LATEST NEWS OF THE AMATEUR AND COMMERCIAL RADIO WORLD

WGR HAS NEW IDEAS FOR BROADCASTERS

Powerful Station at Buffalo Contains Several Unusual Features of Interest.

HEARD 750 MILES AWAY

Full Description of Big Plant Just Opened Is Worth Study by Enthusiasts.

A new and powerful broadcasting station has joined the ranks of the radio entertainers in this section of the city. The newcomer, as some radio enthusiasts who have highly selective sets may already know, is WGR of Buffalo, operated by the Federal Telephone and Telegraph Company of that city.

The station, which has an output of about one kilowatt, has already been heard at a distance of 750 miles, and L. C. F. Horle, consulting engineer of the company, who designed and put the station in operation, confidently expects reports showing that it has been heard at much greater distances than this. Although the new station is far beyond the range of crystal detector sets, vacuum tube amplifying sets should be able to pick it out of the ether without much difficulty in intervals in which WJZ and other nearby stations are not sending.

The new transmitting station has a number of features which are unusual and of interest to many amateurs who have less pretentious stations of their own. The antenna is located on top of the Federal Company's factory at 1738 Elmwood avenue, Buffalo. The aerial consists of a six wire cage on three foot spreaders supported between two forty foot steel masts on the roof of the factory. The wires are approximately eighty feet from the ground.

The lead-in is taken into the building through a large cage which connects with the grounding apparatus mounted on a large bakelite panel in the laboratory. The ground connection is made to the water and steam pipe system in the factory in addition to a direct copper ground secured to large copper plates buried in the factory courtyard. The antenna and ground connections are carried to the transmitter through heavy copper tubing, all supports being of bakelite, and large bakelite panels being used where the antenna passes through the walls of the building.

Radiation Efficiency Is High.

The fundamental of the antenna is approximately 305 meters, and at 360 meters approximately sixteen microhenries of loading inductance are required. This inductance is built up of very heavy solid copper conductor and is connected directly from the antenna and the ground. No series condenser has been used, and because of this it has been possible to get considerably higher radiation efficiency than was originally contemplated.

In describing the station Mr. Horle said the transmitter proper has a power capacity of about one kilowatt and is supplied by a 2,000 volt direct current generator directly coupled with a single phase twenty-five cycle induction meter operating on the Buffalo General Electric Company's line. The supply lines to the meter and those between the generator and the transmitter proper are carefully fused with high voltage fuses, and the generator itself is protected against radio frequency surges by backing by an electrolytic lightning arrester.

The major part of the commutator ripple is eliminated by the use of high voltage paper condensers and iron core inductive chokes. The commutator ripple has been allowed to remain in a slight degree quite intentionally, since its presence indicates to listeners that the station is in operation and is about to broadcast. To reduce it to proper value, however, it has been necessary to use 27 micro-farads in three groups of nine one micro-farad condensers connected in series parallel so that the normal d. c. voltage of each unit is never in excess of 700 volts.

About thirty-seven henries of inductance are used in this filter system and so distributed that the filter is alternately inductive or capacitance progressively from the generator to the vacuum tubes. The generator is further protected from radio frequency getting back into the line from the tubes by the insertion of high frequency chokes. These chokes have an inductance of approximately two milli-henries and properly chosen distributed capacities. Two low power voice amplifying tubes are interplaced between the microphones and the modulator system, all couplings being of the resistance type, and provision is made to operate the voice amplifier tubes on the 2,000 volt supply which operates the power tubes.

Easy Adjustments Provided.

Special coupling resistance units have been devised to make this possible and to make possible the easy adjustment observation and replacement of all parts of the system. The power tube filaments are operated on 60 cycles a. c., provision being made to reduce the resultant hum to a minimum and to increase the tube life through the use of alternating current. The amplifier filaments, however, are supplied by means of storage batteries.

Controls are provided for change in wave length and the changes in coupling on the generating apparatus, for the control of the supply voltage, the filament voltage, and for the instantaneous disconnection of the entire equipment from the supplies through the medium of a quick throw switch. Plugs and jacks are used for the voice control circuits. Meters are supplied for the measurement of the antenna current supply and voltage. The meters on currents to the several tubes, both plate current and grid current, are so mounted on the set as to be under constant observation of the operator. All parts are completely exposed for examination, and the operating conditions can be noted at a glance.

For the various types of reproduction, several types of microphones are used. For ordinary announcements, the common carbon microphone is used, while for special types of transmission, a magnetic microphone is used in connection with considerable additional voice frequency amplification. A small and simple receiving set is mounted near the transmitter, and the operator at all times listens to his own transmission.

A test of this set indicates that the over all efficiency between the direct current generator and the antenna is approximately 48 per cent. Reports have shown perfectly reliable daylight communication over a range of approximately 150 miles when two steps of amplification have been used with the receiver. Daylight communication over a range of thirty miles with a single circuit crystal detector set is found to be dependable.

GOOD RESULTS DEPEND UPON EFFICIENCY OF DETECTOR

Expert Explains Conversion Into Direct Currents for Operation of Telephone Receivers—Connections With Antennæ Are Made in Two Ways.

By A. F. VAN DYCK,

Radio Engineer, General Electric Co.

Preceding articles have described the process of tuning receiving apparatus to make the desired received currents as large as possible, and undesired currents a minimum. The next step is to apply these currents to a device that will convert them to direct currents, which are necessary to operate telephone receivers. This device is called the detector.

There are several kinds of detectors known at present, but only two are in common use, one, the so-called crystal detector, and the other the vacuum tube detector.

Besides the use of an inductor—wire wound into some form of coil—for tuning, the inductor is used to connect the detector to. There are two ways of doing this in common use to-day. In the "single circuit" connection the detector apparatus is connected directly

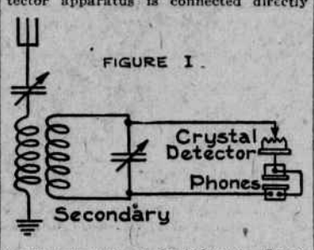


FIGURE 1.

to the terminals of the inductor. Sometimes better results are obtained by connecting the detector across part of the coil instead of across all of it. The best fraction of the whole coil to use is from one-third to one-half of the coil.

Indirect Connection.

The other way of connecting the detector to the antenna is not a direct one. In this method the antenna circuit inductor is made to one winding of a transformer whose other winding, called the secondary, is connected to a condenser. This transformer is often called a coupler, loose coupler or variocoupler. It is a coupler in the sense that it couples together electrically the antenna circuit and the secondary circuit.

The secondary coil has currents induced in it by currents flowing in the primary coil when the two are placed near each other. In the usual radio coupler the secondary coil is made movable with respect to the primary so that the effect of the primary on it can be regulated.

In either the one or two circuit receiver the detector is connected to an inductor. The difference is merely that in one it is to the inductor in the antenna and in the other to the one in the secondary. So that whenever currents flow in the inductor the voltage which is present across it is applied to the detector.

The simplest way of connecting the detector and telephone receivers to the inductor is shown in figure 1. This does not work so well as figure 4, but will serve to explain the operation of the crystal detector.

Many Kinds of Crystal Detectors.

There are a large number of kinds of crystal detectors. They all consist of a small piece of some one of various minerals, upon which rests with light pressure a sharp metal point or a small piece of some other mineral. Some of the minerals which may be used are: Carborundum, silicon, galena, tellurium, molybdenum, pyrites, zincite, cerusite, &c.

All these have different characteristics of operation, some being more sensitive than others; that is, they will make louder sounds in the telephones. In fact, some crystals will give good signals on currents which on other crystals give no audible sound at all. Unfortunately, different crystals of the same material differ widely in sensitiveness, and many work only at a few spots on their services. Therefore, the sensitive spots on any crystal have to be found by trial, and when found do not remain in the sensitive condition indefinitely, but frequently require readjustment.

Galena, with a fine copper or steel wire point resting very lightly upon it, is the most sensitive detector, but is also very unstable. Strong signals, or slight mechanical vibrations, easily destroy its adjustment, and it has to be readjusted very frequently. Carborundum with a steel needle point resting upon it, is one of the most stable crystal detectors, but is not very sensitive, unless a battery of the right voltage is connected across it.

Many of the crystals operate better with a battery so connected, but this of course adds to the complication of the apparatus and loses some of the great advantage of crystal detectors, their extreme simplicity. In between these two, galena and carborundum, there are all degrees of sensitiveness and stability, and it is usually best to select a crystal which combines a fair share of both sensitiveness and stability. Silicon with a brass point is such a combination.

Work Well With Battery.

Now to explain how the crystal detector works. Refer to Fig. 1. The action of all of the crystal combinations described is merely that of a rectifier, that is, current can flow through the detector in one direction only, so that when alternating current, which flows in two directions alternately, is applied to it, the current flow in one direction gets through the detector and the flow in the other direction does not. This, in effect, changes the alternating current to direct current.

Of course, this direct current is a pulsating one, because no current is flowing during the time that the alternating current is applied in the wrong direction to get through, but the effect is the same. This pulsating direct current flows through the telephones as well as the detector, since they are connected in series, and this operates the telephones.

Current Varies in Strength.

In radio telephony, the alternating current which is received in the tuning elements, is varying rapidly up and down in strength just as the transmitter currents vary in accordance with the speech or music sound vibrations. And the pulsating direct current which results through the detector and telephones varies the same way, and therefore the telephone receiver diaphragms are pulled back and forth by the magnetic effects of the currents in their windings, and so give off sound waves.

It is not known just how or why the crystal detector works as it does, and

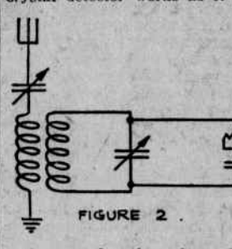


FIGURE 2.

various explanations have been proposed, but it is definitely known that it acts, in effect, as a rectifier. Some crystals are more sensitive than others because they are better rectifiers.

All crystals will work much better if they are mounted in a soft metal alloy, in order to get as much contact with them as possible. If the mineral is held in any other way, such as by set screws, or in a fuse clip, this makes in effect another metal point, working oppositely to the one which is provided, and then current cannot flow through the detector in either direction.

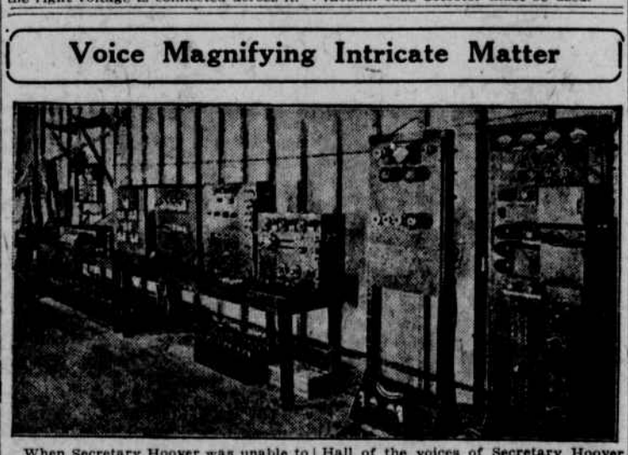
Improved by Another Condenser.

The connections shown in Fig. 1 are subject to improvement by the addition of another condenser (see Fig. 2) which is called the telephone condenser, or sometimes the "stopping" condenser. This should always be used. It need not be a variable condenser, as its size is not very critical. It is used because it has the effect of accumulating and magnifying the rapid high frequency pulses of current which come through the detector into less frequent but larger pulses through the telephone receivers.

Only one item of the crystal detector set remains, the telephone receivers. The ordinary wire telephone receiver, such as used in desk sets, is not well suited to this use, because its windings are not adapted to work efficiently in this sort of circuit. Special windings, known as high resistance windings, are necessary for good results, and so most radio receiving head sets are of this type.

In summary, the crystal detector set is ideal where simplicity of apparatus is desired, and where the distance to be worked is not too great. The distance which a crystal detector receiver will cover is of course dependent upon the power of the transmitting station. The phone stations can be heard on a crystal detector receiver at a distance of usually not over fifty miles. For greater distances than this the more sensitive vacuum tube detector must be used.

Voice Magnifying Intricate Matter



When Secretary Hoover was unable to appear at Atlantic City last week to make the principal address to 5,000 members of the National Electric Light Association at their annual convention the engineers of the American Telephone and Telegraph Company and the Western Electric Company solved the difficulty by an adaptation of the loud speaking telephone. Through the installation of special input apparatus at Washington and loud speaking receivers at Atlantic City and the cooperation of the long lines department of the Bell System, Mr. Hoover was able to remain at his office and yet talk directly to every one in the convention hall without the slightest difficulty.

Similar means were used to convey to the gathering the messages of R. H. Ballard, president of the Southern California Edison Company, and W. A. Britton, president of the Pacific Gas and Electric Company, both former executives of the National Electric Light Association. To give those at Atlantic City some notion of the novelty and magnitude of the feat a roll call was taken over the wire of the telephone operating men at the principal cities all the way across the continent.

In the picture a fair idea is conveyed of the intricate mechanism required for the magnification at the Convention Hall of the voices of Secretary Hoover and the coast speakers.

Although in this case the words of Secretary Hoover and the others came along wires, the apparatus is applicable also to amplifying radio telephone addresses. The Western Electric has performed interesting experiments in radio, although it recently has been working more along the lines of telephone communication over long distances, or the amplification of addresses in halls where acoustics are poor.

ARMY FLYER RADIOS FROM PLANE IN TEXAS

The latest stunt in radio was demonstrated recently by air service officers at Kelly Field, Texas.

Lieut. Canfield, communications officer for the second bombardment group, sent a radio truck to a position in front of the Alamo at San Antonio. The men on board rigged up an antenna and connected it with an amplifying radio set and a loud speaker. A plane, equipped with a transmitting set, roared by, several thousand feet in the air and the listening crowd heard the voice of the pilot high above the growl of the motor.

SEES SERIOUS NEED TO LIMIT AIR'S USE

Big Increase in Broadcasting Is Presenting Problem for Public Thought.

USEFULNESS IS GREAT

Benefits to Nation Hardly Can Be Exaggerated as Use of Radio Grows.

By L. R. KRUMM.

Superintendent of Radio Operations, Westinghouse Electric and Manufacturing Company.

No prediction as to the future uses and applications of broadcasting can be too broad. There will be no greater unifying factor in our national life. The immense advantage of a universal national language such as we have is not fully appreciated in this country because it has never occurred to us that any nation would use more than one language in its intercourse. Those of us who have a clear conception of the national conditions in some of the European countries where several languages are spoken, realize what a common language means to the nation.

Now that in broadcasting we have a means of transmitting this common language to practically all sections at one time, the effect in knitting us together as a nation cannot be overestimated. It may play a great part in our national legislative activity and the day may come when the speeches of Senators and Congressmen may be sent out from a broadcasting station covering the entire nation.

The President may issue his national proclamation by radio telephone. National political campaigns will no doubt be waged by means of speeches broadcasted by the candidates. Selective systems of broadcasting may develop by which subscribers can obtain the particular character of information or amusement they desire without the possibility of being interfered with by other stations.

Can Supplement Newspapers.

Broadcasting has already supplemented the newspapers to a wonderful extent and may greatly increase their activities. Its value to farmers or others living at remote points when newspaper information is not easily accessible is beyond calculation. Already the live stock and grain reports sent out by the Department of Agriculture regarding farm projects and business has met a response indicating that this is one of the most important fields of service in radio broadcasting.

Here is the means that brings the information to the radio listener even quicker than it would reach an auditor in audiences of ordinary size. In many parts of the Middle West, the farmer is guided almost entirely by the information he obtains from the Westinghouse station at Chicago, which broadcasts quotations every half hour from the Board of Trade operations. Local brokers handle the farmers' orders which his country line telephone enables him to place upon the receipt of the guiding radio information.

President Roosevelt during his administration appointed a commission to endeavor to devise means to keep the farmer, in the words of the old song, "down on the farm." Broadcasting will accomplish more in this direction than any means yet devised. Motion pictures and the broadcasting bring cosmopolitan life into the most remote farming regions. Public health instruction is sent out from one government station and the function will no doubt be greatly increased.

Cannot All Talk at Once.

However, in closing this article, the most important impression that we desire to leave is that unlimited broadcasting activities, instead of attaining all the objects outlined heretofore, will, rather, prevent successful attainment. Free speech does not mean that we can all talk at once, and only those with a real message can get attention. Many of us labor under the delusion that we are called and have such a message, but if we speak only in behalf of ourselves or repeat platitudes we add to the din but not to progress.

Unfortunately, the elements controlling radio limit the number of stations that can operate successfully within limited wave bands or geographical areas. The public must decide whether it shall endeavor to pick out the worthwhile message in a bedlam of broadcasting that may come with the establishment of a large number of stations or whether they prefer to limit and classify the broadcasting stations, granting them a license which will carry some of the exclusive features and advantages of a franchise and with its continuity dependent upon the maintenance of a certain standard of excellence and revocable when it is evident that the station no longer fulfills the public demands.

Radio broadcasting stations are now fulfilling a public service without any direct recompense and it is an old adage that things obtained gratis are not always appreciated. It behooves the radio public to consider carefully the effect of unlimited broadcasting and to take an active interest in the radio laws and regulations which may be formulated to control it.

INTERNATIONAL RADIO SHOW TO BE HELD HERE

Another big radio show, the first International Radio Exposition, is being organized by a committee of the American Radio Exposition Company, just incorporated under the laws of Delaware. The show will be held at a date to be announced later in the Grand Central Palace, Lexington avenue and Forty-sixth street.

The purpose will be to depict the marvelous growth of radio here and abroad and to demonstrate that it is not a passing fad but a permanent industry, with infinite possibilities beyond its present development.

Leading radio manufacturers in the United States and Europe have been asked to participate. It is expected that every known make of instrument will be exhibited. Amateurs are invited to prepare exhibits. The committee announces it will welcome anw suggestions that will help to make the exposition the biggest event in radio history. The management is busy with plans for allotment of space, arranging of decorations, and getting ready for the installation of a big broadcasting station on the roof of the palace.

George Brokaw Compton of 120 Broadway is secretary of the committee.

RADIO FOR CALVARY HOUSE.

Patients in the House of Calvary, Featherbed lane, The Bronx, suffering from incurable diseases will soon be able to enjoy concerts and educational features as the result of the vote of San Salvador Council, Knights of Columbus, to install a radio phone outfit in the hospital.

EVENTS OF THE WEEK IN THE RADIO FIELD

Julian S. Myrick to Tell of the Development of Tennis WJZ; Fire Protection Talk to Be Given at WGY by Expert.

The programs for the week of the various broadcasting stations which can be heard within a radius of several hundred miles of New York are presented herewith. During the week THE NEW YORK HERALD will print the daily programs of the stations each morning.

Times given are daylight saving. Tuning instruments for 360 meter waves except in the case of WVP, which sends on 1,450 meters.

Station WJZ, Newark (Westinghouse).

WEEK DAYS.

9:00 A. M.—Agricultural reports and prices as released by the New York, New Jersey Federal Agricultural Bureaus, musical program.
10:00 A. M.—Musical program.
11:00 A. M.—Opening prices on active bonds and stocks under the authority of the New York Stock Exchange, musical program.
12:00 M.—Agricultural reports and prices, weather forecast, musical program.
12:55 to 1 P. M.—Standard time signals from Arlington.
1:00 P. M.—Midday prices on active bonds and stocks, musical program.
2:00 P. M.—Shipping news (excepting Saturday) by the Marine Engineering and Shipping Age, musical program.
3:00 P. M.—Musical program.
4:00 P. M.—Baseball scores, women's fashion news by the Women's Wear Daily Fashion Newspaper, musical program.
5:00 P. M.—Baseball scores, musical program.
6:00 P. M.—Official weather forecast, agricultural reports and prices, shipping news (excepting Saturday), musical program.
7:00 P. M.—Final baseball scores.
8:00 P. M.—Closing prices on active bonds and stocks, marine news by the Radio Corporation of America.
10:52 to 11 P. M.—Official Arlington time signal.
11:01 P. M.—Official weather forecast.

SUNDAY.

3:00 P. M.—Salvation Army services conducted by Capt. J. Allan, former senior chaplain of the Seventy-seventh Division, A. E. F.; sacred music by the National Staff Band, a quartet of vocalists and instrumentalists.
4:00 P. M.—"The Romantic Influence in Modern Novels," by Hawthorne Daniel, editorial staff of World's Work, author of "In the Favor of the King." Courtesy of the National Association of Book Publishers.
5:00 P. M.—Literary vespers, "The Need for Tolerance," by Edgar White Burrill; the message is woven around the following poems, prose and plays: "The Curse of Race Prejudice," "The Brotherhood Spirit of Lincoln," by Walt Whitman and John Boyle O'Reilly; "Ellis Island and New York from a Skyscraper," James Oppenheim; "The Pigeon," John Galsworthy; "Each for All," Edmund Vance Cooke; "Praised by Allah for the Diversity of His Creatures," Rudyard Kipling.
6:30 P. M.—Readings and records from the "Bubble Book That Sings," by Ralph Mayhew. Courtesy of Harper & Brothers.
6:45 P. M.—"Sandman Stories," told by Kasper Seidel. Courtesy Harper & Brothers.
7:00 P. M.—"With Stefansson in the Far North," special message to boys and girls from Mr. Stefansson ;reeadings from "My Life with the Eskimo." Courtesy Macmillan Company.
7:30 P. M.—"Some Facts that Everybody Should Know About Tea," by C. F. Hutchinson, United States Department of Agriculture.
7:45 P. M.—Miss Maude Fealy, who played Portia with the late Sir Henry Irving, will recite "The Quality of Mercy," speech of Portia, from "The Merchant of Venice," courtesy Broad Street Theater, Newark.
8:00 P. M.—Recital by Alice Mengel, Russian pianiste. Program: "Epilog," Schubert; "Valse Chromatique," Leschetitsky; Nocturno, "Why," Alice Mengel; "Swedish Peasant Wedding March," Soderman; "La Source," Blumenthal; "Polish National Dance," Scharwenka; "Evening," Alice Mengel; "Fantasie Polonaise," Alice Mengel; Russian folk songs and dances.
9:00 P. M.—Recital by the senior class of Princeton University, under the auspices of the Princeton Alumni Association of the Oranges. Program: "Do You Want to Know Who We Are?" "Guard of Old Nassau," "Friday Morn," "My Bonnie," solo (selected), "The Orange and the Black," "Australian Girls," "Yodel Specialty," "Princeton, Forward March," quartet; "Southern Medley," "Chinese Honeymoon," "Going Back," specialty; "Faculty Song," "Where O Where," "Whoop 'er Up" and "Old Nassau."

MONDAY.

6:00 P. M.—"Business and Industrial Conditions in the United States," as observed by the National Industrial Conference Board.
7:00 P. M.—Stories from St. Nicholas Magazine; courtesy of the Century Company.
7:20 P. M.—"The Plattsburgh Idea," by Major W. A. Dempsey, Quartermaster Corps, Governor's Island.
7:30 P. M.—"Development of Lawn Tennis and the Davis Cup Contest," by Julian S. Myrick, president of the United States Lawn Tennis Association.
8 to 9:30 P. M.—Concert under the direction of Charles D. Isaacson, musical director of the New York Evening Mail. Opera recital—1. "Face to Face with Rossini." 2. The story of the opera—told in running fashion throughout the performance by Charles D. Isaacson, chairman. "The Barber of Seville," by Gioachino Rossini; comic opera in two parts. Cast: Rosina, Eva Leoni, soprano; Bertha, Edith Mackie, soprano; Count Almaviva, Alexander Tronzoff, tenor; Figaro, Alberto Terrasi, baritone; Doctor Bartolo, Don Basilio, Natale Cervi, basso. Remo Taverna, conductor (at the piano). Act 1. A street in Seville, outside of Bartolo's home. Act 2. Inside the house.
9:30 P. M.—Joint recital by Florence Briggs, violincellist; Dorothy Fine, pianist and accompanist. Program: "Adelaide," Massenet; "Serenade," Pierne; "Simple Avue," Thome; "Gypsy Love Song," Victor Herbert; "The Swan," St. Saens, "Romance," Rubinstein; "Romance Sans Parole," Van Goens; "Where My Caravan Has Rested," Lohr; "Believe Me If All Those Endearing Young Charms," by Miss Briggs; "Romance," Sibelius; Miss Fine; "Country Gardens," Grainger, Miss Fine.

TUESDAY.

7:00 P. M.—"Man in the Moon" stories (c) Newark Sunday Call.
7:30 P. M.—"Quaker Relief in War Torn Europe," by William B. Harvey, associate national secretary of the American Friends Service Committee.
7:40 P. M.—"Best House for Least Money," N. Montgomery Woods, architectural editor of the Pictorial Review, recently assistant to Chief of Design, housing division of the Emergency Fleet Corporation, Philadelphia.
7:50 P. M.—"Broadcasting Broadway," by Bertha Brainard, who will review McIntyre Heath in "Red Pepper."
8:00 to 10:15 P. M.—"The Messiah," by George Frederick Handel, will be rendered by the Oratorio Society (Schubert) of Newark, Louis Arthur Russell, conductor. This society has for forty-two years upheld the high standards of choral music and performances, offering to Newark and nearby communities the very highest class of compositions.

WEDNESDAY.

6:00 P. M.—"Review of the Iron and Steel Industries and Their Relation to General Business Conditions," by the Iron Age.
7:00 P. M.—"Animal Stories," by Florence Smith Vincent; courtesy of New York Evening Telegram.
7:30 P. M.—"Harmonious Town Planning," by Charles W. Hoodley.
7:45 P. M.—"Excavating the Fossil," Edgar W. Cahill, Museum City of Newark.
8:00 P. M.—Literary evening conducted by the editorial staffs of the Outlook, Scientific American and Harper & Brothers.
9:15 P. M.—Recital by Helen Kanders, soprano, of New York.

THURSDAY.

7:00 P. M.—"Jack Rabbit Stories," by David Cory, New York Evening Mail.
7:30 P. M.—"Work Among the Blind Children," by Mary G. Beattie of the International Sunshine Society.
7:45 P. M.—"How to Select a Motor Car," by Alexander F. Johnson.
8:00 P. M.—Recital by Anita Henriques, lyric soprano, from Argentine, who appeared in Buenos Aires very successfully in concert work; Mrs. Elma E. Simis, accompanist. Program: "Comme la Nuit," Bohm, accompanied by the Duo-Art piano. "Saupir," "Chant Hindou," Bemberg; "Ay! Ay! Ay!" "Vidalita," Argentine folk songs; "Los ojos Negros," Alvarez; "The Star," James Rogers. "Voi lo sapete," Mascagni.
9:00 P. M.—"Humorous Experiences of a Cartoonist," by Claire Briggs; courtesy of Popular Radio.
9:30 P. M.—Dance music by the Tom Reynolds (Society) Orchestra; Tom Reynolds, banjoist; John Pospisil, violinist; Al. Pico, saxophonist; Archie Pistilli, cornetist; Joe Scherger, pianist; Fred Hollman, drummer. Program: "Just a Little Love Song," introducing "Dawning," arranged for dance by T. Reynolds; "Oogie Oogie Wa Wa," fox trot; "Swanee River Moon," waltz; "Cutie," fox trot; "Pick Me Up and Lay Me Down in Dear Old Dixieland," fox trot; "I've Got My Habits On," introducing "Zip Coon," arranged for dance by T. Reynolds; "Every Day," from "For Goodness Sake," fox trot.

FRIDAY.

7 P. M.—"Man in the Moon" stories, (c) Newark *Sunday Call.*
7:30 P. M.—"Prevention of Tuberculosis," by M. J. Fine, M. D., Department of Health, city of Newark.
7:45 P. M.—"Electrical Inspection," by F. E. Wand, chief of the electrical bureau, city of Newark.
8 P. M.—Recital by Helen Osmundsen, soprano, from Milwaukee, who last year was the leading soloist at the grand concert of the New York Liederkranz and Arion Society. Program: "Solveig's Song," Grieg; "Jeg Elsker Dig," Grieg; "Rain," Curran; "Wiegenlied," Brahms; "Er Ist's," Wolff; "No One Saw at All," Loewe.
9 P. M.—Concert by the Ingraham Orchestra of the Washington Restaurant, Newark, Gene Ingraham, leader.

SATURDAY.

7 P. M.—"Uncle Wiggily's Bedtime Stories," by Howard R. Garis, the author of the "Uncle Wiggily Stories" printed in many newspapers and frequently appearing on KDKA's and WBZ's radio programs.
7:30 P. M.—"The Auto and Radio as Future Allies," by a member of the National Auto Chamber of Commerce.
7:45 P. M.—"Woman's Place in the Health of the Nation," by Susanna Crocroft.
8 P. M.—Concert by the Majestic Quintet of Newark, Charles Nearman, Jr., conductor; Arnold Follas, violin; Robert Fogel, cornet; Carl Kuchner, trombone; John Kautzman, saxophone; James Edwards, banjo; Harry Lippman, drums and traps; Charles Nearman, piano. Program: "Legion of Victory," "While You Are Smiling," "Kentucky Echoes"; cornet solo, "Le Secret," "Georgia," "On a Moonlight Night"; baritone solos, "Smilin' Thru," "Old Fashioned Girl," "Ty Tee," "I've Got My Habits On"; violin and cornet duet, "O Dry Those Tears," "Mo Lo La"; cornet and trombone solo, "When Shall We Meet Again."
9 P. M.—Concert by the Knickerbocker Quartet, T. Witman, leader.

SUNDAY.

3 P. M.—Radio chapel service, sermon by the Rev. Percy S. Grant, D. D., Church of the Ascension, New York. Sacred music program.
4 P. M.—"Reading for Boys," by William Heffiger, author of "High Benton Worker," courtesy of the National Association of Book Publishers.
4:20 P. M.—Recital by Harold Land, baritone, who took part in the Newark musical festival, courtesy of Antonia Sawyer.
5 P. M.—Vesper service, "The Power of Idealism," by Edgar White Burrill.
6:30 P. M.—Readings and records from the "Bubble Books That Sing," by Ralph Mayhew, courtesy Harper & Bros.
6:45 P. M.—"Sandman Stories," told by Kasper Seidel, courtesy Harper & Bros.
7:00 P. M.—"With Roberts in the Backwoods; His Life and Works Read from Secret Trails," by C. G. D. Roberts. These adventure stories for boys and girls from 8 to 14 years of age are read through the courtesy of Macmillan Co.
7:45 P. M.—"Your Daily Bottle of Milk," by Mary S. Rose, associate professor department of nutrition, Teachers' College, Columbia University.
8:00 P. M.—The Camp Fire Girls, 150,000 in the United States, will enjoy "Mammy Moon" and "Burn Fire, Burn," sung by Ethel Rust Mellor, lyric soprano from Baltimore, accompanied by Mrs. Henrietta Baker Low of the Boston Conservatory of Music; Mrs. Oliver Harriman will read a message from Mrs. Warren P. Harding, chairman of the National Advisory Council, and also send a personal message to the invisible audience.
8:30 P. M.—Joint Recital by Eleanor Lee, contralto, and Eleanor Warren, pianiste.
9:00 P. M.—Recital by Mrs. Rose Sindeband Berlyson, pianiste. Program: "The Nightingale," Alabieff-Liszt; "Scherzo," John Mokrejs; "To a Wild Rose," MacDowell; "Mavette," Karganoff; "XII. Rhapsody," Liszt.

Station WGY, Schenectady (General Electric.)

TUESDAY.

1:30 P. M.—Noon stock market quotations.
7:00 P. M.—Stock and produce market quotations and reports; baseball results and late news bulletins.
9:00 P. M.—Address, "The Vacuum Tube Detector," by A. F. Van Dyck, General Electric Company radio engineer.
9:15 P. M.—Address, "Fire Prevention," by T. Alfred Fleming, supervisor of conservation department of National Board of Underwriters.
8:45 P. M.—Concert program. Selections: (a) "Star Spangled Banner," arranged by Brigadier Slater; (b) march, "America," Veron; Salvation Army Temple Band of Troy, N. Y.; tenor solo, "Tommy, Lad," Margetson, Lewis J. Male, Miss Elsie Male, accompanist; cornet solo, "Carnival of Venice," Clarke, P. J. Clinick; vocal duet, "Serenade, Schubert, Mrs. E. Harris and Miss E. Clinick; selection, "Songs of Scotland," Slater, Salvation Army Temple Band; cornet solo, "The Debutante," Clarke, Mr. Clinick; tenor solo, "In Absence," Baker, Mr. Male; selections, (a) march, "Australia," Slater, (b) march, "The Rock," Stone, Salvation Army Temple Band; vocal duet, "Thy Love Divine," Adam Geibel, Mrs. Harris and Miss Clinick; cornet duet, "O Belle Nuit," from "Tales of Hoffmann," J. Offenbach, Mr. Clinick and Miss E. Clinick; selections, (a) "Come," Slater, (b) national anthem, "America," Keyes, Salvation Army Temple Band.

WEDNESDAY.

1:30 P. M.—Noon stock market quotations.
7:00 P. M.—Stock and produce market quotations and reports, baseball results and late news bulletins.

THURSDAY.

1:30 P. M.—Early stock market quotations.
7:00 P. M.—Produce and stock market quotations, baseball results, news bulletins.
8:45 P. M.—Concert program furnished through the courtesy of the Monday Musical Club of Albany, N. Y.: Selection for two pianos, "Romance and Valse," op. 15 (Arensky), Mrs. Emily Miller Hendrie and Miss Elizabeth Kleist; contralto solo, "By the Waters of Minnetonka" (Lieurance), Mrs. Horatio Bellows, accompanied by Mrs. Lowell D. Kenny, violin obbligato by Mrs. Peter Schmidt; violin solo, melody (Dawes), Mrs. Peter Schmidt, Miss Lydia Stevens, accompanist; reading, "Why the Snake Has No Legs," Mrs. Fay Smiley Stowell; soprano solo, "The Star" (Rogers-, Mrs. Raymond N. Fort, Mrs. Hendrie, accompanist; selections for two pianos, "Romanza," with variations (Grieg), Mrs. Lowell D. Kenny and Mrs. Harry T. Irving); violin solo, "Chant Indue" Rimsky Korsakoff-Kreisler), Mrs. Schmidt, Miss Stevens, accompanist; soprano solo, "Sweet, Sweet Lady" (Spross), Mrs. Fort, Mrs. Hendrie, accompanist; reading, "The Hen" (Cook), Mrs. Stowell; violin solo, "Schon Rosmarin" (Kreisler), Mrs. Schmidt, Miss Stevens, accompanist; contralto solo, "Dawn" (Pearl Curran), Mrs. Horatio S. Bellows, Mrs. Lowell D. Kenny, accompanist; selection for two pianos, "Espana" (Chabrier), Mrs. Hendrie, Miss Kleist.

FRIDAY.

1:30 P. M.—Early stock market quotations.
7:00 P. M.—Produce and stock market quotations, baseball results, news bulletins.
7:30 P. M.—Tenth chapter of "Alice in Wonderland," Kolin Hager, reader.
8:40 P. M.—Health talk by Dr. Hermann M. Biggs, New York State Health Department.
8:45 P. M.—Concert program: Soprano solo, "Come, for It is June" (Harbaway), Mrs. Tillinghast, Mrs. Frank R. Simpson, accompanist; tenor solo, "The Ringers" (Lohr), Edgar S. Van Olinda, Mrs. Edgar S. Van Olinda, accompanist; harp solo, "Sweet Memories" (Hahn), Miss Elizabeth Westlund, soprano solo, "Faites-lui Mes Aveux," from "Faust" (Gounod), Mrs. Tillinghast, Mrs. Simpson, accompanist; tenor solo, "Drink to Me Only With Thine Eyes" (Old English), Mr. Van Olinda; harp solos (a) "Dance of the Gnomes" (Rogers), (b) "Wooden Shoe Dance" (Rogers), Miss Westlund; tenor solo, "Smile Through Your Tears" (Hamblen), Mr. Van Olinda; soprano solo, "In the Time of Roses" (Reichert), Mrs. Tillinghast; harp solo, "Annie Laurie," harp arrangement (J. Cheshire), Miss Westlund; tenor solo, "Sweet Little Woman of Mine" (Bartlett), Mr. Van Olinda.
11:30 P. M.—Reutling's Orchestra, Fred G. Reutling, piano, director; Piano solo, "Songs of Sunny Italy" (Marini), Erno Rapee-Duo-Art; fox trot, "Georgia Rose" (Flynn), orchestra; tenor solo, "Rose of My Heart" (Moret), L. T. Roberts, Mrs. A. J. Herbert, accompanist; fox trot, "Goodby, Shanghai" (Meyer & Johnson), orchestra; waltz, "One Kiss" (Wood, Burnett and Ainheim), orchestra; piano solo, fox trot medley, "Good Morning, Dearie" (Kern), Christie and Brooks-Duo-Art; fox trot, "All That I Need Is You" (Sanity & Baer), orchestra; fox trot, "Georgia" Johnson & Barry), orchestra; fox trot "On the Gin, Gin, Ginny Shore" (Walter Donaldson), orchestra; tenor solo, "Where Miami Dreams" (Whiting), Mr. Roberts, Mrs. Herbert, accompanist; fox trot, "Virginia Blues" (Erdman & Meinken), orchestra; fox trot, "Venetian Love Boat" (Frank Maigine), orchestra.

Station KDKA, Pittsburgh, Westinghouse.

WEEKDAYS.

10 to 10:15 A. M.—Music.
12:30 to 1 P. M.—Music.
3:30 P. M.—Results of all league baseball games by innings. On Saturday those of the International League and American Association will be included. Final scores each day will include all hits and errors. On Saturday baseball scores and a special popular concert beginning at 2 o'clock.
7 P. M.—Baseball scores. Theatrical features.
7:15 P. M.—Special addresses or popular concerts.
7:45 P. M.—Special news. Government market reports. Summary of New York Stock Exchange. Weather report.
8 P. M.—Special addresses by business men and women. Baseball scores.
8:30 to 9 P. M.—Bedtime and "Uncle Wiggily Story" for kiddies.
9 to 10 P. M.—Musical program. Baseball scores.
10:55 to 11 P. M.—Arlington time signals.

SUNDAY.

11:45 A. M.—Services of the Point Breeze Presbyterian Church, Fifth and Penn avenues, Pittsburgh, Pa., Dr. P. H. Barker, minister.
2:45 P. M.—Children's Bible story—"The Story the Angel Told."
3 P. M.—Radio chapel at Westinghouse station KDKA, conducted by Lieutenant-Colonel Thomas Stanyon of the Salvation Army, Pittsburgh, Pa.
7:30 P. M.—Services of the Calvary Episcopal Church, Shady avenue, Pittsburgh, Pa., the Rev. E. J. Van Etten, rector.

MONDAY.

7 P. M.—Weekly survey of business conditions, National Industrial Conference Board. From Pittsburgh Post Studio.
8 P. M.—"Interior Decorations," Joseph Horne Company, Pittsburgh, Pa. From Pittsburgh Post Studio.
9 P. M.—Piano selections by Churchill Van de Vetter.

TUESDAY.

7 P. M.—Weekly dress talk. From Pittsburgh Post Studio.
8 P. M.—Speeches from the seventeenth annual commencement exercises of the Westinghouse Tech Night School, East Pittsburgh, Pa. From Westinghouse station KDKA. "Hints to Children Leaving School to Enter Vocations," Dr. C. H. Garwood, Associate Superintendent Pittsburgh public schools. From Pittsburgh Post Studio.
9:00 P. M.—