Names of Announcers Nominated for C
Installing Set in a Studebak · How to Operate

Radio Digest

EVERY WEEK **PROGRAMS Illustrated** TEN CENTS

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DEATH-RAY NOT FOR U.S.

ZENITH TELLS ABOUT NEW SUPER STATION

SELLS OUT PLANT IN EDGEWATER BEACH HOTEL

WDAP Becomes WGN — Ex-WGN-WJAZ Changes Hands—Zenith Station After New Location

CHICAGO.—Final ramifications of the transaction by which the Chicago Tribune has taken over the Drake hotel station, WDAP, changing its call to WGN and wave to 370 meters, have just been made public. The announcement checks in all respects the rumor story given two weeks ago by Radio Digest.

The Chicago Tribune was merely supervising the programs of the Zenith-Edgewater Beach hotel station, formerly known as WJAZ, it became known.

But the surprise of it all, coming simultaneous with news of the Tribune buying Station WDAP, is that The Chicago Radio Laboratory has sold out its interest in Station ex-WGN-WJAZ of the Edgewater Beach hotel.

Zenith Builds Super Station

The Chicago Radio Laboratory, manufacturer of Zenith Radio receivers, announces that it will shortly begin the erection of a super powered broadcast station on the northwest outskirts of Chicago, far enough removed from residence sections to prevent it from being difficult to tune out. Elaborate plans call for a magnificent studio atop the McCormick building, in Chicago's loop, where the Zenith offices are now located.

The call "WJAZ" is still held by the Zenith company and will be used for the new plant when completed.

NAVY CLAIMS DEADLY WAVE OF NO VALUE

But Reports Say Prof. H. G. Matthews' Device Kills Mice and Stops Motors

Army at Similar Scheme

Uncle Sam Watches with Interest as France and England Struggle for Mysterious Invention

(By Special Correspondence)

WASHINGTON. — Invisible, death-dealing electric rays, close akin to the electromagnetic waves of Radio, mean nothing to the U. S. Government, even though Professor H. Grindell Matthews has caused a bitter controversy between France and England as to which country will have the first option at purchasing his mysterious invention.

Professor Matthews came to the fore recently when he claimed that America was bidding for his device, purposed to be

(Continued on page 4)

Vivian Duncan (center) and her equally famous sister, Rosetta, recently started an independent music publishing business and will Radio all their hits. Both sisters were heard at the WQJ opening. Rosaline Green (left) is the new eighteen-year-old lead for WGY Players and has green eyes and brown hair. Rosemary Hughes (right) is one of the popular soloists heard regularly from WDAP.

OFFICIAL BALLOT

Announcers' Contest

FIRST ANNUAL GOLD CUP AWARD

Editor, Radio Digest,
Dearborn St., Chicago, Ill.

Please credit this ballot as one vote for:

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

Signed .....

Address .....

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

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

.....

given this w[illegible] just turn to page five, fill the nom[illegible]ion certificate in and send it to Radi[illegible]igest, care of the Gold Cup Award E[illegible]itor.

Rem[illegible]mber to save your ballots appearing [illegible]on page two each week. It is by m[illegible]s of the ballots that the award will [illegible]ade. The man or woman polling the highest number of votes wins.

Rules and Regulations of Award

All broadcast 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 on page five.

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

For sending in four consecutive ballots, there will bo a ten vote bonus; eight consecutive ballots, twenty-five vote bonus; twelve consecutive ballots, fifty vote bonus; and sixteen consecutive ballots, seventy-five vote bonus.

Voting will consist of filling in the ballots with the name, initials or nickname of the announcer and the station and mailing to the Gold Cup Award Editor.

Highest Vote Wins Gold Cup

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.

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

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

The Radio Digest First Annual Gold Cup Award will be made by a committee appointed by the publication.

Any question that may arise during the contest will be decided by the Gold Cup Award Editor. His decision will be final.

62 ANNOUNCERS GET NAMES IN BALLOTING

GOLD CUP NOMINATIONS IN FROM EVERYWHERE

Radiophans Instructed to Nominate Now, Vote Later—Rules and Regulations Given

Sixty-two announcers, from every part of the country, have been nominated by their Radiophan friends during the first week of the balloting in the Radio Digest First Annual Gold Cup Award. Every one of these have been nominated more than once, strange to say. The average number of nominations is close to fifty.

Who is the world's most popular announcer? While it is yet too early to hear from England and other foreign countries, where broadcasting has achieved popularity, it is expected that soon nominations and votes for "Uncle" Arthur Burroughs of 2LO, London, and others across the sea will be pouring in.

The vote is world-wide. The announcer receiving the Radio Digest Gold Cup Award will not flatter himself when he claims to be the world's most popular, for that he will be. The balloting is open to the world.

Announcers Nominated Now

The announcers nominated during the first week of balloting, their stations and locations, are:

Arlin, H. W., KDKA, East Pittsburgh.
Barnes, E. T., WGY, Schenectady.
Barnett, S. W., WOC, Davenport.
Buell, Earle, WLAG, Minneapolis.
Calhoun, Adam, WFAA, Dallas.
Cartier, Jaques, CKAC, Montreal, Canada.
Cole, N. D., WHO, Des Moines.
Cooperman, Tess, WLAG, Minneapolis.
Cadigan, John J., WTAT, Boston.
Carlin, Phillip, WEAF, New York.
Cowan, Thomas H., WJZ and WJY, New York.
Cross, Milton J., WJZ and WJY, New York.
Daggett, Uncle John, KHJ, Los Angeles
DePew, J. H., WCBD, Zion City.
Erbstein, Charles, WTAS, Elgin.
Ehrhart, Harry E., WDAR, Philadelphia.
Emery, C. R., WGI, Medford Hillside.
Fanning, Major J. J., WNAC, Boston.
Fitzpatrick, Leo, WDAF, Kansas City.
Gaal, C. A., KUO, San Francisco.
Granlund, N. T., WHN, New York.
Hays, George, WLS, Chicago.
Hay, Bill, KFKX, Hastings.
Hired Hand, WDAP, Ft. Worth.
Haller, Richard V., KGW, Portland.
Hager, Kolin, WGY, Schenectady.
Herske, Arthur R., WTAM, Cleveland.
Holliday, Wm. F., WWJ, Detroit.
Johnson, Elmer (Swan) G., WJAX, Cleveland.
Johnson, F. W., CHYC, Montreal.
Johnson, Paul, WLAG, Minneapolis.
Jones, Miss V. A .L., KSD, St. Louis.
Kaney, Sen A. W., WGN, Chicago.
Kay, Lambdin, WSB, Atlanta.
Kirby, WWJ, Detroit.
Ludgate, William, KSD, St. Louis.
Mack, Johnnie, WJAS, Pittsburgh.
Martin, Victor, WHAM, Rochester.
Milholland, Howard, KGO, Oakland.
Nelson, Jack, WDAP, Chicago.
Palmer, Lester, WOAW, Omaha.
Paschal, ——, WOR, Newark.
Poehler, Eleanor, WLAG, Minneapolis.
Pierce, Jennings, KGO, Oakland.
Pierce, F. W., WOC, Davenport.
Randall, C. R., WCAG, New Orleans.
Reilly, John, WJAR, Providence.
Rothafel, S. L. (Roxie), WEAF, New York.
Rouse, Gene, WOAW, Omaha.
Sartory, Joseph, WCAE, Pittsburgh.
Salzer, Harold A., WHAS, Louisville.
Schilling, John T., WHB, Kansas City.
Smith, Fred, WLW, Cincinnati.
Smith, Edward H., WGY, Schenectady.
Stefan, Karl, WJAG, Norfolk.
Tomy, C. D.,, WCX, Detroit.
Trumbull, Steve, KYW, Chicago.
Tyson, Edwin L., WWJ, Detroit.
White, Major Andrew, WJZ, New York.
Weidaw, Robert, WGY, Schenectady.
Whitney, Robert S., WMAQ, Chicago.
Witten, J. W., WOS, Jefferson City.

Nominate Now; Vote Later

The list above is given to show what announcers have been nominated and has nothing to do with their standing so far as the actual balloting is concerned. If your favorite announcer's name appears above, do not bother to renominate him. One nomination is enough.

Just save your votes for him! Remember that consecutive votes, saved in groups, and turned in together, count for more.

If your favorite announcer's name is not

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Looking Ahead

Hupmobile Radio Installation will be described by H. J. Marx next week. He will show, as he has with many other makes of motor cars, just how to proceed to get the best results tuning in in a "Hup." He will also discuss various portable set circuits.

Tuning, the Difficult Part of Radio for the Beginner, is explained so simply next week by Paul Edelman, author of the "Thirty-Minute" series, that even we couldn't resist reading it. The procedure is amply outlined by well-planned sketches.

Operating and Trouble Shooting the Deresnadyne five-tube Radio frequency set is one of the less technical articles to appear next week for the benefit of our less technical readers. Owners of similar sets will profit by reading this.

Conclusion of the Nine-Tube, Compact Super-Het Treatise will be given by Harry Abbott next issue. Mr. Abbott describes the construction of the cabinet with details so clear that anyone handy with tools can make it.

The World's' Most Popular Radio Announcer cannot remain a conjecture long, for the Radiophan ballots will soon decide who is to get the Radio Digest First Annual Gold Cup Award. Follow the progress of the award next week.

SECRET BROADCAST TEMPTING TO ITALY

TELL STORMY HISTORY OF INVENTION

John H. Hammond Hopeful of Placing "Scrambling" System of Transmitting

NEW YORK. — Scrambled or secret broadcasting will be an accomplished fact in Italy if plans of John Hays Hammond, Jr., American inventor, are carried through. Mr. Hammond recently sailed for Italy and reports that the Italian government is interested and may begin the operation of the new broadcasting system he has devised which it is claimed will permit of collecting fees from the listener direct.

No effort has been made to introduce this plan in the United States as yet, although American patent rights covering the Hammond inventions are said to be owned by the Radio Corporation of America.

The so-called scrambled broadcasting is said to be none other than the secrecy system invented in 1912 by Benjamin F. Miessner, and described in the Radio Digest two years ago. At that time Mr. Hammond intimated that Mr. Miessners' circuit would not work, but a demonstration at that time before a large audience of prominent inventors and scientists proved the falsity of Hammond's statement.

History of Misdealings

Having invented the circuit while in the employ of Hammond, Miessner was asked to patent it in Hammond's name, which he refused to do, saying at that time he would patent it under his own name and assign it to Hammond. Because Miessner refused to violate the patent law by complying with Hammond's wishes, Miessner was asked to leave the employ of Hammond, which he did without any loss of time.

Mr. Miessner then dedicated to secrecy system to the world at large upon the publication of his book, "Radio Dynamics" in 1916. The circuits therefore could not be patented, and if Mr. Hammond has obtained a patent on the system, it is believed by followers of the case to be illegal.

The advantage of the secrecy system is that ordinary receivers can only receive a jargon of mixed, unintelligible sounds. Only receivers designed especially for this transmitting circuit can be used.

Beginning with the idea in 1912, Mr. Miessner gave lectures in 1914 on the scheme applied to torpedo control, both at Purdue university and before members of the Chicago Electric club.

Infant Christened Before Microphone of Station KPO

SAN FRANCISCO.—Having the honor of being the godmother to a baby which was christened before the microphone was the fortune which recently befell Miss O'Brien, director of programs at Station KPO, Hale Brothers, here.

The baby, which is the infant daughter of Mr. and Mrs. J. Raegen Talbot, was christened by Dr. James L. Gordon, of the First Congregational Church of San Francisco. At the conclusion of the service Mme. Talbot sang several lullabies to her baby.

Mme. Talbot, who is a protege of Mme. Calve, has the distinction of being the first voice over the air from Station KPO.

Boston to Put Harvard Baseball Games on Air

BOSTON.—Broadcasting direct from Soldiers' field, located here, Station WNAC, Shepard Stores, will send out play-by-play the baseball games of the Harvard university nine. June 11 and 18 will be heard the games with Dartmouth and Yale, respectively.

MERE MALES CLASH ON AIR OVER "BOB"

BOSTON.—Women of the business world proved their ability to entertain the world at large when they recently went on the air through Station WNAC, Shepard Stores, here. The Advertising Women's club dinner was the feature being broadcast, and one of the big hits of the evening was, "Why Women Should Bob Their Hair." The ensuing debate was given by two mere men.

NOISES OF BUSY CITY INVADE ROOSTERDOM

SCHENECTADY, N. Y. — Station WGY, located in this city, recently broadcast what was called "The Voice of the City," as a novelty feature on its program. The din of a busy corner during a traffic jam, along with the rumble of ash carts and milk trucks as the city woke up were broadcast to the farmer familiar with only the clarion call of the rooster.

TUNING IN ON THE MERAMEC

Lillian Miller, St. Louis girl, finds great sport listening in on her portable tube set while picnicking on the banks of the Meramec river. A short wire leading from the set to the river acts as a ground and no antenna is used. Satisfactory reception of St. Louis and Kansas City stations is reported by Miss Miller.

Reception in Oregon Caves Good and Free from Static

YREKA, CALIF.—Using an eight-tube super-heterodyne receiver and loop aerial, a party of Radio engineers and students from the Yreka high school here succeeded in tuning in KGW, KLX, KPO, CFCN and KGG while in the innermost chamber of the Oregon caves near Grant's Pass. Very clear reception, free from all static, was obtained.

Beauty treatments are being broadcast by one of the famous beauty specialists of Paris.

WESTINGHOUSE PLEA DEFEATED IN COURT

DECISION IMPORTANT TO REGENERATIVE FIELD

Judge Decides Tri-City Co. Has Right to Have Instruments Made By Outside Concerns

DAVENPORT, IA. — Dismissing the plea of the Westinghouse Electric and Manufacturing company and assessing the latter for the cost of the suit against the Tri-City Radio Supply company (Tresco), Judge Martin J. Wade of the federal court here recently handed down a decision of great importance to manufacturers of regenerative receivers.

The judge decided that the Tri-City company had the right to have instruments manufactured by concerns other than their own. The plaintiff company, the judge declared, has been estopped in its claims by the fact that it had accepted royalties on sales from dealers and jobbers on various occasions.

How important the decision is may be judged from the fact that the sales of the company amounted to more than $90,000 for the first three months of the current year, according to the tender of royalties filed in court.

An appeal will undoubtedly be carried to the United States circuit court of appeals at Minneapolis according to the attorneys for the plaintiff.

HEARS APPLAUSE FOR RADIO SPEECH

Hoover Listens by Means of Receiver to Reaction of Talk on Unseen Audience

WASHINGTON, D. C.—There have been many complaints from those talking over the Radio that they never know how their speech is being taken by the listeners in.

Secretary of Commerce Hoover had an interesting experience of this kind recently when he was able to hear voluminous applause following a speech he made to an unseen audience.

Secretary Hoover, sitting at his desk in Washington, talked to an electrical convention at Atlantic City. On his desk also was a Radio receiving set through which he had been following the proceedings of the convention. Immediately after he had made his Radio talk his receiving set was tuned into the Atlantic City convention and he heard the applause for his speech.

Insofar as can be learned this is the first time this has ever been done.

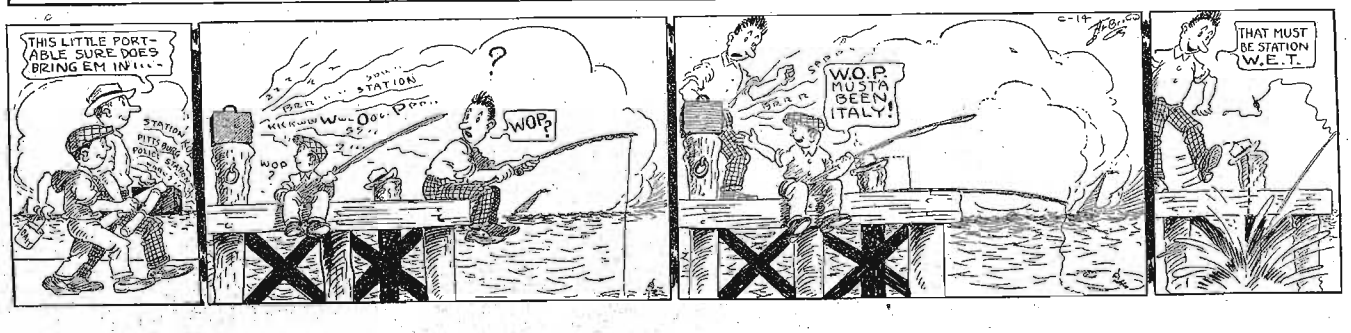
Pittsburgh and "Philly" Put on Radio Chess Meet

PHILADELPHIA.—What is claimed to be the first intercollegiate Radio chess meet will be broadcast June 12 at 11:15 p. m. (Eastern daylight saving time) by Stations WIP, Gimbel Brothers here, and KDKA, Westinghouse at E. Pittsburgh. The contest is between University of Pennsylvania and the University of Pittsburgh, WIP and KDKA giving the plays of the respective schools. All that will be necessary to follow the plays of the opposing teams will be a Radio receiver and a chess board with chess men.

"Bugs" Near Royal Palace Spoiling George's Concert

LONDON.—King George of England is one of the broadcast listeners who curse the careless amateurs these days. It has been found that around Buckingham palace, and also Windsor, there is considerable interference from over-enthusiastic youngsters who would doubtless be horrified if they realized that they were interrupting the drawing-room amusements of their king.

THE ANTENNA BROTHERS — Spir L. and Lew P. — Heterodyning Opinions



U.S. AIRPLANES CAN OFFSET DEADLY RAY

ARMY AND NAVY MEN NOT INCLINED TO WORRY

Cloak of Mystery Belittles Invention, Scientists Say, But France and England Vie for It

(Continued from page 1)

of intrinsic military value in that it could stop automobile and airplane engines and kill human beings at will. He inferred that an offer had been made through a representative of the U. S. Navy.

"Merely a newspaper story," Capt. Ridley McClean, chief of naval communications, characterized the report. The naval intelligence office also denied that the U. S. Navy is bidding or has taken any action relative to the much talked of invention of Professor Matthews.

U. S. Laughs at Matthews' Device

War department officials laughed at the statement of the English inventor. Experiments conducted by the chemical warfare service indicate that the "death-ray" has no practical military value, it was declared. Besides, it was shown, the air service has discovered an insulating material which will not permit the passage of the ray and can be used to protect the occupants and ignition system of the plane.

Animal life can be exterminated at a distance of forty feet by a similar ray now being experimented upon by an American, according to reports. British government scientists also claim results similar to those boasted by Matthews for his invention.

Cloak of Mystery Belittles Invention

The rivalry between France and England to secure exclusive possession of the invention is being watched with quiet, careless interest by the military and naval attaches of the United States embassy in London and Paris.

Whatever Professor Matthews has perfected has been guarded with such a cloak of mystery that many scientists are almost willing to believe his complete story nothing but a magnificent hoax. At least scientific development of the so-called death-ray hardly justifies the extravagant potentialities with which rumors have credited the device.

The dramatic struggle between the two big powers for the "death-ray" is to be deplored, officials here say, inasmuch as it would be impossible to keep its working a secret onee it were put in practical use as in war.

Once the ray is found applicable to war use, it will not be long until all powers will be developing it or its equivalent for their own forees.

British, French, German and American scientists condemn Professor Matthews for his evident desire to attract publicity without foundation in fact. Their attitude is that the professor may have developed the "death-ray" in the laboratory, but will find countless difficulties in putting the ray into operation on the battlefield.

RENE MESNY PUTS MOTOR-STOPPING RAY IN QUESTION

THE STORIES appearing from time to time telling of the perfection of death-dealing and motor-stopping waves or rays by German, French and British scientists caused Radio Digest to query Rene Mesny, professor of Hydrography of the French department of marine and secretary of the foremost Radio society in France.

M. Mesny's comments on the various rumors broadcast by the press of the world are interesting. Excerpts from his study of the situation follow:

"1. The story of the lieutenant who has perfected a practical system for the stopping of gasoline engines is invented out of whole cloth.

Attempt to Verify Rumor

"2. An article has actually appeared in 'La Liberte' setting forth that an engineer has perfected an arrangement making it possible for him to stop automobiles passing directly opposite him in the street. We have sought to have this invention confirmed and see it in operation. The response has been that the fact is true, but when we have tried to verify it there has always been some good reason for delaying the visit and all information given has been evasive.

"3. Finally, as to that which concerns the possibility of developing such an invention, able to operate at a distance, I shall give you my own personal opinion.

Possible Means of Accomplishing

"In order to stop a motor I do not see how it can be done otherwise than by one of the following methods:

"To suppress the sparks of the ignition, be it by demagnetizing the magnet of the magneto or by changing the gas in which the sparks explode into an electrical conductor.

"To produce untimed sparks which explode at irregular intervals, thus impeding the operation of the engine.

"In order to change the gas into a conductor, I do not see that it can bo done by anything but X-rays, and if it is desired to make such rays pass through an appreciable thickness of aluminum, at a distance of several yards, such a result appears to me to be utterly impossible at any distance at which such a result would be interesting.

"As to that which concerns the other methods, the questions of energy available enter again into play."

(Here M. Mesny went into an elaborate discussion of the great amount of power necessary to produce the desired effect. The proof, technical in nature, is omitted.)

Theoretical Result Often Not Practical

"If it is undertaken to operate upon the magnetization of the magneto, the same considerations lead to the same results.

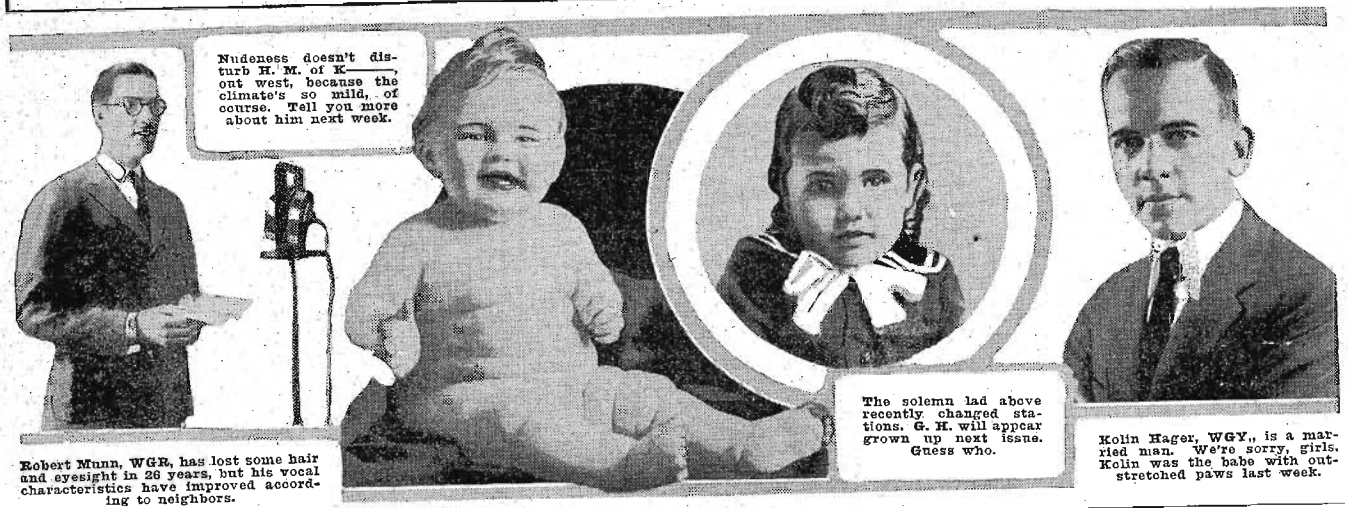
"I think therefore that it is actually impossible to act effectively against the operation of magnetos by means of electromagnetic waves.

"Might an entirely new invention obtain such a result? I do not think so, for such an invention would be closely tied to laboratory work having considerable technical importance. Furthermore, whoever is occupied in placing in operation a scientific idea knows the difficulties to be encountered in passing from the laboratory to the practical; all of which demands a great deal of time. Under these conditions, I am unable to believe that a secret may be kept during such a long time. RENE MESNY."

$1,400 Equipment Gone; Former Emp[illegible]e Sought

CHICAGO.—W. K. Shipma[illegible]26, of Buffalo, formerly employed by the Associated Radio Engineers here, has disappeared, evidently with what is estimated to be $1,400 worth of Radio sets, parts and tools belonging to his employer and customers. A dodger for his arrest describes him as 5 feet 11 inches tall, light complexion, brown suit, gray cap, nearly all upper teeth missing, soft spoken and outwardly very respectful.

BEFORE THEY THOUGHT OF "MIKES"



Robert Munn, WGR, has lost some hair and eyesight in 26 years, but his vocal characteristics have improved according to neighbors.

The solemn lad above recently changed stations. G. H. will appear grown up next issue. Guess who.

Kolin Hager, WGY,, is a married man. We're sorry, girls. Kolin was the babe with outstretched paws last week.

SET BUILDERS GIVE HINTS FOR SUMMER

STRIVE FOR PERFECTION IN SEASON'S RADIO

Experts Tell How to Get Best Results With Any Set During Hot Months

NEW YORK.—The extent to which this will be a Radio summer is becoming apparent with the ever-increasing efforts made by broadcasters, manufacturers and other interests in the Radio industry, to set a high water mark of perfection for Radio reception during the coming months.

Requests from many parts of the United States have led the Radio section of the Associated Manufacturers of Electrical Supplies to issue a series of summer suggestions to the Radio public.

Little difficulty should be experienced in securing good reception in the summer, it is pointed out, as during the past year the power of sending stations has been materially increased. This is expected to eliminate many of the previous difficulties noted during the summer months, not to mention the numerous improvements and refinements in receiving apparatus now on the market.

How to Get Results in Summer

The suggestions are as follows:

1. Whether your receiver is to be used at home, at the seashore or in the mountains, see that the connections are gone over and tightened, that old batteries are replaced and that a good set of tubes are installed.

2. In camping erect your aerial wire from the camp to a branch of one of the tallest trees in the vicinity. If thunderstorms are common, erect an additional aerial not over 10 to 20 feet high. This type of aerial is not so readily influenced by atmospheric disturbances. It can be from 100 to 200 feet long.

3. Whether you use a receiver which operates from a loop, or a receiver which operates from an antenna, the sensitiveness of the receiver should be reduced in times of atmospheric disturbances either by reducing the filament temperature or by "loosening the coupling." The long low aerial or the loop type of receiver will give marked relief this summer from atmospheric disturbances.

How to Get Good Ground

4. See that you have a good ground connection when an aerial is used. If such cannot be obtained at the camp or at the seashore, the equivalent of a good ground connection can be had in the use of a piece of wire 100 to 200 feet in length laid over the surface of the earth directly beneath the aerial.

5. Receiving apparatus in the camp should be duly protected from moisture and dampness.

6. Listeners should bear in mind that the aerials erected at seashore or camp may be quite different from the electrical constant of the aerial used with the same set at home. This means that stations heard at home may not come in at the same point on all the dials.

7. Be sure that the headset cord is not worn, that the connections are tight at the back of the headphones and that the caps are screwed tight.

Between $350,000,000 and one-half billion dollars will, it is believed, be spent on Radio during 1924.

Robert Munn, WGR

ROBERT MUNN was shown on this page last week in the role of a fat, dark-haired, cherubic being commonly known as infant. As the announcer at WGR, Buffalo, N. Y., he is still dark-haired, but that is where the physical resemblance to his infancy ceases.

Mr. Munn is sometimes referred to as the "studio pinch-hitter" at WGR. He is probably the most versatile man at the studio. If one or more members of the program do not show up on time, for the sake of punctuality Mr. Munn frequently "does their stuff" until they come. He is an excellent piano accompanist.

Twenty-six years ago in Girard, Pa., which is said to be near Erie, Mr. Munn was born. His mother now lives at Erie, but Mr. Munn came to Buffalo three years ago. His ambition is to become a composer. Some day he will go to Europe and study, but that is another story.

If he is putting on an organ recital on a Sunday afternoon, we will say, and has six minutes more to go till his time is up, he will go right on with the piece he is playing, improvising as he goes, keeping so close to the nature of the production that he was playing that only one who knows the piece of music and is an expert can tell where the regular production leaves off and where the improvision begins.

"Bob" Munn is tall, slender and dark. His hair is black as midnight and his upper lip is sometimes marked (yes, marked is the word) by a discreet mustache.

If some of the feminine fans, blonds, perhaps, knew Bob Munn as the studio folks do, they would be all headed towards Buffalo. For Mr. Munn is practically the only unattached male about the WGR studio up on the sky-line floor of the Hotel Statler.

Better Programs Is Problem for Confab

U. S. Experts Busy on Plans for Third Airwave Conference

WASHINGTON, D. C.—Experts of the Radio section of the department of commerce are working on tentative plans for the third Radio conference, which it is expected will be called soon by Secretary of Commerce Hoover.

While no announcement has been made at the time of writing it is believed now that the conference cannot be held before July. It is probable that the improvement in broadcasting programs will be discussed along with the reallocation of wave lengths and other problems now confronting Radiophans.

WDAR Generator Gives Way to Battery; Stronger

PHILADELPHIA.—Station WDAR, Lit Brothers, here, has changed its source of power from motor generators to storage batteries. The results obtained in increased strength and clearness of signals are reported excellent.

Cincinnati Gets Call WFBW

CINCINNATI, O.—The new broadcast station at the Alms Hotel has been licensed as WFBW by the government. The first official program was given recently. WFBW is on the air Wednesday, Saturday and Sunday evenings of each week. Exact hours have not yet been agreed upon with the other two stations.

Kolin Hager, WGY

ROMANTICALLY inclined maidens of a past generation addressed love notes to the matinee star. With the advent of the movies, the letters went to the screen star of fine features and attractive form. Today the maidens, charmed by voice alone, address their perfumed notes to Radio announcers.

"K. H." is chief announcer at WGY and is in charge of the studio. He is 29 years old, and the last four years of his age have been spent as a married man. As an aid to identification it might be added that he is five feet ten inches tall and has brown hair and blue eyes.

Mr. Hager's musical education began shortly after he left the cradle. He was boy soprano soloist at All Saints Cathedral, Albany, N. Y., for eight years.

During his high school and college education he studied French, German and Italian with the idea of going into light opera. This idea matured, for after the armistice was signed he sang a leading part in the light opera, "The Isle of Azuwere," which toured France and Germany.

Mr. Hager's ambition is to keep WGY at the top in the broadcasting of diversified programs and it is his earnest endeavor to promote the educational feature in broadcasting. His pet peeves are the Radio speaker, who has little to say and takes a long time to say it; the singer who cannot be convinced that he or she sings badly; the would-be Radio humorist who never gets any further than trying to be funny.

AERIALS TANGLED IN LEGAL MESHES

Tennants of Fashionable Apartments Accused of Stretching Wires Too Low Over Roof

WASHINGTON, D. C. — Radio was brought before the police courts of the District of Columbia for the first time recently when a score of tenants in one of the fashionable apartment houses here were given preliminary hearings on charges of violation of the new building regulations which require antennas to be at least seven feet above the roof. The offenders agreed to raise the aerials to the required height, and the court decided to nol-pros the charges.

The network of low wires, it was charged, would make it exceedingly dangerous for firemen who might be forced to fight a blaze from the roof top.

SPECIAL PROGRAMS TO PUBLIC SCHOOLS

SPEECHES HEARD BY ALL SIMULTANEOUSLY

Receivers and Loud Speakers Deliver Words of Counsellors to Every Oakland School at Once

OAKLAND, CALIF.—If the experiments now being made by the Oakland public schools are successful, a single speaker may inspire and instruct hundreds of teachers and classes assembled under normal conditions in public schools scattered over a wide area in city and country.

This is to be accomplished by a broadcast station transmitting especially for public schools.

Instead of traveling from one school to another, counselling instructors of the Oakland public schools now speak at the studio of KGO, the Pacific coast station of the General Electric company, on Tuesdays and Thursdays at 10:20 a. m., Pacific time. Radio receivers and loud speakers installed in twenty schools in the city then reproduce what is said.

Musical Numbers Give Stimulus

Teachers and pupils assemble in classrooms in the regular manner, with not more than two classes in any one place.

The broadcast program is developed by a special committee working under the direction of Dr. Virgil Dickson of the Oakland public schools. Musical numbers are placed between speakers on the program as a stimulus for the minds of teacher and student listeners. Only eighth and ninth grade classes have been used in experiments thus far made. Eventually all grades may be included.

That parents are taking an active interest in the experiments is shown by a report from one school showing that forty-seven mothers had telephoned that they were listening and were enjoying the programs.

Prison Chapel Gets Set to Carry Sermons to Inmates

BIRMINGHAM, ALA. — The county board of revenue of Jefferson county has decided to install a receiving outfit in the chapel at the county jail for the benefit of the prisoners. The Baraca class of the First Baptist church made the request of the members of the board of revenue that a Radio outfit be installed.

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 .....

14 CITIES, 18 PLANTS LINKED FOR POLITICS

REPUBLICAN CONFAB WILL BE ON AIR WIDELY

Complete Happenings at Cleveland Public Auditorium Are Divulged to Radiophans of Country

By P. A. Price

CLEVELAND.—Proceedings of the Republican National Convention, to have been opened June 10 in the Public Auditorium here, will be heard in their entirety throughout the length and breadth of the United States by means of transmission over land lines of the American Telephone & Telegraph company and broadcasting from powerful stations located in twelve or more important centers of the country.

Though last minute changes may be made, at the time of writing, broadcasting was to be done from the following cities: Providence, R. I., New York, Washington, Buffalo, Pittsburgh, Chicago, Minneapolis, Omaha, Davenport, Kansas City, St. Louis, Ft. Worth, Atlanta and Cleveland. It is also quite possible that KDKA, the Pittsburgh station having convention service, will relay on a low wave length to its sister station, KFKX, at Hastings, Nebraska, and this latter station will broadcast to an immense western territory.

Stations Linked for Broadcast

According to plans outlined by local convention officials, the specific cities and stations interested in the service were to be:

Providence, R. I., Outlet Co., WJAR; Pittsburgh, Pa., Westinghouse Co., KDKA; New York, American Tel. & Tel. Co., WEAF; Washington, D. C., Chesapeake & Potomac Tel. & Tel. Co., WCAP; Buffalo, N. Y., Federal Tel. & Tel. Co., WGR; Chicago, Ill., Sears-Roebuck, WLS, Chicago Tribune, WGN, Daily News, WMAQ; Minneapolis-St. Paul, Minn., WLAG; Omaha, Nebr., Woodmen of the World, WOAW; Davenport, Iowa, Palmer School of Chiropractic, WOC; Kansas City, Mo., Kansas City Star, WDAF; St. Louis, Mo., St. Louis Post-Dispatch, KSD; Ft. Worth, Texas, Ft. Worth Star-Telegram, WBAP; Atlanta, Ga., Atlanta Journal, WSB; Cleveland, Ohio, Union Trust Co., WJAX, Willard Storage Battery Co., WTAM, Radiovox Co., WHK.

At Cleveland, and at Chicago, three stations will probably divide the broadcasting into three shifts, and this division of the long daily periods may be effected in other cities having more than one station.

When Broadcasting Will Take Place

The convention, according to plans, was to be called to order daily at 11:00 a. m., and the proceedings broadcast with practically no intermission until the sessions end late each afternoon or evening, as the case may be. It was also planned to have speeches and addresses broadcast by prominent Republicans.

Chauncey M. Depew and "Uncle Joe" Cannon are mentioned among other notables who will speak in behalf of the "Grand Old Party." It may be mentioned that "Uncle Joe" is quite a Radiophan himself. Jas. D. Preston, of the Senate Press Gallery, was to be "Radio Observer" of the convention.

In short, every Radiophan in the United States within crystal or tube set range of the big broadcasting stations of the country is enabled to hear all that transpires at this first really public convention—really public in the sense that the speeches and applause, the shouts and tumult of exciting moments will be unconfined by the four walls of the building but will be carried on the intangible other waves all over the country.

Stations Pay Cost of Service

The total cost of the service is said to be in the neighborhood of $9,500, borne by the broadcasting stations having the service. The individual amounts paid by the stations will be directly proportional to their distance from Cleveland, in much the same manner that the cost of a long distance telephone call depends upon the distance covered in setting up the connection.

It may be said that the telephone company, with full appreciation of the public service given by the broadcasting stations, has made its rates very reasonable, particularly in view of the extremely long daily periods for which its circuits are withdrawn from remunerative commercial use and placed at the disposal of the stations.

GOLDEN TROPHY FOR ANNOUNCER AWARD

Above photo shows the Radio Digest's First Annual Gold Cup which will be awarded to the world's most popular announcer. This will be decided by the Radio public at large by popular vote.

'TIS SPRING! HIRED HAND WRITES HIT

WBAP's Announcer Agrees to Take All Bouquets, Bricks; Blames His Turning Fancy

FORT WORTH.—"Wuxtry, wuxtry, the one and only 'Hired Hand' announcer at Station WBAP has went and done it." Great excitement prevails in the vicinity of this well-known station for the great announcer of all times has written a song.

He has absolutely no legitimate reason on earth for doing this, but youth must be served and you know that in the spring a young man's fancy, etc., etc. Anyhow, he has written a song and it is called, "Hired Hand Radio Bawl." Nice catchy air n'everything.

All bouquets, brickbats, slams and bangs should be directed at the Hired Hand personally. He'll take 'em all and still come up smiling. Don't forget, if you want to make a hit, or get hit for that matter, send your future biscuit-cooker a copy of his song, for after all is said and done, it certainly is alleged to be good.

WEAF Quits Class D; Resumes "B" Rating

License Used for Experiments Dropped Without Explantion

NEW YORK.—WEAF, the New York station of the American Telephone and Telegraph company, has abandoned its class D license.

The license was obtained for experimental purposes by WEAF from the Radio section of the department of commerce. No reason was given for the abandonment of the license and the station has gone back to class B. The only two stations now operating on class D licenses are WGY and KDKA at Schenectady and East Pittsburgh, respectively.

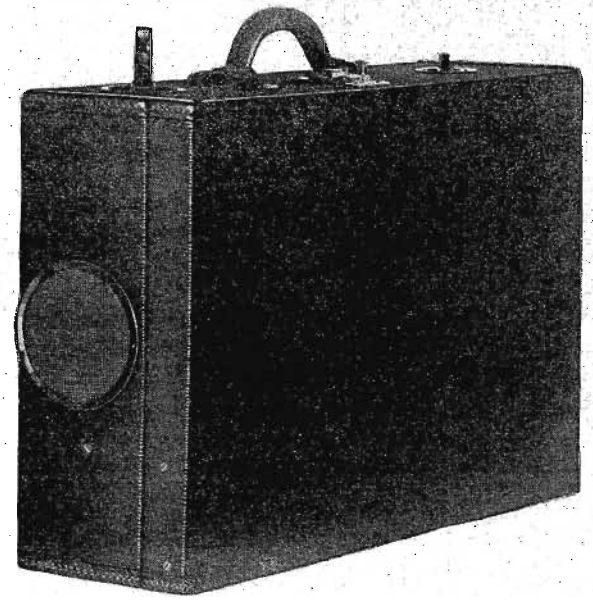
Florida Hears Arnold, Pa.

ARNOLD, PA.—It has been reported that Station WCBU, located here, has been heard in Florida. This is about 1,000 miles distant from the station. Owing to the fact that the plant uses but fifty watts output, the range is considered remarkable.

OPERATING AND TROUBLE SHOOTING

For the Owner of a Zenith Portable Receiver

"OPERATING and Trouble Shooting" is a Radio Digest feature whose purpose is to study the late models of various standard receiving sets and to show the newly initiated broadcast listener, who has purchased such a set, how he can operate it to get the best there is in it and how he can overcome minor difficulties which may be causing some trouble. On page 7 this week the Zenith Portable Receiver is described. Radiophans with other sets will also find these articles worth while reading, particularly the notes on trouble finding.



THIS Zenith portable fully lives up to its name, in a sense that it is really portable, covering all parts necessary for reception. As an illustration, the entire outfit, as shown, can be carried in the hands with the set in operation, no wires trailing or outside connections being necessary. The loop aerial is an integral part of the cover of the suitcase. All batteries are installed inside. The loud speaker is a built-in unit of the case. The circuit has three stages of Radio frequency, detector and two stages of audio frequency, using six 199 tubes. The filament current is taken care of by 3 dry cell units. The plate current is furnished by four small 22½-volt batteries. A small flashlight battery takes care of the grid biasing.

Six tube sockets are mounted on a cushion suspension strip so that no microphonic tendencies of the tubes are produced. The suitcase doesn't have to be opened up for operation. It's simply set in a vertical position, as shown, and rotated as required by the directional qualities of the loop. The tuning controls consist of a variable condenser and potentiometer and rheostat and a battery switch, all located on the top of the suit case. The dials or knobs are sufficiently countersunk into this top board so as not to be in the way or prevent carrying of the case.

Tuning Operation

Naturally, the first step is to pull out the battery switch for lighting the tube filaments. The rheostat should be set about one-half way, further re-adjustments will probably not be necessary after the remainder of the tuning has been completed. The real tuning control is concentrated in the potentiometer and the variable condenser. The potentiometer should be set at about the half-way point and the variable condenser control slowly rotated from maximum to minimum. Upon hearing reception the control should be very gradually shifted until position of maximum volume is obtained. The potentiometer adjustment should then be moved from one side to the other until its position corresponds to strongest and clearest volume. As stated above, the final adjustment is in resetting the rheostat for any improvement.

If no reception is heard when turning the condenser the first time the next step would be to turn the potentiometer first to one side and rotating the condenser control and then to the opposite side. Satisfactory operation of receiver is evinced by the purring sound from the loud speaker aperture in the set. The jack hole on the side opposite the loud speaker aperture permits plugging in of a head set where more critical tuning for long distance work is desired.

(Operation of the Deresnadyne five-tube set will be given in the next issue. This is a large home set that operates with regular outside aerial and ground connections.—Editor's Note.)

Electron Flow in the Operation of Tubes

THE addition of a third electrode called the "grid," between filament and plate, in the vacuum tube makes it possible to increase or decrease the current between plate and filament over wide limits. It is obvious that the electrons traveling from filament to plate must pass through the wires forming the grid. If the grid is given a potential which is negative with respect to the filament, the grid will repel the electrons, but many of them will still pass through and reach the plate, because of their high velocity, inasmuch as the positive plate potential still affects them to some extent. If the grid potential is made still more negative, the plate current will diminish until finally it may be stopped entirely.

If, however, the grid is given a positive potential instead of negative, electrons will be attracted to the grid as well as to the plate and more electrons will now be drawn toward the plate than would otherwise pass, so that the plate current increases. The charge on the grid partially neutralizes the effect of the space charge. A limit to the magnitude of the plate current will finally be reached, when the space charge caused by the large number of negative electrons in the tube fully counteracts the influence of the positive charges on the grid and the plate. The attainment of the limiting or saturation value of the plate current is assisted by the absorption of more electrons into the grid if its positive potential is increased. This absorption gives rise to a relatively small current in the grid circuit. The total electron flow is the sum of the plate current and the grid current. As the potential of the grid becomes more positive, more electrons will be absorbed by the grid.

The current in the plate circuit depends very markedly upon the potential of the space between plate and filament. Electrons which have just left the filament and are moving away from it, give a "space charge," as it is called, to the vacuous space in the vicinity of the filament and will limit the flow of electrons between filament and plate. The influence of this space charge may be controlled by varying the potential of the grid. If the grid is made positive, it will tend to neutralize the effect of the electronic space charge which is negative and the result will be an increase in the flow of electrons from filament to plate. If the grid is made negative, it adds to the effect of the electrons in the space, and decreases the flow of electrons in the plate circuit. Thus, if the temperature of the filament is kept constant, and the potential applied to the plate is kept constant, the current in the plate circuit may be varied also by varying the potential of the grid.—Peter J. M. Clute, Schenectady, N. Y.

Improved Catswhisker

A strip of tinfoil 1 inch in length and ¾-inch in width is cut into prongs resembling the teeth of a hair comb. The strip is rolled into a small tube or cylinder, and placed in the catswhisker support of the crystal detector. With the "teeth" spread apart and resting on the crystal it makes an improvement over the ordinary whisker.

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.	440	Silent	12:30- 1:30	Silent	Silent	Silent	11:00- 1:00	Silent
CKAC, Montreal, Que.	425	Silent	5:30- 9:30	Silent	6:30- 9:30	Silent	5:30- 9:30	2:30- 3:30
CKCD, Vancouver, B. C.	410	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30	10:30-11:30	Silent
CKY, Winnipeg, Man.	450	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	8:30- 9:00	Silent	9:00-11:00	Silent	8:30- 9:00	Silent
CYL, Mexico City, Mex.	510	Silent	10:00-11:30	Silent	Silent	10:00-11:30	Silent	Silent
CYX, Mexico City, Mex.	330	9:00-12:00	Silent	Silent	10:00-11:00	Silent	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	7:00-8:00
KFI, Los Angeles, Calif.	469	12:00- 1:00	8:45- 1:00	8:45- 2:00	8:45- 1:00	8:45- 2:00	8:45- 2:00	8:45- 1:00
KFNF, Shenandoah, Ia.	266	Silent	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	6:30- 7:30
KGO, Oakland, Calif.	361	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	10:00-12:00	12:00- 2:00	9:00-10:00
KHJ, Los Angeles, Calif.	395	8:00- 1:30	8:00- 1:30	8:00- 1:30	8:00- 1:30	8:00- 1:30	8:00- 1:30	8:00- 1:30
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	10:00-12:00	10:00- 1:00	Silent	10:00- 2:00	10:30-12:00
KQV, Pittsburgh, Pa.	270	7:00-10:00	Silent	7:00-10:00	Silent	7:00-10:00	Silent	Silent
KSD, St. Louis, Mo.	546	8:30- 9:30	8:00- 9:00	6:30-11:00	Silent	8:00- 9:00	8:00- 9:00	7:00- 8:00
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	Silent
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, Min'p'l's., 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.	273	6:00- 7:00	Silent	6:00- 7:00	7:10-10:30	Silent	6:00- 7:00	7:10- 8:30
WBT, Charlotte, N. C.	360	Silent	7:30- 8:30	Silent	7:30- 8:30	Silent	Silent	5:30- 6:30
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	6:30- 9:00
WCBD, Zion, Ill.	345	7:00- 9:15	Silent	Silent	7:00- 9:15	Silent	Silent	1:30- 5:00
WCX Detroit, Mich.	517	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
WDAR, Philadelphia, Pa.	395	5:30- 9:00	5:30- 6:30	5:30- 9:00	5:30- 6:30	5:30-11:00	5:30- 6:30	Silent
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	6:00-10:00	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- 9:00	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	6:00-12:00	6:00-12:00	6:00-12:00	6:00-12:00	6:00-12:00	8:15-10:15
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- 3:30	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	7:27- 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	4:30- 5:00	3:00- 4:00
WHK, Cleveland, O.	283	4:30- 5:00	4:30- 5:00	4:30- 5:00	4:30- 5:00	4:30-10:00	5:30-10:00	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	Silent	7:30-10:00
WHO, Des Moines, Ia.	526	7:30- 9:00	Silent	7:30- 9:00	Silent	7:30- 9:00	5:00-11:00	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	Silent	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, Min'p'l's.-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
WLAK, Bellows Falls, Vt.	360	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	8:30- 9:30	6:30- 8:30
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	5:30-10:30
WOAI, San Antonio, Texas	385	9:30-10:30	9:30-10:30	Silent	7:30- 8:30	Silent	Silent	9:00-11:00
WOAW, Omaha, Neb.	526	6:00-11:00	6:00-11:00	Silent	8:00-11:00	6:00-11:00	6:00-11:00	7:00-11:00
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	Silent
WOO, Philadelphia, Pa.	509	5:30- 9:00	Silent	5:30- 9:00	Silent	5:30- 9:00	Silent	7:00- 7:45
WOO, Kansas City, Mo.	360	Silent	8:00- 9:30	Silent	8:00- 9:30	Silent	8:00- 9:30	Silent
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	7:30- 8:30
WOS, Jefferson City, Mo.	441	8:00- 9:30	Silent	8:00- 9:30	Silent	8:00- 9:30	Silent	7:00- 9:00
WQJ, Chicago, Ill.	448	Silent	6:00- 1:00	6:00- 1:00	6:00- 1:00	6:00- 1:00	6:00- 1:00	Silent
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.

Claims Receiving Record

WILMETTE, ILL.—A resident of this town claims what he believes is a record for receiving. He has heard a total of 236 broadcasting stations, using a single-circuit regenerative receiver, two stages of audio, but no Radio frequency amplification. The claimant of the record is Clarke L. Shabino.

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	KGW
254	WMAV	337	WBZ	360	WLAK	400	PWX	441	WOS	492	WEAF
265	KFNF	345	WCBD	360	WMAK	400	WHAS	448	WQJ	500	WMC
270	KQV	345	WLS	360	WOQ	405	WJY	448	WMAQ	509	KLX
278	WNAC	360	KFAF	360	WRM	405	WOR	450	CKY	509	WIP
280	WKAR	360	KGU	360	WSY	410	CKCD	455	KFOA	509	WOO
283	WHK	360	WBT	370	WGN	411	WDAF	462	WCAE	510	CYL
283	WTAY	360	WCAJ	380	WGY	411	WHB	469	KFI	517	WCX
286	WJAS	360	WCAL	380	WHAZ	417	WBAH	455	WJZ	517	WWJ
286	WTAS	360	WDAP	385	WOAI	417	WLAG	469	WCAP	526	WHO
309	WLW	360	WEAY	390	WBAV	423	KPO	469	WRC	526	WOAW
309	WSAI	360	WGI	390	WJAX	425	CKAC	476	WBAP	536	KYW
312	KGO	360	WHA	390	WTAM	425	CYB	476	WFAA	546	KSD
319	WGR	360	WHN	395	KHJ	429	WSB	484	WHAA		
326	KDKA	360	WJAR	395	WDAR	435	NAA	484	WOC		

Germans Can't Get This Patent Back

Schloemilch-Von Bronk Rights Belong to U. S. Navy—R.C.A. Seen Behind House Bill

WASHINGTON.—Patents bought by the U. S. Navy from the Alien Property custodian during the war will remain in the hands of the Navy and cannot be turned back to their German owners, even through legislation, according to Thomas W. Miller, now custodian.

The settling of this point will ease the minds of many manufacturers and dealers who have been wondering about the German patent situation. An eastern publication recently stated that the famous Schloemilch and Von Bronk patent, No. 1,087,892, covering Radio frequency amplification and reflexing and awarded in 1914, would be reverted to its German owners, the Telefunken company, by legislation now before the House of Representatives.

The reversion is impossible according to Mr. Miller.

The Radio Corporation of America, said to have the American rights to all the Telefunken patents, are believed to be promoting the House bills seeking the return of the patents to Germany. In the event these were returned, the Radio Corporation of America would have an American monopoly on the German patents; something it has not entirely as the matter now stands.

Although a great deal of fuss has been made about whether the motion picture companies would have press rights at the Olympic games, no mention yet has been made about broadcasting results.

Senator Phipps on KLZ

CHICAGO.—The report in the issue of May 24, that Senator Phipps broadcast his views in regards to the tax from Station KFAF, should have read Station KLZ. Station KLZ co-operated with the senator in saving Radiophans the cost of telegrams.

30 Minute A-B-C Lessons for Radio Beginners

Chapter XIII—The Radio Detective

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 or not he knows anything about electricity or its application to broadcasting and reception. The series consists of twenty-five chapters, of which the five next will be:

Chapter XIV—Tuning In.
Chapter XV—Working Through Interference.
Chapter XVI—The Power Voice of Radio.
Chapter XVII—Reproducers, The Finishing Touch of Radio.
Chapter XVIII—The Hero Circuits of Radio.

DETECTING Radio waves requires a device called a detector, which really is a rectifier or means for converting alternating Radio frequency current into direct flowing current. Notice the term "direct flowing" differs from the word "direct" as the latter implies a continuous flow. The output current from a detector is uni-directional but not steady, as it comprises a series of rectified half cycles which must be smoothed out into a steady current fluctuation by means of a condenser or inductance in the circuit to which it is connected.

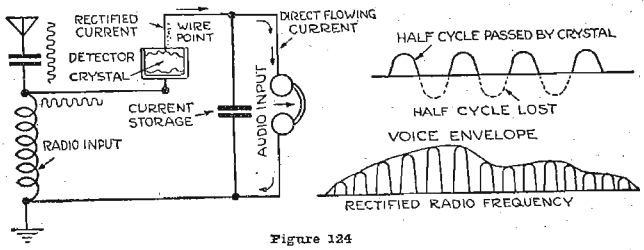


Figure 124

What a Detector Does

Detectors are of various types but the kinds in most use today are the crystal rectifier and electron tube rectifier. A crystal detector consists of a metal wire or mineral contacting with a crystalline mineral material, and has the property of letting electric current flow much easier in one direction through it than reversely. A common form is the lead sulphide called galena as found in mines or made from lead and sulphur in the laboratory. Galena crystals are cubical and certain varieties operate better than others. The metal point touching the galena may be a fine silver or gold wire or plain copper, and is sometimes known in the Radio trade as a "cat whisker."

A detector comprises the crystal, its holder, the wire point or "cat whisker," and some means for adjusting the pressure and position of the wire on the crystal. The sensitivity of a crystal depends on the smallest amount of energy which it can rectify as well as its ability to rectify all the Radio energy supplied to it. When two crystals, such as zincite and bornite are used, considerable pressure can be applied to make a more stable detector. There are many mineral and chemical compounds which can be used.

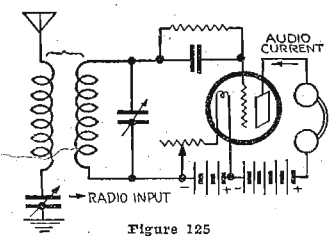


Figure 125

Sometimes the detector is made in permanent form instead of with adjustable contact. When a permanent combination stops its rectifying action it has to be renewed.

A crystal detector requires no local energy from a battery and operates directly on the Radio frequency input as illustrated in Figure 124. The Radio frequency current flowing in the tuned aerial circut can flow through the detector crystal, but, with perfect rectification, one half cycle only passes. A condenser is used to collect the direct flowing half cycles from the detector output, and a direct flowing current from this condenser reproduces the original voice current pulsations into the audio output or headphones.

The reason why the range of a crystal set is limited is that it actually operates on the amount of incoming energy received. In the case of a vacuum tube detector, the incoming energy only needs to control local energy input from a battery.

Vacuum Tube Detector

The two electrode vacuum tube is little used today and its action is much the same as in the case of a crystal detector. In the three electrode detector tube, aside from rectification there is an energy boosting effect, and in general use of vacuum tubes, the detector action is accomplished by a boost in energy value, or amplification.

Figure 125 shows a simple audion or vacuum tube circuit in which the incoming Radio frequency energy is partially rectified and partially amplified by repeating into the plate circuit.

There are two general types of vacuum tubes, one highly evacuated (hard) and the other containing some residual gas (soft). The latter are the more sensitive because they can be operated at critical conditions in which a tiny change on the grid means a large change in plate current. The hard types of tubes are more suited as amplifiers but work as detectors in appropriate circuits.

Tube Characteristics

A hard or amplifying tube will work as a detector if the plate voltage from the B battery is increased sufficiently, say to 60 volts or more, as this alters the operating characteristic. This is without grid condenser. Another way to operate hard tubes for detection is to establish grid currents only or in combination with the use of higher plate voltage. The most generally used method however, employs a grid condenser to insure reasonably good rectifying action. The makers specify instructions for use as a detector. In the case of hard tubes, operating as amplifiers or as detectors without use of grid condenser, the grid circuit is returned to the negative side of the A battery used to light the filaments, but when a grid condenser is used, it is necessary to have the grid return to the positive side of this A battery. In the case of a detector tube or soft tube, using grid condenser, the return should be to the negative side of the A battery.

Regeneration

In the case shown in Figure 126 the detector tube is simultaneously used as an amplifier by means of feedback or regeneration. Hard tubes work fairly well in such circuits but soft tubes are required for best results in circuits such as shown in Figure 125, i. e., those depending principally on detector action.

At best the detector action or rectification in a vacuum tube is not as perfect usually as in the case of a crystal rectifier. By adjusting the operation so that it occurs at the most favorable condition, as illustrated by Figure 127, at the bend in the characteristic performance curve, the best result is obtained. That is the purpose of the vernier control on the filament rheostat and why also variable grid leaks and, other times, a potentiometer is used, thus obtaining operation on the most favorable detecting portion of the characteristic curve.

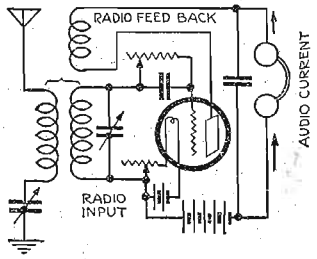


Figure 126

Other Types of Detectors

The sodion tube is a rectifier in which the beneficial ionization effect of the element sodium increases greatly the sharpness with which the plate current changes with a slight change of grid potential. This makes for a more sensitive detector action independent from regeneration. Regeneration is really an amplification effect.

Four element tubes are really combined amplifiers and detectors. In any case, the true detector action of the tube determining its sensitivity is the smallest value of Radio current it can operate on and its ability to rectify all of the Radio current input.

Combinations with Crystal Detector

When imperfect rectification results from use of a hard tube as a detector, it is sometimes an advantage to combine this action with a detector or rectifier of the crystal type. Nowadays this will usually be done in a reflex type of circuit so that the tube acts principally as an amplifier, with the separate crystal detector doing most of the rectification.

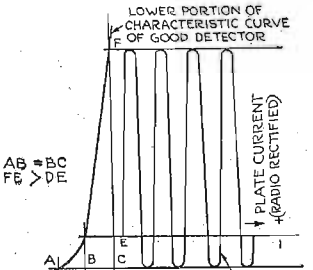


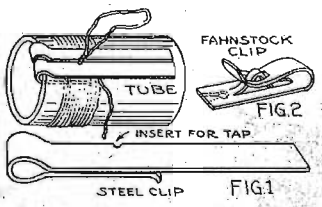
Figure 127

(We are beginning to learn that a great deal depends on proper tuning. You cannot revolve the dials most any way and get good reception. The right combination is necessary and many who think they have it are a long way from the best. The next article in this series has to do with the proper tuning. Read it and be informed.—Editor's Note.)

Wire Holder for Coil Winding

The steel clip shown in Figure 1 may be purchased from a stationary store and is known as a banker's clip. These make good clips for holding the wire on a coil in the winding process and while twisting it to make taps. Use two of the clips as shown and the twist can be easily made and the tap soldered in a neat manner.

If the well-known Radio clip does not fit your screw shank, or if you cannot press it down on account of the screw head interfering cut it with a pair of snips as shown by the dotted line in Figure 2. If the cut is made right it will fit most any screw, or it can be easily slipped under a screw that is already partly driven.—Ferdinand G. Long, Brooklyn, N. Y.



How to Revive Tubes

If the B battery voltage is accidentally applied to the vacuum tube and the filament of the tubes do not burn out they are made inactive unless a plan is made to "brake" them. This consists of leaving them lighted in the sockets for a half hour or so without the B battery connected. This generally restores them to normal working condition.

Smoothing Out and Reducing Static Trouble

Summer Reception May be Made More Pleasant

By I. R. Tannehill

THE majority of static eliminators make their appearance in the winter season when there is little such interference to be overcome. When the real season of atmospherics arrives these so-called eliminators disappear. This is probably due to the fact that the inventor discovers to his chagrin that the eliminator is of no value when pitted against the terrific, hissing, crashing discharges of the summer season.

There is then nothing much left for the listener to do, since those devices which are of some value are, because of their cost and complexity of construction, beyond his resources.

Practically all listeners are willing and anxious to make any sort of experiment that offers any promise of success in this regard. For this reason only and not with any positive statements as to what may be expected, the writer ventures to offer the following to be of some possible use in reducing the static annoyance.

The methods outlined here will result in some diminution of the volume of reception and the head phones will in many cases be necessarily substituted for the loud speaker.

Receiver Silent in Operation

For the same reason—probable diminution of volume—it is essential that the receiver be absolutely silent in operation. In the winter season the broadcast programs are received with considerable intensity, sufficient to mask slight receiver defects which result in hissing and scratching sounds. Along with the increased intensity of static interference with coming summer, broadcast reception seems to weaken. This is probably due to two causes: The conditions which give rise to atmospherics are also unfavorable to transmission; the heavy crashes of static in the receiver so irritate and numb the auditory nerves that they are temporarily insensitive to the intermittent snatches of music or speech. This latter view is corroborated by the fact that the listener usually finds that retreating some distance from the loud speaker or removing the 'phones a little distance from the ears serves to increase the ration of broadcast reception to static.

For these and other reasons it is exceedingly important that the receiver be silent in operation. When this has been accomplished and the receiver is at maximum efficiency, the listener is in a position to pick up with some satisfaction the diminished energy yielded by selective and smoothing devices.

It is well known that high capacities are used successfully in transmitting circuits to smooth out the generator interference and in the same manner capacities in the receiving circuit absorb some of the harshness of the static discharges.

Condenser and Coil in Aerial Circuit

To begin with, a very selective receiver is essential. Even with circuits ordinarily considered selective, the use of a separate antenna coil shunted by a condenser for tuning is quite useful. This coil should be connected directly between the antenna and ground, shunted by a variable condenser of capacity .00025 or .0005 mfd., the proper number of turns to the coil to be determined by experiment, probably about 40 to 50.

With a receiver silent in operation it is surprising the distance to which this separate coil may be moved from the receiver and still an appreciable amount of energy transferred to the receiver. The farther the coil is removed the more the static interference is reduced, but the broadcast reception is likewise diminished. The crashes of static are, however, apparently less frequent. There is a limit to which this selectivity may be increased. At a certain point in the process the static is no longer perceptibly diminished—this is because the windings of the receiver, the transformers, tuning coils, etc., themselves pick up a certain amount of the static directly which is not affected by the coupling. Therefore shielding is useful, but in any event the coils should be a distance where improvement is no longer possible and probably in most instances returned about one-third the distance to the receiver tuning coil. At this point the volume of reception should be fairly good though considerably diminished.

The static crashes should appear somewhat less frequent because of this increased selectivity, though still annoying and of a harsh, hissing character, extremely disagreeable.

Telephone By-Pass

The second consideration is a good telephone by-pass of not less than .001 mfd. capacity. If audio frequency transformers are used, this fixed condenser should by-pass the primary of the transformer.

Across the secondary of the first audio frequency transformer place a fixed condenser of capacity somewhat between .0005 mfd. and .005 mfd., this to be determined by experiment. Capacities at and above .005 mfd. may result in almost complete suppression of reception. Good fixed condensers should be used, there being little excuse for the paper wrapped fixed condensers, as good mica condensers are reasonable in price. The secondaries of the subsequent audio frequency transformers, if any, should also be shunted by fixed condensers.

It will be found that the higher the condenser capacity, the more completely will the extremely harsh and hissing sound of the static crash be eliminted.

Grid Leaks Required

Leaks across the terminals of the transformers, made with a soft lead pencil, may also improve reception. It is important in any circuit in the static season that suffieient grid leakage be provided from the grid to filament of each tube as this serves to carry off the static charge which may otherwise result in temporary choking of the grid circuit and result in ragged reception, another static annoyance which is thus partially eliminated.

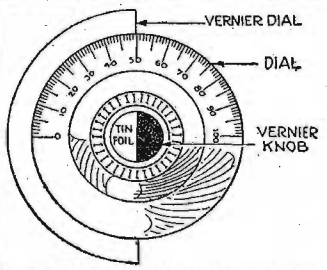
The condensers across the transformers not only smooth out and absorb the static shock, like shock absorbers on an automobile, but they remove much of the shock and numbing effect upon the ear, thus leaving the nerves sensitive to the intermission in which music or speech is being received.

This method of attack has several advantages. In the automobile analogy, we do not attempt to remove the rough places from the road; we drive in such a way as to avoid the bumps and provide shock absorbers to make riding agreeable. Similarly, we use an extremely selective coupling to dodge the static bumps as much as possible and then provide leaks and capacities to absorb and remove the charges and render them less irritating to the nerves, thus leaving frequent intermissions in which the nerves are sensitive to the improved reception. A certain amount of atmospheric interference will inevitably reach the receiver, but we drain it off and absorb it as quickly as possible, instead of leaving it to numb the nerves and choke the circuit until another shock makes it continuous. When we view a motion picture we are not aware that the interruptions are taking place as the separate images are impressed upon the screen. In the same manner, we may provide intermissions in the static interference so that their constant recurrence leaves upon the ear the impression of an almost continuous program.

These are by no means intended as positive statements. The reader may try these experiments and decide for himself whether there is improvement.

Vernier Indicator

Procure a piece of tinfoil the size of the vernier knob and cut it in two across the center, glue one-half on the knob in



the same position as the vernier plate, then whatever the position of the vernier, the silvered face of the knob will indicate the exact position of vernier plate.—Emory E. Phelps, Rockville, Conn.

NATIONAL CONVENTION FILLS ETHER

Wednesday, June 11

Silent night for: CKAC, KFAF, KGO, WAAW, WFAA, WFI, WGY, WIP, WMC, WOAW, WRC, WSAI.

CHYC, Montreal, Can. (Eastern, Daylight, 341), 8:30 p. m., Montreal Harmonic band.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 1:45 p. m., Mount Royal Hotel concert orchestra; 4:30, Mount Royal Hotel the-dansant program.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 9:30 a. m., commencement address graduating class of the U. of Pittsburgh, Dr. William J. Mayo; 5:30 p. m., dinner concert, Pittsburgh Athletic association orchestra; 6:30, two little plays for little girls and boys, Drama league; 7:05, program, arranged, League of American Penwomen, Mrs. Jeanne Oldfield Potter; 8, opera, "The Violin Maker of Cremona," Matthew Frey, composer-director, cast of characters: Giannina, Sara Logan, contralto; Filippo, T. Reid Kenne, barintone; Adgar Sprague, tenor; Tadeo Farrari, Raymond Griffin, bass.

KFAE, Pullman, Wash. (Pacific, 330), 8:30-9:30 p. m., Glee club music; W. S. C. quartet; late song hits, Leighton Bailey; comic tenor numbers, Fred Marshall; "Fodder in Alfalfa," Bliss Dana.

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

KFNF, Shenandoah, Iowa (Central, 226), 12:30 p. m., farmer dinner concert; 7:30, concert, Farmer Puckett.

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

KGO, Oakland, Calif. (Pacific, 312), 3 p. m., music, speaker, Cora L. Williams institute; 4-5:30, concert orchestra, Hotel St. Francis.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., talk, Jeanette P. Cramer; 8, concert, Seiberling-Lucas Music company; 10, dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 469), 12:30-1:15 p. m., program, Cov Barkley's Oakmont Country club orchestra, 2:30-3:30, program courtesy of Barker brothers, arranged by Clair Forbes Crane; 6, children's program, Prof. Walter Sylvester Hertzog; bedtime story, Uncle John; 8-10, program, Aetna Life Insurance Co., Leslie Brigham, director; 10-11, Art Hickman's danee orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont Hotel orchestra; 2:30-3:30, Jack Falt'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; 7-7:30, Rudy Seiger's Fairmont Hotel orchestra; 8-11, E. Max Bradfield's Versatile band.

KQV, Pittsburgh, Pa. (Eastern, Daylight 270), 11-11:30 a. m., music; 1-1:30 p. m., luncheon music; 3:45-4:15, matinee music; 5-5:30, twilight tale and Diary of Snubs Our Dog, for the kiddies; 8:45-9, "Fifteen Minutes of Popular Songs," Ben Rich and Jack Rich; 9-9:30, "The Personal Side of Concert Management," Edith Taylor Thomson; music, Alvin Adams, director; Anne George, soprano; Sarah Logan, contralto; Elizabeth Coles, violinist; 10:15-11, "Song Revue," Malle and Little.

KSD, St. Louis, Mo. (Central, 546), 6:45 p. m., Abergh's Concert ensemble; Arne Arnesen, violinist; 9, Shepard School band, W. A. Godbey, director; 11, dance music, Rodemich's orchestra.

KYW, Chicago, Ill. (Central, Daylight, 536), 11:35 a. m., table talk, Mrs. A. J. Peterson; 6:45 p. m., children's bedtime story; 7-7:30, dinner concert, Congress hotel; 8-8:58, Violet Brady Stewart, soprano; Frederick T.Blum, baritone; Sallie Jenkes, accompanist; Louise Field and her Society orchestra; 9:45-12:30 midnight revue.

PWX, Havana, Cuba (Eastrn, 400), 8:30-11 p. m., General staff band of the Cuban army, Jose Molina Torres, leader.

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

WBAP, Forth Worth, Texas (Central, 476), 9:30-10:45 p. m., concert, Dot Echols and her orchestra.

WBAV, Columbus, Ohio (Eastern, 390), 12 m., Ila Lorbach Owens, pianist.

WBBR, New York, N. Y. (Eastern, Daylight, 273), 8 p. m., J. R. Schlossberg, baritone; 8:20, ten-minute talk on the care of the teeth, Dr. L. C. Strkus; 8:30, Bible story for young people, Mrs. J. F. Stephenson.

WBZ, Springfield, Mass. (Eastern, Daylight, 337), 6 p. m., dinner concert, WBZ trio; 7:30, bedtime story for the kiddies; 7:30, concert, St. John's Episcopal church quartet, William J. Short, director; Nellie Lamson, soprano; Evelyn Currier, alto; Phillip J. Short, accompanist; WBZ trio; 8:30, Mrs. Philip Shotlander, soprano; Philip Shotlander, tenor; George Fitzgerald, baritone; C. P. Keene, accompanist; 9, Mildred Taylor, violinist; Gladys Berry, cellist; Susan Williams, pianist; 11:30, dance music, Leo Reisman and his orchestra; 12, "Where I'll End Nobody Knows," Elma Maxwell, composer; 12:15, Leo Reisman and his orchestra; 12:30, songs, Bill Coty, Jack Armstrong.

WCAE, Pittsburgh, Pa. (Eastern, Daylight, 462), 3 p. m., Fred Rosenfeld, pianist; 6:30, dinner concert, William Penn hotel; 7:30, Sunshine Girl; 7:45, Joe Jacobson, character singer; 8:30, song exploitation night.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., Oriole Terrace orehestra; 6, dinner concert; 8:30, musical program, Florenee Paddock, director.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Star's Radio trio; 6-7, School of the Air, piano tuning-in number the Duo-Art; weekly health talk, auspices of the Health Conservation association; the Tell-Me-a-Story Lady; Music, Fritz Hanlein's Trianon ensemble; 8-9:15, music, program arranged and presented by Amy E. Winning; 11:45-1 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Plantation Players.

WDAR, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., daily almanac; 12:02 p. m., organ recital, Stanley theater; 12:30, Arcadia Cafe concert orchestra; 2, Arcadia Cafe concert orchestra; 2:30, Mrs. Louis Love, "Care of Children;" 4:30, Rebecca Berg, pianist; 7:30, Dream Daddy's bedtime stories; 10, Howard Lenin's Arcadia Cafo dance orchestra.

WEAF, New York, N. Y. (Eastern, Daylight, 492), 11-11:15 a. m., health talk, N. Y. Tuberculosis society; 4-4:15 p. m., Leonard F. Manheim, haritone; 4:30-4:45, Elizabeth Pfeiffer, soprano; 5-5:15, Harold Dean and his Duchess Society orchestra; 5:30-6, children's program; 6-7, dinner music, Hotel Waldorf-Astoria; 7:15-7:30, Synagogue services, Rabbi Morris Silvermen; 7:30-7:40, sports talk, United Cigar stores; 7:50-8, American agriculturist; 8-8:20, Columbia university; 8:30-9, Gold Dust corporation; 9-10, American Chiele company; 10-10:45, National Carbon Eveready orchestra.

WEAO, Columbus, Ohio (Eastern, 360), 1:30 p. m., garden talk, member Ohio State university faeulty; 4 agricultural lecture, faculty member; music, university talent.

WEAY, Houston, Texas (Central, 360), 12-1 p. m., Rice Hotel orchestra; 2:30-3:30, concert; 6-7, Rice Hotel orchestra.

WFAA, Dallas, Texas (Central, 476), 12:30,-1 p. m. musical program, Red-Head Girl.

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

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

WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 11:15-11:45 a. m., physical culture exercises, Henry T. Martin; 12:30-1 George Albert Bouchard, organist; 6:30-7:30, dinner music; 8-9, concert, direction of A. J. Erisman for Great Lakes Transit corporation; 10-11, concert, direction of Edgar Messersmith for Direct Specialty company; 11:30-1:30, supper-dance music, Vincent Lopez Hotel Statler orchestra, Harold Gieser, director.

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

Headliners of the Week

MANY of the programs given below are subject to cancellation to give the right of way to the broadcasting of the Republican Convention at Cleveland, from Tuesday on to its completion. Almost a score of stations will be linked. See page six for details.

If you are a Scotchman and lonesome for the auld country, Sandy Politic will delight your heart and make you feel at home. Tune in for WWJ, Wednesday. CHYC also announces the broadcasting of the oldest band in Canada, the Montreal Harmonic band.

The first and only Radio beauty at the present time will sing from WLW Thursday. You'll agree with the critics when you look on page 13. WSB is celebrating the second anniversary of its debut with a 500-watt transmitter. This ought to be good. KGO is very ambitious this week in broadcasting the oratorio "Hymn of Praise," by Mendelssohn. Don't forget the intercollegiate chess game, to be broadcast by KDKA and WIP.

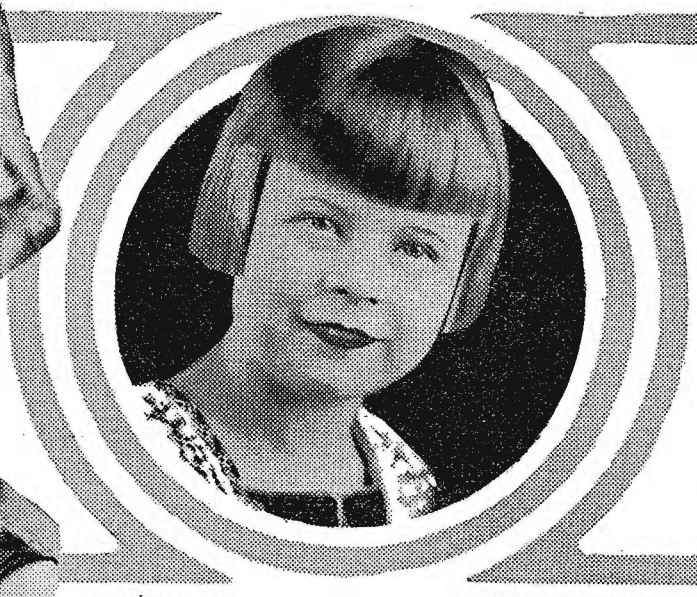
If it happens to be warm Friday, tune in WPAL, Columbus, for the Moores and Ross Ice Cream band, and if it is cold, get the fiery oration at WHA.

Do not be surprised Saturday if you imagine you are in Hawaii, but hear the announcer say WRC. The Honolulans will play Hawaiian music. WIP plans a unique novelty this same evening, when they will lower a microphone into the Atlantic ocean at Atlantic City and relay the sound by land wire to its studio in Philadelphia, from whence Davy Jones' locker will be broadcast to an otherwise dry (?) country. The event marks the opening of WIP's control room on the new steel pier at Atlantic City.

Two new schedules, for the little folks, have been added to the Monday programs of WDAF, a Boy Scout and a child talent program.

And speaking of little folks, WGY plans to entertain you Tuesday evening with musicians and readers of very tender years.

Jean Mirk, soprano, will be heard from KGO, Oakland, in the Mendelssohn oratorio, the "Hymn of Praise," on Thursday evening, June 12. Russell Murphy, the third member of this trio appears regularly in popular song hits at the Minneapolis Station WBAH.



Sade Elizabeth Huck, the pleasant little lady above, will keep you amused with her readings Wednesday, June 11, at WLW, Cincinnati.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., "What the Public Can Do to Help Reduce Prices," R. E. Ellingwood.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., selections, Alamo Theater orchestra; Walnut Theater orchestra; 7:30-9, agricultural tabloid talk; concert, auspices Mrs. John E. Harmon, Jr.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program of semi-classical selections, Sweeney Radio orchestra, direction of George Parrish; 7-8, group of selections by artists from Westom, Mo.

WHN, New York, N. Y. (Eastern, Daylight, 360), 3:45-4:30 p. m., Tom Reilly's Kings of Syncopation; 6-7, at the festive board; 7:30, Roseland dance orchestra; 9-9:30, Dan Gregory's orchestra; 9:45-10:15, Fletcher Henderson's Alabam Club orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 3 p. m., Dagmar Johnson, soprano; Mrs. Horatio Batesell, soprano; Louis H. Dreduding, baritone; Emille Loeben, pianist; Esther Munder Devlin, reader; 6:05, St. James hotel orchestra; 7, Uncle Wip's bedtime stories.

WJZ, New York, N. Y. (Eastern, Daylight, 455), 1 p. m., Schrafft's Tea Room orchestra; 3, Dorothy Bradshaw, soprano; Evelyn, Hunt, pianist; 4, fashion talk, Eleanor Gunn; 4:30, Hotel Commodore Stringed ensemble; 7, story for boys and girls, Florence Smith Vincent; 7:30, Seizer's Cafe Boulevard orchestra; 8:30, city official series talk; 8:45, Jack Trot, bass; 9, "Bald Head Club," John Rodemeyer; 9:10, MacDowell Sisters; 10:30, Emil Coleman's Trocadero orchestra.

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

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints; 2:40-4 p. m., 4-4:30, magazine reading; 5:30-6, children's hour, Mrs. Robert Cargill; 6-6:30, sport hour—"Polo Playing," Lt. Col. E. N. Norton; "Cruising on the Inland Waterways of the Central West," Dr. J. F. Schefcik; 7:30-8:15, farm lectures, "Message from Herbert Hoover," Edwin W. Ely; "Canning Fruits," Mildred Wood; 9:15, business message; 9:30, musical program.

WLW, Cincinnati, Ohio (Central, Daylight, 309), 4 p m., concert for the "Shut Ins," Wurlitzer Concert company, Mr. and Mrs. William Duning, directors; 4:25, French lesson, Mme. Ida Tcimpidis,; 8, Rieker's Melody Ten; 8:30, talk, "Bees," Dr. W. C. Herman; 8:40, original compositions, H. H. Walker; songs, Mary Steele; pianologues, Sade Elizabeth Huck; 9, one-act play, "The String of the Samisen," Rita Wellman; Rosemary Ellerbrock, pianist; William C. Stoess, violinist.

WMAQ, Chicago, Ill. (Central, Daylight, 447.8), 11 a. m., Republican National Convention, over station WLS by the Chicago Daily News, Sears'Roebuck, Chicago Tribune; 1 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; 6, Chicago theater organ; 6:30, Georgene Faulkner, story lady; 8, weekly program, Northwestern university; 8:30, program, Richard De Young; 9, talk, one of the Chicago Charities; 9:15, Mrs. Hulda Hartz, soprano; Peter Olsen, organist; S. R. Samuelson, cellist.

WOC, Davenport, Iowa (Central, 484), 12 m., chimes; 3:30 p. m., "Henry W. Grady's 'The New South'," C. A. Russell; 6:30, Sandman's visit; 8, Erwin Swindell, organist; Francis Armil, pianist.

WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra; 4:45, organ recital, Mary E. Vogt; 7:30, Havana Casino dance orchestra; 9, WOO orchestra, Robert E. Golden, director; 10, Havana Casino dance orchestra, Vincent Rizzo, director.

WOQ, Kansas City, Mo. (Central, 360), 7:30-8 p. m., music, Liberty theater orchestra.

WOR, Newark, N. J. (Eastern, Daylight, 405), 7-7:30 a. m., morning gym class, Arthur E. Bagley; 2:30-2:45 p. m., piano solos, Harry Jentes; 2:45-3, Christne Galloway, soprano; 3:30-3:45, Harry Jentes; 3:45-4, Christine Galloway; 6-15-6:55, "music while you dine," Baudissel's Olympie Park orchestra; 6:55-7, day's sports, Newark Morning Ledger; 8-8:15, Florence Robrecht, soprano; 8:15-8:45, Mary Rose Eaton, violinist; Aubrey Eaton, pianist; 9:30-10, Edward Morris, pianist composer; William Ryder, baritone; 10-11, The Carolinians.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., "Control of Chinch Bugs with Calcium Cyanide and Other Summer Barriers, and Control of Cotton Insects," Leonard Haseman; 8:20, barn dance, quadrille and "fiddlin'," Bill Caton, old-time colored fiddler and his partner, Ola Gathright, guitarist.

WPAL, Columbus, Ohio (Eastern, 288), 6 p. m., Chittenden Hotel orchestra; 7, Grand theater organ; lecture, member Ohio League of Women Voters; 7:30, concert, Moores and Ross Ice Cream Co. band; talk, official of Moores and Ross Co.

WRC, Washington, D. C. (Eastern, 469), 6 p. m., children's hour, Peggy Albion.

WSB, Atlanta, Ga. (Central, 429), 10:45 p. m., song echoes of yesterday.

WTAM, Cleveland, Ohio (Eastern, 390), 8 p. m., Plain Dealer program; Arthur Hess, tenor; Baldwin-Wallace college (Berea, Ohio) male quartet; Carl Rupp's Hollenden dinner concert orchestra; Attilio D'Amico, baritone; Will Rogers, talk; Dave Harmon and his Columbia recording orchestra; WTAM program; Sherwood Music school (Erie, Pa.), Jean Talbot Miller, pianist; Allene Gibbons, violinist; Ralph Paul, tenor; Charlotte Elsassee, soprano.

WTAS, Elgin, Ill. (Central, 286), 7:30-12 midnight, WTAS orchestra; Lee Sims, pianist.

WWJ, Detroit, Mich. (Eastern, 517), 8 a. m., setting-up exercises, R. J. Horton; 12 m., Goldkette's orchestra; 3 p. m., Detroit News orchestra; 7, Detroit News orchestra; Sandy Politio, Scotch entertainer.

Thursday, June 12

Silent night for: KFAE, KFOA, KQV, KSD, WCAP, WDAR, WGR, WOO, WOR, WOS.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 8:30 p. m., special concert, Canadian National Railway entertainers: Choir of St. Louis de France; Emile Gour, tenor; Mlle. F. Poirier, soprano; J. Monday, tenor; address, Rev. J. L. O'Rourke; Prof. J. Saucier, baritone; Prof. A. Letourneau, organist.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., organ recital, Howard R. Webb; 5:30, dinner concert, KDKA Little Symphony orchestra; 6:30, "The Sleeping Beauty," for the Radio Children; 6:45, "The Flag and the Schools," Hon. William H. Stevenson; 7:15, farm program, National Stockman and Farmer; 8, KDKA Little Symphony orchestra, Victor Saudek, conduetor; Anna Laura Cree, soprano; Earl Mitchell, pianist; 10, concert.

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; 8-9, Ambassador hotel concert; 9-10, Examiner concert; 10-11, John Smallman, baritone.

KFKX, Hastings, Nebr. (Central, 341), 9:30 p. m., Hastonian's dance orchestra.

KFNF, Shenandoah, Iowa (Central, 266), 12:30 p. m., Farmer dinner concert; 7:30, program, Kiwanis club.

KGO, Oakland, Calif. (Pacific, 312), 4-5:30 p. m., concert orchestra, Hotel St. Francis; 8, oratorio, "Hymn of Praise," Carl Anderson, director; KGO Little symphony orchestra.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., children's program; 7:15, dance music, George Olsen's Metropolitan orchestra; 10, dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 469), 12:30-1:15 p. m., program of music and news items; 2:30-3:30, program, Barker Brothers, arranged by Claire Forbes Crane; 6-6:30, Art Hickman's danee orchestra; 6:45-7:30, children's program, Prof. Walter Sylvester Hertzog; bedtime story by Uncle John; 8-9:15, program, Fitzgerald Music Co., 9:15-10, program, Clifford Lott, director; chorus of 60 vioces.

KPO, San Francisco, Calif. (Pacific, 423), 1-2 p. m., Rudy Seiger's Fairmont Hotel orchestra; 2:30-3:30, Richard Allen, violinist; Keith Lord, banjoist; LeRoy Henshaw, pianist; William M. Gonway, tenor; Jean

(Continued on page 12)

DAVY JONES' LOCKER MUSIC ON THE

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.

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

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

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

Saturday: CKAC, KDKA, KFI, KPO, KSD, KYW PWX, WBBR, WBZ, WCAE, WCX, WDAF, WDAR, WEAF, WFAA, WFI, WGI, WGY, WHAS, WHK, WIP, WJZ, WLAG, WLS, WMAQ, WMC, WOAW, WOC, WOO, WOR, WPAL, WRC, WSAI, WSB, WTAM, WTAS, WWJ.

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

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

Tuesday: CKAC, KFI, KFSG, KGO, KHJ, KJS, KPO, KSD, KYW, WAAW, WBAH, WBAP, WBZ, WCAE, WCX, WDAF, WDAR, WEAF, WFAA, WFI, WGI, WGY, WHAS, WHB, WHN, WIP, WJAX, WJY, WJZ, WLS, WLW, WMAQ, WMC, WSB, WTAS, WWJ.

Victor Arden, clever manipulator of the Ivories, is one member of the popular team of Ohmon and Arden. Tune in Sunday for WEAF. Margaret Blakeslee (right), the "Dancing Violinist" of WGR, is the headliner Thursday, p. m., June 12.

Thursday, June 12

(Continued from page 11)

Mirk accompanist; 4:30-5:30, Rudy Seiger's Fairmont Hotel orchestra; 5:30-6:30, children's hour stories, "Big Brother;" 7-7:30, Rudy Seiger's Fairmont Hotel orchestra; 8-9, Theodore J. Irwin, organist; 9-10, Etta Wilson, soprano; Norman Simun, baritone; Festo G. Aspre, violinist; 10-11, E. Max Bradfield's Versatile band.

KQV, Pittsburgh, Pa. (Eastern, Daylight, 270), 11-11:30 a. m., music; 1-1:30 p. m., luncheon music; 3:45-4:15, matinee music; 5-5:30, "Twilight Tale" and Diary of Snubs Our Dog, for the kiddies.

KYW, Chicago Ill. (Central, Daylight, 536), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 6:45, children's bedtime story; 6-6:30, dinner concert, Congress hotel; 8-8:20, "TwentyMinutes of Good Reading," Rev. C. J. Pernin; 8:20-9:30, Minnette Smith, soprano; William Hoke, tenor; Geraldine Lacey, pianist; Sallie Menkes, accompanist; Don Lang, dramatic reader.

WAAW, Omaha, Nebr. (Central, 360), 8-9 p. m., talks, W. J. Martin, Rev. E. M. Brown.

WBAH, Minneapolis, Minn. (Central, 417), 12:30-1:30 p. m., Dick Long's trio and soloist; 9:30-11, dance program.

WBAP, Fort Worth, Texas (Central, 476), 9:30-10:45 p. m., Bandmasters' Band concert, masters of Texas bands, J. E. King, director.

WBAV, Columbus, Ohio (Eastern, 390), 12 m., religious service, Rev. Andrew W. Blackwood, pastor Indianola Presbyterian church, speaker; sacred music.

WBBR, New York, N. Y. (Eastern, Daylight, 273), 9:10 p. m., instrumental selections; 9:20, Bible lecture; 9:45, Ethel Nugent, pianist; 10, Adele Muys, violinist.

WBZ, Springfield, Mass. (Eastern, Daylight, 337), 6 p. m., dinner concert, Leo Reisman and his orchestra; 7:10, "At the Theaters," A. L. S. Wood; 7:30, bedtime story for the kiddies; 8:15, concert, Boston Conservatory of Music: Iride Pillay, soprano; Harold Boyle, violinist; Katherine Carver, pianist; 9:15, Durrell String quartet, Josephine Durrell, violinist; Blanche Sweet, 2nd violinist; Anna Golden, violaist; Mildred Ripley, cellist; Mrs. Guy W. Currier, speaker.

WCAE, Pittsburgh, Pa. (Eastern Daylight, 462), 4:30 p. m., Sunshine Girl; 6:30, dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, Ben Fields, WCAE's own entertainer; Thelma Fields, accompanist; 8:30, David Super; 11 late concert, Bizet trio.

WCBD, Zion, Ill. (Central, 345), 8 p. m., Brass quartet; clarinet duets, Studebaker, Klawonn; cornet duets, Newcomer, Mason; Alexander DePew flutist; George Been, xylophonist; Mrs. P. M. LaRose, contralto; Beulah Mitchell, soprano; Fred Schott, tenor; vocal duet, Edith Carey, Mrs. Dorothy C. LaBelle; Mrs. Susie B. Smith, reader; Mrs. Marian Priddy, pianist.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., music; 6, dinner concert; 8:30, second part of the Messiah, Central M. E. church.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's Radio trio; 6-7, School of the Air, piano tuning-in number; address, speaker from the William Jewell college, Liberty, Mo.; reading, Miss Cecile Burton; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon ensemble; 11:45-1 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., Daily Almanac; 12:02 p. m., organ recital, Stanley theater; 12:30, Arcadia Cafe concert orchestra; 2, Arcadia Cafe concert orchestra; "The Market Basket," Mrs. Anna B. Scott; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, Daylight, 492), 4-4:15 p. m., Saxie Joslyn, saxophonist; 4:15-4:30, Norma Helois, soprano; 5-5:30, children's program; 6-7, dinner music, Hotel Waldorf-Astoria; 7:30-7:40, sports tak, United Cigar Stores; 8:20-8:30, Bank of America; 9:45-10:15, Olcott Vail and his Hotel Almanac orchestra.

WEAO, Columbus, Ohio (Eastern, 360), 1:30 p. m., garden talk, member Ohio State university faculty; 8 p. m., WEAO orchestra.

WEAY, Houston Texas (Central, 360), 12-1 p. m., Rice Hotel orchestra; 2:30-3:30, studio concert; 6-7, Rice Hotel orchestra.

WFAA, Dallas, Texas (Central, 476), 12:30-1 p. m., Cycle Park theater; 8:30-9:30, talent, Plano, Texas; 11-12, Jessi McKee and her orchestra.

WFI, Philadelphia, Pa. (Eastern, Daylight, 395), 1 p. m., Meyer Davis' Bellevue Stratford concert orchestra; 6, Sunny Jim, the kiddies' pal; 6:30, Meyer Davis' Bellevue Stratford concert orchestra; 7, Weymann Five dance orchestra; 8, Radio Boy Scouts' meeting; 8:30, Pennsylvania Railroad Glee club.

WGI, Medford Hillside, Mass. (Eastern, Daylight, 360), 7 p. m., meeting of the Amrad Big Brother club; 7:30, talk, Goeffery L. Whalen, "The Radio Movie Man;" 7:45, "Bernie and His Bunch;" 8:15, Federated Film night, Goeffery L. Whalen.

WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 12:30-1 p. m., George Albert Bouchard, organist; Margaret Blakeslee, violinist; 6:30-7:30, dinner music.

WGY, Schenectady, N. Y. (Eastern, 380), 1 p. m., "Entertaining the Convalescent Child," Mrs. W. A. Tuson; 5:30, Stephen E. Boisclair, organist; 7:45, "A Few Moments with New Books," William Jacob; 8, musical program, pupils of Rensselear High school; Frank J. MacDonough; Clayton Shufelt, violinist; travelogue, "A Trip to Hawaii," John B. McGoldrick; Beatrice Riordan, reader; Alice Cooper, violinist; Frank J. MacDonough, pianist.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., selections, Walnut Theater orchestra; selections, Alamo Theater orchestra; 7:30-9 concert Alice Monroe, director; Opal Armstrong, cornetist; four-minute digest of International Sunday School lesson; four-minute Radio Forum Boy Scout talk.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program of classical music, Sweeney Radio orchestra; 7-7:30, vocal and instrumental numbers, by a group of WHB artists; 8-10, dance program for several local organizations, by the Sweeney Radio orchestra.

WHN, New York, N. Y. (Eastern, Daylight, 360), 3:45-4:30 p. m., Leo Feist Music company; 6-7, at the festive board; 10-10:30, all nations program; 10:30-11, Fletcher Henderson's Alabam Club orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 3 p. m., Radio baby clinic; 3:15, Joseph De Fazio, flutist; Maurice Freedman, violinist; Milava Stankowitch, soprano; C. Whiting Carr, tenor; Emilie Leeben, pianist; 6:05, Harold Leonard's Redjackets orchestra; 7, Uncle Wip's bedtime stories; 8, "Timely Topics for Motorists," by Gene Hogle; 8:15, "The Cuckoo Nest," by Y. M. H. A.; 9, "Camp Life," Dr. Matthew C. O'Brien; 9:15, "Music Lovers' Quartet;" 11:15, Radio chess match, University of Pennsylvania and University of Pittsburgh.

WJAX, Cleveland, Ohio (Eastern, 390), 8 p. m., Marjorie Moyer, Edward Prieger, Ross Ettari, pianists; pupils Marie Balas; Robert Downing, balladist; 11, Edward Arthur Kraft, organist.

WJY, New York, N. Y. (Eastern, Daylight, 405), 7:30 p. m., Fitzpatrick Brothers; 7:45, "Photoplay Writing," Roy C. Jones; 8, choir of church of "The Good Shepherd; 8:45, popular songs, Frank Wright and Frank Bessinger.

WJZ, New York, N. Y. (Eastern, Daylight, 405), 1 p. m., Hotel Pennsylvania orchestra; 4, fashion talk, Eleanor Gunn; 4:45, fashion talk, Harper's Bazaar; 5, Edith Harrison, soprano; 7, Uncle Dave Cory's Jack Rabbit stories; 7:30, Cafe Savarin ensemble; 8:15, Wanamaker concert orchestra; 9:15, U. S. Army night; 10:30, Hotel Majestic orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints; 2:40-4 p. m.; 4-4:30, magazine reading; 5:30-6, children's hour, Ellen Nye; 6-6:15, sport hour—"Keeping Your Credit Good," C. E. Mann; 6:15-7, dinner concert; 7:30-8:15, farm lectures, "Public Morals, as Influenced by Public Education," W. F. Webster; "Importance of Fattening Cattle Before Marketing," H. W. Vaughn.

WLS, Chicago, Ill. (Central, Daylight, 345), 1-2 p. m., Will Rossiter, composer; "Relation of City and Country," James R. Howard; 3:45-5:45, Gottfried Haussener, zither soloist; "Our Garden Flowers," Mrs. Lina White; "The Art of Canning Milk," Ellen Rose Dickey; 6:30-7:45, Frank Westphal orchestra; 7-7:45, Pauline Levey, pianist; Mildred Regeno Mayer, reader; Radio club program, Harrison High school; Farm Boys' orchestra; 7:45-8, Lullaby time, Glenn Rowell, Ford Rush; 10:15-1, "Expansion of the Corn Industry," J. R. Howard.

WLW, Cincinnati, Ohio (Central, Daylight, 309), 4 p. m., piano solos, Adelaide Apfel; 10, Times-Star Radio club of the world; 10:10, program, James Robinson, director; 10:45, Woodward High School Instrumental trio; 11, Doherty Melody boys.

WMAQ, Chicago, Ill. (Central, Daylight, 447.8), 11 a. m., Republican National Convention; 4 p. m., lessons in household arts, Mrs. Elizabeth O. Hiller; 4:30, Illinois Federation of Women's clubs; 6 Chicago theater organ; 6:30, Hotel LaSalle orchestra; 8, talk, Rockwell R. Stephens; Boy Scout talk; 8:45, talk, Royal F. Munger; 9, lecture, University of Chicago; 9:15, program, Hyde Park Boys' Glee club.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., program, Mrs. O. H. Muehler, director.

WOAW, Omaha Neb. (Central, 526), 6 p. m., speakers' half hour; 6:30, dinner program, Yost's orchestra; 9, Scotch program; Mrs. Margaret R. Burns, director; Omaha Scottish Pipe band; Scotch songs, James Gunn; vocal solos, Mrs. Margaret R. Burns; Lloyd Schmidt, saxophonist; Mrs. Mae Schmidt, soprano; bagpipe solo, James McDonald; songs Everett Dodds.

WOC, Davenport, Iowa (Central, 484), 12 m., chimes; 3:30 p. m., "Fevers," Karl G. Stephan; 5:45, chimes; 6:30, sandman's visit; 9, Palmer School Radio orchestra; Ralph W. Fuller, baritone.

WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra; 4:45, organ recital, Mary E. Vogt.

WOQ, Kansas City, Mo. (Central, 360), 8-9:30 p. m., popular music program, Hanley Photo and Radio shop; music, Paul Hickman's orchestra; vocal solo; popular vocal numbers, Hallett and Fleming, vaudeville pair.

WOR, Newark, N. J. (Eastern, Daylight, 405), 7-7:30 a. m., morning gym class, Arthur E. Bagley; 2:30-2:45, p. m., C. Carrol Clark, baritone; 2:45-3, readings, E. A. Howes; 3-3:15, Charles Kindelberger, tenor; 3:45-4, Charles Kindelberger; 6:15-6:30, "Radio for the Layman," Albert E. Senn; 6:30-7:20, "Music While You Dine," Tom Cooper's Country club; 7:20-7:30, days sports, Newark Morning Ledger.

WPAL, Columbus, Ohio (Eastern, 286), 6 p. m., Chittenden Hotel orchestra, Gand Theater organ.

WRC, Washington, D. C. (Eastern, 469), 6 p. m., children's hour, Peggy Albion; 7:45, motor talk, auspices American Automobile association; 8, Robert L. Fuerstein, pianist; 8:15, Arthur Maddleton, bass; 8:30, talk, Colonel Levi G. Nutt; 8:45, dance program, Pete Macias' L'Aiglon orchestra.

WSB, Atlanta, Ga. (Central, 429), 8-9 p. m., Sheldon organ recital; 10:45, Mary Lansing quartet and chorus.

WTAS, Elgin, Ill. (Central, 286), 7:30-12 midnight, WTAS orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 8 a. m., setting-up exercises, R. J. Horton; 12 n., Finzel's orchestra; 3 p. m., Detroit News orchestra; 7, Detroit News orchestra; Emily A. McLaughlin, speaker; 10, Goldkette's orchestra.

Friday, June 13

Silent night for: CKAC, KGO, KPO, WIP, WAAM, WBBR, WCX, WFI, WLW, WOR, WRC, WSAI.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 1:45 p. m., Rex Battle and his Mount Royal Hotel orchestra; 4:30, Joseph C. Smith and his Mt. Royal Hotel orchestra.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 11:15 a. m., Broudy's orchestra; 5:30 p. m., Paul Fleeger, organist; 6:30, "Peter, Peter, Pumpkin Eater," Radio children; 8, Westinghouse band, T. J. Vastine, conductor; Mrs. Hiram Hall, soprano; F. L. Raup, baritone.

KFAF, Denver, Colo. (Mountain 360), 8-9 p. m., music, Darrow Music company.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., concert, Myra Belle Vickers' pupils; 8-9, Evening Herald concert; 9-10, Examiner concert; 10-11, Earl Mecker arranging program; 11-12, Ambassador-Max Fisher's Cocoanut Grove orchestra.

KFNF, Shenandoah, Iowa (Central, 266), 12:30 p. m., farmer dinner concert; 7:30, program, Bethel Community Sunday school.

KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m., program, courtesy Metropolitan Merchants association, George J. Mayers, director; Genita Weaver Smith, harpist; instrumental trio, John F. Alleman, violinist; Sarah Knight, pianist; George Gregory, cellist; Mme. Engberg, director; Emily Dow, 12 year old violinist; George J. Mayers, reader.

KGO Oakland, Calif. (Pacific, 312), 4-5:30 p. m., concert orchestra, Hotel St. Francis.

KGW, Portland, Ore (Pacific, 492), 3:30 p. m., lecture, Jessie D. McComb; 10:30, Hoot Owls.

KHJ, Los Angeles, Calif. (Pacific, 469), 12:30-1:15 p. m., prgram of music and news items; 2:30-3:30, program, Barker Brothers, arranged by Claire Forbes Crane; 6-6:30, children's program, Prof. Walter Sylvester Hertzog; bedtime story, Uncle John; 8-10, Louise Gunning, soprano; 10-11, Art Hickman's dance orchestra.

KPO, San Francisco, Calif. (Pacific 423), 1-2 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, 270), 11-11:30 a. m., music; 1-1:30 p. m., luncheon music; 3:45-4:15, matinee music; 5-5:30, Twilight tale, and Diary of Snubs Our Dog, for the kiddies; 8:45-9, popular songs, Maile and Little; 9-10, Marie Van Scoyce, soprano; Russell Mitchell, baritone; Hazel Burkholder, accompanist; 10:15-10:45, "Fifteen Minutes of Popular Songs," Ben Fields and Jack Rich.

KSD, St. Louis, Mo. (Central, 546), 8 p. m., Silverman's orchestra.

KYW Chicago, Ill. (Central, Daylight, 536), 11:35 a. m., table talk, Mrs. Anna J. Peterson; 6:45, children's bedtime story; 7-7:30, dinner concert, Congress hotel; 8:20-8:45, "Making Future Dairymen," Earl J. Cooper; "Among Our Neighbors," W. E. D. Rummel; 9-12:30, midnight revue.

WAAW, Omaha Neb. (Central, 360), 8 p. m., bridge lesson, Mrs. Guy Purdy.

WBAH, Minneapolis, Minn. (Central, 417), 12:30-1:30, p. m., Dick Long's trio and soloist; 6:30-7:30, Harry Anderson, tenor; Naomi Johnson, soprano, harpist.

WBAP, Fort Worth, Texas (Central, 472), 9:30-10:45 p. m., concert, Captain Hart's trio.

WBAV, Columbus, Ohio (Eastern, 390), 12 m., Ila Lorbach Owens, pianist; 8 p. m., concert, Dispatch Little Symphony orchestra, John D. Clark, director.

WBZ, Springfield, Mass. (Eastern, Daylight, 337), 6 p. m., dinner concert, WBZ trio; 7:10, "A Modern Don Quixote," Youth's Companion; current book review, R. A. MacDonald; 7:30, bedtime story for the kiddies; 10, Henry Volk, violinist; Marion Ryan, pianist; Montgomery Male quartet; 11, Smith College Students' orchestra and glee club; WBZ trio.

WCAE, Pittsburgh, Pa. (Eastern, Daylight, 462), 4:30 p. m., special children's program, Sunshine Girl; 6:30, dinner concert William Penn hotel; 7:30, Uncle Kaybee; 8:30, Cooper's Collegian orchestra.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., music; 6, dinner concert; 8:30, musical program, direction of Caro board of commerce.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., the Star's Radio trio; 6-7, School of the Air, piano tuning-in number, the Duo-Art; speaker from the K. C. Children's bureau; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon ensemble; 8-9:15, music; WDAF minstrels; Star Radio orchestra, especially augmented; vocal solos of popular nature; men's chorus and quartet; 11:45-1 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., daily almanac; 12:02 p. m., organ recital, Stanley theater; 12:30, Arcadia Cafe concert orchestra; 2, Arcadia Cafe concert orchestra; 7:30, Dreeam Daddy's bedtime stories; 10, Morning Glory club, Howard Lanin's Arcadia Cafe dance orchestra; songs by Lou Herscher and Carl Zoehrns; features from local theaters.

WEAF, New York, N. Y. (Eastern, Daylight, 492), 11:15-11:45 a. m., talk, Garden Magazine; 5:30-6 p. m., children's program; 6-7, dinner music, Hotel Waldorf-Astoria; 7:30-7:40, sports talk, United Cigar stores; 7:45-7:50, Milkapto stories for the children, Borden company; 8-8:30, Happiness boys; 850-9, Battery Instruction talk, Geo. C. Furness; 9-10, B. Fischer's Astor Coffee orchestra.

WEAO, Columbus, Ohio (Eastern, 360), 1:30 p. m., garden talk, member Ohio State university faculty; 4, agricultural lecture, faculty member; music, university talent.

WEAY, Houston, Texas (Central, 360), 8-9 p. m., popular songs; 9-10, Shrine band.

WFAA, Dallas, Texas (Central, 476), 12:30-1 p. m., address, Dr. Robert Stewart Hyer; 8:30-9:30, musical recital, Mrs. Albert E. Smith, soprano.

WFI, Philadelphia, Pa. (Eastern, Daylight, 395), 1 p. m., Meyer Davis' Bellevue Stratford concert orchestra.

WGI, Medford Hillside, Mass. (Eastern, Daylight, 360), 7 p. m., meeting of the Amrad Big Brother club; 7:30, Charles L. H. Wagner, Radio poet; 7:40, late Ampico releases; 7:50, "Vacation Typhoid," Henry C. Green; 8, musicale.

WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 11:15-11:45 a. m., physical culture exercises, Henry T. Martin; 12:30-1 p. m., George Albert Bouchard, organist; 6:30-7:30, dinner music; 9-11, band concert, Zuleika Grotto band, direction of William H. Beck; 11:30-1:30 p. m., Vincent Lopez Hotel Statler orchestra, Harold Gieser, director.

WGY, Schenectady, N. Y. (Eastern, 380), 1 p. m., "Finishing Softwood Floors," Modern Priscilla; 5:30, readings for children, Mrs. Lewis M. Donaldson; 5:45, children's story in French, Frederik Duelert; 7:45, "The Boss," WGY players; WGY orchestra; 10:30, program of Italian music; WGY orchestra; Antonio Caruso, tenor; Peter Schmidt, clarinetist; Marion Brewer, soprano.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., "Northwestern Oratorical League Contest and Its Meaning," R. W. West; oration as given by U. of Wisconsin representative, Harold Cranefield, class of '25.

WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Alamo Theater orchestra; Walnut Theater orchestra; 7:30-9, concert, auspices Theodore Richbourg.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program of light operatic airs, Sweeney Radio orchestra; 7-8, old-time quadrille dance program, by the Woodies' Quadrille orchestra.

WHK, Cleveland, Ohio (Eastern, 283), 5:30 p. m., music; 9, concert program, by Wm. Taylor Son & Co., Louis Rich and his orchestra; solo numbers, favorite artists.

WHN, New York, N. Y. (Eastern, Daylight, 360), 6-7 p. m., at the festive board; 9:30-10, Hotel Carlton Terrace orchestra; 10:30-11, Roseland orchestra; 11:30-12, S. S. City of Seattle orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 3 p. m., Frank Oglesby studio; 4, "Light in Modern Kitchen," Frank Grove; 6:05, Jordan Lewis dance orchestra; 7, Uncle Wip's bedtime stories.

WJY, New York, N. Y. (Eastern, Daylight, 405), 7:30 p. m., Jean Welker, baritone; 8:15, Surprise program; 10, Olympic Wrestling team; 10:10, Maddalena Hauff, soprano; 10:25, Olympic Rowing team; 10:35, Maddalena Hauff, soprano.

WJZ, New York, N. Y. (Eastern, Daylight, 405), 1 p. m., Hotel Ambassador trio; 3, Hotel Astor organ recital; 4, Eleanor Gunn's fashion talk; 4:10, arts and edcorations; 4:35, Kandy Kiddies, Sarita McLeary; 4:40, fashions of the stage, Cora Moore; 7:30, Weekly French lesson; 7, Antonio Pesel, tenor; Edith Balkwell, accompanist; 8:30, Flora Adler, harpist; 9:25, Mayor Hylan's people's concert; 10:15, Warner Hawkins, pianist; 10:45, Paul Specht's Alamac concert.

WKAQ, San Juan, P. R. (Central, 360), 6-8 p. m., studio program; WKAQ orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints; 2:40-4 p. m., 4-4:30, magazine reading; 5:30-6, children's hour, meeting Radio Health & Toothbrush Club of America;

DANCIN[G]

FOR Dancer[s] following s[...] ule of the w[...] syncopatio[n] given

Wednesd[ay] CKAC, K[...] KFI, KGW, [...] KPO, K[...] KYW, WB[...] WBZ, WD[...] WEAF, [...] WHN, WIP, [...] WMAQ, [...] WOR, W[...] WWJ.

Thursd[ay] CKAC, K[...] KFI, KGW, [...] KPO, K[...] WBZ, WE[...] WHN, WIP, [...] WMAQ, [...] WRC, WWJ.

Friday: C[...] KFI, KHJ, [...] KYW, WD[...] WEAF, W[...] WHK, WHN, [...] WM[...], W[...] WWJ.

Saturd[ay] CKAC, K[...] KHJ, K[...] KGW, K[...] WBZ, WF[...] WFI, WGY, [...] WIP, W[...] WLAG, W[...] WOC, W[...] WPAL, WT[...] WWJ.

Monday: C[...] KFOA, KPO, [...] WDAR, WE[...] WFI, WH[...] WOO, W[...]

Tuesd[ay] CKAC, K[...] KFI, KHJ, [...] KYW, WE[...] WFI, WHN, [...] WJZ, W[...] WMAQ, W[...] WWJ.

AIR FROM WIP SATURDAY, JUNE 14

Marian Brewor (left), a member of the WGY Opera Company, will be heard over this Station June 12. Mathilda Brooks (above), winner of the world's first Radio Beauty contest, will give a unique song recital Monday, June 16, at WLW. Young and Carl.

6-6:30, sport hour, "Surf Riding in Minnesota," John McGovern; 7:30-3:15, farm lectures, "Marl as an Agricultural Aid," Dr. F. E. Foulk; "Like Insurance as a Thrift Institution," J. J. Shambaugh; 9:15, business message; 9:30, musical program.

WLS, Chicago, Ill. (Central, Daylight, 345). 1-2 p. m. Langdon Brothers Hawaiian String music; College news, Book Farmer; 3:45-4:45, Faculty Langdon Brothers School of Music; "Why Jelly Jells," Mrs. Lee; "How to Avoid Insects, Vermin, Sunburn, etc.," member of Illinois State Medical society; 6:30-11, Frank Westphal orchestra; Van's Royal Chicagoans Symphony orchestra; 7:45-8, Glenn Rowell and Ford Rush; 9-10, "Informing the Consumer," Howard Leonard; "Outlook of the Wheat Market," Gilbert Gussler; "The Lazy Farmer," E. G. Thiem; 10-11, studio music.

WLW, Cincinnati, Ohio (Central, Daylight, 309), 4 p. m., special program, P. C. O'Donnell.

WMAQ, Chicago, Ill. (Central, Daylight, 447.8), 2:35 p. m., concert, Lyon & Healy concert; 4:20, items of interest to women; 5:30, pupils, Bush conservatory; 6, Chicago theater organ; 6:30, Hotel LaSalle orchestra; 8, Wide-Awake program and nature study club; 8:40, French lesson, Morin De Cologny; 9 weekly lecture, Field Museum; 9:15, Hazel O'Neil, soprano; Virgil Smith, pianist.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Harris Memorial Methodist choir; 11, Midnight Frolic, Bob Miller's Idlewild orchestra.

WDAW, Omaha, Nebr. (Central, 526), 6:30 p. m. dinner program, Farrakeet's orchestra; 9, Silvus family program; Ralph, aged 8; Harold, aged 5; Eugene, aged 7; Irma, aged 9; 9:30 program, Frank Buckingham, instructor in banjo, mandolin, guitar.

WOC, Davenport, Iowa (Central, 484), 12 m., chimes; 3:30 p. m., "Construction of the Home and Its Relation to Health," A. L. Willis; 5:45, chimes; 6:30, sandman's visit; 8, band concert, Savannah Boys' band.

WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m. organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra; 4:45, organ recital, Mary E. Vogt; 7:30, Hotel Adelphia concert orchestra, A. Candelori, director; 9:30, organ recital, Mary E. Vogt; 10, Hotel Adelphia dance orchestra.

WOQ, Kansas City, Mo. (Central, 360), 7:30-8 p. m., program especially for the Radio Club of Kansas City and Radio fans everywhere; music by orchestra; Radio talks of interest to amateurs.

WOR, Newark, N. J. (Eastern, Daylight, 405), 7 a. m., morning gym class, Arthur E. Bagley; 2:30-2:45 p. m., Mrs. Edward Drake Woodruff, contralto; 2:45-3, "The Clean-up Man," Clyde A. Copson; 3:30-3:45, Mrs. Edward Drake Woodruff; 3:45-4, "Will O' the Wisp," Constance Irwin; 6:15-6:30, songs, children, Agnes Leonard; 6:30-7, "Man in Moon Stories for children," Josephine Lawrence & Wm. E. B. McNeary; 7-7:20, "Music While You Dine," Kenneth Kitchen's Club orchestra.

WOS, Jefferson City Mo. (Central, 440.9), 7:45 p. m., "A Few More Missouri Secrets," Jewell Mayes; address, George A. Dickens; 8:20 musical program.

WPAL, Columbus, Ohio (Eastern, 286), 6 p. m., Athletic Club orchestra; lecture.

WRC, Washington, D. C. (Eastern, 469), 6 p. m., children's hour, Peggy Albion.

WSB, Atlanta, Ga. (Central, 429), 8-9 p. m., second anniversary of WSB 500 watt transmitter; 10:45, jubilee Skylark.

WTAS, Elgin, Ill. (Central, 286), 7:30-12 midnight, WTAS orchestra.

WWJ, Detroit, Mich (Eastern, 517), 8 a. m., setting-up exercises, R. J. Horton; 12 m, GoldKette's orchestra; 3 p. m., Detroit News orchestra; 7, Detroit News orchestra; Anna Campbell, poet; Bernhardt Nippa, baritone.

Saturday, June 14

Silent night for: CKAC, KFNF, KFAE, KFOA, KQV, WAAW, WDAF, WDAR, WGR, WLW. WDO. WOS, WWJ.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 7 p. m., Kiddies' stories in French and English; 7:30, Rex Battle and his Mount Royal Hotel concert orchestra; Herbert Spencer, organist; 8:30, special studio entertainment; 10:30, Joseph C. Smith and Mount Royal Hotel orchestra; Teddy Brown, xylophonist, saxophonist.

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:30 p. m., Daughters's orchestra; 6:30, "Tom, Tom, the Piper's Son, will Pipe for the Radio Children"; 7:30, banque. of the American Flag Day association: Pennsylvania orchestra, Calvary Methodist Episcopal Male quartet; sneakers, Hon. M. Clyde Kelly, Hon. James A. Wakefield, Hon. Albert Johnson, Rev. J. Robert Carelton Clark.

KFAU, Denver, Colo. (Mountain, 360), 8-9 p. m., Glcom Busters.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., local concert; 8-9 p. m., Tilda Rohr, contralto; 9-10, Examiner concert; 10-11 p. m., popular song concert; 11-12, Ambassador-Max Fisher's Cocoanut Grove orchestra.

KFNF Shenandeah, Iowa (Central, 266), 12:30 p. m. farmer dinner concert; 7:30, concert, Henry Field Seed company and friends.

KGO, Oakland, Calif. (Pacific, 312), 4-5:30 p. m., concert orchestra, Hotel St. Francis; 8, comedy, in three scenes "Nothing But the Truth," Wilda Wilson Church, director; Arlon trio; 10-1 a. m., Hotel St. Francis dance orchestra, Henry Halstead, leader.

KGW, Portland, Ore. (Pacific, 492), 3 p. m., children's program; music, Lucrabelle Paulins and Judd pianists; story, Aunt Nell; 10, dance music, George Olsen's Metropolitan orchestra.

KHJ, Los Angeles, Calif. (Pacific, 469). 12:30-1:15 p. m., program of music and news items; 2:30-3:30, program, Barker Brothers, arranged by Claire Forbes Crane; 6-6:30, Art Hickman's concert orchestra; 6:45-7:30, children's program, Prof. Walter Sylvester Hertzog, bedtime story by Uncle John; 8-10, DeLuxe program; 10-11:30, Art Hickman's dance orchestra.

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

KQV, Pittsburgh, Pa. (Eastern, Daylight, 270), 11-11:30 a. m., music; 1-1:30 p. m., luncheon music.

KSD, St. Louis, Mo. (Central, 546), 8 p. m., Missouri Concert orchestra and specialties, Missouri theater.

KYW, Chicago, Ill. (Central Daylight, 536), 11:35 a. m., table talk, Mrs. A. J. Peterson; 7-7:30, dinner concert, Congress hotel; 8-8:58, Margaret Battett, soprano; J. Edward Kleinpell, baritone; Clarence A. Johnson, tenor; Esther Schultz, accompanist; William Zuwkowski, accompanist; Alfred Tweed, month organ and guitar soloist; 8:58-9, talk, Wyvette Gorman; 8:15, Youth's Companion; 12:30, late show.

PWX, Havana, Cuba (Eastern, 400) 8:30-11 p. m., dance music, Armando R. Marrero, pianist; Francisco Delabat, flutist; Antonio Perez, clarinetist; Eduardo Golcochea, violinist; Thomas Gonzalez.

WAH, Minneapolis, Minn. (Central, 417), 12:30-1:30 p. m., children's vaudeville; 7-7:30 p. m., Council of churches.

WBAP, Fort Worth, Texas (Central, 472), 7-7:30 p. m., review of the interdenominational Sunday school lesson and Radio Bible class, Mrs. W. F. Barnum.

WBAV, Columbus, Ohio (Eastern, 390), 12 m., Ila Lorbach Owens, pianist.

WBBR, New York, N. Y. (Eastern, Daylight, 273), 8 p. m., Fred Twaroshk, tenor; 8:15, Eva Nadler, pianist; 8:30, Bible questions and answers.

WBZ, Springfield, Mass. (Eastern, Daylight, 337), 6 p. m., dinner music, Leo Reisman and his orchestra; 7:30, bedtime story for the kiddies; 7:40, Hotel Kimball trio, Jan Geerts, violinist; Angela G. Lonergan, cellist; Paul Lawrence, pianist; 8:30, Jordan trio, Myrtle Jordan, pianist; Ruth Collingbourne, violinist; Mildred Rinley, cellist.

WCAE, Pittsburgh, Pa. (Eastern Daylight, 462), 3 p. m., Billy Zoffer's Music Box cafe orchestra; 6:30, dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, Lew Kennedy, baritone; Irene Setzler, pianist; 8:30, Ada Kelly, pianist; Jack Smalley, baritone; Esther Davies, soprano; Alice Ullstrom, accompanist.

WCX, Detroit, Mich. (Eastern, 517), 4:15 p. m., Frank Kaln and Eastern Star Cafe orchestra.

WDAF, Kansas City, Mo. (Central, 411), 9:30-4:30 p. m., the Star's Radio orchestra; 6-7 p. m., School of the Air, piano tuning-in number, the Duo-Art; address, Edgar Linton, writer, lecturer of Kansas City, the Tell-Me-a-Story Lady; music, Fritz Handley's Triumph ensemble; 11:05-1 a. m., Nighthawk Frolic, "the Merry Old Chief" and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., daily almanac; 12:02 p. m., organ recital, Stanley Theater; 12:30, Arcadia Cafe concert orchestra; 2, Arcadia Cafe concert orchestra; 4:30, Cotton Pickers dance orchestra; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, Daylight, 492), 4-4:15 p. m., Mildred L. Gardner, soprano; 6-7 dinner music, Hotel Waldorf-Astoria; 8-8:15, bedtime story, G. H. Putnam Shoe company; 9-9:15, Helen Graves, soprano; 9:30-10, dramatic readers, Florence de Claron, Terchl, Annie Shields Rankin; 10:30-10:45, LeRoy Dudfield, tenor.

WEAO, Columbus, Ohio (Eastern, 360), 1:30 p. m., garden talk, member Ohio State university faculty.

WEAY, Houston, Texas (Central, 360), 12-1 p. m., Rice Hotel orchestra; 2:30-3:30, studio concert; 6-7 Rice Hotel orchestra; 8:30-10, dance music, McMillan's dance hall.

WFAA, Dallas, Texas (Central, 476), 12:30-1 p. m., "The Flag and the Duty," Hon. Alvin Owsley; 3:30-4, music by old fiddlers, Charles Cornett; 8:30-9:30, musical recital, Dr. Richard Mandell; 11-12, Adolphus Hotel orchestra.

WFI, Philadelphia, Pa. (Eastern, Daylight, 395), 1 p. m., Meyer Davis Bellevue Stratford concert orchestra; 2, Helen E. Diorio, soprano; 4, Ray Miller's Melody Boys; 6, Sunny Jim, the kiddies' pal; 6:30, Meyer Davis Bellevue Stratford concert orchestra; 8:15, Administration chorus, Board of Education; 9, Fenton Label company chorus.

WGI, Medford Hillside, Mass. (Eastern, Daylight, 360), 7 p. m., meeting of the Annad Big Brother club; 7:30, talk on current events, David M. Cheney; musicale.

WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 12:30-1 p. m., George Albert Bouchard, organist.

WGY, Schenectady, N. Y. (Eastern, 380). 8:30 p. m., dance music, orchestra of Hotel Ten Eyck.

WHAS, Louisville, Ky. (Central, 400). 4-5 p. m., selections Walnut Theater orchestra; Alamo Theater orchestra; 7:30-9, Gobber-Triblett orchestra.

WHB, Kansas City, Mo. (Central, 411), 2-3 p. m., ladies' hour program of varied instrumental solos and orchestra numbers, Sweeney Radio orchestra, direction of Geo. Parrish.

WHN, New York, N. Y. (Eastern, Daylight, 360), 12-1 p. m., Radio Shack orchestra; 4:45-5:15, disabled American veterans orchestra; 6-7, at the festive board; 8-8:15, Jimmy Flynn, tenor; 9:30-10, Flag Day National Security League.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 1:00 p. m., Karl Bonawitz, organist; 3, Kronos quintette; 8:05, Harold Leonard's Redjackets orchestra; 7, Uncle Wip's bedtime stories; 8, opening Atlantic City control room of WIP on steel pier; Oreste Vassoli and band, Roy Comerford's symphony orchestra.

WJZ, New York, N. Y. (Eastern, Daylight, 405), 2:30 p. m., flag day exercises; 3, Thurston Noe, organist; Edna Bloom, soprano; Gen. Robert Lee Bullard; Oration Gloria trumpeters; 4:00, Sara V. Turits, soprano; 5:10, Edna Walter, pianist; 7, "Flag Day," Alice Durrel Stueck; 8:15, surprise program; 10, Mary Hirth, soprano; I. Piroshnikff, concertina soloist; 10:30, Club Lida Vasiloa orchestra.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints; 7:30-8:15, business messages; 9:30, dance program.

WLS, Chicago, Ill. (Central, Daylight, 345). 8-12 midnight, national farm barn dance.

WMAQ, Chicago, Ill. (Central, Daylight, 447.8), 6:30 p. m., Hotel LaSalle orchestra; 8, Wicker Pack school orchestra; 9, weekly Chicago theater.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., program, residents of Brinkley, Ark.

WDAW, Omaha, Neb. (Central, 526), 8 p. m., Serjian program, Joe Lovely, director; 9, program, Eugene W. Dinkins, director; Helen Pearce Turner, pianist; Mrs. Harry C. Nicholson, soprano; Mrs. Conrad Young, violinist; Harry Disbrow, baritone; Harriette Clark Helgren contralto.

WOC, Davenport, Iowa (Central, 484), 12 m., chimes; 3:30, "Cases Used in the War," C. C. Hall; 5:45, chimes; 6:30, sandman's visit; 9, Palmer School Radio orchestra; Ralph W. Fuller, baritone.

WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamakee crystal tea room orchestra; 4:45, organ recital, Mary E. Vogt; Wanamaker R. O. T. C. band.

WOQ, Kansas City, Mo. (Central, 360), 7-7:30 p. m., International Sunday School lesson, by Dr. Walter S. Wilson; 8-9:30 p. m., popular dance music, Western Radio orchestra; 11-11:30 p. m., special religious service, Unity School of Christianity.

WOR, Newark, N. J. (Eastern, Daylight, 405), 7-7:30 a. m., morning gym class, Arthur E. Bagley; 2:30-2:50 p. m., artists from the Studios, Lulfi Spada; 2:50-3:05, recital, Florence Burns, contralto, Dr. Charles Dolan, tenor; Gertrude Dolan; 3:40-4, studios, Lulfi Spada; 8-8:55, Cleno Ingraham, Bell Record orchestra; 8:55-9:05, Regal Male quartet; 10:40-11, concert, WOR-IORS, J. M. Barnett.

WPAL, Columbus, Ohio (Eastern, 286), 10 p. m., Athletic Club orchestra, dance program.

WRC, Washington, D. C. (Eastern, 469), 6 p. m., children's hour, Peggy Albion; 7:30, Bill Reeves and his Original Peacock orchestra; 8:15, Bible talk; 8:30, Marx E. Kahn, reader; Theodore Roth, violinist; Paul D. Gabel, pianist; 8:45, Roy K. Easter, baritone; 10, Hawaiian music, Honolulans.

WSAI, Cincinnati, Ohio (Central, Daylight, 302), 10 p. m., weekly news review, Rutherford B. Cox; 10:20, accordian duets, Charles H. Partington, Neil Korh; baritone solos, Leo Carons; soprano solos, Helen Jean Upperman; 12, Traver's serenaders.

WSB, Atlanta, Ga. (Central, 429), 3-9 p. m., week-end revue; 10:45, Radiowl jamboree.

WTAM, Cleveland, Ohio (Eastern, 390), WTAM Dance orchestra, Ev Jones, director; J. E. Morris, tenor.

WTAS, Elgin, Ill. (Central, 286), 7:30-12 midnight, WTAS orchestra.

WWJ, Detroit, Mich (Eastern, 517), 8 a. m., setting-up exercises, R. J. Horton; 3 p. m., Detroit News orchestra; 7, Detroit News orchestra.

Sunday, June 15

Silent night for: CKAC, KFAE, KFAF, KFOA, KGO, KSD, WAAW, WBAH WDAF, WDAR, WOR, WHN, WIP, WDD.

CHYC, Montreal, Can. (Eastern, Daylight, 341), 8:30 p. m., studio concert, Dad's night; Dubois String quartet.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 4:30 p. m., sacred concert.

CKCK, Regina, Can. (Mountain, 420), 9 p. m., Rev. J. H. Tyndall, Chalmers Church choir.

KFI, Los Angeles, Calif. (Pacific, 469), 10-10:45 a. m., L. A. Church Federation service; 4-5 p. m., Mme. Sprotte's choral society; 6:45-7:30, Hattye Mueller, pianist; 8-9, Ambassador hotel concert; 9-10, Examiner concert; 10-11, Packard Six orchestra.

KFNF, Shenandeah, Iowa (Central, 266), 3 p. m. religious services, Men's Gospel team.

KGO, Oakland, Calif. (Pacific, 312), 2:30 p. m., KGO Little Symphony orchestra Carl Brudehamel, director.

KGW, Portland, Ore. (Pacific, 492), 6 p. m., church services, Sunnyside Congregational church, Rev. J. J. Staub, pastor; 7, George Olsen's concert orchestra.

KYW, Chicago, Ill. (Central, Daylight, 536), 10 a. m., Central Church services, Dr. F. F. Shannon pastor; 1:30 p. m. studio chapel service.

WBAP, Fort Worth, Texas (Central, 476), 11-12:15 p. m., services, First Methodist church, Rev. J. W. Bergin, pastor; 4-5, Marguerite A. White, organist; 3-5, memorial services, Woodmen of the World; 11-12 midnight, popular program, Fred Cahoon's orchestra.

WCAE, Pittsburgh, Pa. (Eastern, Daylight, 462), 3 p. m., people's Radio church, Rev. Jennie F. Millwood; 6:30, dinner concert, William Penn hotel.

WCX, Detroit, Mich. (Eastern, 517), 10:30 a. m., services Central M. E. Church, Dr. Lynn Harold Hough; Hudson quartets; 2, Radio chapel services.

WDAF, Kansas City, Mo. (Central, 411), 4-5 p. m., music recital, Sam Bernat and Harry Bernat, violinists; Donald Johnstone, pianist.

WDAR, Philadelphia, Pa. (Eastern, Daylight, 395), 2:30 p. m., Arcadia Cafe concert orchestra, Ferl Sarkozi, director.

WEAF, New York, N. Y. (Eastern, Daylight, 492), 3:30-4 p. m., hymn singing, auspices of Greater Federation of N. Y. churches; 4-5, services, Greater Federation of N. Y. churches; 7:20-9:15, Capitol theater; 9:15-10:15, Skinner organ.

WEAY, Houston, Texas (Central, 360), 11 a. m., church services, First Baptist church; 8, sermon, First Baptist church; 9:30-10, Iris theater organ.

WFAA, Dallas, Texas (Central, 476), 6-7 p. m., Radio Bible class, Dr. William M. Anderson, pastor; 9-9:30, sacred song recital, Riggs Memorial Presbyterian church choir; 9:30-11, Jack Gardner and his Seven Symphonizing syncopaters.

WFI, Philadelphia, Pa. (Eastern, Daylight Saving, 395), 7:30 p. m., services, Arch street Presbyterian church.

WGI, Medford Hillside, Mass. (Eastern, Daylight, 360), 4 p.m., "Adventure Hour," Youth's Comunion; musicale; 8:30, talk, auspices of the Greater Boston Federation of churches.

WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 3 p. m., services, Zion Lutheran church, Rev. Otto C. Busse, pastor; 6:30, services, Zion Lutheran church.

WGY, Schenectady, N. Y. (Eastern, 380). 9:30 a. m., services, Zion Lutheran church, Rev. Otto C. Busse, pastor; 6:30, services, North Reformed church, Rev. Robert Muna, organist.

WHAA, Iowa City, Iowa (Central, 484), 9 p. m., famillar hymns, Edith L. Kelly.

WHAS, Louisville, Ky. (Central, 400). 9:57 a. m., organ music; 10, church service of Fourth Avenue Seventh Day Adventist church Rev. Robert J. Bryant, pastor; 4-5, p. m., concert, Mrs. Jane W. Murrell, director.

WHB, Kansas City, Mo. (Central, 411), 2-2 p. m., program of classical and religious music, Sweeney Radio orchestra; 9-10 p. m., church service from the WHB studio and music by the Sweeney Radio orchestra.

WHK, Cleveland, Ohio (Eastern, 263), 6 p. m., chapel service, auspices Cleveland Federation of churches; 8, p. m., concert program, WHK, Concert orchestra, Max Schmitt, director; solo numbers, Ruth Sponsoller, contralto.

WHN, New York, N. Y. (Eastern, Daylight, 360), 3-4 p. m., Queens County Christian Endeavor union.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., services, Holy Trinity church, Rev. Floyd W. Tompkins, D. D.

WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:30-12 m., Westminster Presbyterian church; 3:15-4:45 p. m., House of Hope Presbyterian church; 6:30-7:40, Second Church of Christ, Scientist; 7:35-9, Hennepin Avenue M. E. church.

WLW, Cincinnati, Ohio (Central, Daylight, 309), 9:30 a. m., school, Editorial Staff, Sunday School publications, Methodist Book concern; 11, services of the Church of the Covenant, Dr. Frank Stevenson; 1:30 p. m., church services, First Presbyterian church, Rev. Fred N. McMillin; 8:15, Western and Southern orchestra: Don Beddoe, tenor.

WOAW, Omaha, Nebr. (Central, 526), 9 p. m., Radio church service, Rev. R. E. Brown, pastor; 9, musical chapel service, North Presbyterian church, Rev. J. M. Hamilton, pastor; Mrs. Deyo Crane, organist; Ruth Wallace, tenor; Christine Poulsen, soprano; Gertrude Ferryman, violinist; Robert Harry, bass; E. R. Long, tenor.

WOC, Davenport, Iowa (Central, 484), 9 a. m., sacred chimes concert; 1:30 p. m., The Palmer School Radio orchestra; 7, lecture; 8, church service; 9:30, The Palmer School Radio orchestra.

WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 10:30 a. m., services, Bethany Temple; 2:30 p. m., Sunday school services, Bethany Temple.

WOQ, Kansas City, Mo. (Central, 360), 11-12:30 p. m., religious service, Unity School of Christianity; 7-7:45 p. m., services of religious nature, Unity School of Christianity; hymn, Unity choir; 8-9:15, religious services, Grand Avenue Temple, preaching, Rev. I. M. Margrett; pipe organ recital; hymns by choir; offertory solo.

WOS, Jefferson City, Mo. (Central, 440.9), 8 p. m., Union open air religious services; Missouri State Prison Band.

WPAL, Columbus, Ohio (Eastern, 286), 6 p. m., Chittenden Hotel orchestra; Grand Theater organ.

WSB, Atlanta, Ga. (Central, 429), 11 a. m., First Presbyterian church; 3-6 p. m., Whitney Hubner Sacred orchestra; 7:45, Wesley Memorial church.

WTAS, Elgin, Ill. (Central, 286), 7:30-12 midnight, WTAS orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 40 p. m., Schueman's Concert band; 5, Detroit News orchestra; 7:30, services St. Pan's Episcopal cathedral.

Monday, June 16

Silent night for: CKAC, KFNF, KFOA, KYW, WFI, WHAS, WIP, WLS, WMAQ, WRC, WSAI.

CKAC, Montreal, Can. (Eastern, Daylight, 425), 1:45 p. m., Mount Royal Hotel luncheon concert; 4:30, Mount Royal Hotel tea-dansant orchestra.

KFAF, Denver, Colo. (Mountain, 360), 8-9 p. m., Rex.

KFI, Los Angeles, Calif. (Pacific, 469), 9-10 p. m., Examiner concert; 10-11, Ambassador-Max Fisher's Cocoanut Grove orchestra.

KFOA, Seattle, Wash. (Pacific, 455), 8:30 p. m., Pacific States Electric company, dance music, Babs B. B. Ladies' orchestra.

KGO, Oakland, Calif. (Pacific, 312), 3 p. m., speaker, Parent-Teacher associations of the San Francisco Bay district; 4-5:30, Hotel St. Francis Dance orchestra, Henry Halstead, leader; 8, Spanish lessons, Oscar Caleno; Scenario Writing course, Edna K. Barker.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., literary program, Portland Library association; 8-10, Miller's Merry-makers.

KQV, Pittsburgh, Pa. (Eastern, Daylight, 270), 11-11:30 a. m., music; 8:45-9 popular songs Ben Fields and Jack Rich; 9-10, Hazel Michael, soprano; J. Isaac Harris, baritone; Frank Martin Fisher, accompanist; 10:15-10:45, Addy Britt.

WAAW, Omaha, Neb. (Central, 360), 8:30-9 p. m., Symphonic Dance orchestra.

(Continued on page 14)

Where to Hear Talks

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

Wednesday: KFAE, KFOA, KGO, KGW, KHJ, KPO, KQV, KYW, WBAH, WBBR, WBZ, WCX, WDAF, WDAR, WBAP, WEAO, WGI, WHA, WHAS, WJZ, WLAG, WLW, WMAQ, WPAL, WOC, WOS, WRC.

Thursday: KDKA, KYW, WAAW, WAAW, WBBR, WBZ, WCAE, WDAP, WDAR, WBAF, WEAO, WFAA, WGY, WHAS, WHB, WIP, WJAX, WJY, WJZ, WLAG, WLS, WMAQ, WOC, WOR, WRC.

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

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

Monday: WBZ, WDAR, WEAF, WEAO, WFAA, WGR, WGY, WHAZ, WLAG, WLW, WOC.

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

Monday, June 16

(Continued from page 13)

WBAH, Minneapolis, Minn. (Central, 417). 12:30-1:30 p. m., Dick Leng's trio and soloist; 9:30-11:30 p. m., L. V. Peterson, tenor; Henry Bessesen, accompanist; Arthur Faust, reader.

WBAP, Fort Worth, Texas (Central, 476). 9:30-10:45 p. m., concert, Fife, Drum, Bugle corps; Fort Worth Boy Scouts, Jim Wilson, director.

WBAV, Columbus, Ohio (Eastern, 390). 12 m., Ila Lorbach Owens, pianist; 8, p. m., concert, WBAV orchestra, Frances Handlan, director.

WCAE, Pittsburgh, Pa. (Eastern, Daylight, 462). 4:30 p. m., Sunshine Girl; 6:30, dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 8:30, Mary Cahill, pianist; Esther M. Dunn, soprano; Frances Victor, entertainer; 11, Johnson's Pennsylvanians.

WCBD, Zion, Ill. (Central, 345). 8 p. m., quartet, Mrs. Thomas, Mrs. Sparrow, John D. Thomas, M. P. Barton; vocal duet., Evangeline and Esther Wiedman; Pearl Ludlow, pianist; cornet quartet.

WCX, Detroit, Mich. (Eastern, 517). 4:15 p. m., music; 6, dinner concert; 7, Adda Eldredge, speaker; Robert Bruce, bass; W. Greenwood, baritone; Frank Ladd, baritone; Thomas Miller, tenor; Thelma Widerman, soprano.

WDAF, Kansas City, Mo. (Central, 411). 3:30-4:30 p. m., the Star's Radio trio; 5-5:30 p. m., Boy Scout program, address of the Kansas City Boy Scout council; talk on camping; quartette; 6-7 p. m., School of the Air, piano tuning-in number, the Duo-Art; address, speaker from the Kansas university; the Tell-Me-a-Story Lady, "request" stories; music, Fritz Hanlein's Trianon ensemble; minstrel program, WDAF minstrels; Star Radio orchestra; solos; men's chorus; quartette; 11:45-1 a. m., the Nighthawk Frolic, "The Merry Old Chief," and the Plantation players.

WDAR, Philadelphia, Pa. (Eastern, Daylight, 393). 11:45 a. m., daily almanac; 12:02 p. m., organ recital, Stanley theater; 12:30, Arcadia Cafe concert orchestra; 2, Arcadia Cafe concert orchestra; 7:30, special features, Stanley theater; Dream Daddy's bedtime stories; 10, Howard Lenin's Arcadia Cafe dance orchestra; features from local theaters.

WEAF, New York, N. Y. (Eastern, Daylight, 492). 5:30-6 p. m., women's program of United Synagogues; 6-7, dinner music Hotel Waldorf-Astoria; 7:30-7:40, sports talk, United Cigar stores; 8-8:15, Ansonia Clock co.; 8:30-9, Hall & McNamara; 9:15-9:30, Constance Hulsman, pianist; 10-10:30, Lee Wellington, Pianist.

WEAO, Columbus, Ohio (Eastern, 360). 1:30 p. m., garden talk, member Ohio State university faculty.

WEAY, Houston, Texas (Central, 360). 12-1 p. m., Rice Hotel orchestra; 2:30-3:30, studio concert; 6-7, Rice Hotel orchestra.

WFAA, Dallas, Texas (Central, 476). 12:30-1 p. m., address, "Astronomical Effects in Meteorology." Prof. J. P. Bean; 8:30-9:30, B. M. Taylor and his vocal quartet.

WFI, Philadelphia, Pa. (Eastern, Daylight, 395). 1 p. m., Mayor Davis Bellevue Stratford concert orchestra; 3, Kilgore school of dramatic art; 6, Sunny Jim, the kiddies' pal; 6:30, Mayor Davis Bellevue Stratford concert orchestra.

WGR, Buffalo, N. Y. (Eastern, Daylight, 319). 11:15-11:45 a. m., physical culture exercises Henry T. Martin; 12:30-1 p. m., George Albert Bouchard, organist; 8:45-9, Gertrude Townsend, presents an arrangement from the novel "Shavings;" 9-11, concert, direction of P. Arlew Mathews for Wheat's Ice Cream company; 11:30-1:30, supper dance music, Vincent Lopez Hotel Statler orchestra, Harold Gieser, director.

WGY, Schenectady, N. Y. (Eastern, 380). 1 p. m., humorous readings; 7:45, musical program, Albany Salvation Army band; Capt. Louise G. Young, contralto; Emily Leggett, concetist; Elizabeth Reehr, soprano; Emma Olmsle, pianist; concertina solo, Adjutant Fred Malpass; address, Capt. Stanley Shepherd.

WHAS, Louisville, Ky. (Central, 400). 4-5 p. m., selections, Alamo Theater orchestra; Mrs. Palmer K. Miller, soprano; Susie Elvira Williams, accompanist; Walnut Theater orchestra.

WHAZ, Troy, N. Y. (Eastern, 380). 9 p. m., Rosamond Burgess, pianist; Mrs. Middlebrook, saxophonist; Mrs. Amelia S. Carpenter, contralto; Mrs. Kappeler, soprano; Isabel Merwitz, reader; 10, dance music, Girls' Bluebird orchestra.

WHB, Kansas City, Mo. (Central 411). 2-3 p. m., ladies' hour program of popular and semi-classical numbers by members of the Sweeney Radio orchestra; 7-8 p. m., dance selections, Sweeney Radio orchestra.

WHN, New York, N. Y. (Eastern, Daylight, 360). 2:15-3 p. m., Irving Berlin Music company; 6-7, at the festive board; 7:30-8, Roseland dance orchestra; 9:30-10 Hotel Carlton Terrace orchestra; 10-11, Radio Shack orchestra.

WIP, Philadelphia, Pa. (Eastern, Daylight, 509). 3 p. m., Cameo trio; 6:05, St. James hotel orchestra; 7:00, Uncle Wip's bedtime—stories.

WLAG, Minneapolis-St. Paul, Minn. (Central 417). 10:45-11:15 a. m., household hints; 11:15-12 m., surprise program; 2:10-2:30 women's club hour, "20th Century Housekeeping," Bernice Bolt; "Dressmaking Lessons," Mme. Myrtle Saperston; 2:40-4, daylight concert; 5:30-6, children's hour, Tess J. Cooneman; 6-6:15, "Sport Review," John Getchell; 6:15-7, dinner concert; 7:30-8:15, farm lectures.

WLW, Cincinnati, Ohio (Central, 309). 4:20 p. m., French lesson, Mme. Ida Tetmpidis; 8:00 special program, Hope Haven Singing society; 8:30, Sion, Look and Listen to Hon. Senator Schnitz; 8:45, Mastropolo trio; 9:15, Woody Meyer's Cincinnati orchestra; 9:30, songs, Mathida Brooks, Radio beauty.

WMAQ, Chicago, Ill. (Central, Daylight, 447.8). 4:20 p. m., Items of interest to women; 6, Chicago theater organ; 6:30, Hotel LaSalle orchestra.

WMC, Memphis, Tenn. (Central 500). 8:30 p. m., request program, Hotel Oayoso orchestra, Prof. Gasper Pappalardo, director.

WOAW, Omaha, Nebr. (Central, 526). 6 p. m., speakers half hour; 6:30-7:30, dinner program, Randall Royal orchestra; 9-11, recital program, artist-pupils of Cecil Berryman, pianist.

WOD, Philadelphia, Pa. (Eastern, Daylight, 509). 11 a. m., organ recital, Mary E. Vogt; 12:02 p. m., Wanamaker crystal tea room orchestra; 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, organ recital Mary E. Vogt; 10:30, Vincent Rizzo's Havana Casino dance orchestra.

WOQ, Kansas City, Mo. (Central, 360). 7:30-8 p. m., music, Liberty Theater orchestra; pipe organ numbers, Grand Avenue Temple.

WOS, Jefferson City, Mo. (Central, 440.9). 8 p. m., "Destruction of Trees and Forests," and "Insecticides and Fungicides," Arthur T. Nelson; 8:20, Missouri Star Priest orchestra; Harry M. Snodgrass, pianist.

WPAL, Columbus, Ohio (Eastern, 286). 6 p. m., Chittenden Hotel orhestra; 7, Grand Theater organ.

WRC, Washington, D. C. (Eastern, 469). 6 p. m., children's hour, Peggy Albton.

WSB, Atlanta, Ga. (Central, 429). 8-9 p. m., Loews Grand Vaudeville theater featuring Georgia Sernaders' orchestra; 10:45 Ritz Harmony boys.

WTAS, Elgin, Ill. (Central, 286). 8 p. m., songs by popular artists; Charles Dale, Joseph Mertz, Jimmie Egert, Isobel Simpson, Bert Davis, Lindsley Coons, Will Rossiter; Lee Sims, organist.

WWJ, Detroit, Mich. (Eastern, 517). 8 a. m., setting-up exercises, R. J. Horton; 3 p. m., Detroit News orchestra; 8:30, Detroit News orchestra.

Tuesday, June 17

Silent night for: KGW, WDAR, WGR, WOC, WOO, WOR, WOS.

CKAC, Montreal, Can. (Eastern, Daylight, 425). 7 p. m., Kiddie stories in French and English; 7:30, Mount Royal Hotel dinner concert; 8:30, special program, "S. S. Regina" orchestra and entertainers; 10:30, Mount Royal Hotel Roof Garden Dance orchestra; George Fishburg.

KFAF, Denver, Colo. (Mountain, 360). 8-9:30 p. m., WPAF Colonel Buster.

KFI, Los Angeles, Calif. (Pacific, 469). 6:45-7:30 p. m., vocal concert; 8-9, Arabassador-Max Fisher's Cocoanut Grove orchestra; 9-10, Examiner concert; 10-11, Windsor trio.

KFNF, Shenandoah, Iowa (Central, 266). 7:30 p. m., concert, Benedict Piano and Radio company.

KGO, Oakland, Calif. (Pacific, 312). 4-5:30 p. m., concert orchestra, Hotel St. Francis; 8, part one: program, Henry Grobe, music dealer; part two: "The Constitution of the United States," Waldo F. Postel; Aerion trio; Virginia Trendwell, contralto; C. E. Irwin, harmonica soloist; Martha Denham Macgregor, soprano; Verona B. Duncan, pianist; Nellie Clark, soprano; Helen Denham Macgregor, soloist; Margaret Avery, cellist.

KGW, Portland, Ore. (Pacific, 492). 3:30 p. m., children's bedtime story; 7-7:30, dinner concert, Cumdress hotel; 8-8:20, musical program, Blanche Blood studio; 8:20, speeches, American Farm Bureau federation; 8:45-9:30, musicale.

WAAW, Omaha, Nebr. (Central, 360). 8-9 p. m., St. Pauls Lutheran church, Rev. M. Mueller.

WBAP, Fort Worth, Texas (Central, 476). 9:30-10:45 p. m., concert, Jackson family French harp artists.

WCAE, Pittsburgh, Pa. (Eastern, Daylight, 462). 4:30 p. m., Sunshine Girl; 6:30, dinner concert, William Penn hotel; 7:30, Uncle Kaybee; 7:45, Charles Mandy, tenor; Olga Mundy, accompanist; 8:30, Bertha Gross and co-operating artists; 11, late concert, artists, Loew's Aldine theater.

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

WDAF, Kansas City, Mo. (Central, 411). 3:30-4:30, p. m., the Star's Radio trio; 5-5:30, weekly child talent program; 6-7, School of the Air, piano tuning-in number, the Duo-Art; address, speaker from the Meat Council of Great Kansas City; address, Clerin Zumwalt, M. A.; the Tell-Me-a-Story Lady; music, Fritz Hanlein's Trianon ensemble; 11:45-1 a. m., Nighthawk Frolic, "the Merry Old Chief" and the Plantation players.

WEAF, New York, N. Y. (Eastern, Daylight, 492). 11:55-11:59 a. m., motion picture forecasts, Adele Woodyard; 4:15-4:30 p. m., Gertrude Gleon, soprano; 5-5:30, children's program; 6-7:15, dinner music, Hotel Waldorf-Arstoria; 7:30-7:40, sports talk, United Cigar stores; 7:50-8, Sophie Irene Loeb; 8-8:30, Corn Products Rifining company orchestra; 9:30-10, Nita A. Nelson pianist.

WEAY, Houston, Texas (Central, 360). 12-1 p. m., Rice Hotel orchestra; 2:30-3:30, studio concert; 6-7, Rice Hotel orchestra.

WFAA, Dallas, Texas (Central, 476). 12:30-1 p. m., address, DeWitt McMurray; 8:30-9:30, musical recital, old fiddlers, Charles H. McKinney; 11-12, entertainers from the Jefferson theater; Pete Pate and his Jazzipators; Bernice Clements and his Sync-o-Jazzers orchestra.

WGY Schenectady ,N. Y., (Eastern 380). 1 p. m., "Light Reading for the Hard of Hearing," Mrs. C. A. Dingman; 5:30, dinner music, instrumental trio of Hotel Ten Eyck; 7:45 Radiotone, "Locomotives That Make Electricity as Well as Use It," C. M. Ripley; 8, Janet Coetz, pianist, 12 years old; Ruth B. West, reader, 12 years old; Dorothea Koch, violinist, 14 years old; Lucille Fisher, soprano, 9 years old; Clayton Shufelt, violinist, 14 years old; Adelaide Ryan, reader, 10 years old; George Kehm, 11 years old; 10:15, Stephen E. Boisclair, organist.

WHAA, Iowa City, Iowa (Central, 484). 12:30 p. m., readings, members of speech department faculty.

WHAS, Louisville, Ky. (Central, 400). 4-5 p. m., Walnut Theater orchestra; Alamo Theater orchestra; 7:30-9, agricultural tabloid talk; Zur Schmierle Harmony Digest; Charlotte Paul Daniels, soprano.

WHB, Kansas City, Mo. (Central, 411). 2-3 p. m., ladies' hour program of semi-classical music by the Sweeney Radio orchestra; 7-7:30 p. m., popular dance music Sweeney Radio orchestra; 8-10 p. m., recital of songs, Kittie Major Gleason, contralto; pianist, Marie Redding; Sweeney Radio orchestra.

WHN, New York, N. Y. (Eastern, Daylight, 360). 2-2:15 p. m., State Theater overture and vaudeville; 6-7, at the festive board; 10-10:30 ,All National program.

WJAX, Cleveland, Ohio (Eastern, 390), program, Cleveland News-Leader; 7:30 p m., E. G. Johnson, bedtime story; Don Palmer Radio talk cartoon; Hotel Cleveland orchestra; Tom Pernicell, director; Gladys Beddoe, soprano; Gertrude Lenz, pianist; Talk, "Own Your Own Home."

WLW, Cincinnati, Ohio (Central, 309). 10 p. m., L. B. Dobie, violinist; Nelda H. Vibrans, soprano; Eva S. Robison, pianist; dance program, Northern Hills orchestra; "Soldiers of Peace," Cincinnati Fire department quartet; 12 midnight, Coon-Sanders orchestra.

WMAQ, Chicago, Ill. (Central, Daylight, 447.8). 4 p. m., Child Life stories; 4:20, fashion talk, Jean Morrat; 4:30, pupils, Glenn Dillard Gunn School of music; 6, Chicago theater organ; 6:30, Hotel LaSalle orchestra; 8, Harrey Hansen book reviews; 8:20, readings, Catherine Lyons; 8:40, French lesson; 9:15, Lyon & Healy program.

WMC, Memphis, Tenn. (Central, 500). 8:30 p. m., program, Tracy Plyler, director; 11, midnight frolic, Pappalardo's Society orchestra.

WOAW, Omaha Nebr. (Central, 526). 6-7:30 p. m., program artist-pupils of Cecil Berryman, pianist; 9-11, program, Omaha Elks band.

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

WRC, Washington, D. C. (Eastern, 469). 6 p. m., children's hour, Peggy Albion, Marguerite Meakim; 8, Grandall's Tivoi theater; 9, political talk;; 9:20, trio, Irving Boernstein's Wardman Park Hotel orchestra.

WSB, Atlanta, Ga. (Central, 429). 8-9 p. m., star party, Atlanta bachelors; 10:45, Paulding County Civitan Band Oldtime Music makers.

WWJ, Detroit, Mich. (Eastern, 517). 8 a. m., setting-up exercises; R. J. Horton; 9:45 a. m., Fred Shaw, pianist and songster; 3 p. m., Detroit News orchestra; 8:30, Detroit News orchestra.

TABLE FOR MAKING TIME TRANSITIONS

Eastern Daylight Saving Time	1	2	3	4	5	6	7	8	9	10	11	12	
Eastern, or Central Daylight Saving Time	12	1	2	3	4	5	6	7	8	9	10	11	
Central, or Mountain Daylight Saving Time	11	12	1	2	3	4	5	6	7	8	9	10	
Mountain, or Pacific Daylight Saving Time	10	11	12	1	2	3	4	5	6	7	8	9	
Pacific Time	9	10	11	12	1	2	3	4	5	6	7	8	

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

Where to Hear Dramas

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

Wednesday: KDKA, opera, "The Violin Maker of Cremona;" WLW, one act play, "The String of the Samisen."

Friday: WGY, "The Boss," WGY Players.

Saturday: KGO, "Nothing But the Truth," KGO Players.

CORRECTION IN CIRCUIT

On page 15 of the May 31 issue, the diagram showing the circuit for the "Talking and Singing Suitcase" was found to have a mistake. In our next issue we will show the circuit as it should be with all corrections made.

Variable Condenser Data

Sir Oliver Lodge formed the first tuned Radio circuit when he connected a condenser to an inductance, and the step helped Radio advance from the laboratory to be of commercial service.

Kordia, a German, patented the first rotary variable condenser in 1893, but this type of condenser did not make its debut in the Radio field until about 1902. The first type consisted of two concentric cylinders, one of which was movable. The sliding plate condensers came next, and were the popular type about 1910. Then came the rotating plate condensers, which are used at the present time. In the early type rotary condenser trouble was experienced in "dielectric losses"—that is, the insulating material between the stationary and movable plates absorbed some of the Radio energy, causing leakage. The Bureau of Standards in 1915 developed a practically resistanceless condenser by using quartz supports. This low resistance increased the signal strength and made possible sharper tuning.

When purchasing a variable condenser the mechanical construction should be considered. Are the contacts good? Are the bearings smooth running? Are the plates accurately spaced and strongly clamped? Is a counterweight provided for the panel mounting types? Is the dial well calibrated? Are the rotary plates locked together and firmly secured to the shaft?

Good insulating material is essential. Quartz, porcelain and hard rubber are good. Bakelite is fair and fibre poor. A good condenser does not have small insulating bushings between metal parts which are at different potentials such as the stationary and movable plates, and where a vernier plate is insulated from the main shaft.

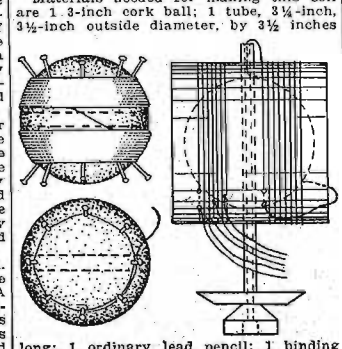
A condenser having .001 mfd. capacity is usually used in tuning low resistance antenna circuits, in a loop receiving circuit, in a wavemeter and in a Radio filter. The .005 microfarad condenser works well as an antenna series condenser for reception of the broadcasting stations and also across the secondary of the tuner.

A condenser in series with the antenna decreases the wave length and the smaller the capacity the greater will be the cut in wave length. If 600-meter commercial code stations interfere with reception of broadcasting stations, the series condenser will help to eliminate the dots and dashes if the antenna is not too large. A condenser shunted across an inductance increases the wave length.

The plate or plates of a vernier condenser should not be as thick as those of the ordinary variable condenser. The thicker the plates the greater will be the capacity. The purpose of a vernier is to obtain fine adjustment and it cannot be secured if the capacity is too large.

Novel Reinartz Coil

Materials needed for making this coil are 1 3-inch cork ball; 1 tube, 3¼-inch, 3½-inch outside diameter, by 3½ inches



long; 1 ordinary lead pencil; 1 binding post, and 4-ounce d.c.c., or s.c.c. wire, No. 22, 24, or 26 gauge.

Find a diametrical center on the cork ball which is to be the rotor, and from this center make a circle of 1 inch radius. On the exactly opposite spot repeat this operation. Then, in one circle, force four 1-inch wire nails into the ball. Place them at equal distances by quartering. Between these insert four or more other nails. Secure an end of the wire to one nail, leaving 6 inches free, and begin by winding one turn against the nails, another turn against the first, and so on until 15 turns have been wound on. Secure the wire firmly, while as many nails as were put in the first circle are put in the second.

Proceed as before and, when 15 more turns have been wound, leave 6 inches free and connect the other end to end of the first winding. With a large needle it is not difficult to thread the 6-inch leads through the ball to the center and bring out through bare space. Near these leads drill a hole a little smaller than an ordinary lead pencil, but take care not to come in contact with the wires. Also make doubly sure that the hole is through the very center of the ball.

The coil must be varnished, shellacked or waxed. While wax is to be preferred, a very efficient coating can be made by dissolving as much celluloid as possible in an ounce of banana oil, then thin with alcohol. Apply this with a brush and the wires will be held firmly in place and the natural color of the coil will be retained.

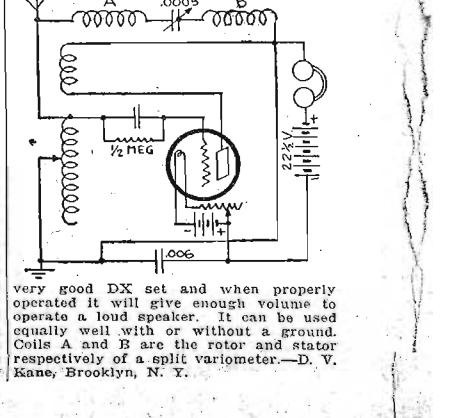
The stator of the coupler also has 30 turns of wire. These are wound on the cardboard tube. Two holes are made about ½-inch apart in the tube, and one end of the wire threaded through these holes. Twenty turns are then wound on, a ½-inch space left, and 10 more turns wound on, a 6-inch tap being taken from each turn. One extra turn is wound on, threaded through two holes as at the start, and an 8-inch lead left. Two holes, the diameter of the lead pencil, should be made through the exact center in the ½-inch space.

Next remove the metal from the top of the pencil, split it lengthwise into two parts and remove the lead. A 1-32-inch hole should be drilled about 1½ inches from the bottom end of the one piece. Put this half of the pencil through the stator and rotor and after connecting the two nearest leads of rotor and stator, thread the other lead of rotor through hole in pencil and bring out through the groove. Then connect to binding post in the ½-inch space. Put other half of pencil through, and shaft will be complete. Where the eraser has been, a ¼-inch dial will fit nicely.

Various improvements may be made if one wishes to go to the extra work. Brass or copper plates may be fastened on the stator tube for shaft to turn on. The shaft may be hollow brass rod instead of a pencil, if desired. The coupler may also be mounted on a base. Other improvements may be made if the builder sees fit.—Henry Cox, Youngstown, Ohio.

Flewelling Set

The accompanying illustration shows an excellent Flewelling set. Tuning on it is extremely sharp. I live but a few miles from New York stations and I can tune any of them out at will. It is a



very good DX set and when properly operated it will give enough volume to operate a loud speaker. It can be used equally well with or without a ground. Coils A and B are the rotor and stator respectively of a split variometer.—D. V. Kane, Brooklyn, N. Y.

Compact Nine-Tube Super-Heterodyne Set

Part II—Panel Drilling and Parts Assembly

By Harry Abbott

THE equipment on the baseboard, as shown in Figure 2, is mounted in four rows and, looking at the diagram, reading from left to right: in the front row; the oscillator coupler, the second audio transformer and the first audio transformer; in the second row, the first detector, the oscillator, the second audio, the first audio and the second detector sockets; in the third row, the tuned coupler and the first, second, third and fourth long wave amplifier tube sockets.

This all sounds like a good deal, and is, but since a super-heterodyne receiver is the only set that will give one long distance loud speaker range on a loop and satisfactory selectivity that is necessary. It is a pleasure to get this apparatus nicely mounted and wired; the cutting, fitting and placing of the shielding is the unpleasant part and there is considerable grief attached to it. It is necessary, though because of the compactness secured.

We now come to actual construction of the set. The panel should be ¼-inch bakelite, formica, condensite or hard rubber and to measure 24 inches by 8 inches. Studying this panel one finds two holes near the center of the left edge ⅝-inch apart; these are for the binding posts to which the loop or secondary terminals of a variocoupler are attached. Near this edge, and about 1 inch from top and bottom, are two more holes for the shields. The hole in the upper left corner is for a screw which fastens the panel to the cabinet. The five holes across the bottom are for attaching the panel to the baseboard by means of flat-head wood screws.

The four groups of holes to the left of the center are for condensers, grid leak and potentiometer. If instruments of any other makes than those shown in the illustrations are used, consider only the shaft holes and make the shaft holes of your templates coincide with the shaft holes of my layout. I mentioned earlier that some readers might like to use a fifth rheostat; it can be placed between the grid leak and potentiometer and in line with them. The two holes on a vertical line just to right of the center are for shields.

Holes Necessary in Panel

The groups of holes toward the right hand end of the panel are labeled with the exception of the jack and binding post holes. From left to right the three 7/16-inch holes near the bottom are sceond stage audio, first stage audio and detector. Along the right edge are six holes on a vertical line to take the six binding posts for battery connections. Reading down from the top, Number 1 is plus 45 for the detector plates; Number 2 is the plus 90 of the Radio frequency amplifiers; Number 3 is the plus A and minus 45; Number 4 is the minus A, plus C, the minus of the B used on the Radio frequency amplifiers and the minus of the B used on the audio amplifiers; Number 5 is the minus C; Number 6 is the plus 90 of the audio frequency amplifiers.

The same suggestion applies to this half of the panel as to the left half; if you do not use the instruments I used, take only the shaft holes and center your templates on them. The hole in the upper right corner is for attaching the panel to the cabinet with a flat-head wood screw.

Assembling the Parts

This set may be assembled in two parts; the panel as one assembly, the baseboard as another. If instruments, no matter what the make, are centered as shown in the panel and baseboard layouts, the two assemblies will go together without trouble. At this point the question comes up of shielding the panel. I did not shield mine but while this omission seems to result in no ill effects and I—am not bothered with hand capacity, several good reasons have been pointed out by friends why this would be advisable. Among these reasons are the fact that waves from long wave stations can go through the panel and be heard, and that static on longer wave lengths will also affect my set. If the reader desires to make a shield for the panel, the panel layout can be used for centering holes but the holes themselves should be large enough to clear any metal parts of instruments which are "live;" that is, in the circuit. Drawings for all other shields are given.

Passing now to the baseboard layout, which is Figure 2, it will be seen that not only are the locations of instruments given but the placing of shields as well. The baseboard should be made of laminated board containing five thin strips the grain of which alternate in direction. The dimensions are 23 11/16-inches by 13 inches which will make the set somewhat deeper than usual but much shorter than would be the case if all nine tubes were put in a row. In Figure 2 locations are given so that any make apparatus may be used. It will be found that all long

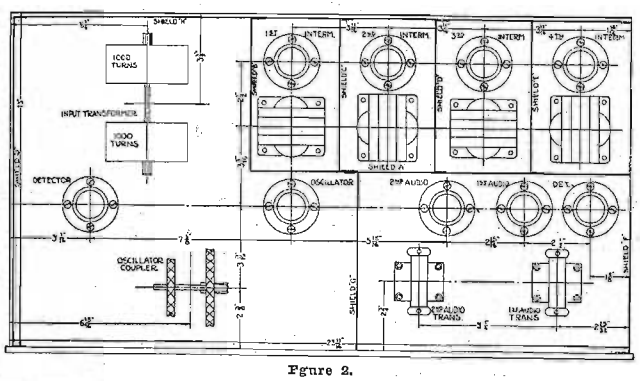


Figure 2.

wave transformers are pretty much the same in size, which fact applies to the tube sockets.

Since I preferred the 199 and 299 class tubes my drawing shows sockets of that size but there is ample leeway if one prefers to put in the larger tubes and sockets. The front row of sockets is moved forward slightly, the rear row slightly back and storage battery tube sockets will go in nicely. Another difficulty that some might encounter occurred to me as I left plenty of room around the oscillator coupler should any readers be unable to secure one like mine.

Should you be unable to get one of the diamond weave type, use one you have. Either a 90 degree or 180 degree coupler will do, or some makes of variometers can be utilized. Remove turns from the center of the stator until 20 are left at each end. One set of 20 turns is the grid coil, the other set, is the plate coil. Remove all but 15 turns on the rotor as a "pick-up" coil. Three honeycomb or duo-lateral coils mounted on a wooden rod will do as well. A 35-turn coil for the grid circuit in the middle, a 25-turn on one end for the plate and a 20-turn for "pick-up." The rod on which these slide should be parallel to the panel.

Coils Used

The input transformer is placed at right angles to the coupler toward the rear of the panel. Any of four types of coils—honeycomb, crisscross-wound, curkoidal-wound or straight closely wound coils—seemed to work equally well in my set, with compactness favoring the crisscross no-air-cell type and sharpness favoring the curkoidal-wound variety. Each of the two coils used contains 1,000 turns and each is shunted with a .00025 condenser for most of the iron core long wave transformers available, whose peak efficiencies are 7,000 to 8,200 meters. One type operates on a longer wave and larger condensers must shunt the input transformers. The two coils should be arranged that they may be brought nearer together or farther apart. Once set, they are left alone.

At this time there is no complete data on the manufacture of good wave iron core transformers although I happen to know that one maker puts 1,000 turns in the primary, 2,700 on the secondary and inserts an iron core measuring ⅝-inch by ⅝-inch made up of very thin, varnished laminations. The wire is crisscross wound by machine, the primary is about ⅝-inch wide, the secondary about ⅞-inch wide and they are slipped on the 2½-inch long core. Try making them if you want to but I'd advise buying them. They are set alternately at right angles to another directly in front of the tube sockets.

Manner of Construction

In constructing this outfit, begin at the rheostat end of the panel and put on the filament battery binding posts, the rheostats and the switch. Do all the wiring possible in connecting these units of the filament circuit. Then mount the grid leak between the rheostats and the binding posts, also the three jacks, but leave their wiring until after the panel and baseboard are brought together. Then go to the opposite end of the panel and put on the two loop binding posts and the tuning condenser and connect them. The first grid leak, the potentiometer and the oscillator condenser can also be put on, but very little wiring can be done on them as yet.

Proceeding now to the baseboard, first set all the parts on the board without screwing them down. Centering the sockets is easy as one has only to look down through the socket and get the

(Continued on page 20)

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New Outdoor Sport

Static Overcome by Use of Loop

THE possibilities of Radio as an outdoor sport are at last being realized. The rapid growth of the new art brought with it some mistakes. The biggest mistake was to let the idea get into the public mind that Radio couldn't be used in summer on account of static.

This of course is not true. It it were so, the broadcasting stations would shut down. But you don't see any of them doing so! If it were true, people wouldn't go on building sets of the reflex type at the present rate.

The fact is that the conquest of static by the use of the loop antenna, the improvement of broadcasting, and the advent of portable sets which are really portable have now made it possible to enjoy Radio in the good old summer time as much as at other times of the year.

"What is vacation without a Radio?" has every prospect of becoming a slogan of nation-wide truth and application.

Summertime, too, is a good time to revamp an old set and have it ready for the busy days of fall when there is not so much time to experiment.

In a word, the year-around use of Radio now has a sound basis. The loop and the use of low-loss condensers in sets like the reflex made good results certain. Broadcasting stations in summer are increasing their sending power. When the summer days are longest, making it harder to broadcast over great distances, several of the more important stations have interconnected systems which covers the distance.

The attractions which Radio will have to offer this summer will be better than ever. Not only will the number and variety of programs be greater, but for the first time in history the proceedings of the nominating conventions of both political parties will be broadcast, and the subsequent campaigns for the election of a President will bring the drama and thrills of the contest to every set-owner.

Right Legislation Needed

Old Law Obsolete for Present Day Requirements

SEVERAL million Radiophans have reason to wish that congress would find time, amid its multifarious investigations, to do a little legislative job that everyone knows needs doing.

Radio operations have been conducted under a law enacted in 1912, when wireless transmission was in a primitive form and Radio telephony was practically unknown. Such control as is now exercised over Radio comes mainly from extra-legal powers given Secretary Hoover by general consent of Radio interests. In the last session a sound regulative measure was introduced, but failed of passage. A new measure had been introduced which is calculated to reduce interference to a minimum and develop an orderly system of communication.

The bill would require all transmitting stations and operators to be licensed by the department of commerce, would provide for allocation of wave lengths and would authorize the president to close or control stations in time of war or other emergency. Owners of receiving sets would not be affected, except to have conditions for reception improved for them.

The present and ever growing magnitude of the Radio industry and its popular following deserve to have this measure taken seriously by congress.

One Way to Aid Entombed Miners

Test Pave Way for Mine Communication

COMPACT Radio receiving and sending sets promise to become an indispensable part of the coal miner's equipment. Engineers of the Interior Department are about to solve, through Radio, the problem of communication, from a sending station to the entombed men, which would be of some value because of the psychological advantage to the men in knowing the progress of their relief and because the latter might be directed to places where rescue would be easier.

RADIO INDI-GEST

Me und Myer's Tube

It vas vonce in New Amsterdam, dot place I can't forget,
No matter how I try und try, I still tink of it yet;
I tink of it und Myers, mine bosom friend vas he;
If you vill hear mine story, den you'll remember me.
Vere da dikes hold back da vater, und da vind mills spot da land,
Lives mine old friend Oscar Myers mit his Radiola Grand.
Ven by night it's nice und quiet und you do not hear a peep,
He starts his Radio and plays until he falls asleep.
But hear me, all da peoples tink dot Myers is a boob,
But he is not so dumb at all, because he has a tube
Vot goes into his Radio, und he can get such stuff
Dot no von else can get at all, und dot is good genuf.
Dot little tube vot Myers got, can sing und talk und play;
Last week it sang in Cherman, und Frenoh da oder day.
It speaks and tells you stories every morning, night und noon
Und in da night dere's special stories for da sloeping room.
Mine goodness, it's remarkable dot such a little ting
Could speak just like da peoples, play da moozio and oan sing;
It seems almost oxclusive, but I know chnst vot I know
Because I heard it mine own self. You see I know it's so.

BURT B. BARSOOK.

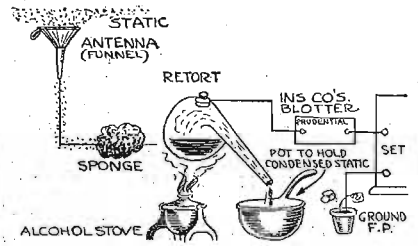
Schopenauer, Wasn't It?

Dear Indi: Friend Wife, in attempt to describe a creation seen recently in a milliner's window, spoke of it as resembling a basket-weave variometer with external ribs. Looked up said kelly and the description fitted to perfection. Who says the ladies take no interest?

PAPRIKA.

Won't the Announcers' Prize Do?

Dear Indi: You herewith have the pleasure of reading a letter from the greatest name in Radio—one who shall go down in history's pages as the greatest electrical wizard of the age. Why? Because, while scientists and engineers have been wracking their brains for years to overcome static, I, who know nothing about Radio, have invented a static eliminator that is the "cat's whiskers." Being by nature a philanthropist, I



am giving this invention free to the world. It is guaranteed to work, as my 12-year-old son, who knows all about Radio, says so.

The Anderson Static Separator works on the theory that static comes only with dampness in the air. In order, then, to do away with static it is necessary to dry the signals before they are detected. That is what the S. S. does, as the sketch shows.

For this free gift the only stipulation I make is that you propose me for the Nobel prize of 1924. Scientifically yours.

W. ANDERSON.

A Sweet Scented Joke

Dear Indi: A peculiar sense of humor caused someone to insert in one of the Cologne papers the statement that one of the biggest department stores had installed a receiving set (which is forbidden in Germany), and extending an invitation to all people to come down and listen in for nothing. When the many infuriated visitors went to the office of the newspaper to complain, they found it closely shuttered.

LONDON BOBBY.

Mrs. Partington Speaks Out

Dear Indi: Mizz Partington says the Senate has been making threats that they are going to use the people's money to build theirselves a Broadcasting Station, as it won't cost them nothing, and they would make this one taxes free.

She thinks all the listeners should get a big petition signed, objecting to this insult, and send it to Secretary Hoover, so he won't give the Senate license to perform this outrage on us.

She says they probably think they could use it for a stump speaker to get votes, if they can get someone to invent a Hook-up for a automatic hand-shaker for our sets, but she says if they do go on the air she's going to bait her wave trap so as to catch 'em and throw 'em out before they get into her set, as she don't find them either amusing nor entertaining.

SIGNING OFF.

Report 'Oboe Reception to the Police

Dear Indi: I've just been listening in to the St. Louis Symphony Orchestry on my set—built according to the specifications given by Miss Terry Mann in your column last week, but with the variometer tapped every ⅛ turn—and I find I can tune out everything except the oboes. I think I will split the variometer—with an axe. Then could I tune out the oboes also? Ex-statically.

C. B. ATTERY.

Help! Give Them Air

Condensed

By DIELECTRIC

Amateur Radio operators are seeking at all times to establish new records in transmission and reception and while most of the outstanding achievements in this field have been credited to our own amateurs, reports come from other countries of notable successes. One of these concerns the recent tests made by Argentine amateurs. Nearly a dozen calls from North American stations were picked up by several of our southern fans and the Argentine Station CB8 was in communication for two hours with Station 2AC in New Zealand. That was pretty good work.

The Post Master General of England has been advised to build a broadcasting plant in conjunction with the new post office station at Rugby, in the hopes of it providing the means of linking that country with ours. In so far as experiments with English reception of American broadcasting are concerned they have been a success. Considerable difficulty has been experienced when we have tried to tune the British stations, up to the present at least. However, the English are looking to a time when telephone subscribers in both countries may be connected by means of Radiophony. Perhaps this may be possible at certain times.

To the indefatigable efforts in research by such men as Senatore Marconi do we owe the marvelous advance in the science of Radiophony. This great Italian genius goes off alone to work out his theories concerning electromagnetic waves to return with an astonishing discovery—"beam" transmission. He announced some time ago that Radio impulses could be sent in a given direction, but had not then determined how far such transmission would carry. Judging from the announcement by Premier Bruce in the House of Representatives in Australia, Marconi has concluded that a "beam" of electric waves may be directed in a predetermined course and carry an indefinite distance. Fuller announcement is to come.

Last year listeners in greeted the approach of summer with dismay, for it seemed to mean the interruption of their Radio enjoyment. Portable sets were a novel and unconvincing substitute for the good old reliable living room brand. This year campers will feel ashamed to receive callers unless they can offer current Radio programs brought in through their portable sets. Not only have these been designed to work in your tent, houseboat or other vacation haunt, but to fit in as part of the regular equipment on your auto—insuring some entertainment whenever you see fit to park the car en route. No one travels Radioless now.

One evening last month while sitting before the dials I tuned in a station broadcasting a violin solo. The miserable intonation,, entire lack of musical understanding of the classical number being mutilated made me feel how seldom it is that violin playing of a high order goes out through the ether. The following night Zimbalist entertained those present at the National Electric Light convention held in Atlantic City with some really beautiful playing. Radio listeners also had the rare privilege of hearing his art, as the session was broadcast.

While to the layman musical concerts heard via Radio are more or less educational, to the musical director they are both that and inspirational. We don't think, as a rule, of the possibility of orchestra leaders listening to the broadcasting of the playing of other orchestras, yet that very thing is often done. So popular a leader as Vincent Lopez has more than one fellow-leader tuned to his musicians playing, when the opportunity is afforded. New ideas are had by this easy and sure way.

How to Install a Radio Set in Your Automobile

Part VI—Studebaker Installation and Suit Case Assembly

By Harry J. Marx

NOW all you Radiophans with Studebaker big sixes, special sixes and all kinds of sixes listen in and take notice. Make up your portable Radio set and get all ready to install it in your seven, nine or eleven passenger touring cars. The youngsters and grown-up folks are all looking forward to those rides in the automobile, but don't be behind times and forget to provide Radio entertainment on your trips.

A fellow doesn't throw out his chest nowadays anymore just because he has an automobile. If you can't brag about having a Radio set installed you're a long way behind times. So better get busy and ready to brag that they've got nothing on you because your car is one of the up to date models with a Radio set all ready for the passengers to listen in.

Plenty of Room for Set

The latest Studebaker models have plenty of room, which makes installation a simple matter without discomforting any of the passengers. Smooth riding qualities of the car make tuning of the set simplicity in itself and the using of reception with the choice of outdoor tuning are all guaranteed to chase away the biggest grouch that summer time discomforts occasionally create.

Just glance at the ample space underneath the dash board. Another one of those dash boards where the lower edge is a wonderful straight line and almost any Radio set will slide into place just as if it were made to fit it. Two angles fastened to the dash board hooked on to the top of the set and you are ready to connect up.

The car provides the storage battery for lighting the tube filaments and a little accessory box attached to the rear of the set will easily accommodate four small 22½ units to take care of your plate battery requirements.

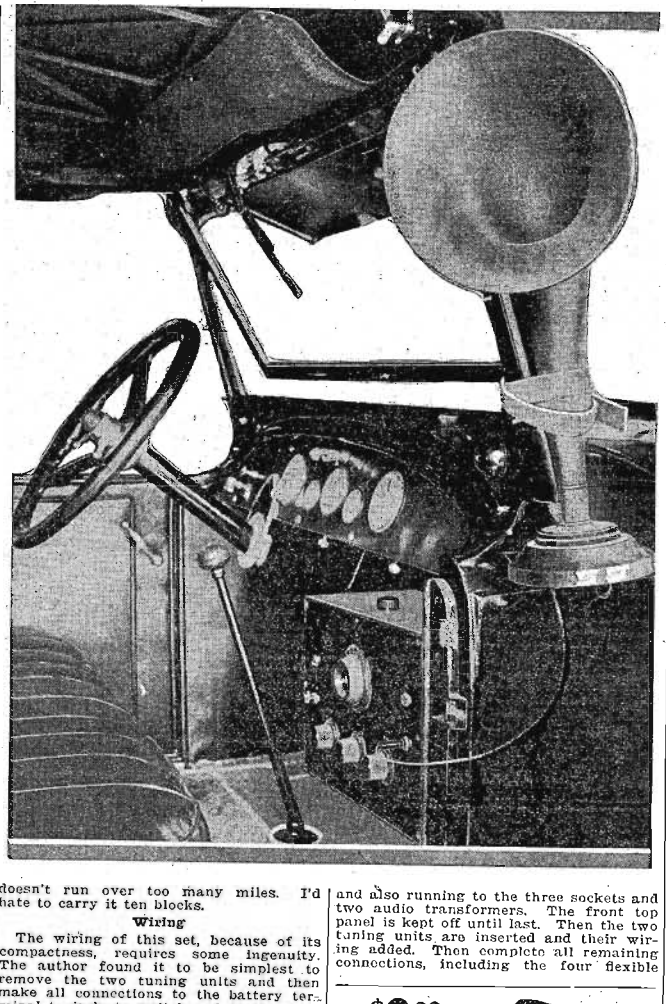
A loud speaker? Oh, yes, that just straps on to the upright strip of your windshield. One of those cloth army straps will do the stunt very nicely. Just point the horn toward the rear seat. The cord will be plenty long enough to plug in on the set.

Use one of those four-wire top cover aerials described in Part I of this series and the body of the car will give you a counterpoise ground effect and you are all set to tune in.

What circuit shall you use? There are numerous ones. Either use the automobile set that is being described in this series, or in the next issue, we are giving three-circuit variations that will be found very satisfactory for this type of receiver. The set used in the illustration is a modification of the original reflex de luxe that was described last fall. It happens to be one of those fancy sets, mahagonite panels, walnut cabinet, but it sure does look well in the old Studebaker.

Suit Case Installation

In the last article you got all of the details of the cabinet to be used for special automobile installation. This time the suit case installation is taken care of in a triple illustration showing a front and rear view of the assembled set and also a picture of the set all completed in the suitcase. The space left in the original suitcase is ample to take care of the batteries, the A-batteries and a very small loud speaker, a folding loop aerial and a head set. The weight of the whole is not too much to inconvenience carrying, provided the distance



doesn't run over too many miles. I'd hate to carry it ten blocks.

Wiring

The wiring of this set, because of its compactness, requires some ingenuity. The author found it to be simplest to remove the two tuning units and then make all connections to the battery terminal to jack, to switch and to rheostats and also running to the three sockets and two audio transformers. The front top panel is kept off until last. Then the two tuning units are inserted and their wiring added. Then complete all remaining connections, including the four flexible leads, to be connected to the binding posts on this front cover panel.

C Battery

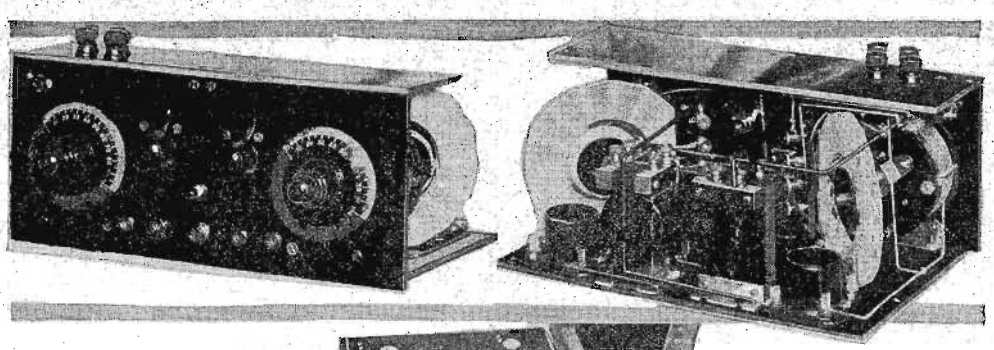
The C battery is one of the small 4½-volt flashlight units that will just slide into place in between the two audio frequency transformers. Some flexible leads were used for connections and the battery then held into position by means of a few turns of tape around the battery and two transformers. Not only does this C battery economize on the B battery drain, but will be found decidedly beneficial in clearing up recepton.

The Tuning Operation

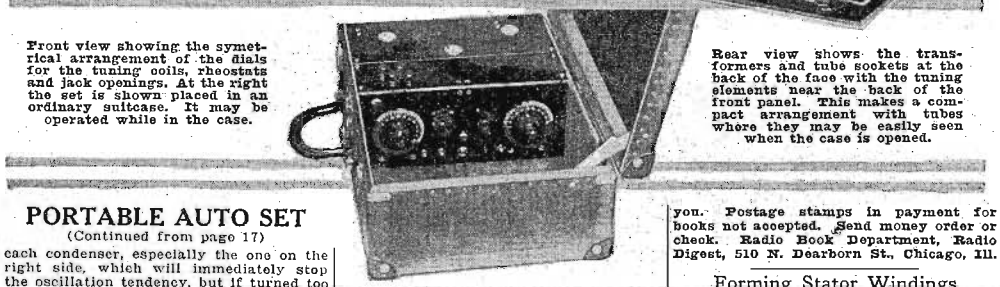
The tuning operation will be found the same whether an outside or loop antenna is used. The small jack switch in the upper left hand corner of the front panel when thrown to the left, cuts out the secondary coil and shunts the condenser directly across the loop. Now, in loop aerial use in some wave length ranges, it will be found that this switch can be turned to the right so that both the loop and the secondary of the first tuning unit are connected in parallel. Contrary to expectations, this will be found to also give very satisfactory results in reception. The action being that two inductances in parallel will permit regular efficiency over a lower wave length range.

The original set uses a soft dectector tube which makes the rheostat setting somowhat critical, but gives decidedly better results. Of course, in this case, only a 22½-volt tap is used for the detector plate circuit. When an A tube is used the rheostat setting is not at all critical, and it will be necessary to increase the detector plate voltage to 45 volts. Naturally, the amplifier rheostat is not critical. In tuning, the rotor knobs in front of the two dials should be set for maximum coupling in each. Both dials must be adjusted simultaneously. If properly assembled and good apparatus is used, the set is decidedly selective, because of the fairly critical adjustment of these two condensers. If, in the adjustment, of either one of these condensers the tubes have the tendency to spill over into violent oscillation, loosen up the coupling by turning the small knob on

(Continued on page 18)



Front view showing the symetrical arrangement of the dials for the tuning coils, rheostats and jack openings. At the right the set is shown placed in an ordinary suitcase. It may be operated while in the case.



Rear view shows the transformers and tube sockets at the back of the face with the tuning elements near the back of the front panel. This makes a compact arrangement with tubes where they may be easily seen when the case is opened.

PORTABLE AUTO SET

(Continued from page 17)

each condenser, especially the one on the right side, which will immediately stop the oscillation tendency, but if turned too far will decidedly diminish the strength and volume of reception. It is advisable, however, to keep this weaker coupling until the station has been properly tuned in with the condenser until maximum volume is obtained to the point just above spilling over. After reception has been tuned in it will be found it is best to readjust the detector rheostat to the position of maximum reception.

Loop Detail

The loop used in the original set is a folding type measuring 12 inches to a side with the four arms hinged at the center so as to fold together, making an over-all length of about 12 inches. It consists of 13 turns of wire spaced ¼-inch apart. The directional qualities of the loop of this type are not as marked as with the larger size. The reception, however, was found to be quite satisfactory.

(Hupmobile installation together with portable set hook-ups will be the subject for the next installment. The hook-ups are especially for the user of automobile sets.—Editor's Note.)

Review of Books

Vacuum Tube Receiver. 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.

Radio Reception. By Harry J. Marx, Technical Editor Radio Digest Illustrated, and Adrian Van Muffling. 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 Radiotelephony. Written in simple language. The subject is presented from the physical rather than from the mathematical standpoint, avoiding the use of higher mathematics. Price, $2.50.

Within the Atom. By John Mills. May be read by the Radiophan with interest for it deals with that infinite particle as associated with electrons, and all chemical and all electrical phenomena. Price, $2.00.

Experimental Wireless Stations. By P. E. Edelman. Simple directions are given in this book for making Radio equipment for the transmission of messages over long distances. Price, $3.

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

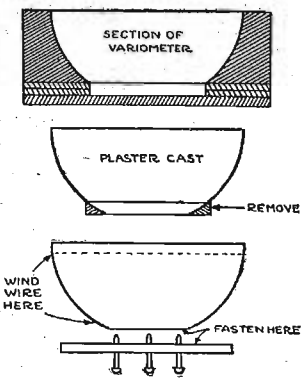
The A. B. C. Vacuum Tubes. By E. H. Lewis. It is a book for beginners who have no knowledge of either Radio or electricity and sets forth the elementary principles of theory and operation of the vacuum tube. No attempt has been made in this book to describe all the possible circuit arrangements, but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

Ideas 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, characteristic measuring set and detailed advice given on the winding of various kinds of standard inductance coils. Price, 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.

Forming Stator Windings

Procure some cardboard and cut squares the same size as the outside measurement of the stator block, and cut holes in them the same size as the smaller hole in the block. Build up these squares of cardboard until they are ⅛ inch thick. These are fastened to the stator. Pour in a mixture of plaster of paris and let it set. Remove the plaster and you will have a form that looks like a bowl. Remove the portion shown in black with a coarse file and smooth with sandpaper. Fasten a small piece of cardboard to the plaster



and the form is ready for winding the coil.

Wind the coils up to about ⅛ inch of the top and give them a coat of water glass or coil cement. Give it time for drying; then remove tho cardboard. Tap tho plaster lightly while pressing on the upper coils of the wire. When removed, coat the inside of the variometer with cement and press the formed coil into it. The other half is made in the same manner. Watch your winding to keep it in the right direction.—Russell C. Hansen, Milwaukee, Wis.

Arrangement of Four Aerial Scheme

Multiple Aerial Gives Good Direction Effect

With the arrangement of aerials as shown in the illustration I get excellent results. There are four aerials each pointing in a different direction from the others.

A small switch is mounted near the window, and the aerial post on the set is connected to the blade of this switch. There are four switch points marked N., S., E., & W., and the aerial pointing to the north goes to the point marked N., etc.

With this arrangement I received more distant stations than when the aerial pointed in one direction was used.—Harold Flonwell, Brooklyn, N. Y.

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

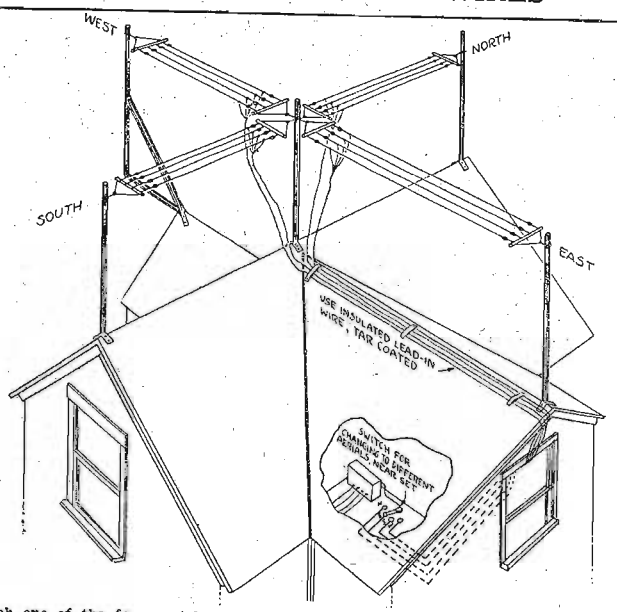
Swinging Aerials

An aerial that is permitted to swing will produce jerky and uncertain signals. The tighter the wire is stretched the better it is for receiving clear signals. Always solder the lead-in wire from the aerial.

Revising Polarity of Phones

It is sometimes an advantage to reverse the polarity of the phones. Some phones will work much better with the current running through them in one direction.

FIVE SUPPORTS HOLD WIRES



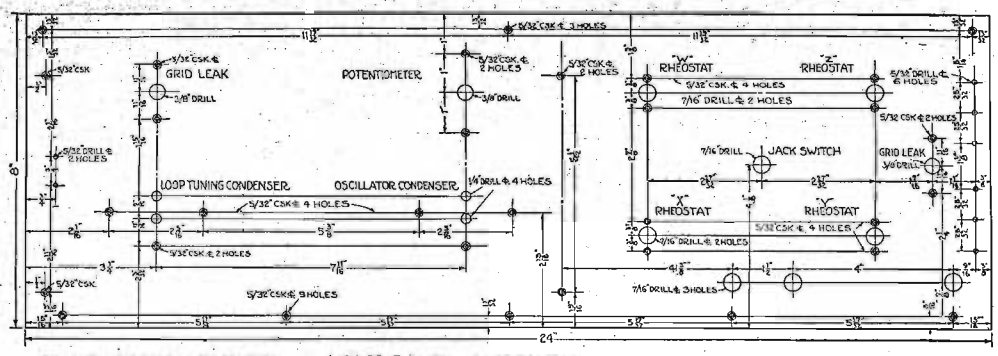
Each one of the four aerials may be tried out in turn to find which is best for bringing in the desired signal. They make the set more selective and produce the loudest reception that can be obtained.

Sponge Rubber Mounts For the Tube Sockets

The vacuum tubes now on the market are rather delicate instruments and are subject to microphonic noises unless mounted correctly. This is easily accomplished by fastening the sockets on sponge rubber.

But the mistake the fans make in doing this is to leave a lot of rubber in the center of the socket, which makes connection to the tube prongs. This causes a high resistance path for the Radio frequency currents and lowers the efficiency of the set to a great extent. Be sure to remove the rubber in the center of the socket.

When experimenting with various hook-ups, make up about a dozen leads of various lengths with snap connections.



NINE-TUBE SUPER

(Continued from page 15)

little centering mark in the middle of the opening. Now, move the panel, with its mounted units, against the front edge of the baseboard and see that the units on each do not touch. Mine cleared each other very well but due to differences in construction those you use may require a slight shifting to right or left on the baseboard. The rear row will need no attention and should not be changed from the layout shown as otherwise the shields will not slip into place. When sure the front row is correctly placed, screw down the nine tube sockets and complete as much of the wiring of the filament circuit as may be done on the board. In wiring all parts on this baseboard keep an eye on the layout and keep as low as possible all wires which must pass under shields and put spaghetti tubing on all wires.

Some experimenters bend their bus wire so that the spaghetti rests on the board but a slight clearance of 1/16-inch might be better. After the filament wiring, connect up the four tubes and four transformers comprising the intermediate amplifier at the rear of the baseboard. The long wire connecting the grid return posts of the first three should be in front of the transformers, while the wire connecting the four plus B posts is between transformers and sockets. At the right hand end of the board this plus B wire is extended just beyond the edge of the board, bent at right angles, covered with spaghetti and brought up outside of the shield F to the second binding post from the top on the panel. The panel is not yet attached to the base so at this stage merely allow enough wire and leave it. Now wire the detector and audio frequency transformers and, as before, leave enough wire to attach to the binding posts on the panel.

(In conclusion the next article will give details of the cabinet for housing the set in a very attractive manner.—Editor's Note.)

Soldered Connections Best

If you must make your connections exceptionally tight on the B batteries, don't make the mistake of using a pair of pliers on the nuts. Many people follow this practice, but it should be avoided, as in nine out of ten cases somo of the connections are loosened or else broken off entirely. If you must have the wires to these batteries good and tight, solder them. This can be done without trouble, providing a very hot iron is used. Don't hold the latter on the binding posts too long, as this will tend to melt the insulating material which surrounds the little screws.

What Does "Modulated Wave" Mean to You?

Relation of "Carrier" to Sharp Tuning Ability

By R. H. Langley

THE wave in space which brings us the broadcast music or voice is known as a modulated high frequency electromagnetic wave. Let us examine this rather imposing expression and see what it actually means.

The voice or music which we wish to transmit varies in frequency from about 30 cycles per second to about 400 cycles per second. An electromagnetic wave could be created at these frequencies. But it is found that it would travel only slightly further than the sound waves themselves. There would therefore be very little to be gained by changing the sound wave into an electromagnetic wave of the same frequencies.

Distances Traveled

It is found that a high frequency electromagnetic wave will travel to enormous distances. The term high frequency in this case means frequencies from about 30,000 cycles per second to about 3,000,000 cycles per second. It will be seen at once that these frequencies are of an entirely different order than the voice and music frequencies. Roughly, they are 1,000 times as great, or stating the fact in another way, 1,000 cycles of the high or Radio frequeucies will occur during one cycle of the voice or audio frequency.

The modulated wave is a combination of the audio and the Radio frequency. The Radio frequency part of the wave is spoken of as the carrier because it is used to carry the audio frequency. The Radio frequency is modulated by the audio frequency, and we ordinarily think of the audio frequencies as existing in the complete wave as a change in amplitude or intensity of the Radio frequency. The successive cycles of the carrier frequency vary in intensity or strength in accordance with the audio frequency.

When we say that the wave is electromagnetic, we mean that it consists of two parts. One part is a magnetic field, exactly like that given by the familiar horseshoe magnet. The other part is an electric field, exactly like the one that can be obtained by rubbing a piece of glass with a cork, by which the glass will then pick up small bits of paper. In the wave, these two fields, electric and magnetic, move through space together, at the velocity of light, or 186,000 miles per second.

The process by which Radio frequency is modulated at the audio frequency is relatively simple. A vacuum tube oscillator is used. As long as the plate voltage on this oscillating tube is held constant, the resulting wave has constant amplitude or intensity and is not modulated. In order to modulate the wave, the plate voltage is varied up and down in accordance with the audio frequency, and the ampliutde of the resulting wave in space varies in the same way.

Components of Wave are Three

Now, it is found that this wave of changing intensity is exactly equal to the sum of three constant frequencies, that is, three frequencies whose amplitude does not change. One of these is, of course, the carrier frequency at which the transmitting tube is oscillating. The second frequency is the sum of the carrier and the voice frequency, and the third is the difference between them. These sum and difference frequencies are known as the side bands. With a receiver that is sufficiently selective, we can tune to any one of these three frequencies and detect it. Remember that each of these frequencies is constant, and that it is only their sum which varies in amplitude. It is easy to see why the sum does change in intensity, because, since the three frequencies are slightly different, they cannot stay in step with each other, or, as we say, in phase with each other, and will consequently tend to help each other at certain times, and at other times will act against each other, and reduce the amplitude or intensity of the combination.

Instantaneous Frequency Changes

No two successive cycles of the modulated wave are alike in amplitude. But are they alike in frequency? Before we can answer this question, we must say what we mean by frequency. When this word is applied to something that repeats itself exactly time after time, it has a very definite meaning. The frequency is the number of these exactly similar cycles that occur in one second. But when the cycles are constantly changing, we can only say that the frequency at any instant is the number of cycles which would occur in one second if all the succeeding cycles were exactly like the one occurring at that instant. In a modulated wave, therefore, we must think of the frequency as constantly changing in its instantaneous value.

The limits between which the frequency of a modulated wave changes are the sum and difference frequencies which we have called the side bands. Let us take a numeric example now, and see how this all works out.

Cycles Per Second

Let us say that the carrier or Radio frequency which we wish to use is 800,000 cycles per second. This corresponds roughly to a wave length of 380 meters, that is, the peaks of the wave as it travels through space will be 380 meters, or about a quarter of a mile apart.

Let us say that the voice frequency at the instant we are considering is 1000 cycles per seeond. This corresponds roughly to high C on the piano.

The modulated wave, then, has a nominal frequenoy of 800,000 and its amplitude varies up and down 1000 times per second in accordance with the voice frequency.

The side bands would be the sum and the difference of these two frequencies, that is, 801,000 cycles per second and 799,000 cycles per second, the instantaneous value of the frequency of the modulated wave will vary between these two frequencies as limits. It is seen at once that if a receiver is to respond to this modulated wave, it must not tune so sharply as to give a different intensity to the different frequencies in this band. If it amplifies the 800,000 cycle part of the wave 100 times, when tuned to it, it must give practically the same amplification up to 801,000 cycles and down to 799,000 cycles.

Musical notes contain frequencies as high as 4,000 or 4,500 cycles per second. The receiver must therefore have a band of uniform response 8,000 or 9,000 cycles wide. It need not, however, have a band any wider than this. This is the limit to which the selectivity of a broadcast receiver can be carried, and to which it should be carried, if we are to be able to choose between broadcasting stations at will. Each station uses a different nominal frequency, and these nominal frequencies are 10,000 cycles apart, so that as the waves vary up and down 4,000 or 4,500 cycles each side of the nominal frequency, they will not overlap each other.

Until the advent of the super-heterodyne receiver, nothing even approaching the degree of selectivity just described could be obtained. Thus it was that we often heard two and three stations at the same time, and were unable to eliminate a powerful nearby station and listen to more distant ones. In the super-heterodyne receiver, however, we can obtain this remarkable degree of sharpness of tuning. We can separate stations that differ by less than one per cent in frequency and yet not distort the music by cutting off the side bands.

Questions and Answers

R. F. and Regeneration

(9049) CEB, Pittsburgh, Penna.

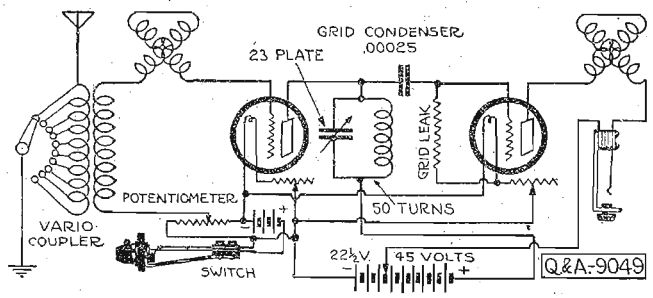
I am a subscriber of the Radio Digest and have tried a good many hook-ups, but don't seem to get any results with them. Of course I get local good, but cannot get outside stations.

I have one variocoupler, two variometers, one 23-plate condenser with vernier, one 23-plate condenser, one Radio frequency transformer, one audio transformer, one grid leak condenser, three sockets, 3 rheostats, one potentiometer, one switch, 6 volt A battery wet, 2-45 volt B batteries, aerial 75 feet long, 2 strands 30 feet high with no other wires near, ground to water pipe.

Also, I have three Cunningham tubes.

A.—We regret to note your experience in operating circuits offered by Radio Digest and since they are on the whole effective types with demonstrable records we are of the opinion that the lack of tuning skill is probably your biggest trouble.

We are presenting herewith a diagram of a superior circuit conforming to the apparatus of your specifications.



Regenoflex

(8275) JLF, Wallace, Idaho.

Some one has coined a word that has started a great deal of argument as to its true meaning, and inasmuch as it is supposed to be connected with Radio you would be in the position to give me the definition.

The source of all the trouble is the word Regenoflex.

A.—In asking for the origination of the word Regenoflex you impose a great responsibility on a mere technical editor when you ask him to define new names coined in the desperate effort to describe the new circuit hydrophobics. Undoubtedly great and arrant liberties are taken with our perfectly good English and any attempt to gather them into any semblance of meaning which is comprehensive and illuminating doth make us mad. I guess we'll just have to let it go at that. Presumably the author is trying to convey a combination of the regenerative and reflex principles.

Neutrodyne and Supers

(8284) JFD, Boligee, Ala.

Would thank the editor to recommend 3 or 4 good neutrodyne sets he considers best. Also would ask if he considers the super-heterodyne better than the neutrodyne.

A.—The spirit of our service does not include a recommendation of manufactured receivers or apparatus.

A comparison of the super-heterodyne and neutrodyne principles of Radio communication gives preference to the former in the matter of receiving range, although at the same time admitting that skillful operation is essential to realization of maximum efficiency.

The neutrodyne principle affords excellent results on a minimum number of tubes for circuits which are to be considered as approaching the laboratory class.

C Battery and Reflex

(8909) JL, Omaha, Nebr.

Would you kindly advise me if it would be of any advantage to connect a C battery to Erla 3-tube reflex and, if so, how? Have read in one of your papers that C batteries make for better and purer amplification and also help to conserve B batteries. Kindly answer through your question department.

A.—In our experience the use of C batteries are advantageous only in audio frequency amplifier stages. We would not recommend their use as advisable in a reflex circuit in which tubes are functioning also as Radio frequency amplifiers.

Radiophone Broadcasting Stations

Corrected Every Week—Part II

FIND MISTAKES AND YOU'LL GET DOLLAR

ONE DOLLAR will be paid to the Radiophan reader of Radio Digest submitting the most errors in any one station's listing in the Directory of Radiophone Stations, which appears in four parts, serially continuously, on page 23. Letters must reach Radio Digest's office not later than one week from date of issue corrected. Readers are not limited to correcting one station, but such corrections must be verified by the stations themselves, and NOT by comparison to other so-called accurate broadcasting directories or lists. Turn in corrections for as many stations as you can find—if you can find errors! Use separate sheet of paper for each station submitted and place name and address on each sheet. In case of tie, duplicate awards will be made.

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

KFNH, Springfield, Mo. 236 meters. 20 watts. State Teachers' College.

KFNJ, Warrensburg, Mo. 234 meters. 50 watts. Warrensburg Elec. Shop. Tues, Fri, 8-10 pm. Central.

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

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

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

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

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

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

KFOC, Whittier, Calif. 230 meters. 100 watts. First Christian Church.

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

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

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

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

KFOL, Marengo, Iowa. 234 meters. 10 watts. Leslie M. Schafbush.

KFON, Long Beach, Calif. 234 meters. 100 watts. Echophone Radio Shop. Slogan, "Where Your Ship Comes In." Club, "Black Cats." Daily ex Sun, 11:30 am, 12:30 pm, 1:30-2:30; 5:45-6:30, 8-9. Pacific.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

KFPN, Jefferson City, Md. 242 meters. 100 watts. Slogan, "Voice of the National Guard." Tues, 10-11:30 pm, news, music. Sat, 10-11 pm, talks, music. Central.

KFPP, Olympia, Wash. 230 meters. 20 watts. G. & G. Radio and Elec. Shop. Daily 6:30-7:30 pm. Wed, 8-11 pm. Pacific.

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

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

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

KFPV, San Francisco, Calif. 236 meters. 50 watts. Heintz & Kohlmeos, Inc. Slogan, "A'int We Got Fun." Sun, 7-8:30 pm. Pacific.

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

KFPX, Pine Bluff, Ark. 242 meters. 100 watts. First Presbyterian Church. Sun, 11 am, 12 m, 7:35 pm, 8:45 pm, church services. Central.

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

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

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

KFQD, Anchorage, Alaska. 280 meters. 100 watts. Chovin Supply Co.

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

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

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

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

KGO, Oakland, Calif. 312 meters. 1,000 watts. Gen. Elec. Co. Sun, 3:30-5 pm. Symphony Orchestra. Daily ex Sun, 1:30 pm, stocks, weather; 4-5:30, orchestra. Mon, Wed, Fri, 3 pm, program. Daily ex Sat, Sun, 6:45 pm, stocks, news. Tues, Sat, 10 pm-1 am, dance music. Mon, Tues, Thurs, Sat, 8 pm, music. Pacific.

KGU, Honolulu, Hawaii. 360 meters. 500 watts. Marion A. Mulrony, The Honolulu Advertiser. Daily, 7:30-9 pm. Tues, Thurs, Sat, special program. 150th meridian. 2½ hours later than Pacific.)

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

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

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

KHQ, Seattle, Wash. 360 meters. 100 watts. Louis Wasmer.

KIAF, Sihtipoc, Minn. 421 meters. 500 watts. Steele Co. Program irregular.

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

KJR, Seattle, Wash. 282 meters. 50 watts. Northwest Radio Service Co. Daily ex Sun, 5:30-6:15 pm, reports. Mon, 7:30-8:30 pm, music. Wed, Thurs, 7:30-8:30 pm, concerts, lectures, bedtime stories. Pacific.

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

KLS, Oakland, Calif. 360 meters. 250 watts. Warner Bros. Radio Supplies. Daily 11:30-1 pm, Fri, 8-0 pm. Sun, 12-1 pm. Pacific.

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

KLZ, Denver, Colo. 286 meters. 500 watts. Reynolds Radio Co. Daily ex Sun, 8:30 am, 10:15, 12:15. Daily ex Sun, Wed, 7:30-8 pm, news, markets. Thurs, 8:15-9:30 pm. Mon, Sun, 9-10:30 pm. Mountain.

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

KMO, Tacoma, Wash. 360 meters. 10 watts. Association Station. (Love Electric Co.) Daily ex Sun, Thurs, 6-7 pm, popular program; 9:15-10, artists' program. Pacific.

KNT, Kukak Bay, Alaska. 268 meters. 100 watts. Walter Hemrich.

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

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

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

KPO, San Francisco, Calif. 423 meters. 500 watts. Hale Bros., Inc. Slogan, "The City by the Golden Gate." Daily ex Sun, 12 m, reading. Daily ex Sat, Sun, 1-2 pm, 4:30-5:30 pm, music. Sat, 1-2 pm, 3:30-5:30 pm, music. Mon, Tues, Thurs, 8-11 pm, concert, lectures. Wed, 8-10 pm, Sat, 8-12 midnight, music. Sun, 11-12:15 pm, church services, 8:30-10, music. Pacific.

KQP, Hood River, Ore. 360 meters. 10 watts. Apple City Radio Club. Slogan, "The Home of the Hood River Apple." Fri, 6:30 pm, music. Wed, 0 pm, special. Pacific.

KQV, Pittsburgh, Pa. 270 meters. 500 watts. Doubleday-Hill Elec. Co. Daily ex Sun, 11-11:30 am; 1-1:30 pm. Mon, Tues, Wed, Thurs, Fri, 3:45-4:15 pm; 5-5:30, music, twilight tales. Mon, Wed, Fri, 9-10 concert. Eastern daylight saving.

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

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

KSD, St. Louis, Mo. 546 meters. 500 watts. St. Louis Post Dispatch. Daily ex Sun, 8:40 am, 9:40, 10:40, 11:40, 12:40 pm, 1:40, 2:40, 4. Mon, 8:30 pm; Tues, 8 pm; Wed, 6:30 pm, 9, 11; Fri, 8 pm; Sat, 8 pm; Thurs and Sun, silent nights. Central.

KTW, Seattle, Wash. 360 meters. 750 watts. First Presbyterian Church. Sun, 11-12:30 pm, 8-4:30, 7-9:30, church service. Pacific.

KUO, San Francisco, calif. 300 meters. 150 watts. San Francisco Examiner. Slogan, "The Voice of the West." Daily ex Sat, Sun, 9:05-9:20 am, weather, news; 11-11:30, markets; 2:30-2:45 pm, sports; 3, financial bulletin; 6-6:30, sports; 6:40, weather. Fri, 5:30-5:45 pm, health. Sat, 9:05-9:20 am, news; 2:30-2:45 sports; 6-6:20, sports, news; 6:40, weather. Sun, 9:05 am, 6:40 pm, weather. Pacific.

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

KWG, Stockton, Calif. 360 meters. 100 watts. Portable Wireless Telephone Co.. Daily ex Sun, 4-5 pm, news, concert, markets. Tues and Fri, 8-9 pm, concert. Sun, 2-3 pm, concert. Pacific.

KYQ, Honolulu, H. T. 270 meters. 100 watts. Elec. Shop, Lewers & Joaquin Co., Ltd.

KYW, Chicago, Ill. 536 meters. 1000 watts. Westinghouse Elec. & Mfg. Co. Daily ex Sun, Sat aft, 9:30 am, 10, 10:30, 11, markets; 10:55, time; 11:05, weather; 11:30, news; 11:35, table talk; 12 m, 12:30 pm, 1, 1:20, 2:15, 2:30, markets; 3, 3:30, 4, news; 4:15, markets; 4:30, 5, news; 6:30, markets. Daily ex Sun, Mon, 6:50, bedtime story; 8, concert; 9, special. Tues, Thurs, 2:35-3 pm, musical frolic. Wed, Fri, 3:30. Sun, 11 am, 6:45-8:45, church services. World Crier every half hour. Central daylight saving.

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

KZN, Salt Lake City, Utah. 268 meters. 500 watts. Cope & Johnson Co. Slogan, "Salt Lake City, Utah, the Center of Scenic America." Daily ex Sun, 8-9:30 pm, music, news, bedtime stories, etc. Mountain.

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

NAA, Radio, Va. 435 meters. United States Navy Dept. Daily ex Sun, 9:45-10:40 am, 12:25-12:40 pm, 1:45-2:20, markets, weather; 2:45-3 (Tues only), Dept. Interior; 3:25-4:40, 5:05-5:20, markets, weather 10:05-10:20, weather. Wed, 7:25-7:40 pm, Civ. Ser. Daily ex Sat. Sun, 7:45-8 pm, dept. programs. Mon, 8:25-8:40 pm, Dept. of Interior. Eastern.

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

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

WAAB, New Orleans, La. 268 meters. 100 watts. Valdemar Jensen.

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

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

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

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

WAAN, Columbus, Mo. 254 meters. 80 watts. Univ. of Mo.

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

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

WABB, Harrisburg, Pa. 266 meters. 10 watts. Harrisburg Sporting Goods Co.

WABD, Dayton, O. 283 meters. 10 watts. Parker High School. Discontinued during summer.

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

WABG, Jacksonville, Fla. 275 meters 10 watts. Arnold Edwards Piano Co. Slogan, "Will Always Be Growing." Daily ex Sun, 8-9 pm. Eastern.

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

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

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

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

WABN, La Crosse, Wis. 244 meters. 450 watts. Ott Radio Inc.

WABO, Rochester, N. Y. 283 meters. 10 watts. Lake Avenue Baptist Church.

WABP Dover, O. 266 meters. 100 watts. Robert F. Weinig.

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

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

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

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

WABU, Camden, N. J. 226 meters. 100 watts. Victor Talking Machine Co.

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

WABW, Wooster, O. 284 meters. 100 watts. The College of Wooster, Dept. of Physics.

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

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

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

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

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

WBAH, Minneapolis, Minn. 417 meters. 1250 watts. The Dayton Co. Daily ex Sun, 12:30-1:30 pm, 7-7:30. Mon, Thurs, 9:15-10:45 pm. Central.

WBAK, Harrisburg, Pa. 400 meters. 500 watts. Pennsylvania State Police. Daily ex Sun, 10:30 m, 1:30 pm, 6:45, police reports, fire protection, markets; 12 midnight, police reports. Mon, Tues, Wed, 7:30 pm, special. Eastern.

WBAN, Paterson, N. J. 244 meters. 100 watts. Wireless Phone Corp. Slogan, "The Silk City of America." Daily ex Sun, 9-11:30 am, 12:30-5:30 pm. Sat morn only. Sun, 10-12 am, 2-5 pm, 7:30-10:30. Eastern. daylight saving.

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

WBAP, Fort Worth, Tex. 476 meters. 750 watts. Fort Worth Star-Telegram. Club, "Radio Truth League." Daily, 5-5:30 pm, 6:30-6:45, baseball scores. Daily ex Sun, 9 am, 10, 11, 12 m, 1 pm, 1:20, 2, 2:20, 3, 4, market reports, weather 4-4:30, special; 6-6:15, "Port of Missing Men." Mon, Tues, Wed, Thurs, Fri, 9:30-10:45, concert. Sat, 7:30 pm, Bible lesson. Sun, 11 am-12:15 pm, church; 4-5 pm, 5-6, baseball, 11-12 midnight, concert. Central.

WBAV, Columbus, O. 390 meters. 500 watts. The Erner and Hopkins Co. Slogan, "We Broadcast a Variety." Daily ex Sun 12:30-1 pm. Mon, Fri, 8-10 pm. Eastern.

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

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

WBBA, Newark, O. 240 meters. 10 watts. Newark Radio Lab. Daily ex Sun, 6:30-7:30 pm, news. Mon, Thurs, 7 pm, musicale. Sun, 2:30 pm, Radio Chapel Service. Eastern.

WBBD, Reading, Pa. 231 meters. 50 watts. Barbey Battery Service. Wed, 10-11:30 pm. Sat, 10-11:30 pm. Eastern.

WBBE, Syracuse, N. Y. 240 meters. 50 watts. Alfred R. Marcy. Irregular program.

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

WBBG, Mattapoisett, Mass. 240 meters. 250 watts. Irving Vermilya. Wed, 8-10 pm, music. Sun, 10:30-12:30 pm, church service; 2:30-5, music. Eastern.

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

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

WBBL, Richmond, Va. 283 meters. 50 watts. Grace Covenant Presbyterian church. Tues, 8 pm. Sun, 11 am, 8 pm. Eastern.

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

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

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

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

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

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

WBBS, New Orleans, La. 250 meters. 100 watts. First Baptist church.

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

WBBU, Monmouth, Ill. 224 meters. 10 watts. Jenks Motor Sales Co.

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

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

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

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

WBL, Anthony, Kans. 261 meters. 50 watts. T & H Radio Co. Wed, 8-9 pm; Sat, 11-12 pm, music. Sun, 10 am, Sunday School lecture. Central.

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

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

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

WBZ, Springfield, Mass. 337 meters 1000 watts. Westinghouse Elec. & Mfg. Co. Daily ex Sun, 12:55 pm; 1:15, time, weather, markets; 6-7, music; 7-7:30, baseball scores, lecture; 7:30, bedtime story; 7:40-10:30 (ex Fri), music; 10:55, time. Wed, 11:30 pm-12:30, am, dance music. Fri, 10-12 mid, music. Sun, 10:45-12:30 pm, church services; 7-9:30, concert. Eastern daylight saving.

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

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

WCAG, New Orleans, La. 268 meters. 50 watts. Clyde R. Randall. Mon, Thurs, 8-9 pm, professional concert. Central.

WCAH, Columbus, O. 286 meters. 100 watts. Entrekin Elec. Co. Slogan, "The Heart of Ohio." Daily ex Sun, 11:30-12:30 am, music, news. Tues, 8-10:30 pm, Sun, 10-12:30 pm, 7:30-9, church services; 4, vespers. Eastern.

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

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

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

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

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

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

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

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

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

WCAU, Philadelphia, Pa. 286 meters. 100 watts. Durham & Co. Daily 5:45 pm, market. Sun, 10:55 am, service; 3 pm, technical talk; 3:15, talk on psychology; 4:10, Bible Readings; 6-8, concert. Eastern daylight saving.

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

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

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

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

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

WCBE, New Orleans, La. 263 meters. 5 watts. Uhalt Radio Co. Slogan, "Second Port U. S. A." Mon, Thurs, 9-10 pm, concert. Sat, 7-8 pm, popular music. Sun, 1-2 pm, dinner concert. Central.

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

WCBG, Pascagoula, Miss. 268 meters. 50 watts. Paul J. Williams. Slogan, "Will Christ Be Glorified?" Daily ex Sun, 7 pm, sermon. Sun, 2:30 pm, 7, service. Central. (Portable, moves often.)

WCBH, Oxford, Miss. 242 meters. 20 watts. U. of Mississippi.

WCBI, Bemis, Tenn. 226 meters. 250 watts. Nicoll, Duncan & Rush. Sat, 8-9:30 pm, dance music. Central.

WCBJ, Jennings, La. 244 meters, 10 watts. J. C. Mans.

WCBK, St. Petersburg, Fla. 266 meters. 500 watts. E. Richard Hull. Mon, Thurs, 7-8 pm. Tues, 8-8:15 pm. Sun, 8-10 pm. Eastern.

WCBL, Houlton, Me. 280 meters, 100 watts. Northern Radio Mfg. Co. Slogan, "Call of the North." Wed, 7:30-10 pm. Sun, 10:30 am, 7 pm. Eastern.

WCBM, Baltimore, Md. 229 meters. 250 watts. Charles Schwarz. Tues, Thurs, 10 pm-1 am. Sat. 9:30-12 mid. Sun, 8:30-10:30 pm. Eastern.

WCBN, Fort Benjamin Harrison, Ind. 206 meters. 50 watts. James P. Boland.

WCBO, Memphis, Tenn. 250 meters. 20 watts. The Radio Shop, Inc. Wed, Sun, 8:30 pm. Central.

WCBQ, Nashville, Tenn. 236 meters. 100 watts. First Baptist church

WCBR, Providence, R. I. 246 meters. 5 watts. Charles H. Messter.

WCBT, Worcester, Mass. 238 meters. 250 watts. Clark University, Collegiate Dept.

WCBU, Arnold, Pa. 254 meters. 50 watts. Arnold Wireless Supply Co. Slogan, "The Booming Town." Daily ex Sun, 5:30-6:15 pm, music. Wed, 7:30-8:30 pm. Sat, 12 midnight, test program. Eastern.

WCBV, Tullahoma, Tenn. 252 meters. 10 watts. Tullahoma Radio Club. Tues, Thurs, Sun, evening programs.

WCBW, Macon, Ga. 226 meters. 20 watts. Maitland Soloman and G. P. Rankin, Jr. Irregular schedule.

WCBX, Newark, N. J. 233 meters. 100 watts. The Radio Shop. Tues, Wed, Fri, 6-6:30 pm; 7:30-10:30. Eastern daylight saving.

WCBY, Buck Hill Falls, Pa. 268 meters. 10 watts. Forks Electrical Shop.

WCBZ, Chicago Heights, Ill. 248 meters. 50 watts. Coppatelli Brothers Music House. Slogan, "Where the Lincoln and Dixie Highways Meet." Tues, Fri, 8-10:30 pm, program. Central daylight saving.

WCK, St. Louis, Mo. 360 meters. 100 watts. Stix, Baer & Fuller Dry Goods Co. Daily, 12-12:30 pm, 3-4:15, 5-5:30. Mon, Wed, Fri, 6:15-8 pm, concert, lecture. Fri, 11-12 pm. Central.

WCM, Austin, Tex. 360 meters. 500 watts. U. of Tex.

WCX, Detroit, Mich. 517 meters. 500 watts. The Detroit Free Press. Club, "Red Apple Club." Daily ex Sun, 2 pm, news; 2:15, stock reports; 2:50, weather, markets; 4:15, 6, music. Daily ex Sat, Sun, 8:30-10 pm, alternate weeks, concert. Tues, 10-12 pm, club. Sun, 10:30 am, 7:15 pm, church services. Eastern.

WDAE, Tampa, Fla. 360 meters. 250 watts. Tampa Daily Times.

WDAF, Kansas City, Mo. 411 meters. 500 watts. Kansas City Star. Club, "Nighthawks." Daily ex Sun, 3:30-4:30 pm, music; 6-7, marketgram, weather, educational, bedtime story, music; 11:45 pm-1 am, Nighthawk Frolic. Mon, Wed, Fri, 8-9:30 pm, concert. Sun, 4-5 pm, music. Central.

WDAG, Amarillo, Tex. 263 meters. 100 watts. J Laurence Martin. Tues, Thurs, 8-9:30 pm, music. Central.

WDAH, El Paso, Tex. 268 meters. 50 watts. Trinity Methodist Church South. Mon, Wed, Thurs, Fri, 7:30 pm, concert. Sun, 11 am. Mountain.

WDAK, Hartford, Conn. 261 meters. 100 watts. The Courant. Sat, 8 pm, concert. Eastern.

WDAO, Dallas, Tex. 360 meters. 50 watts. Automotive Elec. Co. Daily, 1-1:45 pm, 7:15-8. Central

(The third part of the directory of station schedule will appear next week.)

Radio Illustrated

To be up to the minute, a Radio just had to be installed on this new speed boat. In spite of the roar of the motor, concerts are received loud enough to be heard through the loud speaker. (Fotograms)

A pipe and a Radio go well together. A crystal on the bowl gives the music and tobacco in the bowl gives the smoke. (United)

This bathing beauty always takes the Radio to the beach with her. (Atlantic)

Good q
Send a
RADIO F