drawing.

The two coils and condenser units shown (dotted) will be described later.

The proper placing of the sockets and transformers is indicated by the terminal markings that are shown on each in the illustration.

(Owners of Dodge cars will have their inning next issue when Mr. Marx shows what to do to enjoy broadcast pleasures while rolling along the road in this make of automobile.—Editor's Note.)

Inductance and Capacity of Loop Type Aerials

Properly Constructed Loop Gives Good Results

By R. H. Langley

THE loop antenna is a very interesting device. It is quite different in its method of operation from the outdoor antenna. The outdoor antenna is in effect nothing more nor less than a condenser. It is a very large condenser to be sure so far as its physical dimensions are concerned, but electrically it is a relatively small one. The loop on the other hand is an inductance. This fundamental difference between the two is the reason why it is necessary to use different methods of tuning in the two cases.

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

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

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

Voltage Generated

Let us see now what form of loop would have the greatest voltage generated in it by a passing Radio wave. Let us think of this Radio wave as very much like great smooth waves on the ocean, which of course, also move forward with a very definite velocity. The turns of wire on our loop antenna are necessarily in series with each other, that is to say, they form a continuous winding. If the maximum voltage is to be generated in any one turn of the loop, then the voltage generated in the two sides of this turn should be in opposite direction so that they may add and not oppose each other. If the voltage generated in both sides of the loop were in the upward direction at any one instance, then these two voltages would cancel each other, but if the voltage on one side of the turn was up and on the other side of turn, it was down, then they would add and if the loop were connected to a receiver, a current would flow around the turns of the loop. This is, of course, exactly what we wish to have happen.

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

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

Wave Length of Loop

But a loop one-half a wave length long is quite out of the question. It would be as long as a steamship and almost as difficult to handle. The loops which we are using every day are of quite reasonable dimensions. They are only a few thousandths of a wave length long. How do they function? In order to answer this question let us ask ourselves how we would build a coil of wire in order that absolutely no voltage should be generated in it by the passing wave. The only way in which this could be accomplished would be to so build the coil that the same voltage would be generated in both sides of it and that the voltages generated in the two sides would be opposed to each other. This would give a complete cancellation and no voltage at all at the terminals of the loop or coil. It is obvious that the only way in which this could be done would be by so arranging the loop that it had no length at all. That is to say, arranging it so that the two sides were exactly in the same position in space. This would mean that the horizontal wires across the top and bottom of the loop would cease to exist and the loop would become nothing but a wire laced up and down between pegs on the plain surface of a board.

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

Directional Properties

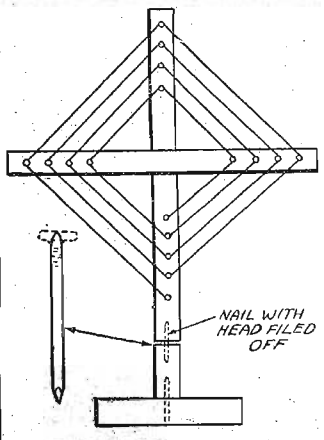
If the loop is rotated so that its horizontal wires are at right angles to the direction in which the signal is coming, then the loop has no length so far as those signals are concerned. The passing wave strikes both sides of each turn in the loop at exactly the same instance and the voltages generated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

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

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

Homemade Loop

The illustration shows the construction of a loop that can be easily put together at home. The tools necessary are a saw, hammer and file. The parts required are



four pieces of wood, two for the frame and two for the base. How to put it together is clearly shown.—Curtis Springer, Indianapolis, Ind.

Questions and Answers

Spark Reception

(07202) TWD, Columbia, S. C.

My reason for writing is for your explanation of the queer manner, or queer way our Radio receiving set acted the other morning.

It was on the morning of February 1st, at about eleven forty-five a. m.

Weather condition—Warm, very dark clouds, very slow drizzling rain, no lightning nor thunder.

Radio Set—Radiola V with loud speaker, four 24-volt B batteries connected to set; large 6-volt A battery. The A battery was not connected to the set and it was about 15 feet away from the set with no wire connection. No lightning arrester was connected to the antenna.

At the above time stated there was no one operating the set, neither was it turned on. Several men were sitting about 10 feet away when they heard a funny noise in the set. One of them looked in the set and found it throwing out large electric sparks. Disconnecting the B batteries, he received a shock at the same time, but that did not help at all. Disconnecting the antenna wire from the set, the sparks quit coming from the machine, but when the antenna wire was held within 6 inches of any metal, a strong spark would pass from the wire to the metal.

This went on for about ten minutes. At the same time other men were going over the antenna carefully but could not find any electric wires on or near the antenna, as it is 100 feet high on one end and 80 feet high on the other end. It is hooked to a large steel tower on one end, and on the other to an iron pipe on top of a two-story brick building, but there are no wires connected to the tower whatsoever, and only telephone and light wires to the building.

A.—We are advising in your inquiry that the action in your receiver as described is not an uncommon occurrence and is due to atmospheric conditions solely. We have numerous citations of a similar action under weather conditions like those prevailing at the time your attention was engaged in the display of electrical phenomena.

No concern need be entertained as there is no hazard involved.

Super-Triplex

(07053) WCC, Minneapolis, Minn.

I have arrived at the point of success or failure on your super-triplex hook-up. The set is full of "whiskers" on amplification, which occurs only on the two amplifying steps, the detector being perfectly clear. I am getting distance and volume but am unable to clear up the signals for long distance work. The reception under these conditions is very distorted, speech is not understandable and music is a jumble. I am using an aerial 135 feet long and twenty feet high, perfectly clear from interfering wires, etc., with 40 feet of heavy insulated lead-in wire.

The coupler was made as closely as possible to your specifications, a Hilco lattice open wound variometer was used, a 200 detector and 201A amplifiers. Have used from 16 to 22½-volts on the detector plate and from 67½ to 90 on the amplifier. Have checked the set over for interference and do not seem to be able to take out the distortion enough to clear up long distance stations, although all local stations come in without any distortion whatsoever even on three tubes and the greatest possible volume. I have shunted the primary leak with .00025 condenser and have helped to clear up the signals to some extent, however, with quite a loss of volume. Do you think I can clear up the set by the use of a C battery? Would you recommend crossing the transformers with a leak and a condenser, or either? I was unable to obtain transformers or a ratio of 3 and 5 to 1, and, therefore, used a Jefferson transformer ratio 6-1 on the first step and 3.75 to 1 on the second step, have tested these transformers and find their induction is splendid.

A.—We have carefully noted difficulties encountered in operation of the Super-Triplex circuit offered in Radio Digest. It is our opinion that the source lies in the amplifier unit and from experience believe that it can be traced to the make of transformer which are often found to be defective, causing distortion. The ratio on the first step is a bit high.

We are unable from the details offered to isolate any other factor that would seem to be responsible for limitations.

Try a C battery in circuit as it may serve to clear up reception to some extent.

Abelé Circuit

(07980) KA, Carthage, Ill.

Please answer the following questions concerning the Abelé circuit discussed by M. W. Thompson in the March 1 issue of Radio Digest.

What is the capacity of the fixed condenser across the phones? Will this set cover the entire range of broadcasting wave lengths from 224 to 546 meters? If not, how can it be made to do it? Is this circuit difficult to set up and operate? Would vernier rheostats or a grid leak and condenser in the grid lead of the second tube help any? If so, what sizes for A tubes? Is not this circuit the same that is used in the Grebe CR-12 receiver? Would it be all right to use 80 turns on the primary inductance tapped every 10 turns? Is number 24 dsc. wire suitable for winding the coils? Would it be possible to construct this set so that it would cover a wave band of 75 to 750 meters? Is this circuit as efficient as the neutrodyne circuit? Would a neutrodon connected between the grid of the first tube and the plate or the grid of the second tube help any? Would this circuit prove efficient in the hands of the average B. C. L. with two stages of audio frequency amplification and one stage of push-pull amplification? How can it be determined when the taps on the second coil are located correctly?

A.—The fixed condenser across the phones is, as usual, a .001 mfd. The circuit is capable of reception on all present broadcast wave lengths. The circuit is simple of construction and operation and if specifications are followed will prove effective. Innovation in the nature of departure from the diagram and the values cited is not recommended. It is similar to that involved in the Grebe CR-12. Number 24 dsc. wire will serve for winding and eighty turns tapped at every ten turns will accomplish an effective primary inductance.

Additional number of turns on coil would permit of reception on higher wave lengths. The circuit in question compares favorably with the neutrodyne receiver, although we would prefer the latter. Two stages of audio frequency, one push-pull method, would be advantageous.

Long Distance Simplex

(06551) NRM, Providence, R. I.

In the Radio Digest of December 8th you published a plan for a single tube selective long distance simplex receiving set on page 14.

Could this set be made with the use of dry cell batteries in place of the storage battery? If so, how many should be used and what voltage of B battery should be used?

In using dry cells and proper B battery what kind of tube and what resistance should be used?

What number of plates should the condenser have and what kind?

What kind of wire is used to make connections from part to part?

I will be very grateful if you will send me a list of the exact parts to use in the making of this set, also any information that you may send in regards to the building of same.

A.—Dry cell tubes can be used, generally speaking, in any standard circuit without necessitating change of wiring. The voltage of both A and B battery will depend upon the tube employed. We are recommending the UV-199 tube with three dry cells and a 30 ohm rheostat and 45 volts plate potential.

A 23-plate vernier variable condenser is indicated. Number 18 tinned copper wire is suitable for making connections. Standard apparatus of rugged construction is recommended.

Helpful discussions in behalf of the beginners are conducted in current issues of Radio Digest and afford a medium of valuable data on the theory and practice of Radio communication and its underlying principles.

Radiophone Broadcasting Stations

Corrected Every Week—Part IV

State, City, Call

Alabama:
Auburn, WMAV
Birmingham, WSY
Mobile, WEAR
Montgomery, WKAN

Arizona:
Phoenix, KFAD, KFCB
Tucson, KFDB

Arkansas:
Conway, KFKQ
Fayetteville, KFDY, KFMQ
Fort Smith, KFOZ
Little Rock, KFMB, WCAV
Pine Bluff, KFPX

California:
Bakersfield, KDZB
Berkeley, KRE
Burlingame, KFNZ
El Monte, KUY
Fresno, KMJ
Hollywood, KFAR
Long Beach, KFMY, KFON
Los Angeles, KFI, KPPG, KFPR, KFSG, KHJ, KGS, KNX
Oakland, KGO, KLS, KLX, KZM
Paso Robles, KFNL
Richmond, KFOU
Sacramento, KFHR
San Diego, KDPT, KDYM, KFBC
San Francisco, KPPV, KPO, KUO
San Jose, KQW
San Luis Obispo, KFBE
Santa Ana, KFAW
Santa Barbara, KFHJ
Santa Rosa, KPPV
Stanford Univ., KPGH
Stockton, KJQ, KWG
Whittier, KFQC

Colorado:
Boulder, KFAJ
Colorado Springs, KFFQ, KFKZ
Denver, AA3, KDZQ, KFAF, KFKH, KFLE, KLZ
Greeley, KFKA
Gunnison, KFJA
Trinidad, KFBS

Connecticut:
Hartford, WDAK
New Haven, WPAJ
Storrs, WABL

Delaware:
Wilmington, WHAV, WOAT

District of Columbia:
Washington, WABB, WCAP, WDM, WIAY, WIL, WMU, WQAW, WRC

Florida:
Jacksonville, WABG
Miami, WQAM
Pensacola, WGAN, WLAV
St. Petersburg, WCBK, WSAG
Tampa, WDAE
West Palm Beach, WBBJ

Georgia:
Atlanta, WBEF, WSB
Columbus, WDBA
Macon, WCBW

Idaho:
Boise, KFAU, KFDD, KFFB
Kellogg, KFEY
Moscow, KFAN
Wallace, KFOD

Illinois:
Belvidere, WOAG
Cambridge, WTAP
Carthage, WCAZ
Chicago, KFW, WAAF, WDAP, WLIB, WGN, WQJ, WMAQ, WSAX
Chicago Heights, WCBZ
Decatur, WHAG, WHAP
Elgin, WTAS
Galesburg, WRAM
Joliet, WWAE
Lake Forest, WABA
Lincoln, WBBM
Mattoon, WQAL
Monmouth, WBBU
Oak Park, WTAY
Peoria, WJAM, WQAX
Rockford, KFLV, WIAB
Streator, WTAX
Tuscola, WDZ
Urbana, WRM
Zion, WCBD

Indiana:
Greencastle, WLAX
Greenfield, WOAK
Harrison, WCBN
Indianapolis, WBBZ
Laporte, WRAF
Marion, WIAQ
Mishawaka, WOAO
South Bend, WGAZ
West Lafayette, WBAA

Iowa:
Ames, WOI
Atlantic, KFLZ
Boone, KFSQ
Burlington, WIAS
Cedar Falls, KFJX
Cedar Rapids, KFLP, WJAM, WAU
Davenport, WOC
Des Moines, WHO
Dexter, KFJY
Fort Dodge, KPER, KFJY
Iowa City, WHAA
Lamoni, KFFV
Le Mars, KFCY, WIAU
Marengo, KFOL
Marshalltown, KFJB
Ottumwa, KFEL
Shenandoah, KFNF
Sigourney, WOAD
Sioux City, KFMR, KFOV, WEAU
Waterloo, WRAN

Kansas:
Anthony, WBL
Beloit, WPAR
Hutchinson, KFHX
Iola, KFID
Louisburg, KFIL
Manhattan, WTG
Milford, KFKH
Peabody, KFNX
Topeka, WJAQ, WPAM
Wichita, KFOT, WEAH

Kentucky:
Louisville, WHAS, WLAP

Louisiana:
Alexandria, KFFY
Baton Rouge, KFGC
Franklinton, KFLD
Jennings, WCBJ
New Orleans, WAAB, WAAC, WABZ, WBBS, WCAG, WCBE, WDSU, WGV, WIAE, WPAF, WWL
Shreveport, KFXR, KFHE, WGAQ

Maine:
Bangor, WABI
Houlton, WCBL
Portland, WTAJ

Maryland:
Baltimore, WCAO, WCBM, WEAR

Massachusetts:
Boston, WNAC, WTAT
Dartmouth, WMAF
Fall River, WSAR, WTAB
Lowell, WCAP
Medford Hillside, WGI
New Bedford, WDAD
Springfield, WBZ
Taunton, WDBB
Worcester, WCBT, WDAS

Michigan:
Ann Arbor, WCBC
Berrien Springs, KFGZ
Dearborn, WWJ
Detroit, KOP, WCX, WWJ
East Lansing, WKAR
Flint, WEAA
Houghton, KFMW, WWAQ
Kalamazoo, WOAP, WLAQ
Menominee, KFLB
Mt. Clemens, WABX
Petoskey, WBCH
Port Huron, WBBH
Rogers City, WBBO
Saginaw, WABM

Minnesota:
Duluth, KFMS
Hutchinson, WFAN
Minneapolis, KFDZ, KFEX, KFMT, WBAH, WCAS, WLAG, WLB
Moorhead, WFAU
Northfield, KFAOX, WCAL
St. Cloud, WFAM
St. Paul, AV7, KFOY

Mississippi:
Coldwater, KFNG
Oxford, WGBH
Pascagoula, WCBG

Missouri:
Butler, WNAR
Cameron, WFAQ
Cape Girardeau, WSAB
Carterville, KFPW
Columbia, WAAN
Independence, KFIX
Jefferson City, KFPN, WOS
Joplin, WHAR
Kansas City, WDAF, WHB, WMAJ, WOQ
Marshall, WJAT
Moberly, KFEP, KFOJ
St. Joseph, KFHD
St. Louis, KFEZ, KSD, WCK, WEB, WEW, WMAY, WRAO
Springfield, KFNU, WIAI
Warrensburg, KFNJ

Montana:
Billings, KFCH
Bozeman, KFDO
Butte, KFEW, KFLA
Havre, KFBB
Helena, KFNY
Stevensville, KFIF

Nebraska:
David City, KFOR
Fremont, WOAE
Hasdings, KFKX
Lincoln, KFAY, WMAH
Norfolk, WJAG
Oak, KFEQ
Omaha, KFCZ, KFFX, KFOX, WAW, WIAK, WNAL, WOAW
Tecumseh, WTAU
University Place, WCAJ
Utica, KFGY
York, KFDB

Nevada:
Sparks, KFDB

New Hampshire:
Laconia, WEAY

New Jersey:
Atlantic City, WHAR
Camden, WABU, WWAF
Gloucester City, WBAX
Lambertville, WTAZ
Newark, WAAM, WABS, WBS, WOR, WRAZ
N. Plainfield, WEAM
Paterson, WBAN
Trenton, WMAL, WOAX, WWAB

New Mexico:
Albuquerque, KFLR
Roswell, KFMZ
State College, KOB

New York:
Albany, WNJ
Buffalo, WGR
Canandaigua, WSAW
Canton, WCAD
Canowvia, WMAC
Ithaca, WEAI
Lockport, WMAK
New York, WBAY, WEAF, WHN, WJX, WJY, WJZ, WLAW, WQAO, WSAP
Port Chester, WSAY
Poughkeepsie, WFAF
Rochester, WARO, WHAM
Rossville, WBBR
Schenectady, WGY, WRI
Syracuse, WBBE, WFAB, WLAH, WNAD
Tarrytown, WRW
Troy, WHAZ
Utica, WSL

North Carolina:
Asheville, WPAJ
Charlotte, WBT
Wilmington, WBBN

North Dakota:
Fargo, KFLY, WDAY, WPAK
Grand Forks, KFJM, KFJQ

Ohio:
Canton AQ6
Cincinnati, WAAD, WHAG, WLW, WSAI
Cleveland, KDPM, WHK, WJAX, WTAM
Columbus, WBAY, WCAH, WEAO, WMAN, WPAL
Dayton, AW3, WABD
Dover, WABP
Granville, WJD
Hamilton, WBK
Lima, WOAC
Newark, WBBA
Pomeroy, WSAZ
Sandusky, WABH, WQAF
Springfield, WNAP
Toledo, WABR, WTAL
Wooster, WABW
Yellow Springs, WRAV
Youngstown, WDBF

Oklahoma:
Bristow, KFJK
Chickasha, KFGD
Oklahoma City, KFJF, WKY
Norman, WNAD
Okmulgee, WPAC
Tulsa, WGAF, WLAL

Oregon:
Astoria, KFJI
Arlington, KFGL
Baker, KFDA
Corvallis, KFDJ
Hillsboro, KFEQ
Hood River, KFHB, KQP
Marshfield, KFOF
Medford, KFAY
Pendleton, KFFE
Portland, KDYQ, KFEC, KFIF, KFOH, KGG, KGW

Pennsylvania:
Allentown, WCBA, WSAN
Altoona, WGAW
Arnold, WCBU
Buck Hills, WCBY
Butler, WBB
Easton, WMAP
East Pittsburgh, KDKA
Erie, WYAE, WTAT
Grove City, WSAJ
Harrisburg, WABB, WBAK
Haverford, WABQ
Johnstown, WBBV, WTAC
Lancaster, WDBC, WGAL
McKeesport, WIK
Parkesburg, WQAA
Philadelphia, WABY, WBRT, WCAU, WDAR, WFI, WGL, WIAD, WIP, WNAT, WOO, WWAD
Pittsburgh, KQV, WCAE, WCBF, WJAS
Reading, WBBD, WRAW
Scranton, WQAN, WRAY
State College, WPAB
Villanova, WCAM
Washington, WABT
Wilkes-Barre, WBAX

Rhode Island:
Cranston, WEAP
East Providence, WKAD
Pawtucket, WBHQ
Providence, WCBR, WEAN, WJAR, WRAN, WSAD, WTAG

South Carolina:
Charleston, WBBY, WNAQ, WOAH
Clemson College, WSAC

South Dakota:
Brookings, KFDY
Rapid City, WCAT
Sioux Falls, WPAT
Vermillion, WEAJ
Yankton, WNAX

Tennessee:
Bemis, WCBI
Knoxville, WNAV
Lawrenceburg, WOAN
Memphis, WCBO, WMC
Nashville, WABV, WCBQ
Tullahoma, WCBV

Texas:
Abilene, WQAQ
Amarillo, WDAG, WQAC
Austin, WCAL, WNAS
College Station, WTAW
Corsicana, KFNC
Dallas, WDAO, WFAA, KFOP, KFRR
Denison, KFPQ
Dublin, KFPL
El Paso, WDAH, WPAT
Fort Worth, KFIX, WBAP
Galveston, KFLX, KFOQ, WIAC
Greenville, KFPM
Houston, KFVK, WCAK, WEAY, WEV, WRAA
Orange, KFGX
Plainview, WSAT
Port Arthur, WEAH
San Antonio, AS6, WCAR, WOAI
San Benito, KFLU
San Marcos, KFMU
Tyler, WOAN
Waco, WJAD, WWAO
Wichita Falls, WKAF

Utah:
Ogden, KFCP
Salt Lake City, KDYL, KFLH, KFOO, KFPH, KZN

Vermont:
Bellows Falls, WLAR
Springfield, WQAE

Virginia:
Arlington, NAA
Blacksburg, WEAE
Fortress Monroe, WNAW
Norfolk, WBEW, WTAR
Richmond, WRBL

Washington:
Aberdeen, KNT
Bellingham, KUZR
Everett, KGBL
Lacey, KGY
Neah Bay, KFHB
Olympia, KFBV
Pullman, KFAE
Seattle, KDZE, KFHR, KFIO, KFOA, KFQW, KGB, KJR, KTW
Spokane, KPIO, KFFY
Tacoma, BE1, KFBG, KGB, KMO
Walla Walla, KFCF
Wenatchee, KDZI, KZV
Yakima, KFIQ

West Virginia:
Charleston, WPAZ
Clarksburg, WHAK
Martinsburg, WDBD

Wisconsin:
Fond du Lac, KFIZ
Kenosha, WHAD
La Crosse, WABN
Madison, WHA
Milwaukee, WHAD, WIAO
Neenah, WIAJ
Osseo, WTAQ
Sisihi, WAR
St. Croix Falls, WRAJ
Stephens Point, WLBL

Wyoming:
Casper, KFEV, KFPS
Laramie, KFBU

Alaska:
Juneau, KFIU

Hawaii:
Honolulu, KGU

Porto Rico:
San Juan, WKAQ

Australia:
Willoughy, 2FC

British Isles:
Aberdeen, 2BD
Birmingham, 6IT
Bournemouth, 6BM
Cardiff, 5WA
Glasgow, 5SC
London, 2LO
Manchester, 2ZY
Newcastle, 5NO

Canada:
Bellerue, CFCO
Calgary, CFAC, CFCN, CHBC, CHCM, CKCX
Edmonton, CFCK, CJCA
Halifax, CHAC
Hamilton, CHCS
Iroquois Falls, CFCH
Kingston, CFRC
London, CFCW, CJGC
Mont-Joli, CJCM
Montreal, CFCF, CFUC, CHYC CKAC
Nanaimo, CFDC
New Westminster, CFXC
Olds, CJCX
Ottawa, OA, CKCH, CKCO
Quebec, CFCJ, CHCD
Regina, CKCK
St. John, CJCI
Saskatoon, CFQC
Sudbury, CFCH
Toronto, CFCA, CHCB, CJCD, CJCN, CJSC, CKCE
Vancouver, CFCG, CFYC, CHCL, CJCE, CKCD
Victoria, CFCL, CHCE
Winnipeg, CKY

Cuba:
Caibarien, 6EV
Cienfuegos, 6AZ, 6BY, 6CY, 6DW
Colon, 5EV
Havana, PWX, 2AB, 2BY, 2CX, 2DW, 2HS, 2JQ, 2KD, 2KP, 2LC, 2MG, 2MN, 2OK, 2OL, 2PG, 2SW
Santiago, 8AZ, 8BY, 8DW, 8EV, 8FU
Tuinucu, 6KW, 6XJ

Czecho Slovakia:
Prague, KBELY

France:
Lyons, YN
Paris, CW, ESP, FL

Mexico:
Mexico City, CYB, CYL, CYX

Switzerland:
Geneva, HB1

PART IV—STATION DATA

(The following schedules complete the alphabetical station data list, Part III of which was given last week.)

WQAE, Springfield, Vt. 275 meters. 50 watts. Moore Radio News Station. Slogan, "Among the Green Hills of Vermont." Sat. 7:30-8 pm, 11-1 am. Sun, 8:10-9:30 pm, address. Eastern.

WQAF, Sandusky, O. 240 meters. 5 watts. Sandusky Register. Daily, 10:30 pm, weather. Eastern.

WQAL, Mattoon, Ill. 258 meters. 10 watts. Coles County Tel. & Telg. Co. Slogan, "The buckle on the Corn Belt." Wed, Sat, 8-10 pm, music, lectures; Sun afternoon, special programs, services.

WQAM, Miami, Fla. 283 meters. 100 watts. Electrical Equip Co. Slogan, "It is Always June in Miami." Daily ex Sun, 12 m, weather. Thurs, 9 pm, specialties. Sun, 9 pm, music. Eastern.

WQAN, Scranton, Pa. 280 meters. 100 watts. Scranton Times. Slogan, "The Voice of the Anthracite." Daily ex Sun, 12:30-1 pm, 4-4:30, 7:30-8, news, reports, music. Tues, Fri, 8 pm, entertainment. Eastern.

WQAO, New York City, N. Y. 360 meters. 100 watts. Calvary Baptist Church. Sun, 10:30 am, 7:45 pm, church services. Eastern.

WQAQ, Abilene, Tex. 360 meters. 100 watts. West Texas Radio Co.-Abilene Daily Reporter. Slogan, "The Capital of West Texas." Tues, Thurs, Fri, 8-9 pm. Sun, am, pm, church services. Central.

WQAS, Lowell, Mass. 266 meters. 100 watts. Prince-Walker Co. Daily ex Sun, 10:45-11 am, 2:30-3 pm, music. Mon, Wed, Fri, 6-7 pm, news, concert. Thurs, silent. Eastern.

WQAW, Washington, D. C. 236 meters. 5 watts. Dept. of Elec. Eng., Catholic University of America.

WQAX, Peoria, Ill. 360 meters. 100 watts. Radio Equipment Co. Mon, Wed, Fri, 7:15-8 pm.

WQJ, Chicago, Ill. 448 meters. 500 watts. Calumet Baking Co.—Rainbo gardens. Daily ex Sun, 11-12 m, 3-4 pm, woman's hour. Daily ex Mon, 7-8 pm, 10-2 am, music. Central, Daylight Saving.

WRAA, Houston, Tex. 360 meters. 200 watts. Rice Institute. Mon, 8-9 pm, concert, college activities. Sun, 4:30 pm, extension lecturers. All games broadcast. Central.

WRAF, La Porte, Ind. 224 meters. 20 watts. Radio Club, Inc. Mon, Thurs, Sun, 8 pm, Central.

WRAH, Providence, R. I. 231 meters. 15 watts. Stanley N. Read. Sun, 4:30-6 pm. Eastern.

WRAL, St. Croix Falls, Wis. 248 meters. 100 watts. Northern States Power Co. Slogan, "The Dalles of the St. Croix." Club, "Royal Order of Inceterate Knob Twisters." Wed, 9-10:30 pm, concert. Central.

WRAM, Galesburg, Ill. 214 meters. 100 watts. Lombard College. Mon, Fri, 4-5 pm. Wed, 8-10 pm. Central.

WRAN, Waterloo, Iowa. 236 meters. 10 watts. Black-Hawk Elec. Co. Slogan, "We Radiate all news." Daily ex Sun, 5-5:45 pm. Special Mon programs, 8:15-9:15 pm. Central.

WRAO, St. Louis, Mo. 360 meters. 20 watts. St. Louis Radio Service Co. Mon, 7:30-9 pm, dance music. Sun, 3:30-5 pm, music. Central.

WRAV, Yellow Springs, O. 252 meters. 100 watts. Antioch College. Wed, 8 pm. Thurs, 10:30 pm, Sun, 7 pm. Central.

WRAW, Reading, Pa. 238 meters. 40 watts. Avenue Radio Shop. Thurs, 10 pm. Eastern.

WRAX, Gloucester City, N. J. 268 meters. 100 watts. Flexon's Garage. Mon, Wed, Fri evenings, programs.

WRAY, Scranton, Pa. 280 meters. 10 watts. Radio Sales Corp. Mon, Wed, Sat, Sun, 8:30-10 pm, concert. Eastern.

WRAZ, Newark, N. J. 233 meters. 100 watts. Radio shop of Newark. Tues, Wed, Fri, 7:30-9:30 pm, novelty programs. Eastern, Daylight Saving.

WRC, Washington, D. C. 469 meters. 500 watts. Radio Corp'n of America. Daily ex Sun, 5:15 pm, code practice; 6 pm, children's hour. Mon, Wed, Fri, 8-6:30 pm, music. Tues, Thurs, Sat, 8:15-11 pm, music. Eastern.

WRK, Hamilton, O. 360 meters. 200 watts. Doron Bros. Elec. Co. Slogan, "The Oldest Station in Existence." Fri, 8:15 pm, music, lectura. Sun, 2:15 pm, music. Central.

WRL, Schenectady, N. Y. 360 meters. 500 watts. Union College Radio Club. Irregular schedule.

WRM, Urbana, Ill. 360 meters. 500 watts. Univ. of Ill. Tues, 7-8 pm, music. Thurs, 8-9 pm, Univ. news, talks, music. Irregular schedule of University events. Central.

WRR, Dallas, Texas. 360 meters. 20 watts. City of Dallas. Daily ex Sun, 11:30-12:30 pm, weather; 2:45-3:30, sports, markets, news; music. Sun, 11 am, 7:30 pm, church service. Central.

WRW, Tarrytown, N. Y. 273 meters. 150 watts. Tarrytown Radio Research Laboratory. Slogan, "Everything in Radio." Daily, 9 pm, police reports. Mon, Wed, Thurs, Sat, Sun, 7-8 pm. Mon, Tues, Wed, Fri, Sat, 9-11:30 pm. Thurs, 8-9:10 pm, 10:30-11:30. Sun, 8-9 pm, service; 8-9:10, police reports; 10:30-11:30, concert. Eastern Daylight Saving.

WSAB, Cape Girardeau, Mo. 360 meters. 100 watts. Southeast Mo. State Teachers College. Mon, Wed, 3:30 pm, lecture, 9, concerts. Central.

WSAC, Clemson College, S. C. 360 meters. 500 watts. Clemson Agri. College. Mon, Wed, Fri, 8 pm. Eastern.

WSAD, Providence, R. I. 261 meters. 100 watts. Fosters-Jewelers. Daily, 12:30-1 pm. Sat, 7-8 pm. Wed, Fri, 6-7 pm. Thurs, 8:15 pm, music, entertainment. Sun, 2-4, music, church features. Eastern Daylight Saving.

WSAG, St. Petersburg, Fla. 244 meters. 10 watts. L. Vanderbeck Davis. Tues, Thurs, Sat, 7:30 pm, bedtime stories; 8-10, music. Eastern.

WSAH, Chicago, Ill. 240 meters. 500 watts. A. G. Leonard, Jr. Daily ex Sun, 6:30-6:30 pm. Fri, 8:45-10. Central.

WSAI, Cincinnati, O. 309 meters. 500 watts. United States Playing Card Co. Tues, 7-10 pm. Thurs, 8-10 pm. Sat, 10-11:30 pm; 12-1:45 am. Central Daylight Saving.

WSAJ, Grove City, Pa. 360 meters. 250 watts. Grove City College. College activities. Wed, 7:30-9 pm, music. Fri, basket ball. Eastern.

WSAL, Indianapolis, Ind. 246 meters. 50 watts. Franklin Elec. Co.

WSAN, Allentown, Pa. 229 meters. 10 watts. Allentown Radio Club. Tues, Thurs, 8 pm. Eastern.

WSAP, New York, N. Y. 263 meters. 250 watts. City Temple. Sat, 10:46-1 pm. Sun, 7:30-9:30 pm. Eastern.

WSAR, Fall River, Mass. 254 meters. 100 watts. Doughty & Welch Elect. Co., Inc. Daily ex Sun, 12-1 pm. Mon, Thurs, 6-7 pm. Wed, 8-10 pm. Sun, 4:30-6 pm. Eastern Daylight Saving.

WSAT, Plainview, Tex. 288 meters. 20 watts. Donohoo-Ware Hardware Co.

WSAW, Canandaigua, N. Y. 275 meters. 5 watts. John J. Long, Jr. Irregular Fri programs.

WSAY, Port Chester, N. Y. 233 meters. 100 watts. Irving Austin, Chamber of Commerce.

WSAX, Chicago, Ill. 268 meters. 20 watts. Chicago Radio Lab.

WSAZ, Pomeroy, Ohio. 258 meters. 50 watts. Chase Elec. Shop. Daily ex Sun, 5:30 pm, weather. Tues, Thurs, Sat, 5 pm, music. Central.

WSB, Atlanta, Ga. 429 meters. 500 watts. Atlanta Journal. Slogan, "The Voice of the South." Daily ex Sun, 12-1 pm, music, weather; 2:30, reports; 4-4:30, music; 6-6, news, sports; 8, concert (ex Wed); 10:45-12, concert. Sun, 10:54-12:15 pm, 5-6, 7:30-9:15, church services. Central.

WSL, Utica, N. Y. 273 meters. 100 watts. J. & M. Elec. Co. Daily ex Sat. Sun, 11-11:30 am, 5-6 pm, music, news. Mon, Wed, Sat, 8-9 pm. Sun, 10:30-12 m, 7:30-9 pm. Church services. Eastern.

WSY, Birmingham, Ala. 360 meters. 500 watts. Alabama Power Co. Sun, 11 am, 8 pm, church services. Central.

WTAB, Fall River, Mass. 286 meters. 100 watts. Fall River Daily Herald. Tues, Thurs, 8-10 pm. Sun, 2:30-4:30 pm. Eastern Daylight Saving.

WTAC, Johnstown, Pa. 360 meters. 150 watts. Penn Traffic Co. Daily ex Sun, 4 pm. Sun, Thurs, 7:30 pm. Eastern.

WTAF, New Orleans, La. 283 meters. 20 watts. Louis J. Gallo. Slogan, "The Bayou Station." Daily, 6:45-7 pm, police, baseball, weather. Tues, Sat, 9-10:30 pm; Thurs, 10:30-11:30 pm; Sun, 10-12 midnight, revue. Central.

WTAG, Providence, R. I. 268 meters. 10 watts. Korn Music Co.

WTAJ, Portland, Me. 236 meters. 20 watts. The Chase Shop. Wed, Sun, 7:45 pm. Eastern.

WTAL, Toledo, Ohio. 252 meters. 10 watts. Toledo Radio & Elec. Co. Tues, Thurs, 8:45 pm. Sat, 8 pm. Eastern.

WTAM, Cleveland, Ohio. 390 meters. 1,000 watts. Willard Storage Battery Co. Slogan, "The Voice from the Storage Battery." Daily ex Sun, 6-7:30 pm, dinner concert; 6:35-7, baseball, news. Wed, 7-9 pm, concert. Sat, 8-10 pm, dance music. Eastern.

WTAP, Cambridge, Ill. 242 meters. 100 watts. Cambridge Radio & Elec. Co. Tues, Sat, 12:15-1:15 pm, 9:30-10:15. Central.

WTAQ, Osseo, Wis. 254 meters. 100 watts. S. H. Van Gorden & Son.

WTAR, Norfolk, Va. 280 meters. 100 watts. Reliance Electric Co. Tues, Sat, 7:30 pm, markets; 8, music. Eastern.

WTAS, Elgin, Ill. 286 meters. 500 watts. Chas. E. Erbstein. Slogan, "Willie, Tommie, Annie and Sammie." Daily, 8:15-12 mid., music. Fri, 12:30-1:30 pm, organ. Sun, 2:30-5 pm, music. Central.

WTAT, Boston, Mass. 244 meters. 100 watts. Edison Elec. Illuminating Co. (Portable Station).

WTAU, Tecumseh, Neb. 360 meters. 10 watts. Ruegg Battery & Elec. Co. Tues, 8:30 pm. Central.

WTAW, College Station, Tex. 280 meters. 500 watts. Agricultural and Mechanical College of Tex. Wed, Fri, 8-8:30 pm, music, talks. Sun, 11 am, church services. Central.

WTAX, Streator, Ill. 231 meters. 50 watts. Williams Hardware Co. Mon, Thurs, 9-10 pm. Tues, 12 m-2 am. Central.

WTAY, Oak Park, Ill. 283 meters. 500 watts. Oak Leaves. Daily ex Sun, Mon, 6:15-8:15 pm. Central.

WTAZ, Lambertville, N. J. 283 meters. 15 watts. Thomas J. McGuire. Mon, 8-10 pm, music. Eastern Daylight Saving.

WTG, Manhattan, Kan. 360 meters. Kan. State Agri. College. Daily ex Sun, 9:03 am, weather (code). Central.

WWAB, Trenton, N. J. 226 meters. 10 watts. Hoenig, Sweni & Co. Wed, 7:30-10:30 pm. Eastern Daylight Saving.

WWAC, Waco, Tex. 360 meters. 100 watts. Sanger Bros. Temporarily discontinued.

WWAD, Philadelphia, Pa. 360 meters. 100 watts. Wright & Wright, Inc. Mon, 8 pm. Thurs, 8:30 pm. Eastern Daylight Saving.

WWAE, Joliet, Ill. 227 meters. 500 watts. Alamo Dance Hall. L. J. Crowley. Wed, Sat, Sun, 8:30-12 midnight, orchestra. Central.

WWAF, Camden, N. J. 236 meters. 1000 watts. Gelvin Radio Supply Co.

WWAD, Houghton, Mich. 244 meters. 250 watts. Michigan College of Mines. Daily ex Sun, 12 m, news, markets. Mon, Fri, 8 pm, talks, music. College sports. Central.

WWJ, Dearborn, Mich. 273 meters. 50 watts. Ford Motor Co. Wed, 8-10 pm, music, lectures. Eastern.

WWJ, Detroit, Mich. 517 meters. 500 watts. The Detroit News. Daily ex Sun, 8-8:30 am, setting up exercises; 9:30-9:45, household hints; 9:45-10:25, health talks; 10:25-10:30, weather; 11:55-12, time; 12:05-12:45 pm, music; 3:30-3:35, weather; 3:35-4:15, markets; 5-6, sports. April 22, and every other week. 8:30-10 pm, concert. Sat, 7-8:30 pm, concert. Thurs, 10-12 pm, "midnight special"; Sun, Fri in weeks, 7-8:30 pm, concert; Sun, 11 am, 7:30 pm, church services; 2-3 pm, or 5-6, concert. Eastern.

WWL, New Orleans, La. 280 meters. 100 watts. Loyola Univ.

2AB, Havana, Cuba. 240 meters. Alberto S. de Bustamante.

2BD, Aberdeen, Scot. 285 meters. 1,500 watts. British Broadcasting Co. Daily ex Sun, 3:30-4 pm, concert; 5-5:30, women's hour; 5:30-6, children's period; 7-10:30, concert. Sun, 3-5 pm, 5-5:30, 8:30-10:20, Greenwich Mean.

2BY, Havana, Cuba. 250 meters. Frederick W. Borton.

2CX, Havana, Cuba. 320 meters. Frederick W. Borton.

2DW, Havana, Cuba. 300 meters. Pedro Zayas.

2FC, Willouby, Australia. 1,000 meters. 5,000 watts. Farmer & Co., Ltd.

2HS, Havana, Cuba. 180 meters. Julio Poever.

2JQ, Havana, Cuba. 150 meters. Paul Perez Falcon.

2KD, Havana, Cuba. 350 meters. E. Sanchez de Fuentes.

2KP, Havana, Cuba. 200 meters. Alvara Daza.

2LC, Havana, Cuba. 250 meters. Luis Casas.

2LO, London, Eng. 365 meters. 1,200 watts. British Broadcasting Co.

2MG, Havana, Cuba. 280 meters. 20 watts. Manuel G. Salas. Daily ex Sun, 3-4 pm, music. Evening program.

2MN, Havana, Cuba. 270 meters. Fausto Simon.

2OK, Havana, Cuba. 360 meters. Mario Garelo Velez.

2OL, Havana, Cuba. 200 meters. Oscar Collado.

2TW, Havana, Cuba. 230 meters. Roberto E. Ramires.

2WW, Havana, Cuba. 210 meters. Amadeo Saenz.

2XD, Havana, Cuba. 345 meters. 50 watts. Dr. Eduardo Sanchez.

2ZY, Manchester, Eng. 385 meters. British Broadcasting Co.

5EV, Colon, Cuba. 360 meters. 100 watts. Leopold V. Figueroa. Sun, 9-11 pm. Eastern.

5IT, Birmingham, Eng. 420 meters. British Broadcasting Co.

5NO, Newcastle, Eng. 400 meters. British Broadcasting Co.

5SC, Glasgow, Scot. 422 meters. British Broadcasting Co. Daily ex Sun, 3:30-4:30 pm; 4:45-6. Mon, Wed, Fri, 7-10:30 pm. Thurs, Sat, 7-12 midnight. Sun, 3-5:30 pm, 8:30-10:15. G. M. T.

5WA, Cardiff, Wales. 353 meters. British Broadcasting Co.

6AZ, Cienfuegos, Cuba. 200 meters. Valentin Ulivarri.

6BM, Bournemouth, Eng. 385 meters. British Broadcasting Co.

6BY, Cienfuegos, Cuba. 300 meters. Jose Ganduxe.

6CX, Cienfuegos, Cuba. 170 meters. Antonio T. Figueroa.

6DW, Cienfuegos, Cuba. 225 meters. Eduardo Lerry.

6EV, Caibarien, Cuba. 290 meters. Maria Josefa Alvarez. Daily, 10:30 pm.

6KW, Tuinucu, Cuba. 332 meters. 100 watts. Frank H. Jones. Slogan, "If You Hear the Kco of the Cuckoo You Are in Tune With Tuinucu." Mon, Tues, Fri, Sun, 10:30 pm, music. Wed, Thurs, Sat, 6:30 pm, music. Sat, 12 midnight, dance music. Eastern.

6XJ, Tuinucu, Cuba. 275 meters. 100 watts. Frank H. Jones.

8AZ, Santiago, Cuba. 240 meters. Alfredo Brooks.

8BY, Santiago, Cuba. 250 meters. Alberto Ravelo.

8DW, Santiago, Cuba. 275 meters. 15 watts. Pedro C. Andux. Daily, 4:30-8:30 pm, 10:30-12.

8EV, Santiago, Cuba. 180 meters. Eduardo Matcos.

8FU, Santiago, Cuba. 227 meters. Andres Vinnet.

(This completes the alphabetical station data list. Part I, the first installment of the four-part list, will appear next week.)

Radio Illustrated

How Miss Adele Waugh startled early spring promenaders on the boardwalk at Atlantic city when she was wheeled up that famous thoroughfare sharing a wheel chair with a Radio set. Atlantic Foto

A novel two-tube reflex set built by Sidney Kasindorf, is shown above. The set and batteries are built in a small-sized suitcase. The ground and aerial wires are wound on a fish reel and reeled in when not in use. K. & H.

Nurses of the Maternity hospital, London, entertaining their wee charges with a Radio concert. One little tot took exception and entered his loud squawker in competition with the Radio. International

A Radio truck fully equipped with a large receiving set, during a tour of the U. S., entertained the kids of New York city's east side, with a concert. International