

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

REG. U. S. PAT. OFF.

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RADIO HELPS DEAF HEAR

HOOVER OKEHS NEW BROADCAST RULINGS

MODIFIES CONFERENCE RECOMMENDATIONS FOR TIME

Applications for Two New Broadcast Classes Necessary—Amateurs Get 150-220 Meter Band

By Carl H. Butman

WASHINGTON.—Secretary of Commerce Hoover announced April 2 that he had accepted the recommendations of the second Radio Conference with modifications and that all broadcasting stations now operating may continue to do so on wave lengths of



360 and on 400 meters temporarily, filing applications for transfer to the two new special classes if they desire to do so.

The new classes will comprise: Class A, stations under 500 watts in power, similar to the present general class, to which "distinctive" wave lengths lying between 222 and 300 meters will be assigned "so far as is possible"; and Class B stations rated between 500 and 1,000 watts, especially qualified for long distance and efficient service, which may be assigned wave lengths between 300 and 345 meters and between 375 and 545 meters. There are thirty Class B stations today, which will be given special waves within these two bands, although they may continue to operate on 400 until the new plan can be put into effect. Most B stations will receive exclusive waves except where there are several plants in one locality, in which event they will have to divide their hours.

Modifies Conference Program

Judging from his final report on the recommendations of the Radio conference, Secretary

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Miss Jean Barry, comely and talented Barry portion of the Pantages vaudeville team, White & Barry. With Miss White, Miss Barry recently appeared on a program at KGB, The Tacoma Ledger-Mullins Electric Company Station at Tacoma, Washington. She sings attractively but her forte is piano work

Miss Bessie Brown, a favorite entertainer from Station KSD Lewis Smith Photo

CHILD TESTS HOLD HOPES FOR OTHERS

O. M. Pittinger, Supt. Indiana Schools for Deaf, Finds Airphone Success

Kiddies Hear First Music

Amplified Sounds Awaken Latent Sense—Score in Trial—Nearly All Respond

By Felix F. Bruner

INDIANAPOLIS, IND.—"The partially deaf may regain hearing through Radio," says O. M. Pittinger, superintendent of the Indiana Schools for the Deaf. In an interview with the Digest Mr. Pittinger said: "Although I believe it is highly possible to restore hearing to those having latent hearing, I do not think it probable that the totally deaf person can be made to hear through any treatment.

"Radio may become valuable in this connection as constant listening to intensified sound waves coming through the receivers should develop hearing. Children who are thought deaf have not really developed their talent for hearing, and I think Radio will aid them to again form the lost habit of detecting sound waves. In my recent tests at the Indiana State School for the Deaf I have found that some of the children who were considered past hearing, were able to distinguish between words and music.

Many Hear for First Time

"I am very pleased with the results of these tests, and it is my plan to continue the work with Radio. I expect to accomplish what has been hitherto considered the impossible."

In the experiments that recently took place a surprising number of the children of the school were able to really hear for the first time that they could remember. While many that could hear the music

(Continued on page 2)

Voliva Will Teach "Flat World" Theory from Zion

New Plant to Tell the World—It Is Flat

ZION, ILL.—Two steel towers will be erected on a hill near the Zion tabernacle to serve as antenna towers for the new Zion Radio broadcasting station from which the teachings of Voliva, his theories of flat worlds, fixed stars and oysterless existence will be broadcast. This location will place the antenna 230 feet above the level of the lake.

The location was decided upon following a conference with F. S. Bernhardt, engineer in charge of installation. A building will be erected immediately underneath the antenna and will contain an operating room, generating room, reception room and studio. The station will broadcast on 400 meters wave length and will be in operation early in May.

WESTINGHOUSE FAILS IN RADIOCRAFT FIGHT

NEW YORK.—The Westinghouse Electric and Manufacturing Company has been denied a preliminary injunction in its suit against the DeForest Radio, Telephone and Telegraph Company and the Radiocraft Company, a subsidiary. The Westinghouse Company is suing for alleged infringements of the Armstrong license grant held by the Radiocraft Company. It is said that Westinghouse is merely after publicity.

RADIO HELPS DEAF HEAR

(Continued from page 1)

were unable to hear the announcements, the tests were thought highly successful. Future tests are to be made with the aid of a highly amplified loud speaker and it is thought the intensified sound waves will be audible to even a greater number of the children.

A score of the children, some of them rated entirely deaf and others almost completely deaf, responded to the recent experiment, many being able to hear fairly clearly.

Case of Isabelle Schaible

Isabelle Schaible, a pupil, heard music for the first time. Others were able to hear and distinguish between speaking and music, but Isabelle responded more completely than the others.

She sat with a Radio headset over her ears. Her face almost shouted in her excitement. The strains of a dance orchestra were being received from a local station.

Instructors, pupils and visitors crowded about and watched her. She started beating time to the music with her foot. Any doubt that she was hearing was dispelled. Isabelle, whose home is at Lafayette, Ind., has been deaf from childhood. Instructors rated her "completely deaf." She could distinguish nothing when the set received a concert from Detroit. But when the loud tones of a local dance orchestra came through the phones she immediately responded, signaling with her hands to an instructor that she heard music.

When the music stopped and an announcer started talking she signalled she could not hear a sound, although persons with normal hearing listening in on other sets could hear perfectly.

Few Fail to Respond

A score of pupils, whose hearing was in all stages to complete deafness, submitted to the experiment. Only four or five did not respond. A number considered deaf could distinguish between speaking and music.

The first two pupils with whom the experiment was tried were Gertrude McKnight of Carmel, Ind., and Mary Monfreda of Indianapolis. When the phones were placed to their ears their faces brightened. They expressed the opinion it was "fine" and could distinguish between speaking and music.

Leon Heinrich, South Bend, Ind., an advanced pupil, put the receivers to his ears. His face was a study for a moment. "I can hear something like a street car," he said.

Instructors expressed the opinion he had felt the vibrations of a street car and the vibrations of the headset felt the same.

Compare to Talking Machine

On the second test, when an Indianapolis station was broadcasting, Leon accurately and repeatedly distinguished between music and talking. He has been deaf since he was five years old.

Many of the children declared they were listening to a phonograph when the music was being played. It was explained that while some possibly had sufficient hearing to distinguish phonograph music, others had recognized the vibrations of the Radio music as similar to those of the phonograph.

Intense interest in the experiment was expressed by instructors and pupils alike. They gathered around the receiving set and whenever any one succeeded in hearing there were smiles and congratulations.

HOOVER OKEHS NEW LAW

(Continued from page 1)

Hoover did not think it expedient to undertake so broad a program of reconstruction, and has compromised on the committee's plan. This he terms a step in ideal development of measures for prevention of interference in public broadcasting. It is evident that limited personnel and funds come into the question of a general revision of broadcasting regulations and the assignment of exclusive waves, while some difficulties present themselves in those bands used by shipping.

In order to provide a systematic assignment of wave lengths to the various stations broadcasting without hardship, the commerce department proposes to cooperate with the individual stations within the broad confines of the recommendations of the conference.

Classes Under New Rules

The "co-operative" regulations follow: "Class A will include those stations equipped to use power not exceeding 500 watts. In this class it is proposed that the Radio inspectors, in co-operation with the station owners, shall assign distinctive wave lengths to each station so far as is possible in the area from 222 to 300 meters. No station will be required to change from 360 unless it is so desired.

"Class B will include those stations equipped to use from 500 to 1,000 watts. In this class it is proposed to similarly offer to license these stations on special wave lengths from 300 to 345 and from 375 to 545 meters, having regard to the maintenance of some ship work on 450 meters as outlined above and again no station will be required to change from 360 unless it so desires.

"Class C will comprise all stations now licensed for 360 meters. In this class no new licenses will be issued for stations on 360 meters until the plan is entirely real-

(Continued in fourth column)

AN EVENING AT HOME WITH THE LISTENER IN

(SEE NOTE BELOW FOR INSTRUCTIONS)

Table with columns: Station and City, Met., Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. Lists various stations and their broadcast times.

(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. Thus the use is very simple.)

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Table listing contents: "All the Live News of Radio", An Evening at Home with the Listener In, It's J. E. K. of WOR Herself, Week's Advance Broadcast Programs, etc.

Looking Ahead

- A Cheap Single Tube Reflex—that will bring the local ones in on a loop, and run circles around a regenerative set—will be described in the next series by H. J Marx, beginning next week. E. T. Flewelling Has More to Tell—Read what he has to say in the eleventh article of his series, to appear next week.

Newsstands Don't Always Have One Left

WHEN YOU WANT

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Form for subscription: Publisher Radio Digest, 123 West Madison St., Chicago, Illinois. Please find enclosed check M. O. for Five Dollars (Six, Foreign) for One Year's Subscription to Radio Digest, Illustrated. Name, Address, City, State.

HOOVER OKEHS NEW LAW

(Continued from first column)

ized. Stations which do not wish to move under the general plan may remain at 360 meters, but they will necessarily be subject to some interference at best. It is thought that by the above plan the stations can be gradually brought into accord without hardships.

Amateur Stations

"Under the plan amateurs are given the whole area from 150 to 220, instead of being fixed upon 200 with special licenses at 375. The special license hitherto issued for amateurs at 375 will now be issued at 220. Certain special cases will be taken care of otherwise. It is proposed, in co-operation with the amateur associations, to develop an assignment of wave bands in classifications so as to somewhat relieve the present interference among amateurs. The number of wave bands which can be used among the short wave area assigned to the amateurs is greater in proportion than among the longer wave lengths, and these arrangements expand the area hitherto assigned to amateurs."

Duo-Reflex Transformers

DEALERS: Send for free blue prints of the Erla Duo-Reflex one tube circuit.

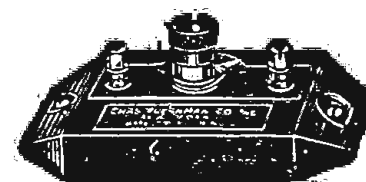
HUDSON-ROSS 123 W. Madison St. Chicago

Radio PATHFINDER & Wall Map advertisement. Includes a map of the United States and text describing the product's features for finding broadcast stations.

GET STATIONS You Never Heard Before

If you want real distance and clear signals you must use the

FRESHMAN Variable Resistance Leak



The latest and most essential part of an efficient tube set

COMBINED WITH .0025 MED. MICON CONDENSER \$1.00

Affords an unbroken range—Zero to 5 Megohms. Clarifies signals, Lowers filament current, Eliminates hissing, Increases battery life.

VARIABLE RESISTANCE LEAK WITHOUT CONDENSER 75c

At your dealers—otherwise send purchase price and you will be supplied postpaid.

CHAS. FRESHMAN CO., INC.

106 Seventh Avenue New York City

NAVY TRANSMITS 15,768,308 WORDS

SIXTEEN DISTINCT USERS WITH NAVY LARGEST

No Transfer of Funds or Reimburse- ments Are Received for 'Traffic— Savings Are Actual

WASHINGTON.—During the first quarter of the fiscal year 1923, the Naval Communication Service transmitted about four and one-half million words by Radio, the Navy's part of which was three million, some of which necessarily was administrative, in connection with the Communication Service. It is surprising that the next largest user was the Department of Agriculture with nearly half a million words.

Handle 15,768,308 Words

In the calendar year, the Navy handled a total of 15,768,308 words for the Government through its shore stations. Of this total, 10,884,217 were Naval orders and despatches. The balance, nearly five million words, was for other departments, both the Agricultural and War Department filing over a million words each. All told, 16 different bureaus used the Navy Radio service, including the White House and the House of Representatives.

Based on commercial rates, the Communication Service for the year ending June 30, 1922, handled for the Navy \$2,721,000 worth of business and \$1,040,667 for other Government Departments.

Makes Offer to Other Departments

The Navy receives no transfer of funds or re-imbursements for the work performed for other Government Departments, yet the savings are actual. The Navy has these necessary facilities and offers them to other departments' use for official business. During the fiscal year 1922, the commercial work handled amounted to \$277,122.42. This was actual cash turned into the U. S. Treasury. Thus the total Government and Commercial traffic amounted to a little over four million dollars, earnings and savings.

RECEIVING SETS ARE USED ON HOUSEBOATS

Owners Laugh at Landlords and Coal Barons

BOSTON MASS.—Several houseboat owners have been beating the coal and the landlord during the past winter by establishing winter quarters on their houseboats, tied up at the L Street Bridge, South Boston. Two of them have added Radio sets to their snug quarters and have had a good time all winter, listening to the broadcasts from various stations and laughing at the landlord profiteers. John Powers, owner of the "City Point," formerly a motor boat, ferry used between South Boston and Castle Island, and converted into a houseboat, and Charles Nordwell, owner of another houseboat, installed their Radio sets just as if they lived in a city dwelling, but instead of using steam pipes or water pipes for grounds, they merely dropped the ground wires overboard. With the coming of warm weather, they will lift anchor and move out into the bay, going back and forth from shore by rowboat or power launch, and using their Radio sets at night on the water instead of going to the movies.

Dr. Stefan Grotowski Opens WEAF Polish Night Program

NEW YORK.—The Polish Night Program broadcast through WEAF on the evening of April 2, was arranged by the Polish Bureau of Information of New York. Prominent Polish citizens and officials and musical talent of the highest order cooperated to acquaint the Radio audience with the culture and art of Poland. Dr. Stefan Grotowski, Polish Consul General in New York opened the program with a brief talk on Poland since the war.

WDAP AND WOC HAVE FIRST STATION SONGS

THERE are two station songs so far, WDAP, the Drake Hotel Chicago song, and the first, WOC, Davenport, Iowa. The Drake song is composed by Jack Nelson, program director of WDAP. The official WOC song is a published ballad entitled "Station WOC of Davenport, Iowa—Where the West Begins." Words and music were written by Nat Ozmon, a song writer of Moline, Ill.

CANADA TELLS FANS OF MAIL PROCEDURE

LONDON, ONT.—Messages giving practical pointers regarding the procedure followed in the dispatch of mails and kindred topics are being broadcast by the post office department at Ottawa as a means of informing the public on matters of general interest. The messages contain helpful hints regarding mails sent to centers within the Dominion and also to foreign countries.

"J.E.K." OF WOR HERSELF



Above is Miss Jessie E. Koewing, popularly known as "J. E. K.," announcer and program director of Station WOR, of the L. Bamberger Stores, Newark, N. J. You have often heard, "This is Station WOR of, etc., J. E. K. announcing, etc."—that is she. J. E. K. is single, as she says, "That is, I hope I won't be long." She absolutely refuses to give her age, but judging by her photo, we are sure it could not have been very long ago since she was born in Evanston, Ill. Miss Koewing arranges all the WOR programs, directs them and then announces sometimes—otherwise she sits around and does knitting

Morning Albertan Adopts Digest's Word Radiophan

"Fan" Is Too Easily Confused with Baseball Followers

CALGARY, ALTA.—The Morning Albertan at Calgary, owner of CHBC, has adopted the Radio Digest spelling of "Radiophan", after a year's use of "radio fan" this being considered a better term. The usage is also becoming more and more general among Radio editors of daily newspapers throughout Western Canada. Owing to this, it is now impossible to abbreviate to "fan," which although sometimes convenient in writing headlines, is considered to be confusing with followers of motion pictures or baseball.

LISTENING IN BARRED TO HOUSE MEMBERS

Sir W. Joynson-Hicks Ill-favors "Counter Attraction"

LONDON.—The members of the house of commons will not be subjected to the temptation of "listening in" to jazz music or other entertainment features on the Radio telephone, to the detriment of their attention to official business, it was announced by the postmaster general in reply to a suggestion made by a member that receiving apparatus be installed in the house. The member based his suggestion on the desirability of giving the commoners an opportunity of passing on the quality of the post office department's

KYW TO BROADCAST PLAYS FROM STAGE

CHICAGO PLANT IS FIRST IN THE FIELD

Arrangements Are Completed to Put North Shore Players' "Bargain Day" on Air

By Robert Stanton

CHICAGO.—Radiofans of the United States will be entertained on the evening of April 17th, with another feature attraction from Westinghouse Station KYW. Since the entire production of Shore Leave was broadcast from Powers theater several months ago, Willson J. Wetherbee and Walter C. Evans, director and chief engineer respectively, of KYW have endeavored to develop the broadcasting of spoken drama to meet the popular demand of the invisible audience for this form of entertainment. Their efforts have culminated in arranging through the co-operation of Jessie Royce Landis, director of the North Shore Players company, and daughter-in-law of Kenesaw Mountain Landis, barrister and baseball arbiter, a schedule of one-act plays to be produced from time to time in the studio of KYW.

First to Broadcast from Stage

The first of these is entitled Bargain Day, and was arranged and directed under the personal supervision of Mrs. Landis. The part of the harassed husband will be played by Sidney M. Spiegel, Jr., who acted the roll when the play was given in Chicago. The finale lead will be interpreted by Jessie Royce Landis.

Station KYW is now widely known to be the first broadcasting station in America to have broadcast an entire drama directly from the stage of the theater and the aim of the management is to give KYW's audience more plays and to make the station a theater without a stage.

Basketball Game and Concert Cause Friction

Argument Settled by Broadcasting Two Events Alternately

HOUSTON, TEX.—Rice Institute nearly had a row with Texas A. & M. College, during the basketball finals at the city auditorium here. It all happened over Radio-telephone rights.

Broadcasting stations in Houston have a schedule whereby The Evening Post furnishes a two hour musical program between 8 and 10 p. m. each Friday night. The basketball games were played during the same hours. Rice Institute station, WRAA, wanted the air; but The Evening Post artists were assembled in the studios each Friday ready to send a concert program from WEAY, Will Horwitz Jr.'s Iris theater station.

The same thing happened three successive weeks. Leo W. Martin, announcer at WEAY, solved the difficulty by having a telephone placed in The Post studio so that while a musical number was going out a reporter could write the basketball play-by-play. The game was flashed between numbers.

Springfield Has Club

SPRINGFIELD, MASS.—A new club was recently organized here to be known as the "Springfield Associated Radiowls." The object of the club is the advancement of Radio as a science and to promote a better spirit of good fellowship between Radiophans. Officers are, H. B. Watkins, president; E. N. Grise, vice president; E. C. Tarleton, secretary and H. F. Oliver, treasurer.

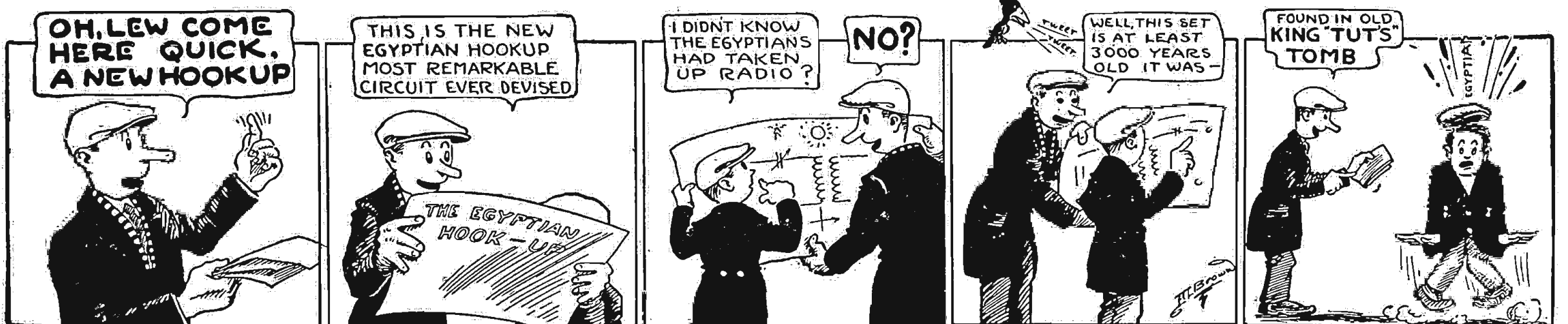
broadcasting.

To this suggestion Sir W. Joynson-Hicks, the postmaster general, replied that he did not think it was his duty to provide "such a counter attraction" in the chamber of the house.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Tut! Tut! Spir's Spoofing Us



The Week's Advance Broadcast Programs

Tuesday, April 10

KDKA, Eastern, 8:30 P. M., Concert by F. Feigenbaum, violin; Mrs. F. Feigenbaum, accompanist; Adele Eggers Furniss, soprano; Miss Schaney, accompanist; Brinley Jones, baritone. Program: Soprano solos, "For All Eternity," Mascheroni; "Sing, Smile, Slumber," Gounod. Soprano and violin obligatos, "The Summer Wind," Bischoff, and "Sweet Miss Mary," Neidlinger, violin solos, "Serenade," Pierre, "Romance," Wienawski; "Sara-bande," Bohm. Baritone solos, "The Last Watch," Pinsuti; "I Passed by Your Window," Brahe; "The Wolf," Shield; "There Is No Death," O'Hara, and "Thanks Be to God," Dickson.

KSD, Central, 8:00 P. M., Allie Schmidt, soprano; Mrs. Oma Culbertson Prescott and Mrs. A. H. Helbig, pianists.

KYW, Central, 11:30 A. M., Table Talk, domestic science, by Mrs. Anna J. Peterson. 8:00 to 9:00 P. M., Verna Lyon Boorman, contralto; Sallie Menkes, accompanist; Joseph Izzo, flute; Mrs. W. G. Watson, reader; Pasadena Orchestra Deluxe; Elmer Gray, piano; Charles Elkin, violin and alto sax; Walter Wagg, cornet; Carl Morris, C melody sax; Sig. Meyer, banjo; Jack Wrout, drums; Isham Jones and orchestra. Program: 1, Mr. Gallagher and Mr. Sheean, "Flower of Araby," by Pasadena Orchestra Deluxe; 2, "Cradle Song," "Rosalie," by Verna Lyon Boorman; 3, "Berceuse," "Mazurka," by Joseph Izzo; 4, "Baby Blue Eyes," "Sweet Lovin' Mamma," "Dearest," by Pasadena Orchestra Deluxe; 5, "Romance of a Hammock," "The Saleslady," by Mrs. W. G. Watson; 6, Popular Dance Selections, Isham Jones Orchestra; 7, "I Come to Thee," "Teach Me to Pray," by Verna Lyon Boorman; 8, Flute Solo, by Joseph Izzo; 9, "Sonnet on Stewed Prunes," by Mrs. W. G. Watson; 10, "You've Gotta See Your Mamma Every Night," "Funny Blues," "Aunt Hagar's Blues," by Pasadena Orchestra Deluxe.

WBAP, Central, 7:15 to 8 P. M., Concert by the Fort Worth High School Glee Club; 9:30 to 10:30 P. M., Concert by the Harmony Club of Fort Worth.

WBEZ, Eastern, 7:45 P. M., "Installation of Bird Gardens," by C. J. Anderson, The Bird Man; 8:00 P. M., Concert by Roberts Banjo Club.

WDAF, Central, 10:00 P. M., Miss Burdette Cleveland, sopr.; J. E. Stevens, bass; Miss Helen Steen, sopr.; Miss Helen Greim, Jack Chapman's Dance Orchestra.

WGY, Eastern, 7:40 P. M., Address, "The World's Greatest Nursery," by Clifford R. Pettis; 7:45 P. M., Vaudeville program, Orchestral selection, "March of the Spirits," by The Troubadours; Tenor solo, "Good Night, Little Girl, Good Night," by Earl Emery; Instrumental Trio, "Mighty Lak a Rose," by H. B. Coggeshall, violin; H. P. Cheney, saxophone; A. O. Conant, piano; Humorous Monologue, "The English Dude," by Maurice G. Randall; Saxophone Duet, "One Sweet Day," by Charlotte Hofeliche and Rudolph Beerle; Mrs. J. S. Beerle, Accompanist; Yodeling Selections, "My Alpine Sweetheart," "Lullaby," by Charles J. Bradt; Piano Duet, "Souvenir of Stephen Foster," by Genevieve Beerle and Rudolph Beerle; Male Quartet, "A Little Close Harmony," by Troy Masonic Quartet, Orville Ackert, 1st tenor; Asa O. Coggeshall, 2nd tenor; Charles W. Mead, baritone; Henry A. Leffingwell, bass; Echoes from old time minstrel end man—shaking the bones and tambourine, by Jack Williams; Humorous Monologue, "The Dude Fireman," by Maurice G. Randall; Novelty solos, "Dishpanola Solo," "Spadeola Solo," by Harry P. Cheney; Male Quartet, "More Close Harmony," by Troy Masonic Quartet; Saxophone Duet, "Sweet Kentucky Sue," by Charlotte Hofeliche and Rudolph Beerle; Bass solo, "In the Garden of My Heart," by Henry A. Leffingwell; Orchestral selection, "1923 March," by The Troubadours.

WHAS, Central, 4:00 to 5:00 P. M., Concert by the Alamo Theater Orchestra. Three minute biography of Old Testament characters, "Hezekiah." Piano solos and Tenor solos, Robert Veazy, playing his own accompaniments; Selections by Heyde C. Conrad, playing the Alamo Theater organ; 7:30 to 9:00 P. M., Full concert by the Louisville Normal School, Miss Dorothy Park, director; Soprano soloists, Miss Grace Deppe, Miss Helen Ferguson; Violin soloists, Miss Mary Louise Wilde, Miss Ethelreda Wilde, Miss Viola Hawkins, Louis Stabler; Piano soloists, Miss Grace Weiber, Miss Ethel Sote, Miss Dorothy Park; Reading, Miss Ruby Feige; Piano accompanists, Miss Dorothy Park and Miss Grace Deppe; Reading, "An Interesting Historical Episode," Setting-up exercises.

WJAX, Eastern, 7:30 P. M., Concert furnished by the Cleveland News.

WJZ, Eastern, 7:00 P. M., "Polaris, Story of an Eskimo Dog," by the author and lecturer, Ernest Harold Bynes. 7:30 P. M., Dance music by the Vincent Lopez "Red Cap" Orchestra. 8:30 P. M., Program by Stockbridge Stocks, first started by Dorothy Stockbridge. Organization made possible by the fact that all work in connection with their production is done by members of the company in every capacity from stage carpenter to "handsome hero." These members, all amateurs, are composed of writers, artists, lawyers and reporters. Most of the plays given by the Stockbridge Stocks are written especially for them, as is their presentation this evening by Christopher Morley; 9:00 P. M., "Broadcasting Broadway," by Bertha Brannard; 9:15 P. M., "University of the Air," "Vision and Purpose in Business," by John G. Jones, Alexander Hamilton Institute; 9:30 P. M., Concert by Patricia Boyle, blind pianiste; 9:45 P. M., Concert by Ellen Richmond Marshall, young con-

tralto. Miss Marshall's repertory includes English, French, Italian, Russian and German songs; 10:01 P. M., Continuation program by Patricia Boyle; 10:15 P. M., Continuation program by Ellen Richmond Marshall.

Call Letters	Owner and Location	Wave-Length
KDKA	Westinghouse Co., E. Pittsburgh, Pa.	360
KSD	Post-Dispatch, St. Louis, Mo.	400
KYW	Westinghouse Co., Chicago, Ill.	400
WBAP	Star-Telegram, Ft. Worth, Tex.	400
WBEZ	Westinghouse Co., Springfield, Mass.	422
WDAF	Chicago Board of Trade, Chicago, Ill.	390
WGY	General Electric Co., Schenectady, N. Y.	370
WHAS	Courier-Journal and Times, Louisville, Ky.	360
WJAX	Union Trust Co., Cleveland, O.	400
WJZ	Westinghouse Co., and R. C. A., Newark, N. J.	360
WLW	Crosley Mfg. Co., Cincinnati, O.	360
WMAQ	Daily News and Fair Store, Chicago, Ill.	400
WMC	Commercial Appeal, Memphis, Tenn.	400
WOC	Palmer School of Chiropractic, Davenport, Ia.	400
WWJ	News, Detroit, Mich.	400

WLW, Central, 10:00 P. M., Soprano soloist, Mrs. H. Neale Walters; Piano soloist, Miss Lillian Finn; Reader, Miss Nora Beck; Fluegel horn soloist, Edward Sobarg; Entertainment by the Roger Hill Dance Orchestra; 1, Opening selections by the Roger Hill Dance Orchestra; 2, Vocal solos, "Twas April, Little Boy Blue," by Mrs. H. Neale Walters; 3, Piano solo, "The Love Waltz," by Miss Lillian Finn; 4, Fluegel horn solo, "My Heart at Thy Sweet Voice," by Edward Sobarg; 5, Reading of story, "By Courier," by Miss Nora Beck; 6, Selections by dance orchestra, Pack Up Your Sins, Ivy, Dearest and Fate; 7, Vocal solos, Hail, Glorious Morn, One Fleeting Hour, In Sweet September, by Mrs. H. Neale Walters; 8, Piano solo, Butterflies at Play, by Miss Lillian Finn; 9, Fluegel horn solo, selections from "The Bohemian Girl," by Edward Sobarg; 10, Concluding selections by dance orchestra.

WMAQ, Central, 4:35 P. M., Program arranged by the Bush Conservatory of Music; 7:00-8:00, The Weekly Babson report; Edgar Lee Masters, poet; Robert B. Harshe, director of the Art Institute School of Art, will talk.

WMC, Central, 8:00 P. M., Program sponsored by the Beethoven Club of Memphis, Mrs. W. A. Bickford, chairman; 11:00 P. M., Midnight Frolic.

WOC, Central, 3:30 P. M., Educational talk by F. C. Walker; 5:45 P. M., Chimes concert. (No broadcasting on Tuesday evening by agreement of Tri-City Stations.)

WWJ, Eastern, 8:30 P. M., The Town Crier; The Detroit News Orchestra; Jimmy Jenkin's Trio; Miss Marie T. Bush, soprano; LeRoy De Turk, pianolog.

Wednesday, April 11

KDKA, Eastern, 6:15 P. M., Dinner concert by KDKA Little Symphony Orchestra, direction of Victor Saudek; 8:00 P. M., Special program broadcasted direct from the Fort Pitt Hotel. Walter Dill Scott of Northwestern University, Evanston, Ill., lecturer; Ruth Bowers Gibson, violin; Adalaine Merrill Biddle, accompanist; 9:15 P. M., Concert by Professor Grogan, piano; Mrs. Grogan, harp; Mrs. Delphine Heimert, dramatic soprano; Mrs. Edna Griffey Mars, accompanist, and KDKA Orchestra. Program: Soprano solos, "I Know," "Yesterday and Today," "Song of the Soul," and "From the Land of the Sky Blue Water"; Orchestra, Overture, "Oberon," Popular Hits of the Day; Excerpts from "Robin Hood"; Concert waltz, "Roses from the South"; Themes from "La Tosca," "Madame Butterfly," and "La Boheme," Puccini; and "Evolution of Dixie."

KSD, Central, 8:00 P. M., Bellglade Orchestra; 8:30 P. M., Helene Hellweg, soprano, N. V. Dixon, baritone, Charles Maehl and Mrs. N. V. Dixon, pianists.

KYW, Central 8:00 to 9:00 P. M., Rose Quinn, contralto; Sallie Menkes, accompanist; Milan Lusk, violinist; Eloise Bedlam, pianist, accompanist; Ben Ray and Rudy Patek, concertina; Betty Williams and her Musical Buddies; Betty Williams, piano; Joe Williams, saxophone; Leigh Taylor, saxophone; Isham Jones and orchestra; program, 1, A Dream, The Cradle Song, by Rose Quinn; 2, Cavatina, Souvenir, by Milan Lusk; 3, Burning Sands, Lovin' Sam, by Ben Ray and Rudy Patek; 4, Lullaby Moon, Love Sends a Little Gift of Roses, by Betty Williams and Her Musical Buddies; 5, Caprice Viennoise, Japanese Etude, by Eloise Bedlam; 6, Popular dance selections, by Isham Jones and orchestra; 7, Love Sends a Little Gift of Roses, The Sweetest Story Ever Told, by Rose Quinn; 8, Caprice Espagnole, by Milan Lusk; 9, Dixie Highway, Wedding of the Winds, by Ben Ray and Rudy Patek; 10, Sahara Butterfly, Dearest, by Betty Williams and her Musical Buddies; 9:05 P. M., "Spring Clean-Up and Beautifying Campaign," by National Board of Fire Underwriters.

WBAP, Central, 7:15 to 8:00 P. M., Concert by Jesse Morris of Dalhart, Texas; 9:30 to 10:30 P. M., Concert by the Glee Club of the Daniel Baker College, Brownwood, Texas.

WBEZ, Eastern, 7:45 P. M., "The Most Dangerous Animal in the United States," by Harold E. Miner, M. D., State District Health Officer; 8:00 P. M., Concert by Laura O. Payne, soprano; L. Thompson, baritone; Miss Thompson, pianist and accompanist.

WHAS, 4:00 to 5:00 P. M., Concert by the Alamo Theater Orchestra; Three minute biography of Old Testament Characters: "Sennacherib"; Piano solos, Miss Alice Griffin; Selections by Heyde C. Conrad; 7:30 to 9:00 P. M., Soprano solos, Miss Beatrice Thompson, accompanied by Mrs. Albion Cornwall; Baritone solos, Albion S. Cornwall, accompanied by Mrs. Albion S. Cornwall; Soprano and baritone duets, Miss Thompson and Mr. Cornwall, accompanied by Mrs. Cornwall; Piano solos, Miss Carol Dean Talley, of Anniston, Ala.; Reading, Miss Augusta Van, of Anniston, Ala.; Lyric soprano solos, Miss Sara Riley, of Buckhorn, Ky., accompanied by Reginald Billin; singing Kentucky mountain ballads; Reading, An Interesting Historical Episode; Setting-up exercises.

WJAX, Eastern, 8:30 P. M., Concert by the Conference Orchestra and Conference Chorus of the Sixteenth Annual Meeting of the Music Supervisors' National Conference. Program, Part 1, 1, Overture, "Mirella"; 2, "The Happy Wanderer"; 3, Minuet from Symphony in E Flat; 4, "Rakoczy March"; 5, Minuet for Strings; 6, Grand March from "Queen of Sheba," by Conference Orchestra, Osbourne McConathy, Northwestern University, Director. Part 2, Community singing by audience and chorus led by George Oscar Bowen, University of Michigan, Music Department. Part 3, Ten choruses by American composers sung by the Conference Chorus, directed by W. Otto Miessner, Milwaukee State Normal School; "Out of the Silence," "Hope Carol," "Song of the Marching Men," "Indiana Mountain Song," "Israfil," "Song of the Western Men," "My Ole Banjo," "Summer Night," "Mexican Serenade." "Here Comes the Flag."

WJZ, Eastern, 2:00 P. M., "Book Review," by Grace Isabel Colbron; 9:00 P. M., "Foods for Health and Pleasure"; "Fat Folks and Their Food," by Anne Lewis Pierce, Director of Tribune Institute; 9:15 P. M., "Review of Reviews," by Beatrice Prince; 9:30 P. M., Ampico Series of Distinguished Artists' concerts. The artists for evening are John Mundy, cellist, and Clytie Hynes, soprano; 10:01 P. M., Continuation of program by the Ampico Artists.

WLW, Central, 8 P. M., Band concert by Tenth Infantry Band of Fort Thomas, Ernest Fisher, Conductor; Cello solos by Mrs. H. Morris, accompanied by Ruth Draper; Baritone solos by Ray Lombardi, accompanied by Marjory Garrigus; A short Radio burlesque by Richard Alvin Plough; March, Barnum and Bailey's favorite by Tenth Infantry Band; A group of Italian songs, by Ray Lombardi, accompanied by Marjory Garrigus; Tenth Infantry Band, selections from The Red Mill; Cello solos Berceuse from Jocelyn; Calm as the Night, by Mrs. H. Morris; Fox Trot, "All Muddled Up," Trombone Tragedy, "Slipertitus," Tenth Infantry Band; Waltz, "Wedding of the Winds," Tenth Infantry Band; A group of English songs by Ray Lombardi, Marjory Garrigus at the piano; Sounds from the Sunny South; Selection from Chimes of Normandy, Tenth Infantry Band; Cello solo, Saraband, by Mrs. H. Morris, Ruth Draper at the piano; March 324th Field Artillery, Tenth Infantry Band.

WMAQ, Central, 4:35 P. M., Program arranged by the Cosmopolitan School of Music and Dramatic Art; 7:00-7:30 P. M., Miss Georgene Faulkner, The Story Lady, stories for the children; 9:15-10:00 P. M., Mrs. Clara M. Schevill, soprano.

WOC, Central, 3:30 P. M., Educational talk, by D. K. Kirk; 7:00 P. M., Concert, by Mt. Ida Presbyterian Church Choir, of Davenport, Iowa; 10:00 P. M., Musical program, by Swedish Baptist Church Choir, Moline, Ill., Erwin Swindell, Musical Director.

WWJ, Eastern, 3:00 P. M., The Detroit News Orchestra; 8:30 P. M., The Town Crier; The Detroit News Orchestra, program by the J. L. Hudson Stores.

Thursday, April 12

KDKA, Eastern, 6:00 P. M., Organ recital from the Cameo Motion Picture Theater; 8:30 P. M., Concert by Imperial Sextet of Harmony, assisted by Pika Johnson and Margaret Daugh, soloists; Program: Orchestra selections, "Falling," "Lovin' Sam," "A Kiss in the Dark," "Carolina in the Morning," "French Trot," "Stuttering," "Lonely Nest," "Buddy," and "I Wish I Knew." Vocal selections, "Carolina in the Morning," by Mr. Johnson; and "Buddy," by Miss Daugherty.

KYW, Central, 8:00 to 9:00 P. M., Musical program courtesy Lyon & Healy Concert Department, also Isham Jones and orchestra; 9:05 P. M., "Twenty Minutes of Good Reading," by Rev. Claude J. Pernin.

WBAP, Central, 7:15 to 8 P. M., Concert by Blewett's orchestra of Denton, Texas; 9:30 to 10:30 P. M., Concert by the 300-voice choir of the First Baptist Church, Fort Worth.

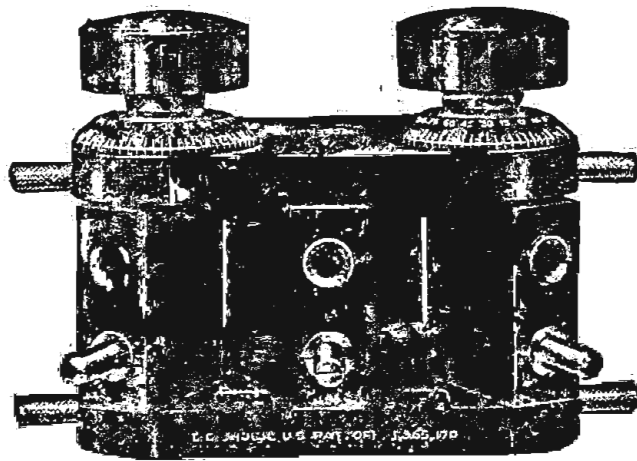
WBEZ, Eastern, 8:00 P. M., Concert by Mabel Burns, soprano; Mrs. Eftaver, violin; Wilber Woodworth, basso; Mary Steele, pianist.

WDAF, Central, 10 P. M., Concert, Miss Jessie R. Edwards, soprano; Mrs. Clara West Moulton, contralto; Jack Chapman's Dance Orchestra.

WGY, Eastern, 2:00 P. M., Music and talk, "What Animal Experimentation Has Taught Us," Miss Jessie G. Cole, nutritionist, N. Y. Department of Health; 7:45 P. M., Radio drama, "On Trial," Instrumental selection, "Intermezzo," WGY Orchestra; Drama, "On Trial," Reizenstein; The cast: The Defendant, Edward H. Smith; His Daughter, Rosemary St. Louis; His Wife, Ruth Schil.

(Continued on page 6)

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NIGHT HAWKS USE DIRECT WIRE PLAN

UNIQUE MICROPHONE EXCHANGE EMPLOYED

Operator on Duty All Day Can Connect with Local and Out-of-Town Points

By Vera Brady Shipman

"It's the Kansas City Night Hawks, folks," and the air is full of jazz. The Coon-Sanders orchestra at the Hotel Muehlebach is a nightly feature of WDAF, the Kansas City Star, beginning at 11:45 p. m. Coon of the orchestra assists the Merry Old Chief, designated as the "professor," in initiating new members by Radio with the aid of a cowbell or a cuckoo.

This microphone connection with the Star's plant, (there is one on the announcer's table as well as one secreted in the flowery latticed ceiling decorations of the Muehlebach grill), belongs to a series of connections located at various public buildings of Kansas City as well as in three Kansas towns—and is unique in this country in complete broadcasting service. An operator is always on duty at WDAF on the Star roof, ready to tune in at any hour for any kind of a public gathering.

Where Direct Wires Go

There is a wire to the American Royal building from which last November, when the Kansas City Live Stock Show was in progress, the famous Lindsborg, Kansas, Messiah chorus of 500 voices was presented. By broadcasting this chorus to those who could not attend the show in person, the world's greatest oratorio was saved for thousands.

A wire to the Grand Avenue Temple tunes in some of the finest religious gatherings, which houses a choir of Kansas City's finest musicians, and an organist of national note.

A wire to the new Million Dollar Speedway tells the world of the races direct as they are run.

A triple connection for the Neumann Theater gives Radiophans the orchestra, stage acts or the pipe organ.

Three Muehlebach Hotel microphones connect into the dining rooms, the most spectacular of which is the grill housing the Night Hawks' frolic.

Wires Connect to Outside Cities

There is a wire to the University of Kansas at Lawrence, forty miles away. Last December, a K. U. alumnae program was given. I know of one group listening in Chicago (450 miles away) who sang their alma mater with a deeper significance and yelled their famous "Rock Chalk" with a stronger vehemence because of the romance attending Radio.

A wire out to Manhattan, Kansas, the State Agricultural College, 150 miles west, performs a like college service.

Connection with the Kansas State Penitentiary at Lansing, permits news broadcasts of escaped prisoners.

A performance at any of those places at any time, is connected by a turn of a switch, and the entire nation is given the opportunity to listen in.

Foreign Listeners Hear WDAF

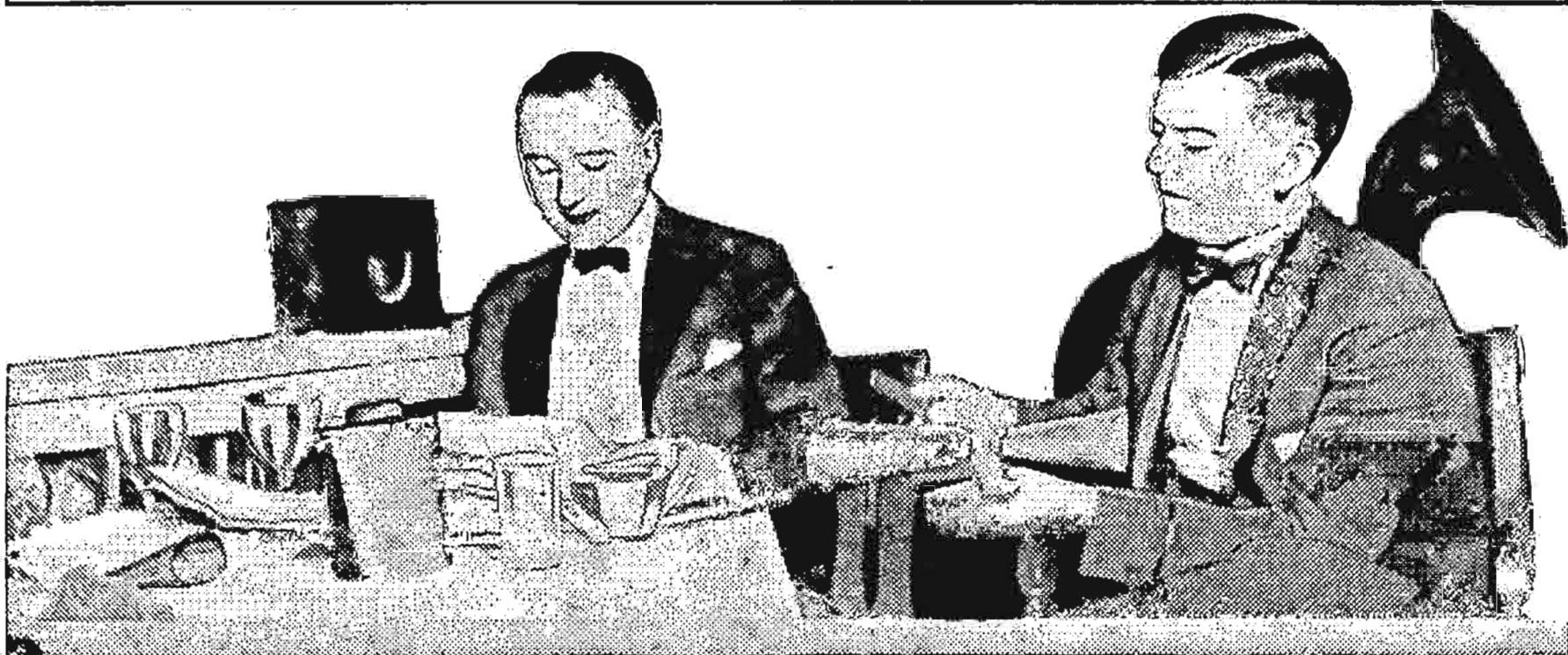
Not only America, but foreign countries are hearing WDAF. London, 3,500 miles away, has reported three times. A ship off Australia told of hearing the Star station once. Even Hawaii listens in each evening to the Night Hawks. The states of Central and South America, the West Indies, and Alaska have expressed thanks for the WDAF entertainment. A man in London, England, has even made a dictaphone record of a complete WDAF concert.

The Radio department of The Star keeps WDAF on its tiptoes. The personnel includes Leo Fitzpatrick, Radio editor and Merry Old Chief of the Night Hawks; Robert M. Reed, program manager; D. D. Johnson, engineer and operator; Ernest Moorfield, chief announcer; Don Phelps, assistant operator; John Patt, secretary and assistant announcer.

The Kansas City Star, one of America's greatest newspapers, is keeping up to its journalistic standard in the realm of Radio as well.

Turkey has neither ship nor coast stations open to public service. This country will not accede to certain regulations regarding the accounts for Radiograms originating from foreign vessels in the harbor of Constantinople.

THE "MERRY OLD CHIEF" AND CARLTON COON



This is the "Merry Old Chief," of the Kansas City Star Night Hawks, initiating new members into that organization at one of the regular nightly sessions held at the Hotel Muehlebach. The attending gentleman (with the cow bells) is Carlton Coon of the Coon-Landers Orchestra. If you are a listener of WDAF you have heard both of them on the air

25,000 BOY SCOUTS TAKE UP AIRPHONES

Several Powerful Sets Are Maintained by Individual Troops—Others Have Own Apparatus

NEW YORK.—The 25,000 Boy Scouts of Greater New York are taking an active interest in Radio. Not only do many of the individual Troops maintain powerful sets but in addition several thousand of the boys have installed apparatus of their own.

A special Radio Information Bureau is conducted by the Manhattan Council, which has jurisdiction over some 7,000 Scouts. Through this agency the boys are encouraged to build their own sets, and so gain a much more intimate knowledge of the principles of Radio than they could otherwise get. As an outcome of this teaching the Scouts to depend on their own resources, a number of ingenious sets have been developed among which a small but efficient "Hiking Set" weighing only ten pounds, is outstanding.

CANADA TO BAR BOOK MAKERS FROM ETHER

Introduce New Bill to Prohibit Race News by Radio

LONDON, ONT.—A bill which has been introduced in the Ontario legislature by Hon. W. E. Raney, attorney-general, aimed at bookmaking on horse races, covers broadcasting tips by Radio. If it is found that it does not, then amendments will be made to cover this form of spreading news, states the attorney-general.

It is further interesting to note that Sir Lomer Gouin, of the Dominion Parliament, may have to bring in further amendments to his federal legislation on betting on horse racing. The section of the criminal code to which the federal bill is connected names "telegraph, telephone, mail or express" as prohibited means for conveying information.

Apparently Radio is not named in the criminal code. It means that another section of the code will have to be amended to bring Radio in as illegal methods for distribution of betting odds and prices.

International Conference on Radio to Follow Hague

WASHINGTON.—An international conference for the control of submarines, Radio and aircraft may follow the informal negotiations just concluded at The Hague. The State Department has cabled the governments concerned for permission to make public the report of its special commission, which was submitted to Secretary Hughes Saturday. The interested nations may then seek to work out the problem in much the same way they undertook the limitation of armaments.

WJAX Broadcasts Al Sirat Grotto Band—Proves Hit

CLEVELAND, O.—Plans for another Radio Concert by the Al Sirat Grotto band have been formulated here by officials following the receipt of "encore" telegrams from almost every section of the country. The first Radio concert by this famous band was given recently at the Union Trust company's broadcasting station, WJAX, under special arrangements with the Cleveland News and News-Leader.

Congdon Resigns From WGM

WGM, The Atlanta Constitution, has a new director. Through the resignation of George Congdon, Jr., L. O. Mosely, former assistant director and well-known sheik with the Southern drawl, has been promoted to director of the station. Mosely is a native Georgian, graduate of Emory College, member of the Phi Kappa Psi fraternity, and an all-round newspaper man.

WOR Opera Season Wins Fans' Favor

Letters from All Parts of Country Prove Popularity of Bamberger Programs

NEWARK, N. J.—The "opera season" at WOR here is proving a great success. Philip Ienni, the manager of the Puccini Grand Opera Company, which is putting on the performances has received thousands of letters from fans from all over the United States, Canada and Mexico, telling how much the operas are enjoyed by everyone. The operas are given once a month. The entire cast and orchestra assembles at the WOR studio. The following operas are yet to be given:

"Aida", April 17; "Carmen", May 8; "Barber of Seville", June 1. Other operas will be announced later.

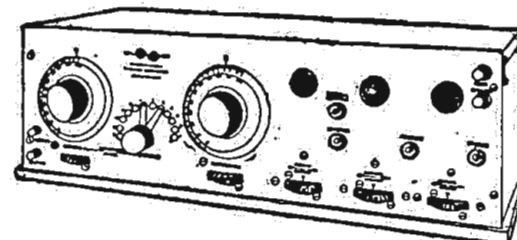


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—Confucius.

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CHICAGO

ADVANCE PROGRAMS

(Continued from page 4)

ling; Her Father (deceased), Horace Roberts; The Dead Man, Frank Quinn; His Widow, Margaret V. Smith; His Secretary, Edward E. St. Louis; A Maid, Viola Karwowska; A Hotel Proprietor, Cortland Hopkins; The Judge, Frank Oliver; District Attorney, J. S. B. Mullarkey; The Defendant's Counsel, Franklin Hill; Foreman of the Jury, Severn Le Valley; Act I, scene 1—Library in the house of Gerald Trask, June 24, 1922. Time, 9:30 in the evening; Scene 2—The Court Room; Orchestral selection, "Jardins d'Amour;" Act II, scene 1—The Court Room, scene 2—The sitting room in the home of Robert Strickland, June 24, 1922, at 7:30 in the evening; scene 3—The Court Room; Orchestral selection, "Serenade;" Act III, scene 1—The Court Room, the second day of the trial; scene 2—A room in a hotel on Long Island thirteen years earlier; scene 3—The Court Room; Orchestral selection, "Intermezzo Gracile;" Epilogue—scene 1—Jury Room; Scene 2—The Court Room; Orchestral selection, "Victory March."

Friday, April 13

KDKA, Eastern, 7:30 P. M., Review of "Cyrano de Bergerac" Rostand, by Marjorie Stewart; 8:15 P. M., Concert by Carnegie Tech. Mandolin and Glee Clubs, broadcast from Carnegie Lecture Hall. KSD, Central, 8:00 P. M., Mound City Orchestra; 8:30 P. M., Pauline J. Bell, soprano; Louise Bernero and Anna Sorokin, pianists; 11:30 P. M., Mrs. Frank Howard, mezzo-soprano; Mrs. J. H. Eggers, violinist; Lucille Cook, pianist; John C. Sartelle, whistler; J. H. Egger, cellist; Mrs. Georgia McAdams Clifford, reader; Max Mason, French Horn; James Hay, Jr., flutist; Mrs. Nellie MacKenzie, accompanist. KYW, Central, 8:00 to 9:00 P. M., Musical program, Salvation Army Band, Adjut. J. A. Fynn, conductor, also Isham Jones and his orchestra; Program: 1, "Divine Love," Selection: "Banner of Liberty," by Salvation Army Staff Band; 2, Vocal solo, "The Name of Jesus," by Colonel Fynn; 5, Sextette, "The Lost Chord," by Salvation Army Sextette; 6, March, "Vigilance," Selection, "Nazareth," Chimes, "Hollingside," March, "Emancipation," by Salvation Army Staff Band; 9:05 P. M., Review of Latest Books by L. Jones, Lit. Ed. of Chicago Evening Post. WBAP, Central, 7:15 to 8:00 P. M., Concert by Mrs. Leslie Ware and Bess Ware of Baylor College for Girls, Belton, Texas; 9:30 to 10:30 P. M., Program by the President's Day banquet of the Fort Worth University Club, musical program by the Texas Christian Univ. WBZ, Eastern, 8:00 P. M., Concert by Mme. Calixta Dupont Courchene, pianist and reader, assisted by E. S. Wells, tenor. WGY, Eastern, 2:00 P. M., Music and talk, "Music in the Home," Mrs. Edward P. Pressey; 7:40 P. M., Health Talk, "Golf

Dangerous to Health," Dr. W. Nicolls, Jr.; 7:45 P. M., "The Pirates of Penzance;" Pallophotophone Address, Colonel Frederick Palmer; Operetta, "The Pirates of Penzance," Gilbert & Sullivan; The Cast: Richard, Pirate Chief, M. H. Simmonds; Samuel, his Lieutenant, Carl N. Jester; Frederic, a Pirate Apprentice, Asa O. Coggeshall; Major-General Stanley, of the British Army, Kolin D. Hager; Edward, Police Sergeant, J. F. Quinlan; Mabel, General Stanley's youngest daughter, Edith Ennis; Kate, Edith, Isabel, General Stanley's daughters, Ethel Guest, Agnes MacDavitt, Jane Terrell; Ruth, a Piratical Maid of All Work, Rose Mountain and WGY Orchestra; Act I: Pirate Chorus, "Pour, O King, the Pirate Sherry;" Ruth, "When Frederic Was a Little Lad;" Pirate King and Chorus, "O Better Far;" Ruth and Frederic, "Oh, False One;" Ladies' Chorus, "Climbing Over Rocky Mountains;" Frederic and Ladies' Chorus, "Oh, is There Not One Maiden;" Mabel and Ladies' Chorus, "Poor Wandering One;" Mabel, Frederic and Ladies' Chorus, "How Beautifully Blue the Sky;" Major-General Stanley and Chorus, "I Am the Very Pattern of a Modern Major-General;" Cast, "He is Telling a Terrible Story;" Act II: Mabel and Ladies' Chorus, "O Dry the Glistening Tear;" Sergeant of Police and Policemen, "When the Foeman Bares His Steel;" Ruth, Frederic and Pirate King; "When You Had Left Our Pirate Fold;" Mabel and Frederic, "Ah, Leave Me Not Alone;" Mabel, Sergeant and Policemen, "Thou in Body and in Mind;" Sergeant and Policemen, "When a Felon's Not Engaged;" Sergeant, Pirates and Policemen, "A Rollicking Band of Pirates We;" Samuel, Pirates and Policemen, "With Catlike Tread;" Major-General Stanley with Pirates and Policemen, "Softly Sighing;" Entire Cast, "We Triumph Now;" 10:30 P. M., Musical program, Instrumental selection, "Old Time Medley," by WGY Quartet; Pallophotophone Address, "The Need for the National Reserve Corps;" General Brice P. Disque; Contralto solo, "In the Gloaming," by Gladys Robinson, Ann Connell, accompanist; Piano duet, "Poet and Peasant," by Mrs. W. Murdock and Ivan Strough; Cello solo, "Traumerei," by Ernest Burleigh; Instrumental selection, Fantasia on "My Old Kentucky Home," by Quartet; Contralto solo, "Juanita," by Gladys Robinson; Piano duet, "Humoresque," by Mrs. W. Murdock and Ivan Strough; Some Humor from "Topics of the Day;" Violin solo, "Flower Song," by Edward A. Rice; Instrumental selection, "Homestead Melodies," by Quartet; Contralto solo, "Just a Song at Twilight," by Gladys Robinson; Instrumental selection, "Down on the Plantation," by Quartet.

Saturday, April 14

KDKA, Eastern, 7:00 P. M., "One-day Auto Trip and Road Conditions," Pittsburgh Auto Club; 7:15 P. M., One-act play by School of Drama, Carnegie Institute of Technology; 8:00 P. M., Boy's Features, by the J. G. Bennett Co.; 8:30 P. M., Concert by Monessen Volunteer Firemen's Band, direction of W. B. Laird. KHJ, Pacific, First anniversary of station, 8:00 P. M., Sammie Sisters in Patriotic

revue; Address by Colonel Arthur Williams and Colonel J. M. T. Partello. KSD, Central, 8:00 P. M., Thaletta Kronsbein, contralto; Hartzel Lyon, baritone. KYW, Central Standard Time, 8:00 to 9:00 P. M., Program, Henrietta Pepin, soprano; Margaret Miller, accompanist; R. C. Kuhn, violinist; Mrs. R. A. Brandt, accompanist; Bruce L. Stocking, pianist; M. S. Wetzel, pianist. Isham Jones and orchestra. Program, 1, Lost—A Wonderful Girl, by B. L. Stocking and M. S. Wetzel; 2, "Ich Liebe Dich," "Leng," by Henrietta Pepin; 3, Mr. Gallagher and Mr. Sheen, by B. L. Stocking and M. S. Wetzel; 4, Berceuse from Jocelyn, by R. C. Kuhn; 5, Popular dance selections, by Isham Jones and Orchestra; 6, The Nightingale Has a Lyre of Gold, soprano solo, by Henrietta Pepin; 7, Medley of Popular Airs, B. L. Stocking and M. S. Wetzel; 8, Pekin, by R. C. Kuhn; 9, Aggravatin' Papa, by B. L. Stocking and M. S. Wetzel; 9:05 P. M., "Under the Evening Lamp," a service including stories, articles and humorous sketches. WBAP, Central, 6:30 to 6:45 P. M., Review of the interdenominational Sunday school lesson by Mrs. W. F. Barnum, leader of the Barnum Bible Class of the First Methodist Church. WBZ, Eastern, 8:00 P. M., Concert by Marjorie Brown, soprano; Paul Webber, pianist. WDAP, Central, 10:00 P. M., Mrs. Agnes T. McMeekin, soprano, and popular music program; Jack Chapman's Dance Orchestra. WHAS, Central, 4:00 to 5:00 P. M., Concert by the Alamo Theater Orchestra; Three-minute biography of Old Testament Characters: "The Three Prophets, Zephaniah, Habakkuk, Nahum;" Selections by Heyde C. Conrad, playing the Alamo theater organ; 7:30 to 9:00 P. M., Full concert by the Beta Pi Omega Sorority, Miss Margaret Hammerstein, director. Reader, Miss Bessie Sonner; Violin solos, Miss Sarah Hill Richardson; Piano duets, Miss Mary Emily Chenu and Miss Annette Waring; Piano solos, Miss Ruth Blakey and Miss Margaret Hammerstein; Soprano solos, Miss Sallie Pennington, Miss Thelma Duffin; Contralto solos, Miss Stella Wharton; Five-minute address, Arthur Mason, associate director of Louisville Conservatory of Music; Setting-up exercises. WJZ, Eastern, 1:15 P. M., Concert by G. O. West and Swanee Orchestra, B. Nathanson, violin and saxophone; R. C. Erickson, saxophone; A. R. Wooley, saxophone; G. I. Johnson, banjo; O. R. Seaman, trumpet; Early Worthley, trombone; H. Ennis, drums; Wm. Griffin, bass; G. O. West, piano director. They will play popular numbers; 7:00 P. M., "Uncle Wiggly Stories," by Howard R. Garis, author. WMAQ, Central, 7:00 to 7:30, Talk on Red Cross by Capt. Hiatt; 9:15, Talk on the "Plan to plant another tree" campaign; the Park-Kostner Band. WMC, Central, 8:00 P. M., Program supplied by residents of Helena, Arkansas, quartette composed of Hugh Bennett, first tenor; Joseph Greenfield, second tenor; E. E. Clifford, first bass, and W. F. Evans, second bass; Mrs. B. L. Lyford, soprano; Prof. Sharkis, violinist; Mrs. S. E. Mundt, pianist. WOC, Central, 3:30 P. M., Educational talk, by C. C. Hall; 7:00 P. M., Musical program, Erwin Swindell, musical director. Girls' Glee Club of Penn College; 8:00 P. M., Educational lecture, "America and Her Wonderland, the Yellowstone Park," by Chas. A. Payne, world traveler and special lecturer for the University of Minnesota; 9:30 P. M., Dance program (one hour), P. S. C. Orchestra. WWJ, Eastern, 3:00 P. M., The Detroit News Orchestra.

Sunday, April 15

KDKA, Eastern, 10:45 A. M., Services First Presbyterian Church, Pittsburgh, Rev. M. Alexander; 2:30 P. M., Bible Story for Children, by Rev. W. A. Logan, of Alpha Lutheran Church, Turtle Creek, Pa.; 2:45 P. M., Address by Dr. L. S. Mudge of Philadelphia, Pa.; 4:00 P. M., Organ recital by Dr. C. Heinroth, organist; 4:45 P. M., Vesper services of Shadyside Presbyterian Church, Pittsburgh, Rev. Hugh Thompson Kerr; 7:45 P. M., Special service for sailors and seamen, by Rev. E. J. Van Etten, of Calvary Episcopal Church, Pittsburgh. KYW, Central, 11:00 A. M., Central church services from Orchestra Hall, Dr. F. F. Shannon. Musical program under direction of Daniel Protheroe; 3:30 P. M., Studio Chapel service, Dr. A. J. McCartney, Kenwood Ev. Church; 7:00 P. M., Chicago Sunday Evening Club service from Orchestra Hall, Chicago. Special musical program by Choir of One Hundred under direction of Edgar Nelson. The speaker will be Dean Charles R. Brown, Yale University. WBAP, Central, 11:00 A. M., 12:15 P. M., Complete services First Methodist Church, Rev. J. W. Bergin; Will Foster, organist; 3:30 to 4:30 P. M., Concert by

the Broadway Presbyterian Church Choir presenting cantata, The Atonement. WDAP, Central, 9:15 P. M., Hans Muenzer, violinist; Henry Selinger and the Drake Concert Ensemble. WGY, 10:30 A. M., Church services, Sermon, "Christianity Limited," Rev. A. W. Rogers, D. D., Emmanuel Baptist Church; 4:00 P. M., Orchestral selection, "Serenade," by WGY Symphony Orchestra, Leo Kliwen, conductor; Soprano aria, "One Fine Day," from Madam Butterfly, by Irene Nettles, Mrs. Katherine Michaelson, accompanist; Orchestral selection, "Lyric Suite," "Shepherd's Boy," "March of the Dwarfs," by WGY Symphony Orchestra; Soprano solos, "The Time for Making Songs Has Come," "In the Time of Roses," by Irene Nettles, Mrs. Katherine Michaelson, accompanist; Orchestral symphony, "Surprise Symphony, G Major," Andante, Menuetto, Allegro di Molto, by WGY Symphony Orchestra; 7:30 P. M., Church services, sermon, "Christ and His Church," Rev. A. W. Rogers, D. D., Emmanuel Baptist Church. WHAS, Central, 9:57 A. M., Organ music; 10:00 A. M., Church service under the auspices of the Broadway Methodist Church; Rev. Dr. David K. Pegues; organist and choir director, Miss Florence Ritter. Miss Ruth Hedden, soprano; Miss Alma Hood, contralto; Miller Haas, tenor; Robert D. Creamer, baritone; 4:00 to 5:00 P. M., Address by Dr. Maxwell Savage; contralto soloist, Mme. Cara Sapin; baritone soloist, Reginald W. Billin; violin soloist, Miss Emily Locke Breaux. WJZ, Eastern, 11:00 A. M., Morning services West End Presbyterian Church, N. Y. City, sermon by Rev. A. E. Keigwin, D. D.; Sacred music by children's mixed choir of 110 voices under direction of Miss Maleva Harvey, organist, also by mixed quartet; Willard Ward, baritone; Lotta Madden, soprano; Jane Crawford Eller, alto, and Easton Kent, tenor; 3:40 P. M., "Poems," by Angela Morgan; 4:10 P. M., Concert by Erna Korn, contralto, and Hedy Spielter, pianiste; 6:30 P. M., Readings and records from the "Bubble Books That Sing," by Ralph Mayhew; 7:00 P. M., "Coming Events Cast Their Shadows Before," What Present World Shadows Augur," fifteen minute analysis, by New York Times Annalist; 7:15 P. M., Estey Organ Recital; 8:00 P. M., "Visby—Enchanted City of the World," by Wirt Barnitz, World Traveler; 8:15 P. M., Concert by Frances Callow, harpist; 8:45 P. M., Concert by Waldorf Astoria Symphony Orchestra, Joseph Knecht, conductor; 10:01 P. M., Concert by Myron Watkins, tenor. WWJ, Eastern, 11:00 A. M., Church services from St. Paul's Cathedral; 4:00 P. M., The Detroit News Orchestra.

Monday, April 16

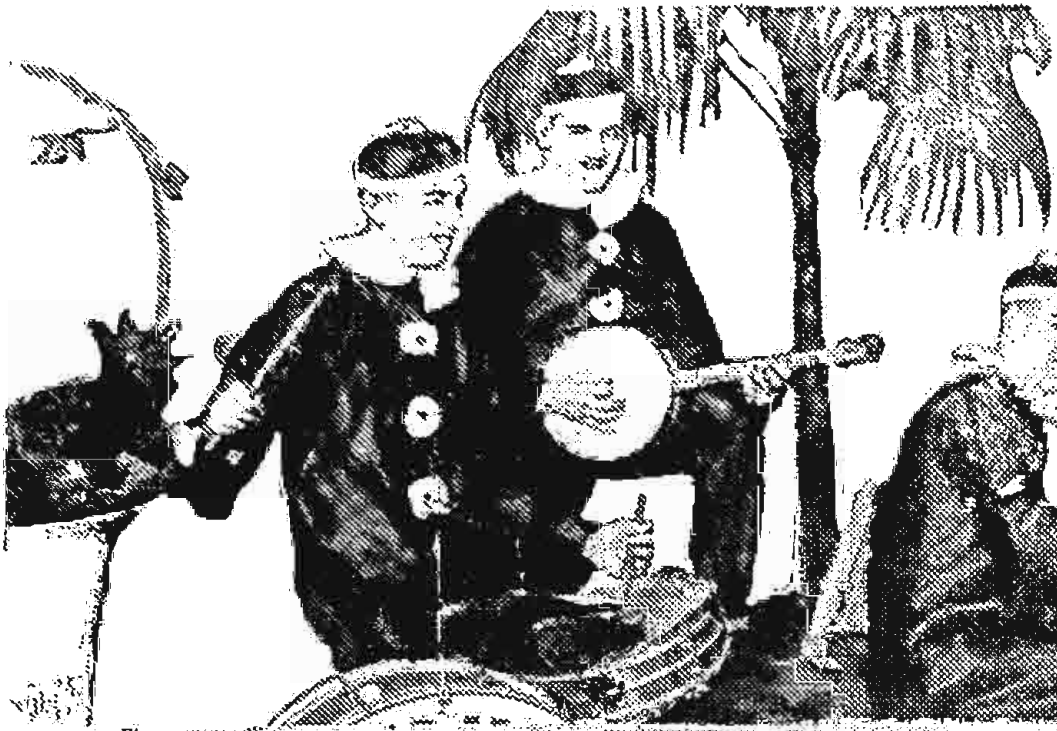
WBAP, Central, 7:15 until 8:00, Vocal and instrumental concert presented by the Fine Arts Department of the Texas Presbyterian College, Milford, Texas; 9:30 to 10:30, Concert by the American Legion quartet and other artists of Paris, Texas. WHAS, Central, 4:00 to 5:00 P. M., Concert by the Alamo Theater Orchestra; Three-minute biography of Old Testament Characters: "Zedekiah," prepared and read by Rev. R. R. Rose, of Shelbyville, Ky.; Piano solos, Miss Margaret Munro, of Berkeley, Cal.; Mezzo soprano solos, Miss Ruby Freeman, of Benton, Ill.; Selections by Heyde C. Conrad, playing the Alamo Theater organ; 7:30 to 9:00 P. M., WHAS is silent on Monday evenings. WGY, Eastern, 2:00 P. M., Music and household talk; Instrumental selection, "Lalla Rookh," by WGY Instrumental Quartet; Some humor, from "Topics of the Day;" Cello solo, "Siciliano," by Ernest Burleigh; Soprano solo, "My Lullaby," by Mrs. Edward Coons, E. C. Smith, accompanist; Instrumental selection, "Air de Ballet," by WGY Instrumental Quartet; Reading, "Something of Interest to All;" Instrumental selection, "Mazurka Caprice," by WGY Instrumental Quartet; Address, "The Broadcast Listeners' Antenna," by R. H. Langley, Radio Engineer; Violin solo, "Air" from "Concerto in A Minor," by Edward A. Rice; Soprano solo, "I Love But Thee," by Mrs. Edward Coons; Instrumental Trio, "Romance," by American Trio; Soprano solo, "A Memory," by Mrs. Edward Coons; Instrumental trio, "Le Cygne," by American Trio.

Japanese Ambassador Speaks

NEW YORK.—It was the Radio audience's unusual privilege to hear the Japanese Ambassador to the United States, the Honorable H. E. Masanao Hauikara when speeches at the annual dinner of the Japan Society were broadcast through WEAF on the evening of April 4.

THE ARTHUR PUDLIN VARIABLE HIGH RESISTANCE especially designed adjustable Grid Leak to be used in critical circuits where adjustment depends upon accurate leak; endorsed by leading radio engineers of the country including the well known Mr. Flewelling. 1/10—5 Megohms. Price 75c With .00025 Condenser \$1 ARTHUR PUDLIN ENGINEERING CO. 329 E. 29TH STREET, NEW YORK Interesting proposition to Distributors, Jobbers and Dealers

FIVE MELODY BOYS OF STATION WSY



One of the most popular dance orchestras of the South is the "Melody Five Boys," head-liners at Station WSY, Birmingham, Alabama. Their wailing saxophones and tremulous minors of the banjo and piano creates a brand of creepy jazz that somehow seems associated with "down in Dixie," the kind that is only heard by listeners of WSY. The above photo shows the boys in action before the microphone

ETHERIZED SERVICE PROVES POPULARITY

LISTENERS IN GATHER IN SMALL GROUPS

Request for Address Given Over Ether Results in 100,000 Copies Being Distributed

BOSTON, MASS.—A tremendous power has been developed by the Radio for the church, in the past few months, since the Greater Boston Federation of Churches has taken up the Radiophone and services broadcasted from two different stations by arrangements with several different churches. The congregations, from mere handfuls have grown to thousands, and the sphere widened from a comparatively few members of the sending church to homes many miles distant, some of them hundreds of miles away.

Listeners in Are in Groups
One Nashua, N. H., young man told of one Sunday night service when a group of eight gathered at his home to hear the broadcasted service from WGI (Amrad). He stated that he knew personally of five other similar gatherings in his own neighborhood. In addition lenten services have been broadcasted every noon from Keith's Theatre, Boston, and letters have been received from all parts of New England, as well as other states.

Gives Copies of Address
One speaker, J. Weston Allen, received a request for the manuscript of his address, that 100,000 copies of it might be made for distribution. A set recently presented to the Massachusetts Society for the Prevention of Cruelty to Children, for use at its temporary home by the Episcopal Cathedral of Boston has been productive of much good among the children.

WOC REPLACES WIRES DOWN BY SNOWSTORM

Davenport Plant Handles Sickness and Death Messages

DAVENPORT, IA.—A severe sleet and snowstorm played havoc with all lines of communication in the vicinity of Davenport recently. The Bell Telephone Company's loss of toll poles in the Davenport area alone was estimated at two thousand. The telegraph wires were demoralized, making it exceedingly difficult for the telegraph companies and railroads to get messages through to destination.

On the following morning, Radiophone Station WOC, with two operators constantly on the job, was placed at the service of the railroad, telegraph and telephone companies for important messages to aid them in securing crews and material to repair their lines, and for sickness and death messages. The regular programme of Station WOC was abandoned for this work, and the station was kept busy until far into the night. This is probably the first time on record when a Radio assistance to the public through the aid given the telegraph and telephone companies in time of a storm.

Canada Hears Police Message

LONDON, ONT.—The possible wide use of the Radiophone in tracing criminals and stolen property was illustrated by the fact that a London Garage having a receiving Radio set, received recently here a message broadcast from Palmer Chiropractic college (WOC) in Davenport, Iowa, asking police and garage employees to be on the lookout for a stolen motor car.

Wife Sues Hubby; Names Radio Set

Says His Affections Are Won by—a Coil, a Tube and a Hank of Wire

LOS ANGELES, CALIF.—One small joy-bringing Radio set has been named as a co-respondent in a divorce complaint which has been filed in the local Superior Court on March the 15th. The case is considered to be the first one of its kind on record.

The complaint was filed by Mrs. Grace Mead Purdy against her husband, Kenneth C. Purdy. Mrs. Purdy stated that her married life had been perfectly happy until her husband became a victim to Radio. After that, she said his passion for her was entirely submerged in his passion for Radio.

Spends Cash on Set
Instead of presenting her with money to buy clothes with, she says her husband began to spend all his free change on Radio material. This in spite of the fact that his income was stated to be over \$500 a month. Not only did Mr. Purdy spend all his money for Radio, but he spent all his time in the company of his new desire declares his wife in the complaint. Finally, the point was reached where Mr. Purdy received the choice of his wife or his Radio set, and according to the statement of Mrs. Purdy in Court, her husband chose his Radio set.

COLLEGE TO HAVE NEW BROADCASTER

Lake Forest School Will Be on the Air About May 1

CHICAGO.—Lake Forest college will soon be telling the world all about the advantages of education on the North Shore, according to plans announced today by President Moore of the institution. Contracts have been signed for the installation of a broadcasting outfit, which will be erected soon after May 1. The set will be capable of broadcasting 800 miles, it is said. The operating room and studio will be placed on the third floor of College hall with aerials strung to masts erected on College hall and North hall.

January Exports of U. S. Total \$141,577 Apparatus

American Radio exports in January fell off slightly over those of December. The exact figures were: January \$141,577 against December, \$163,236. During January, the last month for which figures are available, most of these exports went to Canada, although large shipments of apparatus went to Australia and Cuba.

Establish Customers Club

BOSTON, MASS.—Chandler & Farquhar, hardware dealers, who have opened a new store here in Winthrop Square, having an enlarged Radio department, have established a Customers' Club on the second floor, extending across the entire front of the building, and well back to the rear. Here are comfortable chairs, with all the latest Radio publications, and a library of books on Radio, and a chance to smoke and talk Radio with friends or acquaintances. Talks and expert advice are given by a staff of Radio experts to those who wish help or information. In addition, the firm constructs sets free for those who buy their parts there.

CFCN Works Five Hours' Broadcast

Special St. Patrick's Night Concert Sets New Record for Calgary Plant

CALGARY, ALTA.—Five hours of broadcasting without an intermission was the feat accomplished by CFCN, the Radio station of the W. W. Grant Radio, Ltd., at Calgary, on St. Patrick's night, Saturday, March 17. Three Irish concerts and a dance program were broadcast between 9:30 o'clock in the evening and 2:30 o'clock the next morning, Mountain Standard time.

Give Special Concert

Several local talented artists were secured to broadcast a special Irish concert for the benefit of local and Alberta Radiophans. Following this there was a special concert and partial dance program for residents of Prairie City, Oregon, which was requested by telegraph by Paul H. Crouter, of Prairie City. Then CFCN went on the air with its regular Saturday night, program, which was followed with a program for Republic, Washington, arranged with Rev. Raymond A. Riedner, pastor of the Church of the Immaculate Conception.

Following its lengthy program telegrams and letters were received from all parts of the country congratulating CFCN.

WESTINGHOUSE IS BARRED BY CHINA

MINISTER OF WAR REFUSES RIGHT TO EXPORT

Radio Apparatus Classified as Contraband of War—Refer to Arms Conference Restrictions

WASHINGTON, D. C.—The Government of China has refused the Westinghouse Electric International Corporation permission to import Radio materials into China and to establish broadcasting and receiving stations.

Application which was made through the American Legation at Peking, followed a decision by the concern to attempt to establish Radio telephony in China. Permission was refused by the Minister of War, on the ground that Radio apparatus is contraband of war, and therefore cannot be brought into China, upon penalty of seizure. Reference was made by the Chinese to the restrictions concerning Radio adopted by the Washington Arms Conference.

Records to be played on the phonograph which teach the Radio code, are now on the market and are said to be very good for anyone taking up this interesting and profitable study.

Now Obtainable!

The New
Pacent Universal Plug

A Pacent quality product that answers perfectly every plug requirement. Simple to connect—affords perfect biting contact—and the price enables you to have one for every phone cord. Ask your dealer for Number Forty PACENT Plug.

PACENT ELECTRIC CO.
Incorporated
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50¢

SALES OFFICES
Chicago—Philadelphia—St. Louis—Minneapolis—Washington, D. C.—San Francisco
Canadian and British Licensees: Colonial Radio Ltd., Hamilton, Canada

Radiophone Broadcasting Stations

Corrected Every Week—Part III

State, City, Call	State, City, Call	State, City, Call	State, City, Call	State, City, Call	State, City, Call
Alabama: Auburn, WMAV Birmingham, WOAY, WSY Mobile, WEAP Montgomery, WKAN	Alabama: Gainesville, WKAY Macon, WGAK, WMAZ Savannah, WHAO, WRAB	Louisiana: New Orleans, WAAB, WAAC, WCAG, WGV, WIAF, WWL Shreveport, KFDX, WGAQ	Oak, KFEQ Omaha, KFCC, WAAW, WIAK, WNAL, WOAW, WOU, WOV Rushville, WEAV Tecumseh, WTAU University Place, WCAJ York, KFDR	Norman, WNAD Okemah, WKAK Oklahoma City, WKY, WMAB Okmulgee, WPAC Tulsa, WEH, WGAF, WLAL	Waco, WJAD, WLAJ, WWAC Wichita Falls, WKAF
Arizona: Phoenix, KDYW, KFAD, KFCE Tucson, KDZA, KFDH	Idaho: Boise, KFAU, KFDD Kellogg, KFEY Moscow, KFAN Thomasville, WPAX Wallace, KFCC	Maine: Bangor, WMB Bangor, WPAY Houlton, WLAN	Nevada: Reno, KDZK, KFAS, New Hampshire: Laconia, WKAV	Oregon: Astoria, KFGG Baker, KFPA Corvallis, KFBJ Eugene, KFAT Hillsboro, KFEO Hood River, KFHB, KQP Marshfield, KFBH Medford, KFAY Pendleton, KFFE Portland, KDYQ, KFEC, KGG, KGN, KGW, KQY Salem, KFCD	Utah: Ogden, KDZL, KFCEP Salt Lake City, KDYL, KDYV, KZN Vermont: Bellows Falls, WLAK Burlington, WCAJ Springfield, WQAE
Arkansas: Fayetteville, KFDV Fort Smith, WCAC, WGAR Little Rock, WCAV, WEAX Pine Bluff, WOK	Illinois: Belvidere, WOAG Carthage, WCAZ Chicago, KYW, WAAF, WBU, WDAF, WJAZ, WMAQ, WPAW, WSAH, WWAY Decatur, WBAO, WCAP, WHAP Elgin, WTAS Galesburg, WRAM Mattoon, WQAL Peoria, WJAN, WQAX Quincy, WCAW Rockford, WIAB Springfield, WDAC Tuscola, WDJ Urbana, WRM	Maryland: Baltimore, WCAO, WEAR, WKC, WNAV Frostburg, WPAQ	New Jersey: Atlantic City, WHAR Camden, WRP Jersey City, WNO Moorestown, WBAF Newark, WAAM, WBS, WJZ, WOR N. Plainfield, WEAM Ocean City, WIAD Paterson, WBAN Trenton, WMAL, WOAX	Pennsylvania: Altoona, WGAW Clearfield, WPI Easton, WMAP Erie, WQAV Grove City, WSAJ Johnstown, WTAC Lancaster, WGAL McKeesport, WIK Parkesburg, WQAA Philadelphia, WCAU, WDR, WFI, WGL, WIP, WNA, WOO, WVAD Pittsburgh, KDKA, KQV, WCAE, WJAS Scranton, WQAN, WRAY State College, WPAB Villanova, WCAM Wilkes-Barre, WBAX, WNAH	Virginia: Arlington, NAA Blacksburg, WEAE Fortress Monroe, WNAW Portsmouth, WQAO Westhampton, WQAT
California: Altadena, KGO Bakersfield, KDZB, KYI Berkeley, KQI, KRE Del Monte, KLN El Monte, KUY Eureka, KNI Fresno, KDZH, KMJ Hanford, KFBD Hollywood, KEAR Long Beach, KSS Los Angeles, KDZF, KFCL, KFI, KHJ, KJS, KNN, KNV, KNX, KOG, KUS, KWH, KXS Modesto, KXD Oakland, KLX, KZM Pasadena, KLB Redding, KFAZ Richmond, KFDM Sacramento, KFBA San Diego, KDPT, KDYM, KFBC, KFFA, KON San Francisco, AGI, KDN, KZG, KDZZ, KFDB, KLS, KPO, KSL, KUO San Jose, KFAQ, KQW, San Luis Obispo, KFBE Santa Ana, KFAV Santa Barbara, KFJH Stanford Univ., KFGH Stockton, KJQ, KWG Sunnyvale, KJJ Taft, KFEB Venice, KFAV	Indiana: Anderson, WEAU Brookville, WSAL Evansville, WOAU Fort Wayne, WFAS Greencastle, WLAX Huntington, WHAY Indianapolis, WLK Marion, WIAQ Mishawaka, WQAO Muncie, WJAF South Bend, WGAZ Terre Haute, WEAC West Lafayette, WBAA	Massachusetts: Boston, WAAJ, WFAU, WNAC Dartmouth, WMAF Lowell, WQAS Medford Hillside, WGI New Bedford, WDAU Springfield, WBZ Worcester, WCN, WDAS	New Mexico: Roswell, KNJ State College, KOB	Rhode Island: Cranston, WKAP Edgewood, WEAG Providence, WVEAN, WJAR, WRAH	Washington: Aberdeen, KNT Bellingham, KDZR Centralia, KDZM Everett, KDZZ, KFBL Lacey, KGY Mt. Vernon, KFGE Neah Bay, KFHH Pullman, KFAE Seattle, KDZE, KDZT, KFHR, KHQ, KJR, KTV Spokane, KFDC, KFZ Tacoma, BEL, KFEG, KFEJ, KGB, KMO Walla Walla, KFCE Wenatchee, KDZI, KZV Yakima, KFV
Colorado: Boulder, KFAJ Colorado Springs, KFFQ, KFBV, KFCK, KHD Denver, DD5, DN4, KDZQ, KEEP, KFAF, KFDL, KLZ Gunnison, KFHA Pueblo, KFGB Trinidad, KFBS	Iowa: Ames, WOI Burlington, WIAS, WLAT Cedar Rapids, WJAM, WKAA Centerville, WDAX Council Bluffs, WPAF Davenport, WHAI, WOC Des Moines, KFDP, WGF, WHX Dubuque, WQAK Fort Dodge, KFER, WEAB Iowa City, WHAA Lamoni, KFFV Le Mars, KFCEY, WIAU Newton, WHAH Shenandoah, WGAJ Sigourney, WOAD Sioux City, WEAU, WHAE Vinton, WIAE Waterloo, WHAC, WMAR, WRAN	Michigan: Ann Arbor, WMAX, WQAJ Bay City, WTP Dearborn, WWI Detroit, KOP, WCX, WWJ East Lansing, WKAR Flint, WEA Kalamazoo, WQAP, WLAQ Lansing, WHAL Laurium, WPAV Rogers, WCAF Saginaw, WIAW	New York: Albany, WNJ Amsterdam, WPAS Binghamton, WIAV Buffalo, WGR, WWT Canton, WCAD Cazenovia, WMAC Ithaca, WEAT Lockport, WMAK Newburgh, WCAB New York, KDOV, WBAY, WDT, WEAF, WJX, WLAB Poughkeepsie, WFAF Rochester, WHAM Ridgewood, WHN Schenectady, WGY, WRL Syracuse, WBAB, WDAI, WFAW, WLAH, WNAV Tarrytown, WRV Troy, WHAZ Utica, WSL Waterford, WFAG	South Carolina: Charleston, WFAZ, WNAQ, WOA Clemson College, WSAC Greenville, WQAV Orangeburg, WGAM	West Virginia: Clarksburg, WHAK Morgantown, WHD
Connecticut: Bridgeport, WKAX Greenwich, WAAQ Hartford, WDAK Middleton, WOAS New Haven, WGAH, WPAJ Waterbury, WQAD	Kansas: Anthony, WBL Atwood, WEAD Beloit, WPAR Emporia, WAAZ Hutchinson, WLAS Independence, WFAV Liberal, WMAG Lindsborg, WDD Manhattan, WNAK, WTK Marion, WRAD Parsons, WPAJ Salina, WFAD Topeka, WJAO, WPAM Wichita, WAAP, WEAH, WEY	Minnesota: Duluth, WJAP, WMAT Hutchinson, WFAN Minneapolis, KFDZ, WBAD, WBAH, WCAS, WLAG, WLB Moorhead, WPAU Northfield, WCAL St. Cloud, WFAM St. Paul, AV7, WAAH	North Carolina: Asheville, WFAJ Charlotte, WBT Greensboro, WQAZ Raleigh, WLAC	South Dakota: Brookings, KFDY Rapid City, WCAT Sioux Falls, WFAT Vermillion, WEAJ	Wisconsin: Beloit, WKAW Kenosha, WOAR Madison, WGAY, WHA Milwaukee, WAAK, WCAV, WHAD, WIAO Neenah, WIAJ St. Croix Falls, WRAL Superior, WFAC Waupaca, WPAH
Delaware: Wilmington, WHAV, WOAT, WPAW	Kentucky: Bowling Green, WNAW Frankfort, WQAK Lexington, WQAH Louisville, WHAS WLAP Paducah, WIAR	Missouri: Butler, WNAR Cameron, WFAQ Cape Girardeau, WSAB Columbia, WAA Independence, WPAJ Jefferson City, WOS Joplin, WHAH Kansas City, WDAF, WBB, WMAJ, WOQ Marshall, WJAT Moberly, KFFP Rockport, WMAD St. Joseph, WEAK St. Louis, KFEZ, KSD, WCK, WEB, WEW, WMAJ, WRAO Springfield, WIAI, WKAS, WQAB Tarkio, WIAT Webster Grove, WOAL	North Dakota: Fargo, WDAY, WPAK Grand Forks, WQAB Mayville, WRAC Wahpeton, WMAW	Tennessee: Knoxville, WNAV Lawrenceburg, WQAN Memphis, WKN, WMC	Wyoming: Casper, KFCC, KFDF Douglas, KFBU Laramie, KFBU Fairbanks, WLAY
District of Columbia: Washington, WDM, WEAS, WHAQ, WIL, WYAY, WJH, WMU, WPM, WQAW	Florida: Jacksonville, WDAJ Miami, WIAZ, WQAM Pensacola, WGAN, WLV Tampa, WDAE, WEAT, WHAW West Palm Beach, WKAH Winter Park, WRAP	Montana: Billings, KFCH Bozeman, KFDO Butte, KFAP Great Falls, KDYS Havre, KFBE	Ohio: Canton, WWB Cincinnati, WAAD, WHAG, WIZ, WLW, WMH Cleveland, KDPM, WHK, WJAX Columbus, WBAV, WCAH, WEO, WMAN, WPA Dayton, WAI, WJAJ Fairfield, WL2 Granville, WJD Hamilton, WBAU, WRK Lebanon, WPG Lima, WOAC Marietta, WBAW Sandusky, WQAF Springfield, WLAM, WNAP Stockdale, WJAK Warren, WLAZ Washington C. O., WGAX Wooster, WGAU Youngstown, WAAJ	Oklahoma: Ardmore, WAAA	Alaska: Fairbanks, WLAY
Georgia: Atlanta, WGM, WSB College Park, WDAJ Decatur, WAAS		Nebraska: David City, WRAR Fremont, WQAE Hastings, WQAY Lincoln, KFDU, WFAV, WGAT, WJAB, WKAC, WMAH, WQAP, WSA Norfolk, WJAG		Texas: Abilene, WQAZ Amarillo, WDAK, WRAU Austin, WCM, WNAS Beaumont, WMA College Station, WTAW Dallas, WDAO, WFAA, WRR El Paso, WDAH, WPAT Fort Worth, WBAP, WPA Galveston, WHAB, WIAC Houston, WCAK, WEAY, WEV, WGAB, WRAA, WSAV Laredo, WWAX Orange, WKAL Plainview, WSAT Port Arthur, WFAH San Antonio, AS6, DM7, WCAK, WQAI Stanford, WQAZ Tyler, WQAF	Hawaii: Honolulu, KDIX, KGU, KYQ

(NOTE.—The third and last part of the schedule list appears below. Next week the first part will appear.)

WLAW, New York, N. Y. New York Police Dept.

WLAX, Greencastle, Ind. Greencastle Community Broadcasting Station. (Putnam Elec. Co.)

WLAY, Fairbanks, Alaska. Northern Commercial Co.

WLAZ, Warren, O. 100 mi. Hutton & Jones Elec. Co. Wed 8-9:15 pm, classical concert. Sat, 10:30-11:30 pm, music, sports. Sun, 7:30-8:30 pm, church services. Eastern.

WLB, Minneapolis, Minn. Univ. of Minn. 100 mi. Daily ex Sun, 12-12:30 pm, 7:30-7:50. Central.

WLK, Indianapolis, Ind. 485 also. 500 mi. Hamilton Mfg. Co. Daily ex Sun, 11-11:30 am, 12-12:30 pm, 5-5:30, reports. Tues, Thur, 8:30-10 pm, concert. Sun, 8:30-10. Central.

WLW, Cincinnati, O. 2,000 mi. Crosley Mfg. Co. Daily ex Sun, 10 am, 1 pm, 3, 4, Mon, Wed, 8-10 pm. Tues, Thurs, 10-12 pm, music, news. Sun, 11 am, church service. Central.

WMAB, Oklahoma City, Okla. 500 mi. Radio Supply Co. Mon, Wed, Thurs, 8:30-9:30 pm, concert. Central.

WMAC, Cazenovia, N. Y. 330, 250, 275 only. 500 mi. C. B. Meredith. No definite schedule.

WMAD, Rock Port, Mo. Atchinson County Mail.

WMAF, Dartmouth, Mass. Round Hills Radio Corp.

WMAE, Liberal, Kan. 75 mi. Tucker Elec. Co. Daily ex Fri, Sun, 7:30-8:30 pm, music, news. Fri, 8-9 pm, concert. Central.

WMAG, Lincoln, Neb. 100 mi. General Supply Co. Daily ex Sun, 2:15 pm, music, news. Mon, Thur, 7:30 pm, music. Central.

WMAJ, Kansas City, Mo. 485 only. 600 mi. Kansas City Daily Drivers Telegram. Daily ex Sun, 8:15 am, 9:15, 10:15, 11:15, 12:15 pm, 1:15, 2:15, weather, markets, news. Central.

WMAK, Lockport, N. Y. 485 also. 1,500 mi. Norton Labs. Tues, 8-9:30 pm, music. Eastern.

WMAL, Trenton, N. J. 100 mi. Trenton Hdwe. Co. Mon, Thur, 7:30-9 pm, music, lecture. Eastern.

WMAM, Beaumont, Tex. Beaumont Radio Equipment Co.

WMAN, Columbus, O. 50 mi. First Baptist Church. Sun., 10:30-12 m., 7:30-9 pm, church services. Central.

WMAP, Easton, Pa. 400 mi. Utility Battery Service Co. Daily ex Sun, 4-5 pm, 6-6:45. Wed, 8-9:55 pm, entertainment. Eastern.

WMAQ, Chicago, Ill. 1,500 mi. The Chicago Daily News (Fair Department Store). Daily ex Mon, 4:35-5 pm, 9:15-10. Wed, Fri, Sat, 7-7:30 pm. Tues, Thur, 7-8 pm. Central.

WMAR, Waterloo, Iowa. Waterloo Electrical Supply Co. Schedule not established.

WMAT, Duluth, Minn. 485 also. 500 mi. Paramount Radio Corp. Daily ex Sun, 11:20 am, 4:20 pm, weather; 6:15-7:30 pm, markets. Tues, Fri, 8-9:30 pm, concert. Central.

WMAV, Auburn, Ala. Ala. Polytechnic Inst.

WMAW, Wahpeton, N. D. 50 mi. Wahpeton Elec. Co. Daily, 7-7:30 pm, music, sports, news. Central.

WMAX, Ann Arbor, Mich. K. & K. Radio Supply Co.

WMAY, St. Louis, Mo. 1,000 mi. Kingshighway Presbyterian Church. Sun, 11 am, 8 pm. Tues, 7-8 pm, church services. Central.

WMAZ, Macon, Ga. 250 mi. Mercer University. Daily ex Sun, 5:30-6 pm, 7-7:30, 8:30-9:30, music. Tues, Wed, Thur, 10:30-11 am, chapel. Eastern.

WMB, Auburn, Me. Auburn Elec. Co.

WMC, Memphis, Tenn. 400, 485 only. 2,000 mi. The Commercial Appeal. Daily ex Sun, 9:30 am, 12 m, 3 pm, weather, markets; 12:30-2 pm, concert; 8, music. Wed night silent. Tues, Fri, 11 pm, Mid-night Frolic. Central.

WMH, Cincinnati, O. Precision Equipment Co. Temporarily discontinued.

WMI, Washington, D. C. 100 mi. Doubleday-Hill Elec. Co. Daily, 4:30 pm, concert, sports. Thurs, 8, 9, concert. Eastern.

WMAB, Bowling Green, Ky. 500 mi. R. D. Nichols. Daily ex Tues, 4-5 pm, 7:30-9, music. Central.

WMAC, Boston, Mass. 200 mi. Shepard Stores. Daily ex Sun, 4-5 pm, dance music. Tues, Thur, 7-8:30 pm, Wed, Sat, 9:30-11 pm, Fri, 8-9:30 pm. Sun, 11-12 am, 2:30-4 pm, 6:30-8:30 pm, church services, Eastern.

WMAD, Norman, Okla. 200 mi. Okla. Radio Engineering Co. Daily ex Sun, 7:45-8:15 pm, news. Central.

WMAN, Manhattan, Kans. Manhattan Radio Supply Co.

WNAL, Omaha, Neb. R. J. Rockwell

WNAM, Evansville, Ind. 200 mi. 485 also. Ideal Apparatus Co., Inc. Mon, Wed, Fri, Sat, 10-11 am, music, reports; 3-4 pm, 7-8, entertainment. Sun, 3-4 pm, music. Central.

WNAN, Syracuse, N. Y. 1,000 mi. Syracuse Radio Tel. Co. Mon, Wed, Sat, 7:30-9:30 pm, concert, agriograms, etc. Eastern.

WNAQ, Charleston, S. C. Charleston Radio Elec. Co.

WNAF, Springfield, O. 200 mi. Wittenberg College.

WNAR, Butler, Mo. C. C. Rhodes.

WNAS, Austin, Tex. Tex. Radio Corp. (Austin Statesman)

WNAT, Philadelphia, Pa. 500 mi. Lennig Bros. Co. Daily ex Sun, 12:15-1 pm, Wed, Sat, 7:30-9:30 pm. Sun, 2:30 pm, 4:30, church services. Eastern.

WNAV, Knoxville, Tenn. People's Tel. & Telg. Co.

WNAW, Fortress Monroe, Va. Henry Kunzmann.

WNAY, Yankton, S. D. Dakota Radio Apparatus Co.

WNB, Baltimore, Md. Shipowner Radio Service.

WNJ, Albany, N. Y. 60 mi. Shotton Radio Mfg. Co., Inc. Daily ex Sun, 10-10:15 am, market reports. Wed, 8:15 pm, concert. Eastern.

WNO, Jersey City, N. J. Wireless Telephone Co of Hudson Co., N. J.

WOAA, Ardmore, Okla. Dr. Walter Hardy.

WOAB, Grand Forks, N. Dak. 50 mi. 485 also. Valley Radio. Daily ex Sun, 10-11 am, 2-2:30 pm, entertainment, reports. Sun, 3-4 pm, music, church service. Central.

WOAC, Lima, O. Maus Radio Co.

WOAD, Sigourney, Ia. Friday Battery & Elec. Co.

WOAE, Fremont, Neb. Medland College.

WOAF, Tyler, Tex. 485 also. 50 mi. The Tyler Commercial College. Daily ex Sat & Sun, 12 m, weather, markets; 7 pm, weather, codes; 10:15, U. S. Navy press. Sun, 11 am, 7:30 pm, church service. Central.

WOAG, Belvidere, Ill. Apollo Theatre.

WOAH, Charleston, S. C. 200 mi. Palmetto Radio Corp. Mon, Thur, Sat, Sun, 10 pm-11 am, music. Eastern.

WOAI, San Antonio, Tex. 485 also. 1,800 mi. Southern Equip. Co. (Evening News-Express.) Daily ex Sun, 10:30 am, 12:15 pm, 3, 6, news, markets. Tues, Sun, 9:30-10:30 pm, concert. Thurs, 7:30-8:30 pm, concert. Central.

WOAJ, Parsons, Kans. 50 mi. C. E. Ervin. Thurs, 7-8 pm, music, lectures, news. Sun, 3-4:30 pm, Sermon, music, news. Central.

WOAK, Frankfurt, Ky. Collins Hardware Co.

WOAL, Webster Groves, Mo. 300 mi. W. E. Woods. Sun, 3-5 pm. Central.

WAN, Lawrenceburg, Tenn. 1,000 mi. James D. Vaughan. Daily, 8-9 pm, concert. Central.

WOAP, Mishawaka, Ind. 200 mi. Lyradion Mfg. Co.

WOAQ, Kalamazoo, Mich. Kalamazoo College.

WOAR, Portsmouth, Va. Portsmouth Radio Assn.

WOAS, Kenosha, Wis. H. P. Lundskow

WOAS, Middletown, Conn. 100 mi. Bailey's Radio Shop. Daily ex Sun, 4:15-6 pm, music. Sat, 9-12 pm, dance music. Eastern.

WOAT, Wilmington, Del. Boyd Martell Hamp.

WOAU, Evansville, Ind. Sowder Bowling Piano Co.

WOAV, Erie, Pa. 600 mi. Penna. Nat'l Guard. Tues, Thurs, 8:30-10 pm, music. Fri, 10 pm, sports. Sun, 7-8 pm, church services. Eastern.

WOAW, Omaha, Neb. Woodmen of the World.

WOAX, Trenton, N. J. 342 only. 300 mi. F. J. Wolff. Intermittent schedule.

WOAY, Birmingham, Ala. John M. Wilder.

WOAZ, Stanford, Tex. Penick Hughes Co.

WOC, Davenport, Ia. 400 and 485 only. 1,000 mi. Palmer School of Chiropractic. Daily ex Sun, Tues, night, 10:55 am, time; 11, weather; 12 m, chimes; 2 pm, markets; 3:30, talk; 5:45, chimes, ex Wed; 9:30, sports; 7, concert; 10 pm, concert, Wed, only; 9:30 pm, concert, Sat only; Sun, 9 am, chimes; 1:45 pm, 6, concert; 7, church services; 8, concert. Central.

WOI, Ames, Ia. 485 also. 200 mi. Iowa State College. Daily ex Sun, 9:30 am, 12:45 pm, 9:30, music, weather. Central.

WOK, Pine Bluff, Ark. 485 also. 500 mi. Ark. Light & Power Co. Tues, Fri, 9-10 pm, concert. Sun, 11-12 m, 7:30 pm, church services. Central.

WOO, Philadelphia, Pa. 400 only. 500 mi. John Wanamaker. Daily ex Sun, 11 am, organ recital; 11:30, weather; 12 m, time; 4:45 pm, organ recital; 9:55, time; 10:02, weather. Mon, Thurs, 7:50 pm, concert. Eastern.

WOQ, Kansas City, Mo. 485 also. 1,000 mi. Western Radio Co. Mon, Tue, Wed, Thur, 9:45 am, 10:55, 11:30, 12:30 pm, 2, 7:30, time signals, reports, etc. Fri, 1:15 pm, sacred service, Sat, 8 pm, concert. Sun, 7 pm, concert.

WOR, Newark, N. J. 490 only. 2,000 mi. L. Bamberger & Co. Daily ex Sun, 2:30-4 pm, 6:15-7:30, music, talks; Tues, Fri, 8-11 pm, music, entertainment. Eastern.

WOS, Jefferson City, Mo. 485 also. 1,500 mi. Missouri State Marketing Bureau. Daily ex Sun, first 15 min. of every hour from 8 am-2 pm, markets. Daily, 5 pm, music, markets. Mon, Wed, Fri, 8-9:30 pm, concert. Central.

WOV, Omaha, Neb. R. B. Howell

WOU, Omaha, Neb. Metropolitan Utilities Dist. 485 also. 1,000 mi. Fort Worth Record. Daily ex Sun, 10:55-11 am, 11:30-12 m, 1:30-2 pm, 2:30-3, 6-6:30. Daily ex Sun, Mon, Wed, 8:30-9:30 pm, 10-10:05. Mon, 11-12 mid. Sun, 3-3:30 pm, 9-9:30. Central.

WPAA, Waco, Neb. Anderson & Webster Elec. Co.

WPAB, State College, Pa. Pa. State College.

WPAC, Okmulgee, Okla. Donaldson Radio Co.

WPAD, Chicago, Ill. 500 mi. W. A. Wieboldt & Co. Daily ex Sun, 12:30-1:30 pm, 6:30-7 pm, music. Wed, Fri, 10-11 pm. Sun, 2:30-3:30 pm. Central.

WPAF, Council Bluffs, Ia. Peterson's Radio Co.

WPAG, Independence, Mo. Central Radio Co., Inc.

WPAH, Waupaca, Wis. 485 only. 3,000 mi. Wisconsin Dept. of Markets. Daily ex Sun, 8:30 am, 9:30, 10:30, 11:30, 3 pm, 5, markets, weather, news, etc. Central.

WPAJ, New Haven, Conn. Doolittle Radio Corp.

WPAK, Fargo, N. D. North Dakota Agricultural College.

WPAL, Columbus, O. Superior Radio & Tel. Equip. Co.

WPAM, Topeka, Kans. Awerbach & Guettel

STATION SCHEDULES

(Continued from page 8)

WPAF, Winchester, Ky. Theodore D. Phillips.
WPAQ, Frostburg, Md. General Sales & Engineering Co.
WPAR, Bolott, Kan. 50 ml. R. A. Ward. No definite schedule.
WPAS, Amsterdam, N. Y. J. & M. Electric Co.
WPAT, El Paso, Tex. Saint Patrick's Cathedral.
WPAU, Moorhead, Minn. Concordia College.
WPAV, Laurium, Mich. Tinetti & Sons.
WPAW, Wilmington, Del. 50 ml. The Radio Installation Co. Daily ex Sun, 4-6:30 pm, music, code instruction. Wed, 8-10:30 pm, music, Eastern.
WPAZ, Thomasville, Ga. 25 ml. S-W Radio Co. Daily ex Sun, 5-6 pm, roads, weather, stocks, music. Mon, Wed, Fri, 8:30-9:30 pm, music. Sat, 10-11 am, codes. Sun, 11:30 am-12:30, 8:30 pm-9:30, church service, Eastern.
WPAZ, Bangor, Me. Bangor Radio Lab.
WPAZ, Charleston, W. Va. Dr. John R. Koch.
WPG, New Lebanon, O. 485 also, 1,500 ml. Nushawg Poultry Farm. Daily ex Sun, 12-12:15 pm, news, 6-6:30 pm, markets Mon, Fri, 8-9:45 pm, music, farm program, Central.
WPI, Clearfield, Pa. Elec. Supply Co. pm, news, Mon, 8 pm, concert, Eastern.
WPM, Washington, D. C. 200 ml. Thos. J. Williams, Inc. (Washington Daily News.) Daily ex Sun, 12:30 pm, news, Mon, 8 pm, concert, Eastern.
WQAA, Parkersburg, Pa. 1,500 ml. Horace A. Boale, Jr. Daily, 10:30 pm, Eastern.
WQAB, Springfield, Mo. Southwest Missouri State Teachers College.
WQAC, Amarillo, Tex. 200 ml. E. B. Gish.
WQAD, Waterbury, Conn. 310 only, 30 ml. The Whittall Elec. Co. Mon, Wed, Fri, 6:30-7:45 pm, music. Boy Scout news, Wed, 8:30-9:30 pm, concert, Eastern.
WQAF, Sandusky, O. Sandusky Register.
WQAH, Lexington, Ky. Brock-Anderson Elect. Eng. Co.
WQAI, Ann Arbor, Mich. Ann Arbor Times News.
WQAK, Dubuque, Ia. Appel-Higley Elec. Co.
WQAL, Mattoon, Ill. 100 ml. Coles County Tel. & Tel. Co. Tues, Thurs, 9-11 pm, music, lectures, Central.
WQAM, Miami, Fla. 500 ml. Electrical Equip. Co. Daily ex Sun, 5:15-5:45 pm, news, stocks, weather; 7-7:30 pm, music. Sun, 9-11 pm, music. Eastern.
WQAO, New York City, N. Y. 300 ml. Calvary Baptist Church. Sun, 11:15-12:15 am, 3:30-9:30 pm, church services, Eastern.
WQAP, 100 ml. Nebr. Am. Radio Co.
WQAR, Muncie, Ind. Press Pub. Co.
WQAT, Richmond, Va. 200 ml. Radio Equipment Corp. Daily ex Sun, 2-5:15 pm, music. Sun, 3-5, Eastern.
WQAS, Lowell, Mass. 50 ml. Prince-Walter Co. Daily ex Sun, 10:45-11 am, 2:30-3 pm, music. Mon, Wed, Fri, 6-7 pm, news, concert, Thurs, silent, Eastern.
WQAV, Greenville, S. C. 75 ml. Huntington & Guerry, Inc. Tues, Thurs, 7:30-8:30 pm, music. Sat, 7:30-8 pm, music, Eastern.
WQAW, Washington, D. C. Catholic University of America.
WQAA, Houston, Tex. 400 ml. Rice Institute. Mon, 8-9 pm, concert, college activities. Sun, 4:30 pm, extension lectures, Central.
WRAB, Savannah, Ga. Savannah Board of Public Education.
WRAD, Mayville, N. D. State Normal School.
WRAD, Marion, Kans. Taylor Radio Shop.
WRAH, Providence, R. I. Stanley N. Reed.
WRAJ, Pittsburgh, Pa. M. H. Pickering Co.
WRAL, St. Croix Falls, Wis. Northern States Power Co.
WRAM, Galesburg, Ill. 200 ml. Lombard College. Wed, 7:30-9 pm, college activities, announcements, schedule irregular, Central.
WRAN, Waterloo, Ia. 100 ml. Black Hawk Electrical Co. Daily ex Sun, 5 pm, 5:30, concert, news. Mon, Fri, 8:30-9:15 pm, concert. Sun, 11:15, church services, Central.
WRAR, David City, Nebr. 100 ml. Jacob C. Thomas. Tues, Fri, 7-9 pm, Central.
WRAU, Amarillo, Tex. 50 ml. Amarillo Daily News. Tues, Thurs, 7:30-8:30 pm, music, Central.
WRAV, Yellow Springs, O. Antioch College.
WRAV, Scranton, Pa. 485 also, 100 ml. Radio Sales Corp. Daily ex Sun, 11 am, music; 12 m, reports; 3:15-5:30 pm, reports, music; 7, bedtime stories, music. Wed, 8:15-9:45 pm, music. Sat, 8:15, 10:30 pm, music. Sun, 4 pm, chapel, Eastern.
WRK, Hamilton, O. 1,000 ml. Doron Bros. Elec. Co. Tues, Thur, 9-10:30 pm, music, lecture. Sun, 10:30 am, church service, Central.
WRL, Schenectady, N. Y. Union College Radio Club.
WRM, Urbana, Ill. 300 ml. Univ. of Ill. Mon, Thurs, 8:30-8:50 pm, 9-9:30, Univ. news, talks, music, Central.
WRP, Camden, N. J. 250 ml. Federal Inst. of Radio Telg. Daily ex Sat, Sun, 10-10:45 pm, music, news, agriograms, Eastern.
WRR, Dallas, Tex. 485 also, 200 ml. City of Dallas. Daily ex Sun, 12-12:30 pm, weather; 3-3:30, sports, markets, news; 7-7:15, police news; 8-8:30, music. Sun, 11 am, church service; 7-8 pm, police news, church service, Central.
WRW, Tarrytown, N. Y. 1,000 ml. Tarrytown Radio & Research Laboratory. Mon, Thurs, Sat, 6:15-7 pm, 7:30-8:30, 10:30-12 pm, Sun, 1-3 pm, Eastern.
WSAA, Marietta, O. 50 ml. B. S. Sprague Elec. Co. Wed, 7:30 pm, Eastern.
WSAB, Cape Girardeau, Mo. Southeast Mo. State Teachers College.
WSAC, Clemson College, S. C. Clemson Agri. College.
WSAH, Chicago, Ill. A. G. Leonard, Jr.
WSAJ, Grove City, Pa. 700 ml. Grove City College. College activities, no definite schedule.
WSAL, Brookville, Ind. Franklin Elec. Co.
WSAS, Lincoln, Nebr. 485 also, 700 ml. Nebr. Dept. of Agri. Daily ex Sat pm and Sun, 10 am, 11, 12:20 pm, 2, reports, Central.
WSAV, Houston, Tex. Clifford W. Vick. Temporarily discontinued.
WSB, Atlanta, Ga. 400 and 485 only, 1,500 ml. Atlanta Journal. Daily ex Sun, 12-1 pm, music; 2:30, reports; 4-4:45 pm, music; reports; 5-6 pm, 7-8, 10:15-12, music. Sun, 10:54 am, 5-6 pm, 7:30-9, church services, Central.
WSL, Utica, N. Y. 500 ml. J. & M. Elec. Co. Daily ex Sat, Sun, 11-11:30 am, 2-2:30 pm, 3-3:30, 4-4:30, 5-5:30, music, news, Mon, Wed, 8-9 pm, Sat, 11-11:30 am, 5-6 pm, 8-9, Sun, 10:30-12 m, 7:30-9 pm, Eastern.
WSN, Norfolk, Va. 100 ml. Shipowners Radio Service. Mon, Wed, Sat, 8:15-9:30 pm, concert, Eastern.
WSY, Birmingham, Ala. 2,000 ml. Alabama Power Co. Daily ex Sun, 9:30 am, 3 pm, 3:30, news, weather. Mon, Wed, Fri, 8 pm, music, Tues, Thurs, 5 pm, entertainment. Sun, 11 am, 7:30 pm, church services, Central.
WTAC, Johnston, Pa. Penn Traffic Co.
WTAU, Tecumseh, Neb. Rugsy Battery & Elec. Co.
WTAW, College Station, Tex. 200 ml. Agricultural and Mechanical College of Tex. Wed, Fri, 7:30-8:30 pm, addresses. Sun, 11 am, 4 pm, 7, church services, Central.
WTG, Manhattan, Kan. 485 only, 75 ml. Kan. State Agri. College. Daily ex Sun, 9:55 am, weather (code), Central.
WTP, Bay City, Mich. 75 ml. Ra-Do Corp. Mon, Wed, Fri, 1:30-2 pm, reports, news; 6:30-7:30 pm, concert, Central.
WVAC, Waco, Tex. 485 also, 1,500 ml. Sanger Bros. Daily ex Sun, 11 am, weather; 1:30 pm, entertainment. Wed, Sat, 8 pm, music, entertainment, Central.
WWAD, Philadelphia, Pa. Wright & Wright, Inc.
WWAX, Laredo, Tex. 150 ml. Wormser Bros. Daily ex Sun, 4:30-5:30 pm, music. Mon, Sat, 8-9 pm, music, Central.
WWAY, Chicago, Ill. Marigold Gardens.
WVB, Canton, O. 300 ml. Daily News Printing Co. Tues, Thurs, 8-9 pm, Eastern.
WVI, Dearborn, Mich. 200 ml. Ford Motor Co. Wed, 10-11 pm, music, lectures, Eastern.
WVJ, Detroit, Mich. 400, 485 only, 1,500 ml. Evening News. Daily ex Sun, 9:30-9:45 am, household hints; 9:45-10:25, health talks; 10:25-10:30 am, weather; 11:55-12, time; 12:05-12:45 pm, music; 3-3:30, music; 3:30-3:35, weather; 3:35-4:15, markets; 5-6, markets; 7-10, entertainment. Sun, April 15, and every other week, 11 am, 5:30 pm, church services. Sun, fill in weeks, 2 pm, concert; 7:30, church services, Eastern.
WWL, New Orleans, La. Loyola Univ.
WWT, Buffalo, N. Y. 200 ml. McCarthy Bros. & Ford. Daily 2-4:30 pm, 7:30-9:30, Eastern.
(Note.—This completes the station schedule list. The first part will appear again next week.)

Largest Radio Store in America RADIO BUY HERE FOR LESS Largest Radio Store in America

Radio Supplies purchased here are sold under a positive guarantee of satisfaction. We carry the largest new stock of first quality merchandise.

Complete Parts for Ultra Audion Circuit (Known as the Wonder) \$11.90

Table listing components for Ultra Audion Circuit: 9x10 1/2 Formica Panel, 23-Plate Condenser, Bakelite Socket, etc. with Regular Price and Our Price columns.

Freund's Wonder Circuit \$13.20

Table listing components for Freund's Wonder Circuit: 9x10 1/2 Formica Panel, 9x10 1/2 Genuine Solid Mahogany Cabinet, etc. with Regular Price and Our Price columns.

Complete Parts for Reinartz Sets, \$11.45

Table listing components for Reinartz Sets: 7x13 Formica Panel, Remler Bakelite Socket, Howard Vernier Rheostat, etc. with Regular Price and Our Price columns.

Complete Parts for 2 Step Amplifier \$12.45

Table listing components for 2 Step Amplifier: 7x10 Formica Panel, High Ratio All-American or Thordarson Transformer, etc. with Regular Price and Our Price columns.

Table listing various components: Moulded Variometers, 180° Moulded Variocouplers, Mahogany Variometers, etc. with Regular Price and Our Price columns.

Table listing various components: Brandes Superior Headset, Valley Battery Chargers, Antenna Aerial Plug, etc. with Regular Price and Our Price columns.

Complete Parts for Knocked-Down Receiving Set \$17.95

Table listing components for Knocked-Down Receiving Set: 2 Variometers, 1 Variocoupler, 3 Bakelite Dials, etc. with Regular Price and Our Price columns.

Complete Parts for Flewelling Circuit \$12.45

Table listing components for Flewelling Circuit: 6x14 Formica Panel, 23 Plate Variable Condenser, etc. with Regular Price and Our Price columns.

Table listing VARIABLE CONDENSERS: \$4.30 Value, 43 PLATE, now \$1.75; \$7.00 value 43-plate Vernier Variable Condenser, etc.

U.S.A. SIGNAL CORPS Aviation Type 194-W WESTERN ELECTRIC PHONES, \$7.95

Each Phone Cap is covered with soft rubber ear cushions, and an aviation leather helmet goes with each set! These are the only phones to pass the Government specifications for sensitiveness and loudness, the requirements called for in aircraft reception.

ORIGINAL BALDWIN PHONES

These are the Genuine Nathaniel Baldwin "Mica Diaphragm" \$9.95 Genuine Baldwin "Mica Diaphragm" Type \$4.65 "C" Loud Speaking Units. Special..... \$27.45

3000 Ohm GUARANTEED HEADSETS, \$8.50 Value \$3.65 | MAGNAVOX, LOUD SPEAKERS, Type R3 . . . \$27.45

Table listing JACKS, HONEYCOMB COIL, and Cabinets with various specifications and prices.

FORMICA PANEL, 1/8" thick, Black or Brown, Square Inch . . . 1 1/2c

We guarantee all merchandise purchased of us. Mail orders receive immediate attention

Complete Parts for Single Tube Reflex Circuit . . . \$32.65

Table listing components for Single Tube Reflex Circuit: 43-Plate Vernier Variable Condenser, Howard Potentiometer, etc. with Regular Price and Our Price columns.

BUY HERE FOR LESS CHICAGO SALVAGE STOCK STORE 509 South State Street CHICAGO, ILLINOIS

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Aid to Shorthand Students

Good Practice Obtained by Taking Down Speeches

EVERY day brings to light another use for Radio broadcasting. It is now revealed that students of shorthand and typewriting are picking up addresses out of the ether to increase their speed at the typewriter or in writing shorthand symbols of the speaker's words. Those who have had to rely upon the patience of a member of the family or a friend to read to them while they dashed off the dots, dashes and curves, can appreciate the advantage of Radio dictation.

Railroads Considering Radio

Large Demands for Communication Forces New Methods
THE unusual development of the Radio in recent months has aroused renewed interest in the investigation now being conducted by the Telegraph and Telephone section of the American Railway association in the use of Radio and wire carrier systems on the railroads.

The committee having this in charge are consulting with manufacturers of Radio equipment so as to make a study of the feasibility of securing carrier current telegraph operation over railroad wire plants.

It is the intention to use Radio to a greater extent on railroads, wherever it can be placed to advantage at the present time and to gain a place for standardization on all systems.

Warning to the Youth

Be Careful About High Power Electric Wires

RECENTLY a boy of 16 years rose early one morning to fasten his wires to the rear porch of his home and in doing so he tossed the ends across an electric light service wire, the ends of the antenna falling to the next door yard. He ran down and grasped them. The wires stuck and he tugged and twisted them. This tugging wore the insulation from the electric light wires and there was a flash. The boy fell to the ground screaming—his hands and arms were burned by the high voltage which had run through his antenna wires. He was started for the hospital but he died en route.

Radio experts can draw a lesson from the tragedy, pointing to it as a warning to youthful Radiophans for exceptional care in the preparation of their sets in the city and the dangers of permitting antenna to be too close to power and light wires.

Advertising with Noise

Filling the Air with Overstrained Music Is Obnoxious

THERE have been complaints to our office on many different subjects but the most recent one, and one that is quite common to most of us, is for Radio shops to make as much noise from their stores as it is possible for them to make. The expectation, of course, is to gain trade by this manner of supposed advertising. One local paper in a certain community says, "Loud, noisy, nerve-racking, tormenting and torturing music comes from the Radio store." In this community a petition was circulated which had many signers. It was used to place the grievance before the commissioners. The petitioners said that after a solid day spent in listening to the strains of jazz and syncopated canned music as wafted to the street from the Radio shop they do not only go half mad, but they are unable to work with normal efficiency.

Recently we published an editorial on "Ether Etiquette" which pointed out the unsportsmanlike methods of breaking into concert time or, in other words, "speaking out loud in an assembled audience." Now this complaint comes at the other end of the line. Neighbors' rights are again trodden to earth.

It may be all right to fill the air with music from one's retail store, but it would be better to confine it within the walls. Then, too, with the tone brought down to where it should be, the reproduction will be more perfect and the all-around results and business getting will be better.

Condensed

Radio, as usual, is abreast of the times. Ever since the discovery of Tut-ankh-Amen's resting place and the treasures buried with him, there has been a mad rush to make everything we wear and do correspond to that period in ancient Egypt. So Station WJAX, of Cleveland, broadcasted a Radio night in Egypt and made quite a hit. This is the first, I believe, that Radiophony has been used to pay homage to King Tut, who, if he could see and hear again would find just a few things of which his age could not boast—Radio among them.

Nearly all fans are agreed on one thing and that is the genuine observance of a silent period. Chicago is not alone in its attitude toward the "staggered hour" scheme as it is a dangerous substitute for a real period of silence. Nothing short of an entire evening's silence on the part of local broadcasting stations should be countenanced. This subject has been hashed and rehashed until it would seem as though we were ready to go ahead and do something, but some such substitute as the staggered hour comes up to prove how slow is our progress. One fan in the East wrote a savage letter to a daily newspaper expressing his candid opinion of a local station whose duty seemed to be to broadcast each evening until a very late hour. He was desirous of hearing something other than the announcement of that station's call letters. There remain some stations who would seemingly prefer to shut down completely rather than give one evening a week to the reception of outside broadcasting. But that leads to another observation.

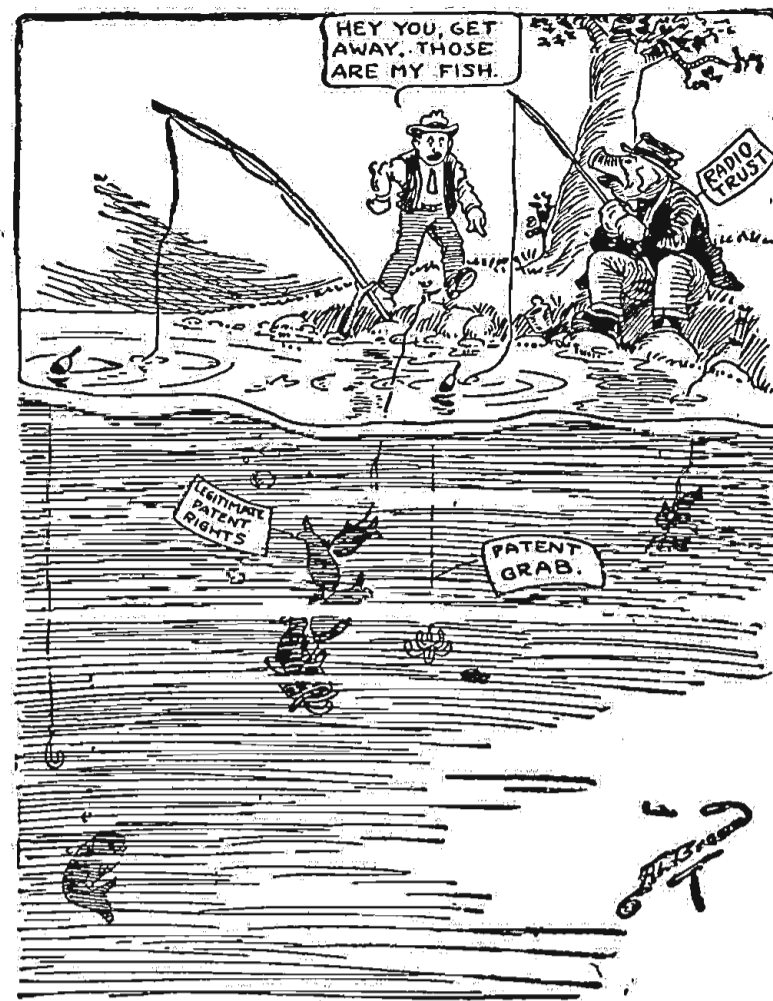
Some of the interference now experienced by those operating receiving sets will disappear with the allocating of higher wave bands to broadcasting stations. This was proposed by the National Radio Chamber of Commerce at the meeting called by Secretary Hoover a short time ago. Extending the range of wavelengths to include up to 550 meters would lessen the present jam on two wave lengths, considerably clearing the air. Perhaps this should have been attended to before now; yet we must not lose sight of the fact that until rather recently no one foresaw the trouble resulting from so many licenses to broadcast. It had to be either a reduction of the number of stations licensed or a greater number of wave bands on which they could operate. Possibly the English rule was a very wise one pertaining to broadcasting. Our problem will soon be solved and then we can enjoy listening in with a minimum of interference.

You may have read of the appeal to the Department of Commerce from a blind man in South Dakota for a receiving set, as he understood these were being distributed to the blind. Of course no such generous plan is in effect anywhere in our government departments. However, the Government Radio authorities are urging private parties to contribute to a fund for the express purpose of purchasing sets for the afflicted. A blind person is so limited in his contact with the rest of the world without a receiving set and so very much a part of it with one. Surely inexpensive equipment could be assembled at specified points and then distributed to those so sorely needing them. Radio Clubs might profitably spend some of their time in constructing sets for the blind; bringing credit to the club and untold joy to the sightless.

Music carried by Radio is being used in one instance to supply this necessary adjunct to a movie house. A Radio amplifier installed in the gallery of Old Chapel at Pennsylvania State College gives to the students music from a large group of broadcasting stations, insuring good orchestra music with the cinema. There are times when the selections being transmitted are held despite the incongruity sometimes noticed, as, for instance, a comedy picture with music of a serious or sacred nature. At this student Y. M. C. A. gathering there are in the neighborhood of one thousand present and some of the music heard there originates in the city of Chicago. This is said to be the only motion picture audience in the country securing its music in this manner.

The popularity of exercising to Radio has entered a stage of low visibility, yet Station WHAS has made a valiant attempt to renew the interest in this gymnastic feature. Not only does this station devote a certain period to instruction in health exercises, but they arrange them in such a manner that they may be followed when headsets are used. A picture was shown in a Radio paper of the entire office force in one company taking their regular exercises to the instructions coming through the loud speaker. Invite in all your friends who have not the advantage of a receiving set and then get WHAS to lead you all in alleviating torpidity of the liver. That sad looking gentleman with sallow complexion will become a new individual after a few trips to your home while this feature is being broadcast. Try it.

There are certain limitations to the things a licensed liquor dispensary in England may do and one of them concerns Radio. So many owners of hotels and restaurants have been impressed with the attractiveness of providing their patrons with Radio reception that they have installed these wherever possible. However, the British authorities have recently ruled that public houses in England may not install Radio sets, as to do so would convert them into a different type of entertainment house than that stipulated in the liquor license. We have no such restrictions over here, but then we haven't the liquor houses either.



RADIO INDI-GEST

(This column is open to all aspiring Radioknuts who tender suitable contributions. Try to "make" the column if you can. All unsuitable manuscripts are turned over to the Office Squirrel who does not guarantee their return or anything else for that matter.—Indi.)

The Radio Tramp By Walt Drummond

At times, when tuning in your set,
You hear a g-r-r-r! and clack!
And other sounds come trooping in—
You cannot keep them back.

Now, I will tell who makes these sounds,
It's my friend, Happy Jack;
He's either on his way somewhere,
Or else he's coming back.

Jack was an old-time printer tramp,
Was ever "on his way,"
Who rode a hundred thousand miles
In box-cars in his day.

He worked on every sheet of note,
A day or two at most;
He'd journey from the north down south,
And then from coast to coast.

One day, about five years ago,
Jack halted here to rest;
He'd worked his way in from the east,
Was headed to the west.

He said to me: "In this fast age,
The freight train is too slow.
I've had a hunch when 30's called
I'll ride the Radio.

(The "Radio Tramp" will be concluded in April 21 issue)

We Don't Read the Disgust

Dear Indi—'Slie. 'Slie. I don't believe it either! You are allus saying something about QRM and there ain't no sech station. I know 'cause it ain't on page 8 of the Disgust. See for yourself. —Peggy.

Your Third Question Is Correct

dear indi—as i am a reader of the radio disgust i think i got a rite to ask some q & a's—(1) can you play dx records on the phonograph? (2) do you have to change the toobes plates to bowls when you use a souper set? horribly yrs, dick h roberts—hootstown arkansas.

You Are Right, You're Right, We'll Sayurite!

Indi—In some section "squeals" are bothering the fan. Probably the air hogs.—Lillian G.

Yea, He Lives in Our Block

Dear Indi—A headline reads: "1,000,000 persons within 3,000 miles of the city to hear 'The Fool.'" Who using Radio has not heard him, I ask you?—Rita M.

There was a young man from Wilmette
Who rigged up a Radio-set,
When he tuned in the latter
He heard the thing chatter,
"Good-Night," with the whole alphabet.
—In Disgust.

—Or the "Lost Chord"

Indigest—I suggest the "Broken Melody" might be appropriate when statie is around.—S. N.

A. B. C. Lessons for Radio Beginners

Chapter XV—Construction and Use of the Loop Aerial

By Arthur G. Mohaupt

THE loop aerial is a convenient form of aerial to use for receiving Radio messages and broadcast entertainments when it is difficult or impossible to erect a suitable outdoor antenna, or when an aerial is desired that can be readily carried from place to place without involving extensive erection or construction work.

The loop aerial is also the best type of aerial to use when it is desired to reduce to a minimum the interference resulting from other stations operating at or nearly at the same wave length. In fact, it is in these extreme directional effects that the greatest possibilities and values of the loop aerial lie. For example, a properly designed loop aerial can be directed toward a distant transmitting station, and the signals received without practically any interference from local or nearby stations, except in case one of these is in the same line with the distant station.

Advantages of Loop Aerial

Other advantages of a loop aerial are that it is entirely immune from any dan-

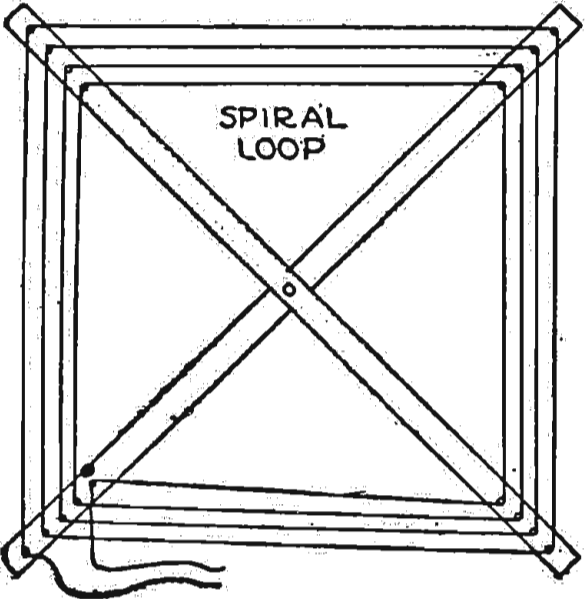


Fig. 52

ger due to lightning, and that it is not affected by atmospheric or weather conditions. Static also does not interfere with the effective operation of the loop.

In spite of these numerous desirable features, the loop aerial is by no means a perfect aerial, for the amount of energy it can absorb is very small, and hence Radio frequency amplification is necessary before the incoming oscillations are strong enough to be impressed upon the input or grid circuit of the detector tube. This not only adds to the initial expense of the required apparatus, but it also adds to the number of adjustments that must be made in the tuning process.

The loop aerial really came into existence only during the last few years, for prior to that the principles underlying

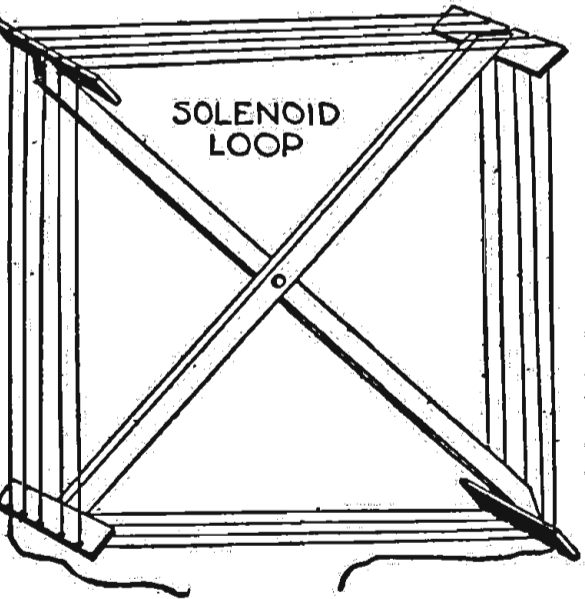


Fig. 53

Radio frequency amplification were still very vague, and suitable apparatus was not available on the market for effectively receiving the small amounts of energy accepted by a loop aerial. However, with the advances made recently in the design and perfection of Radio frequency amplifying apparatus, the loop aerial has now come into its own, and bids fair to extensively replace the old familiar outdoor aerial where compact and portable receiving equipment is desired.

Types of Loop Aerials

As the name suggests, the loop aerial consists of a long wire wound in the form of a loop or coil and held rigid on some convenient and sturdy support. This loop may be wound in different forms or shapes; for example, it may be wound in the form of a square, rectangle (one pair of sides longer than the other) or a triangle (three-sided loop). Some loops have even been wound in the form of a figure eight, or a square loop with figure eight windings. However, from numerous trials and tests it has been found that the most

satisfactory form of loop, both from the point of view of directional qualities and receiving efficiency, is the square loop.

ing. If the plane of the coil is parallel with the front of the wave, that is, if one face of the coil is in the direction the

It passes over the ends of the 42-inch supporting sticks, it is a good plan to mount bakelite end pieces with suitably cut

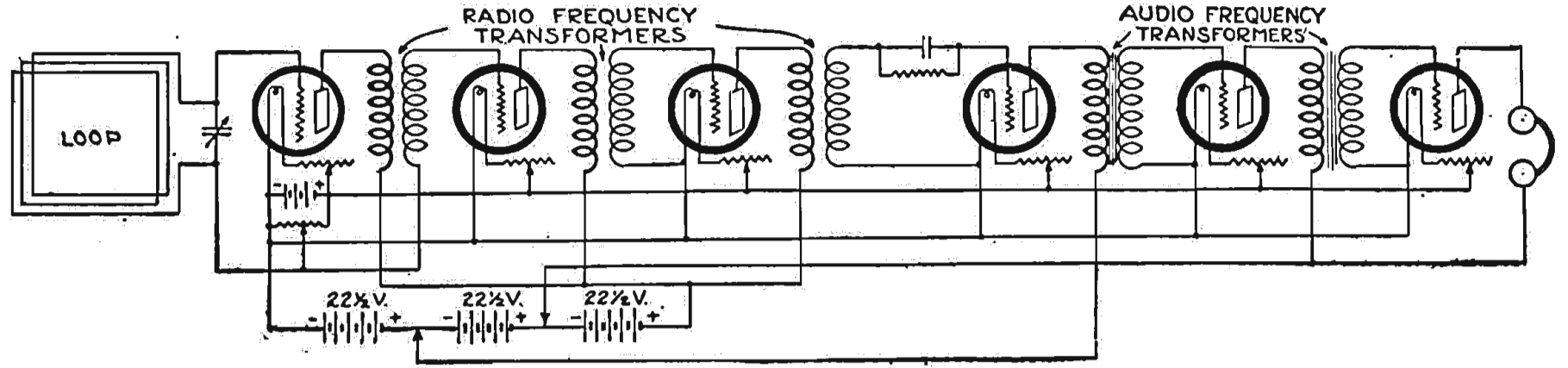


Fig. 54

The square loop is easily constructed, is very directional, and if properly designed forms a very effective receiver.

The Spiral Loop

The square loop, in turn, can be wound in two ways. In the first place, it can be wound in the form of a spiral with one turn inside of the other and each turn becoming smaller as the center of the loop is approached. A loop aerial of this type is illustrated in Figure 52. As is shown, the wire starts at one corner, and after making one complete turn, the second turn is started inside of the first, the successive turns being spaced about one-half inch apart. The spiral loop thus resembles a large pancake coil, with all the wires lying in the same plane and each successive turn being smaller than the preceding turn.

The Solenoid Loop

Another way of winding a square loop is illustrated in Figure 53. Here the loop is wound in the form of a large square coil or solenoid with a very large diagonal compared to its length. This form of loop aerial seems to be the more popular and is used to a greater extent than the spiral loop. One important feature about it is that it lends itself readily to being wound on the interior of the cabinet enclosing the receiving apparatus. Such an arrangement forms a very compact and self-contained unit; and if used in conjunction with suitable Radio frequency amplifying apparatus, it gives very satisfactory and efficient service.

The spiral loop is highly directional and can be wound to be very compact. It is used very extensively for Radio compass stations and direction finders. It possesses the disadvantage, however, that its operation is restricted to the shorter wave lengths, in that it cannot easily be wound for the longer wave lengths on account of the smaller space allotted to each successive turn.

The solenoid loop, however, is not hampered by such restrictions, because for a given size loop more turns can be arranged and each turn is of the same length. It is somewhat less directive than the spiral loop and also permits of broader tuning. It is thus somewhat better adapted for the reception of broadcast messages and musical entertainments.

How the Loop Aerial Receives

The operation of the loop aerial is, of course, based upon the principles of electromagnetic induction. We will remember that Radio messages are carried through space in the form of electromagnetic waves, and these waves as they advance are intercepted by the numerous metallic objects and wires that lie in its path. As these waves thus come upon the loop aerial, they cut across the wires comprising the loop and induce in them electrical oscillations corresponding in nature to the characteristics of the impinging waves.

The effect produced by these induced oscillations, however, depends upon the position of the loop with respect to the direction in which the waves are advanc-

ing. If the plane of the coil is parallel with the front of the wave, that is, if one face of the coil is in the direction the wave is moving, then the oscillations induced in opposite sides of the coil will oppose each other and thus be neutralized. However, if the plane of the loop is at right angles to the front of the advancing wave, the nearer side of the coil will be intercepted before the farther side is; and although the difference may appear to be so minute if the speed of propagation of the wave is considered, the out-of-phase conditions of the oscillations in opposite sides of the loop are sufficient to enable the detection of the resulting induced currents if sufficiently sensitive apparatus is employed.

It is thus evident why the loop aerial is so directional in its operation, for the nearer the face of the loop is at right angles to the front of the wave the greater will be the phase difference, and the more marked will be the resulting oscillations flowing in the loop. Therefore, when a loop aerial is used for receiving, the plane of the loop should point in the direction of the station from which the received signals are coming. By then turning the loop slightly in one direction or the other, a position will be found at which the signals are coming in loudest. If the loop is turned at right angles to this position, no sounds at all will be heard.

Constructing a Loop Aerial

In the construction of a loop aerial there are two items to consider, the first is the supporting framework and the second is the winding of the loop itself. The framework should be rigid and strong enough to support the loop without requiring any bracing from the wire itself. It should also be arranged so as to be capable of being rotated on a vertical axis in order that the loop can easily be adjusted for receiving sending stations in any direction.

A convenient arrangement to use is two varnished wooden strips 42 inches long so that each side of the square loop will be about 30 inches (two and one-half feet) long. This size has been found to be very satisfactory for receiving wave lengths ranging from 360 to 485 meters. In order that the wire will be well insulated where

grooves in them for holding the loop. This will to some extent avoid the collection of dirt and moisture, and thus prevent current leakage between the successive wires at these points.

In mounting the loop it makes little difference as to whether the sides of the coil are vertical and horizontal, or whether it is tilted at an angle of 45 degrees so that one diagonal forms the vertical axle. But it should be constructed perfectly symmetrical, and mounted so that it will remain in a set position without requiring constant resetting.

Winding the Loop

The actual size of wire to use is not so very important, but should be sufficiently large to avoid high resistance or excessive current loss. Practically any size wire between 14 and 18 is very suitable. Bare copper wire is quite generally used to good advantage, for it does not involve any serious dielectric losses due to the insulations. Number 14 braided or tinned copper strand seems to work best and produces the best quality signals.

As to the size of the loop, experiments have shown that in general the larger loops operate with better efficacy, for with a larger loop less turns are needed to give the necessary inductance, and with less turns the amount of distributed capacity is reduced. However, another factor to consider is that a coil which has the greatest inductance possible for a given

(Continued on page 14)

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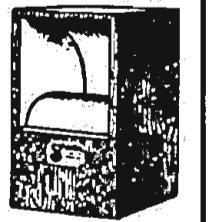
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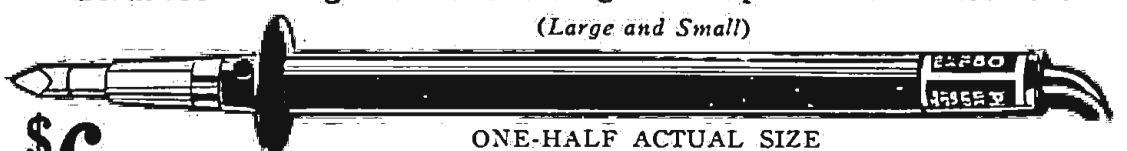
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Reinartz Hook-Up Secures Results

Change in Tickler Coil Wiring Improves Circuit

After having done considerable experimenting with the Reinartz circuit I found that very much stronger signals could be received with the hook-up as shown in

WORKSHOP KINKS? EARN A DOLLAR—

THERE are many little kinks worked out at home that would aid your fellow Radio worker if he only 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 securing 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.

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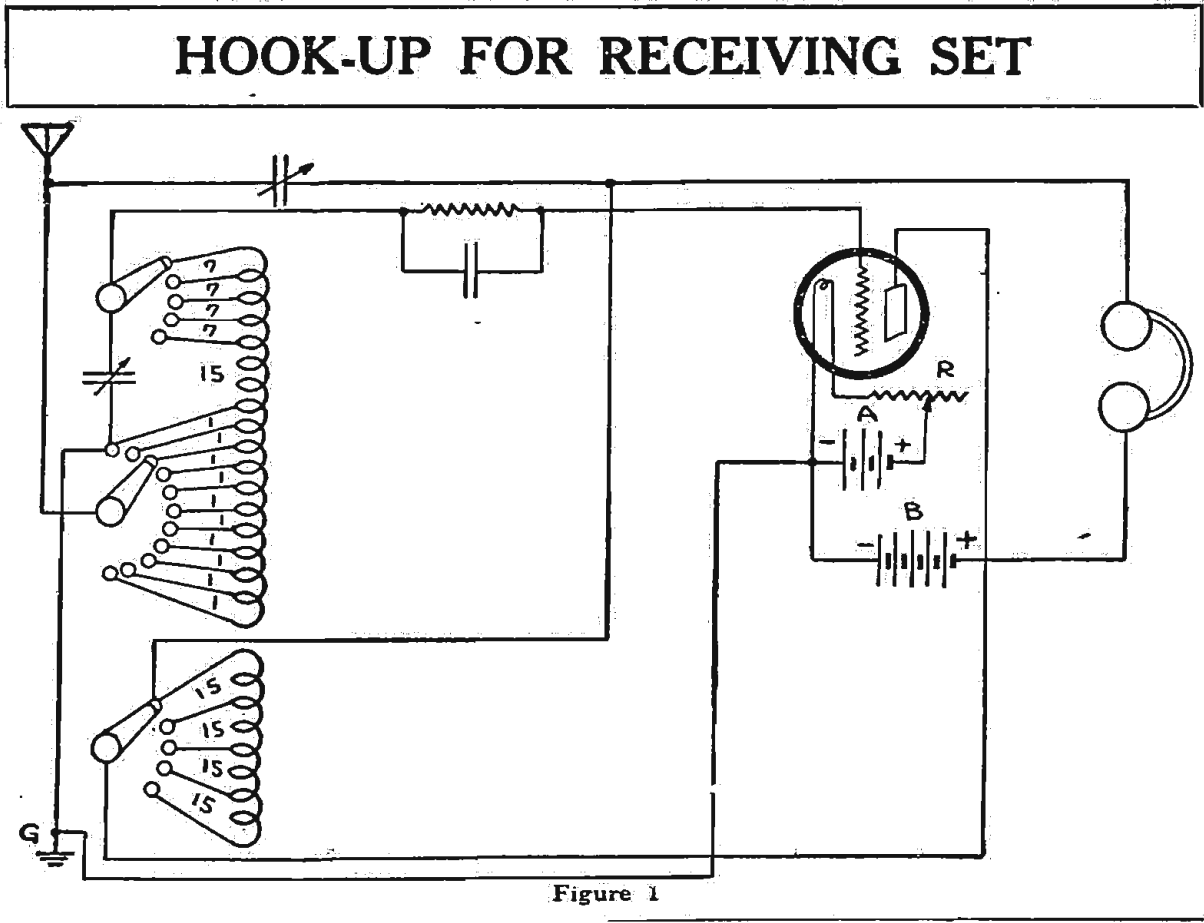


Figure 1

the grid coil and the antenna lead was taken from the severed end of the units coil. The joined switch handles were connected to the ground, thus eliminating all chance of body capacity. Naturally the flow of current had to be reversed in the tickler coil, which change is noted. My other change is also shown on this dia-

Figure 1. It will be seen that the change is made with the inside or tickler coil. The connection thus makes all the current which passes through the receiver to also run through the tickler coil. Several of my friends have tried this and find they get stronger signals. Being bothered with a considerable

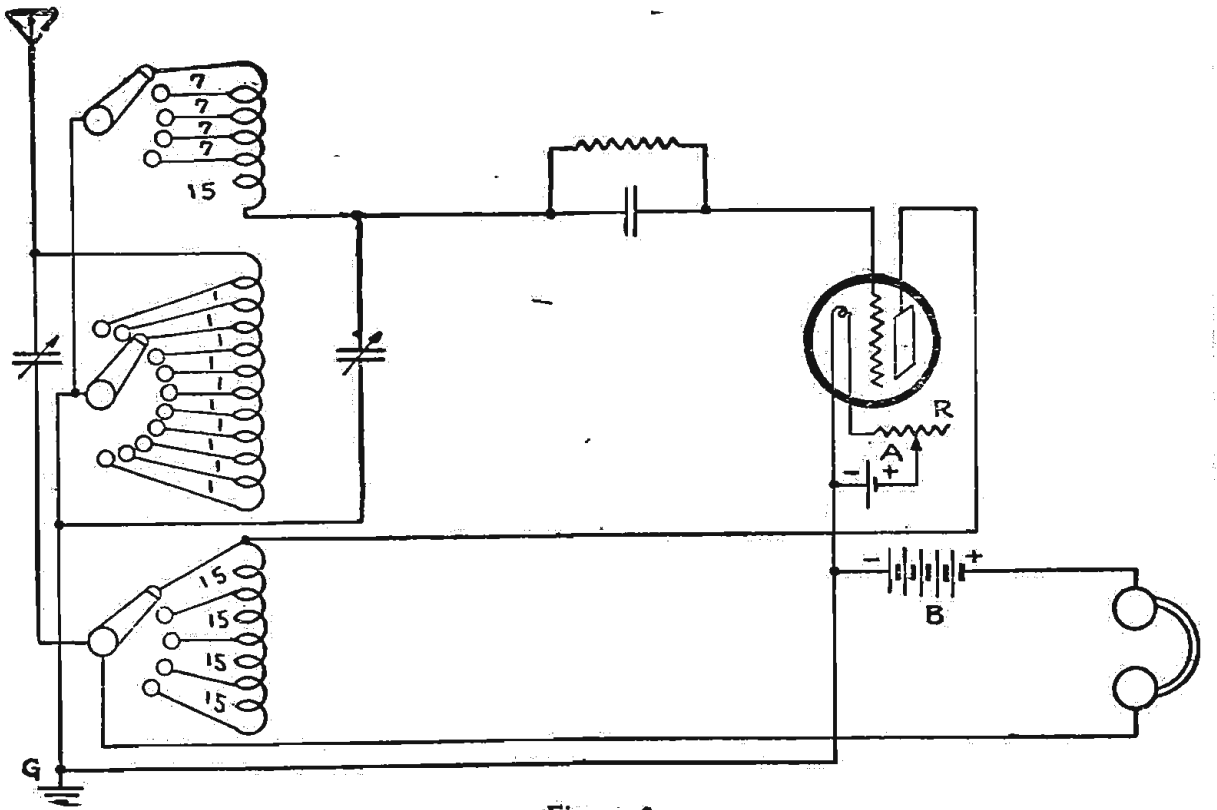


Figure 2

amount of body capacity from the switch handles and points I made some changes which absolutely eliminates this trouble. The diagram Figure 2 shows how this was accomplished.

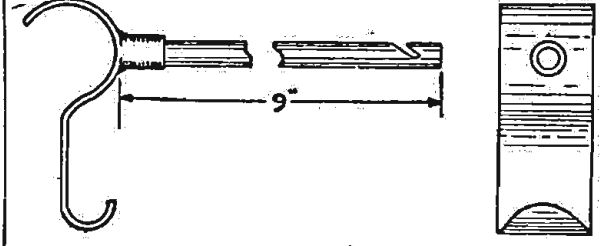
The coil of units was separated from the coil of 15 and sevens, or the grid coil where they joined in the center, then these coils were again joined by connecting the two switch handles together. The grid lead was taken from the severed end of

gram but it could be easily used on the regular Reinartz circuit.—C. K. Beebe, Chicago, Ill.

Switzerland is showing a growing interest in Radio. Parts of that country are cut off from Radio communication owing to the very high mountains, but fans in other sections listen in daily to the news sent out from the Eiffel Tower in Paris.

Picture Molding Hook Supports Inside Aerial

The ordinary picture frame hook provides a means for making an inside aerial support. All that is necessary is to procure a number of the hooks and



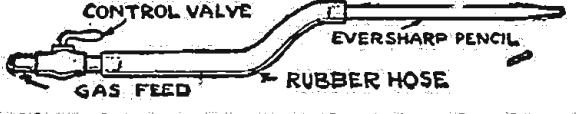
solder on a rod connection 9 inches long. A notch is cut in the outer end into which the wire is placed. These are attached to the molding at intervals and the antenna wire dropped into the notches.

Value of Short Wiring

The reason for the use of short wiring and right-angle turns in connecting a set is a simple one. Every wire carrying an electric current has a magnetic field; if two wires are placed near each other, they will absorb current, but if placed at right angles they will oppose each other, which is just what they should do. If the wires are run long they will, of course, meet with other long leads, and there will be adverse inductions.

Soldering Gas Torch

I was experimenting with a gas torch recently and it gave me the idea as follows: An eversharp pencil was procured and the magazine removed from it. A



rubber hose was attached to the large end of the pencil and the other end of the hose secured to a gas connection on the gas stove.

If there is no connection on the stove lift one of the burners from the pet cock and slip the hose on this tube. I found this a very handy tool for soldering connections.—Robert M. Cramer, Chillicothe, Mo.



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How to Make a Regenerative Receiver

Cabinet and Coils Are Easily Made at Home

The following is a description of the construction of a good regenerative receiver, using the well-known Armstrong tickler coil in the plate circuit.

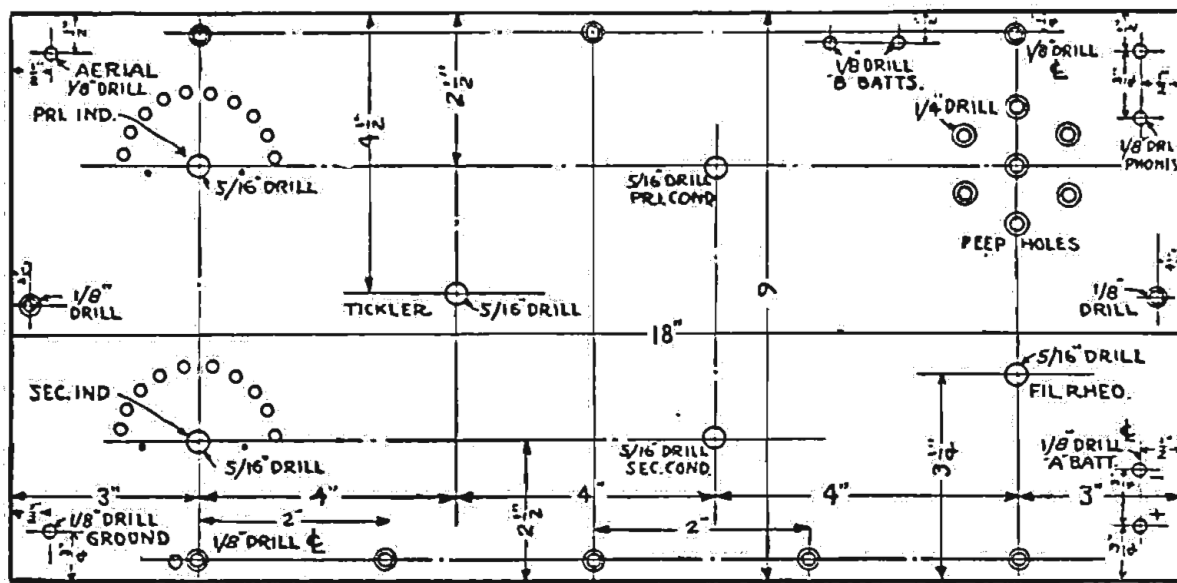
LIST OF MATERIAL.

- 1 bakelite panel 18 in. by 9 in. by 1/8 in. thick.
- 1 bottom of cabinet 18 in. by 6 in.
- 1 top of cabinet 9 in. by 6 in.
- This wood should be walnut, oak or mahogany 1/4 in. thick.
- 2 sides of cabinet 9 in. by 6 in.
- 1 back of cabinet 18 in. by 9 in.
- 175 ft. No. 23 S. S. C. magnet wire.
- 2 .001 Mfd. variable condensers unmounted with knobs and dials.
- 1 telephone condenser, .0012 Mfd. capacity.
- 1 cardboard tube 6 in. long, 4 1/2 in. diameter by 1/2 in. thick.
- 1 cardboard tube 2 1/4 in. long, 2 7/8 in. diameter, 1/2 in. thick.
- 20 switch points 1/4 in. diameter.
- 6 switch stops 7-32 in. diameter.
- 2 switches for inductance—radius of blade 1 1/4 in.
- 1 switch lever and knob for tickler coil.
- 2 bushings for tickler coil shaft.
- 1 brass rod 7 in. long by 3-16 in. diameter.
- 8 binding posts.
- 1 filament rheostat.
- 1 grid leak condenser.
- 1 vacuum tube socket.
- 6 machine screws with nuts for condensers and rheostat.
- 2 dozen wood screws.

Construction of Coils

Take the cardboard tube, 4 1/2 inches in diameter, and punch two holes at the extreme end about 1/2 inch apart, leaving enough protrude for connections and begin winding, taking a tap off after ten turns have been wound. Continue the winding until ten taps of ten turns each have been taken. This completes the primary. A space of 2 inches should be left between the primary and secondary wind-

PANEL LAYOUT FOR ONE TUBE SET



the wire across the space and wind twenty-five more turns in the same direction, on the other side of the space. Punch two small holes near the end of the last turn and make the wire fast, as at the beginning of the winding, leaving about 4 inches for connections.

In the center of the 5/8-inch space cut one 3-16 inch hole on each side for the shaft. No bushings are necessary here, as the tickler should be kept in place by sealing wax after the tickler has been inserted inside the large tube and the shaft pushed through the holes. The two ends of the winding on the tickler coil, where connections are to be made, should be soldered on to about 6 inches of soft flexible cord wire, a telephone cord, or the like, to give enough play in the wire when revolving the tickler inside the large coil.

The soldered connection should be insulated with a piece of rubber tubing. When the coil is completed it should be given a good coat of shellac.

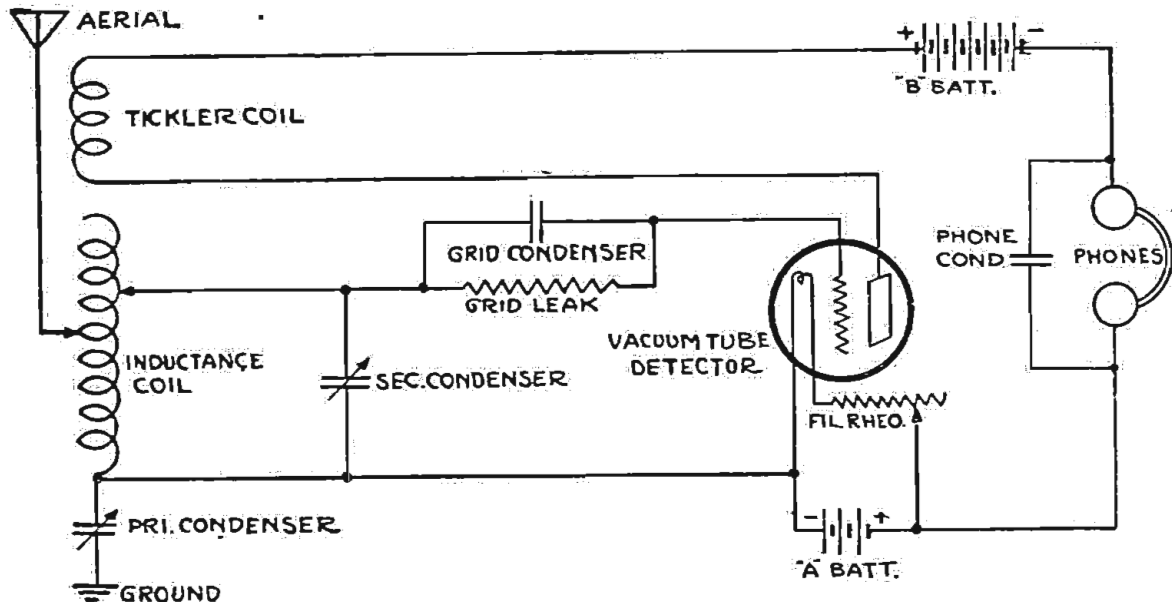
Insert the tickler inside the inductance coil and pass the brass shaft through both

with a hole in the center, should be obtained for a foundation for the coil, which should be screwed down to the cabinet through the blocks. When fastening the coil to the bottom, see that the end of the shaft fits exactly through the hole drilled in the panel for the tickler coupling. The primary and secondary condensers and filament rheostat should be screwed to the panel with the six machine screws and nuts. The vacuum tube socket and grid leak condenser are fastened to the bottom piece of the cabinet. All binding posts, switch points and switch stops should be screwed to the panel before wiring. The ten taps from the primary and secondary are soldered to their respective switch points. The telephone condenser may be maintained in place by the con-

(Continued on page 14)

PHANTOM-CIRCUIT

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ings on the coil. After the last tap of the primary has been taken off, the wire should not be broken, but wound diagonally across the 2-inch space and the secondary winding started. Take a tap off for each complete turn and take ten taps. Punch two small holes 1/2 inch apart near the last tap and push the end of the wire through one and then through the other hole, pulling it up tight, leaving enough for connections.

Through the center of the 2-inch space, between the primary and secondary, cut a hole 3-16 inch in diameter through each side of the coil for the tickler coil shaft. The two bushings for the shaft should be fitted in these holes. Two more small holes are punched through the space between the windings, in order to make connections from the tickler to the plate. When the coil is completed, it should be given a good coat of shellac.

Tickler Coil Winding

The tickler coil winding is started on the cardboard tube, which is 2 1/4 inches long, in the same manner as the primary coil, by punching two holes at the end of the tube, pushing the wire through one hole and bringing it through the other, leaving 4 inches for connections, wind twenty-five turns, then leave a space of 1/2 inch in the center of the tube, bring

tickler and large tube. The end of the shaft should have a small hole about 1-32 inch drilled through the diameter and a pin inserted to keep the shaft in position. The two leads from the tickler are brought out through the two small holes in the inductance coil.

Drilling the Panel

The panel should be drilled as illustrated, and the bottom of the cabinet fastened to it with wood screws. Two small blocks of wood or other material

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3/32" THICK	1¢ PER SQ. INCH
1/8" THICK	1 1/2¢ PER SQ. INCH
3/16" THICK	2¢ PER SQ. INCH
1/4" THICK	2 1/2¢ PER SQ. INCH
3/8" THICK	4¢ PER SQ. INCH
1/2" THICK	5 1/4¢ PER SQ. INCH

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How to Prevent Spilled Acid from Doing Harm

The solution or electrolyte used in lead acid battery is composed of water and sulphuric acid. This solution will destroy any but wool cloth and hence should not be spilled on carpet or clothing. If the solution should become spilled, apply as quickly as possible, household ammonia or baking soda to the spot covered by the solution. The ammonia or soda, being alkalies, will neutralize the sulphuric acid and prevent its further destructive power.—H. E. Jameson, Milwaukee, Wis.

Breaks in Flexible Receiver Cords

One of the commonest occurrences of open circuits in a Radio receiving outfit is in the flexible telephone receiver cords. These leads are continually being twisted and untwisted and bent so that it frequently happens that the strands break, usually near the tips.

The symptoms of this condition are evidenced by hearing intermittent or interrupted signals in the receivers every time the flexible cords are shaken. The noise heard when the broken ends of the strands are rubbed together is a series of clicks quite similar to strong static.

One remedy is to cut off the broken end and solder the cord tip on the new cord end thus made available. In most cases, however, it will be found advisable to put in new cords, since a repair to a broken cord weakened by constant usage may only serve as a temporary remedy.—P. J. M. Clute, Schenectady, N. Y.

W. T. 50f Peanut Tubes, 4 V. 1/2 Amp. with Adapter.....	\$2.75
Improved Radio 6 V. Detector Tubes.....	\$2.75
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1 Tube Regenerative Receiving Set with Detector Tube and 3000 Ohm Headset.....	\$29.75
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Cutting and Washington Regenerative 3 tube set will receive over 2,000 miles—Armstrong circuit.....	125.00	59.50	6 Ohms 1 1/2 Amperes.....	1.20	.55
HONEYCOMB COILS			Moulded Rheostats.....	1.00	.40
D. L. 25.....	1.54	1.15	Framingham Vernier Rheostat.....	1.50	1.15
D. L. 35.....	1.54	1.15	Amsco Potentiometers—360 Ohms Resistance.....	1.75	1.00
D. L. 50.....	1.65	1.25	JACKS		
D. L. 75.....	1.65	1.25	Firco Jacks, Open Circuit.....	.70	.30
D. L. 100.....	1.75	1.35	Firco Jacks, Closed Circuit.....	.85	.40
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Bristol Loud Speaker.....	22.50	17.50	Flat Plugs.....	1.00	.50
Pathe Loud Speaker. Made by the well known Pathe Phonograph Co.....	22.00	17.50	Round Plugs—Bulldog Grip.....	1.25	.60
Wooden Loud Speaker—for perfect reception.....	7.50	6.00	4 Way Plug.....	1.50	1.25
Magnavox Loud Speaker, newest model.....	45.00	23.75	CRYSTAL DETECTORS		
HEAD SETS			Glass enclosed, moisture proof, spring adjustment, moulded bakelite base, with tested crystal, perfect design..		
Federal Phones—2200 Ohms.....	8.00	6.50	Open type—moulded base (completely assembled).....	1.50	.50
Dictagraph Phone—3000 Ohms.....	12.00	5.95	DIAL AND KNOB		
Potter Precision Phones—2200 Ohms.....	9.00	5.50	3 inch Composition Dial and Knob.....	.75	.30
Potter Precision Single Phone—1100 Ohms.....	4.50	3.00	3 1/2 inch Unbreakable Dial and Knob—1/4 inch hole.....	1.00	.50
N. & K. Phones—6000 Ohms—Made in Germany. This is one of the best phones made.....	16.00	7.75	4 inch Composition Dial and Knob—1/4 inch hole.....	1.25	.50
Nathaniel Baldwin Phones—Type C.....	12.00	10.25	Knob—extra fine quality.....	.75	.30
Baldwin Single Phone—Type C.....	6.00	4.95	CABINETS		
TRANSFORMERS			Mahogany Cabinet—hinged top 7x10.....		
Thordarson Audio Frequency Transformer.....	4.50	3.85	Mahogany Cabinet—hinged top 7x18.....	2.95	2.35
W. D. 12" Audio Frequency Transformer.....	5.00	4.00	Mahogany Cabinet—hinged top 7x24.....	3.45	2.95
Acme transformer—type A-2S.....	5.00	4.25	VARIOMETERS		
VARIABLE CONDENSERS			Fisher Mahogany—150 to 500 meters.....		
3 Plate Vernier Condenser, moulded ends.....	1.50	1.10	Franco Mahogany.....	5.00	2.50
11 Plate Condenser, moulded ends, .00025.....	2.50	1.35	Pathe Moulded.....	5.00	2.50
23 Plate Condenser, moulded ends, .0005.....	3.00	1.50	Haven Red Moulded Bakelite Variometers—Silk Wound.....	7.00	4.75
43 Plate Condenser, moulded ends, .001.....	4.00	2.00	Columbia Black Moulded Bakelite Variometers—Silk Wound.....	5.50	4.30
Franco 22 Plate Variable Condenser with Vernier.....	6.60	4.00	Eagle Red Moulded Bakelite—the best made.....	8.00	5.50
Franco 43 Plate Variable Condenser with Vernier.....	7.70	4.50	VARIOCOUPERS		
V. T. SOCKETS			Franco Mahogany—Silk wound Fibre Tuning.....		
Single Sockets—Brass Tubing.....	1.00	.40	Fisher Mahogany Variocouplers.....	5.00	2.50
Double Sockets—Brass Tubing.....	2.00	.90	Fisher 130" Variocoupler.....	5.00	2.50
Triple Sockets—Brass Tubing.....	3.00	1.35	Pathe Moulded Silk Wound.....	6.00	3.50
Single Sockets—Alden Napier red moulded condensite.....	1.00	.55	Eagle Moulded Red Bakelite—the best made.....	8.50	5.75
W. D. 11 Socket—extra fine quality.....	1.00	.35	Franco 130" Variocoupler, Bakelite Silk Wound.....	5.00	2.75
HARD RUBBER PANELS			HONEYCOMB COIL MOUNTINGS		
7x10 unbreakable.....	.85	.55	Triple Mountings with leads—screw adjustment.....	5.00	3.55
7x18 unbreakable.....	1.50	.90	Double Mountings with leads—screw adjustment.....	3.50	3.00
7x24 unbreakable.....	1.95	.95	Single Mountings.....	.55	.40
BAKELITE PANELS			BATTERIES		
7x10.....	1.25	.85	EXIDE "A" Storage Battery, 6 V. 40 Amperes Hours, Type 3 LXL5.....	17.85	14.00
7x18.....	2.25	1.50	EXIDE "A" Storage Battery, 6 V. 80 Amperes Hours, Type 3 LXL8.....	23.10	19.00
7x24.....	3.25	2.25	EXIDE "A" Storage Battery, 6 V. 120 Amperes Hours, Type 3 LXL-13.....	31.50	25.00
All Panels 3/16 inch thick.....	9.00	5.75	Everyready "A" Storage Battery—6 Volt, 90 Amperes Hours.....	13.00	16.00
Silk Wound ALL WAVE Coupler.....	12.00	7.50	Everyready "A" Storage Battery—6 Volt, 110 Amperes Hours.....	20.00	18.00
Silk Wound BAKELITE Vario-Tuner.....	12.00	7.50	Bright Star "B" Battery, 2 1/2 Volts.....	1.75	1.10
PHONE CONDENSERS			Bright Star "B" Battery, 2 1/2 Volts.....	3.00	2.00
All Capacities Fixed Condensers, grid leaks, etc.....	.30	.09	Bright Star "B" Battery.....	5.00	3.50
Freshman Variable Grid Leak.....	.75	.60	2 1/2 Volts, Variable, 5 Positive terminals.....	1.75	1.10
Freshman Variable Grid Leak and Condenser combined.....	1.00	.75	Bus Bar Wire (2 ft. lengths).....	.03	.03

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A. B. C. LESSONS

(Continued from page 11)

length of wire is a more efficient absorber of radiant energy than another coil of the same inductance but with less number of turns. It is therefore necessary for a given wave length to strike a happy medium between these several attending circumstances. For the reception of ordinary broadcast messages which are sent out at wave lengths ranging from about 360 to 485 meters, a loop about 30 inches (2 1/2 feet) square and wound with ten turns spaced 1/2 inch apart, forms a very efficient receiving aerial.

The wires leading from the loop to the receiving set should be arranged as short as possible and should be placed so as to reduce to a minimum all capacity and inductance effects upon adjacent conductors, etc.

The Receiving Circuit.

The receiving circuits used with loop aerials are very similar to the multi-stage Radio frequency amplifier circuits illustrated and discussed in the previous chapter; except that in this case the loop is regarded as comprising the tuning coil or inductance, and the receiver is tuned to the desired wave length by means of a 23-plate variable condenser shunted across the terminals of the loop. The remainder of the detector and amplifier circuits do not differ from the receiving circuits employing a variocoupler or variometer as a tuning inductance.

An efficient loop aerial receiving circuit is illustrated in Figure 54. Here three stages of Radio frequency and two stages of audio frequency amplification are employed. As is shown, the terminals of the loop lead directly to the terminals of the receiver corresponding to the aerial and ground connections. Shunted across these two terminals is a 23-plate variable condenser for tuning purposes. The remainder of the circuit does not differ any from the general form previously described.

In operating a receiving station of this kind, the filaments are first heated to their normal brilliancy. The receiver is then thrown into resonance with the incoming waves by adjusting the tuning condenser. The loop is then rotated the necessary amount to bring the signals in loudest, and finally the other necessary adjustments are made until stable operation results.

After resonance is established between the loop and the tuning condenser, the potential oscillations are impressed on the grid and filament of the first amplifier tube. From here they are sent through the second and third stages of the Radio frequency amplifiers, and are then impressed upon the input circuit of the detector tube. From the output circuit of the detector tube the audio frequency oscillations are amplified through two stages of audio amplification. The current oscillations are then sufficiently strong to efficiently operate a loud speaker.

Conclusion

Although the loop aerial will hardly replace the outdoor aerial completely; nevertheless, with improved Radio frequency amplifying apparatus and more efficient receiving and detecting equipment, the loop aerial will come into more and more extensive use among the Radio public. It is true that the necessary stages of Radio frequency amplification greatly increase not only the initial cost but also the maintenance expense; but where these items are of less importance, the loop aerial receiving station forms a very desirable form of Radio receiver.

Chapter Sixteen

Chapter sixteen which will occur in the

next week's issue, will be devoted to the nature and characteristics of reflex receiving circuits which have of late come into such extensive use. The reflex circuit, combining as it does Radio and audio frequency amplification, is a very interesting type of receiver and one that many will like to try out.

REGENERATIVE RECEIVER

(Continued from page 13)

nections. Other wiring should be done as indicated in diagram. The wiring should be done with stiff wire and covered with rubber tubing or other insulating material. The two sides, back and top of the cabinet are screwed together and then fastened to the panel and bottom. Applying two coats of varnish on the cabinet makes a very neat appearance to the set.

In order to distinguish the different controls, and improve the appearance of the receiver as a whole, small name plates may be attached under their respective controls. If the A and B battery binding posts are marked by a name plate, the polarity is readily ascertained, and mistakes are less likely to occur.

No further explanation of the wiring is necessary, as the diagram and back view of the set is simple and easily understood. The receiver has a wave length range from 200 to 700 meters.—A. R. Friess.

The Reader's View

Week-End Set

Many thanks to your prompt reply to my letter of February regarding the Super-Hetrodyne circuit. This information checks up with the data I have on hand and from which I am going to build my set during the summer.

I have followed your articles regarding the Flewelling Circuit with interest. The first one came out in your paper of October 21st, 1922, and the next morning I had one in operation—it is certainly a wonder—we do not call it a "Flivver"—a "Week End" Set is the name we have given it. In the back of the car it goes with a WD 11 tube, 75 feet of wire and a pair of Baldwin phones and we have music wherever we go.

During the last of November I picked up practically all of the stations east of

- High-grade Crystal Set, complete; value \$12, at \$ 6.45
- 3000-ohm Supreme Head Sets; value \$8.50 3.95
- 180-degree High-grade Couplers, reg. price \$4.50 2.39
- 22 1/2-volt large size "B" Batteries, regular price \$3, at 1.59
- National Air Phones Crystal Set; regular price \$12.50 7.35
- De Luxe Home Chargers, regular price \$18.50, at \$13.75
- Original Nathaniel Baldwin Head Sets, Type C 9.45
- Original Nathaniel Baldwin Single Units, Type C, with cord 4.65
- 14 Karat Gold Grain Detector. Puts the joy in radio; regularly \$2.00, at 1.55
- Atlas Supreme Radio Set, range 1,500 to 2,000 miles on one tube; special \$22.50
- Brach Lightning Arrester; regular price \$2.50 1.05
- Mahogany Finished Cabinets; size 6x9 1.35

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Kansas City, Texas, Cuba, Atlanta, etc., on a Cunningham 300 tube with 22 1/2 Volts Max. on the plate. At that time I had finished experimenting and built it into a permanent set for taking on trips. I have tried out many of the new arrangements and have yet to find anything better than the one I decided to use; but I admit that some of the new ideas make a little more noise, which some fans believe is volume.—Judson Hayward.

New Association Formed

ST. LOUIS.—At a recent gathering of owners and operators of licensed Radio transmitting stations in this city, an organization to be known as the "Radio

Transmitters' Association of St. Louis" was formed.

The object of this association, as set forth in the constitution, is to promote the interest of all licensed Radio operators and their stations. The following officers were elected: J. D. Lucas, president; P. F. Ring, vice president; Leslie Essington, secretary and treasurer.

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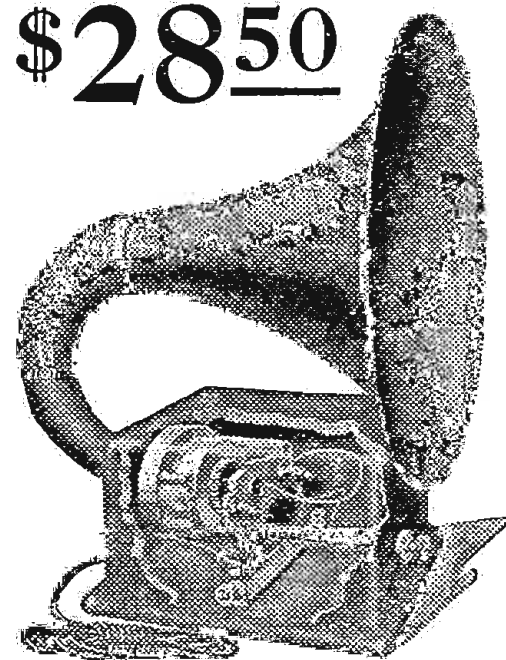
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Phantom View Showing The Adjustable Air Gap

consists of an adjusting dial mounted in front of the cabinet, by means of which the distance between the magnetic poles and the diaphragm may be increased or decreased, thus varying the pull of the magnet on the diaphragm and permitting tuning up in complete harmony, under all varying conditions of reception.

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- Grid leak and Grid condenser
- Rubber binding posts
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- Switch lever and switch points
- 23-plate variable condenser (made by Jern Firth)
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List Price	HEAD SETS	Our Price	List Price	AUDIO TRANSFORMERS	Our Price
\$ 8.00	Brandes—Superior	5.50	\$7.00	Federal	5.50
8.00	Dictograph	5.75	7.00	Radio Corp. U. V. 712	5.60
8.00	Federal 2200 Ohms	4.95	6.50	Rasla	5.10
7.50	Stromberg Carlson	4.75	4.50	Thordarson	3.00
6.00	Frost 3000 Ohms	4.25	6.00	Amplex W. D. 12	3.95
6.00	Royalphone	3.75	5.00	General Radio	4.35
5.50	Murdock Type 57	4.10	6.00	Jefferson	5.00
12.00	Western Electric 509W	9.50	7.00	Amertram	5.95
12.00	Baldwin Type C, Master	8.50	5.00	Acme	4.10
6.00	Baldwin Type C, Single	4.00			
	LOUD SPEAKERS			PANELS	
\$161.00	Western Electric	\$145.00	7x10	BAKELITE—3/16 inch Stock	
55.00	Western Electric	50.00	7x12	.....\$1.35	7x15 .....\$1.95
45.00	Magnavox (New Type)	38.00	7x14	.....1.45	7x18 .....2.50
40.00	Callophone	30.00	7x14	.....1.85	7x24 .....2.95
20.00	Dictograph	15.00		HARD RUBBER—Grade A	
15.00	Brittania	12.50	7x10	.....\$0.90	7x18 .....\$1.45
	MISCELLANEOUS SPECIALS		7x15	.....1.35	7x24 .....1.90
Firth 23-Plate Condenser	.....\$1.30	Three Coil Mountings	.....\$3.50		
Firth Triple Sockets	......90	Two Coil Mountings	.....2.75		
Firth Double Sockets	......70	Single Coil Mountings	.....2.50		
Millard Rheostats	......45	180° Variocoupler	.....2.79		
Double Phone Cords	......60	Variometers	.....2.75		
Fada Type Switch Levers	......23	Vernier Rheostats	.....1.35		
Firth Crystal Detectors1.00	11-Plate Condenser1.35		
Brach Lightning Arrester1.25	43-Plate Condenser2.15		
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The "How" of the Simplified Super Circuit

Part X—An Explanation of Several Causes of Failure

By E. T. Flewelling

DURING my travels throughout the United States I have been able to pick up some very valuable information concerning the points that seemed to give the fans the greatest amount of difficulty in securing successful operation of the Flewelling circuit.

It seems best at this time to get right down to cold, hard, point-blank statements as to how the circuit should be handled, because it is only in this way that one may be sure of securing the results that most of us know may be obtained.

The various parts have been discussed but there are so many new fans who have entered into the game that it is only fair to go over some of the points for their benefit.

Utilizing a Nuisance

Previous articles have shown that one of the main features of the circuit is that of changing a nuisance into a utility. To be more clear, in the old days, the squealing and howling caused by rectification with a block tube, due to oscillations and improper grid leak settings, etc., was considered the nuisance. Now, in the Flewelling circuit the entire secret is this: Absolute control of the blocking and absolute control of any squealing or howling that may present itself in the operation of the circuit. This is done in two ways; with proper values in the

circuit itself, and by positive control of the grid by the way of the grid leak. The whole secret of the circuit operation actually centers on this point. Everything else being right, if you are unsuccessful in making the circuit operate, then you may concentrate your entire efforts on the grid leak.

Proper Grid Leak Necessary

At the time the circuit was first brought out, it was an impossibility to secure any satisfactory form of commercial grid leak due to the popularity of the Flewelling circuit and our constant hammering on the point that a good grid leak is an absolute essential in any Radio circuit, especially one using hard tubes; however, there are now several more or less acceptable forms manufactured. There is one type in particular that enjoys a large scale that is not at all suitable for any Radio circuit. It is suggested that you be careful not to try this form on the Flewelling circuit.

It seems too bad that we must limit our remarks to suggestions at times, but due to the large field that we are in and the fact that the writer has no personal axe to grind we will have to satisfy ourselves with references only to those types that have been used and found successful. Grid leaks are very difficult to manufacture and secure uniform results from each and every one and it is suggested that you

purchase what you believe to be a reliable form and if you are unable to secure results from it understand that possibly you were unfortunate in that the particular one that you purchased happened to be defective. Give the leak benefit of the doubt and purchase another one. This may seem a peculiar procedure but it is suggested in view of the writer's extensive experience with the types of leaks now manufactured. I am simply passing this on to you as my own personal experience, and it is only a profitable thing to do. As said before, a good grid leak is valuable on any set.

Mounting the Coils

Another point that comes to mind is the matter of mounting the coils. I am going to have a lot to say about various coils in future articles. The plan is to broaden out considerably from the 50 and 75-turn coils.

Considering these two just now, the point comes up as to whether tight or loose coupling is desirable. It is easily answered to this end. Local work frequently calls for loose coupling. Distance work on the other hand almost invariably calls for close coupling. Many are troubled with the question "What type of mounting should be used?" and this is answered in the same way as before. A good reliable honest product is the only

answer. Inasmuch as I have suggested various types for other parts of the circuit, I will say that at this time I am using the Crown coil mounting, which, I believe, is manufactured in New York. The idea to be looked for in a coil mounting is the ability of the mounting to give either loose or close coupling and stay where it is put. In other words, do not purchase a mounting that is unable to hold its setting.

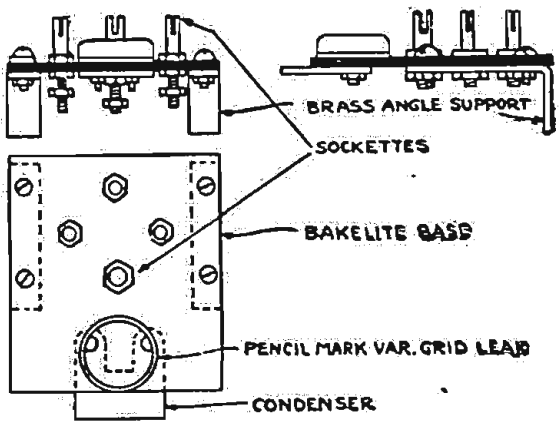
Adjusting the Coils

This brings us to the point which I have often emphasized, but the Radiophans seem to overlook. The Flewelling circuit has been reduced to the point where it is as simple as can be expected and where it is guaranteed to work immediately if the famous grid leak and other parts are right, with this one exception, the fields of the two coils must work together. Therefore, when the circuit is entirely finished and it does not operate, and the grid leak has no effect on it, there is only one thing to look for, and that is the ability of the coils to "work" together or "buck" one another. They must work together. Try reversing the two lead going to the 75-turn coil, if unable to get results.

These two points are the kernel of the nut. If they are right, it is safe to say that you will enjoy the same wonderful results as reported to date by thousands of my friends.

Combination WD11 Tube Socket and Grid Leak

An inexpensive and neat little socket for the WD 11 tube was made up in combination with the grid leak condenser and support as shown in the accompanying sketch. A piece of 1/8-inch thick insulating composition was cut 2 1/2 by 3



inches to serve as a base. Four vacuum tube sockets were located, as shown, to take the tube prongs. A variable grid leak of the pencil type with cap was mounted near one edge. The grid condenser is of the type to fit the terminals of the leak and is attached thereto underneath the base. Two pieces of 1/8-inch

brass, 3/8 inch wide were cut and bent to form angle supports as shown. Use 6-32 or 8-32 round head brass screws and nuts for fastening the supports to the base. The whole arrangement is attached to the panel just under or over the rheostat, as desired, by means of the same size flat head brass screws and nuts. —J. M. Walsh, Honesdale, Pa.

Cut Down Aerials

LONDON, ENGLAND.—French Radio experts are having considerable difficulty ascertaining who is broadcasting on the same wave length as the Eiffel Tower and at the same time. In the vicinity of London there is a problem of a different nature. Interference from amateurs has been prevalent and now someone has taken to

cutting aerials down, in an effort to get rid of the alleged nuisance. The work is believed to be that of boys, but so far the miscreants have not been discovered.

One of the uses of Radio is the taking of speeches, news and lectures by short-hand students, thus increasing their efficiency and speed.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF RADIO DIGEST, published weekly at Chicago, Illinois, for April, 1923.

State of Illinois, County of Cook, SS.—Before me, a notary public in and for the State and county aforesaid, personally appeared E. C. Rayner, who, having been duly sworn according to law, deposes and says that he is the publisher of the RADIO DIGEST and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 435, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, E. C. Rayner, 717 Irving Park Blvd., Chicago, Ill.; editor, Chas. F. Smisor, 4757 Lake Park Ave., Chicago, Ill.; managing editor, Evans E. Plummer, 1015 N. State St., Chicago, Ill.; business manager, none.

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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

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RECEIVING RECORDS CONTEST

By the Contest Editor

THIS week the complete list of record holders revised to date is given. Since the March 10 issue, 132 more records have been added to the 312 then published. Only 70 of these records have been beaten, and the rest have been able to hold their own. Send your records in this week and see if you can keep them in until the next time the complete list appears.

The rules of the contest are also given this time for the benefit of the new fans who have become interested.

Below is the list of the "survival of the fittest":

Station—Miles Away—Who Heard It

- AS6—1250, John Kiener, Cleveland, O.
- CFAC—1650, R. A. Deger, Dayton, O.
- CFCX—1450, C. E. Barton, Johnson City, Tenn.
- CFCE—2325, B. H. Seydel, Tacoma, Wash.
- CFCN—2000, C. M. Bussey, Hudson, N. Y.
- CHBC—2450, S. S. Florence, B. Phillips.
- CHCA—1625, T. S. Wildman, Nicholas, Iowa.
- CHCB—2125, Arthur Chapelle, Woodburn, Ore.
- CHCC—1325, Samuel Woodson, Jr., Liberty, Mo.
- CHCD—1250, B. U. Livingston, Morristown, N. J.
- CHCE—2100, G. F. Aiken, Providence, R. I.
- CHCX—1500, M. E. Gilbert, Douglas, Wyo.
- CJCA—1650, Kenneth C. Gensburg, Ind.
- CJCB—1300, V. Dennis, Okaloosa, Kans.
- CJCE—2100, F. C. Woodford, Canton, O.
- CJCG—1425, G. E. Wharton, Houston, Tex.
- CKAC—2700, A. C. Carter, Juneau, Alaska.
- CKCD—1325, E. M. Perkins, Jr., Sioux Falls, S. D.
- CKCK—1650, L. C. Burwell, Jr., Charlotte, N. C.
- CKCR—1225, Samuel Woodson, Jr., Liberty, Mo.
- DD5—1225, C. D. Mason, Cleveland, O.
- DM4—1700, Arthur Chapelle, Woodburn, Ore.
- DN1—1150, L. J. Martin, Minneapolis, Minn.
- DN2—2100, W. E. Davison, Berwick, N. S., Can.
- KDCJ—1225, E. M. Perkins, Jr., Sioux Falls, S. D.
- KDJJ—2450, C. Edge, Jr., Melbourne, Fla.
- KDKA—2500, Robert Rowe, Santa Clara, Calif.
- KDNB—2175, F. C. Woodford, E. J. Poyser, Canton, O.
- KDPT—1800, C. Hackney, Fairmont, Ind.
- KDYL—2450, R. Doull, Halifax, N. S.
- KDYM—2025, F. B. Steer, Cleveland, O.
- KDYQ—2550, C. M. Rice, Jr., Worcester, Mass.
- KDYR—2300, F. H. Peran, Oswego, N. Y.
- KDYS—1700, M. C. Ridenour, Kingwood, W. Va.
- KDYU—1525, T. S. Wildman, Nicholas, Ia.
- KDYW—1250, Edmund Howard, Waterbury, Conn.
- KDZX—5000, C. F. Rose, Jr., Springfield, Mass.
- KDYZ—1325, J. Wallace, Bridgeville, Pa.
- KDZA—2025, Breisch Motor Co., Ringtown, Pa.
- KDZE—1725, Phillip Delano, Bonne Terre, Mo.
- KDZF—1850, C. H. Nolder, Cincinnati, O.
- KDZK—1300, Harold Canon, Storm Lake, Iowa.
- KDZQ—2175, H. S. Olding, New Glasgow, N. S., Can.
- KDZT—1250, E. M. Perkins, Jr., Sioux Falls, S. D.
- KFAB—2325, Breisch Motor Co., Ringtown, Pa.
- KFAD—2125, Mrs. A. S. Mawhinney, New York, N. Y.
- KFAE—1650, G. E. Wharton, Houston, Tex.
- KFAF—1775, F. W. Foss, Boston, Mass.
- KFAM—1775, J. W. Hawes, Boston, Mass.
- KFAN—1250, Chas. N. Schwab, Grinnell, Iowa.
- KFAP—1950, A. M. Tobias, East Orange, N. J.
- KFAU—1325, Ross Hansch, Baraboo, Wis.
- KFAW—1325, M. L. Johnson, Atchison, Kans.
- KFAY—2200, L. A. Graf, Dunkirk, N. Y.
- KFBB—1050, R. Henry, Butler, Mo.
- KFCB—2125, J. D. Crosby, Stauffer, Pa.
- KFCB—1375, W. M. K. Young, Kansas City, Mo.
- KFCB—1450, R. E. Reed, Eureka, Kans.
- KFCB—1775, Richard Reeder, Alliance, O.
- KFCB—1950, H. S. Juday, Eldorado, O.
- KFCB—2450, T. W. Zeigler, Charleston, S. C.
- KFBQ—1025, B. H. Seydel, Tacoma, Wash.
- KFCB—1950, J. W. Mayfield, Cincinnati, O.
- KFCB—1425, O. P. Klein, Leduc, Alta., Can.
- KFCB—1775, M. L. Johnson, Atchison, Kans.
- KFCF—1775, R. A. Deger, Dayton, Ohio.
- KFCF—1300, M. L. Johnson, Atchison, Kans.
- KFCX—1075, G. E. Wharton, Houston, Tex.
- KFDA—2250, L. Genack, Springfield, Mass.
- KFDB—2400, W. H. Rhodes and Chas. Rhodes, Middleton, Pa.
- KFDD—1150, H. R. Wunder, Cheviot, O.
- KFDL—1225, John Kiener, Cleveland, O.
- KFEB—1125, R. L. Hartman, Hoisington, Kans.
- KFEL—1050, H. R. Wunder, Cheviot, O.
- KFGH—1425, M. L. Johnson, Atchison, Kans.
- KFI—2900, W. E. Davison, Berwick, N. S., Can.
- KFV—1750, A. L. Ober, North Manchester, Ind.
- KFZ—2175, A. A. Acken, Jersey City, N. J.
- KGB—1250, C. Bennett, Aurora, S. D.
- KGC—1350, S. M. Woodson, Jr., Liberty, Mo.
- KGG—1850, Vernon Adams, Joplin, Mo.
- KGL—1650, D. E. Rogers, Craudon, Wis.
- KGN—1875, Fay Allarding, Lake Odessa, Mich.
- KGU—4650, Eugene Evans, Tippencanoe City, Ohio.
- KGV—3700, M. C. Bidwell, Grinnell, Ia.
- KGV—2475, Dr. L. D. Bassett, Sidney, N. Y.
- KHD—1000, Arthur Chapelle, Woodburn, Ore.
- KHJ—3000, H. S. Olding, New Glasgow, N. S., Can.
- KHQ—2500, C. M. Rice, Jr., Worcester, Mass.
- KJ—2175, M. F. Jacot, Copley, O.
- KJR—2300, H. S. Olding, New Glasgow, N. S., Can.
- KKB—1900, Billy Withington, Jackson, Mich.
- KLP—2180, W. G. Mann, London, Ont., Can.
- KLK—2600, C. C. Dunbar, Greenville, N. H.
- KLZ—2100, W. E. Davison, Berwick, N. S., Can.
- KMJ—1050, C. C. Sawyer, Liberal, Kans.
- KMO—1600, Ross Hansch, Baraboo, Wis.
- KNI—2150, John Kiener, Cleveland, O.
- KNJ—1425, J. Wallace, Bridgeville, Pa.
- KNT—2125, J. H. Wall, Rensselaer, N. Y.
- KOB—1975, C. M. Rice, Jr., Worcester, Mass.
- KOG—2125, A. H. Jessup, Erie, Pa.
- KON—1900, F. Brinson, Urbana, O.
- KOP—2075, T. W. Smith, Watonsville, Calif.
- KPO—2550, C. M. Bussey, Hudson, N. Y.
- KQI—1350, E. M. Perkins, Jr., Sioux Falls, S. D.
- KQP—2100, G. A. Walter, McDonald, Pa.
- KQV—1325, M. B. Gilbert, Douglas, Wyo.
- KQW—1900, C. Conrad, Logansport, Ind.
- KSD—4000, Walter Lee, Lost Harbor, Alaska.
- KTW—1250, C. Bennett, Aurora, S. D.
- KUO—2675, C. M. Rice, Jr., Worcester, Mass.
- KUY—2100, Roland Smith, Hilo, Hawaii.
- KVQ—1125, G. D. Roberts, Edmonton, Alta., Can.
- KW—2500, Mrs. A. S. Mawhinney, New York, N. Y.
- KWH—2300, C. L. Walker, Napanee, Ont., Can.
- KWJ—2125, C. J. Lohman, McDonald, Pa.
- KXD—2075, Richard Reeder, Alliance, O.
- KXS—2325, A. C. Thompson, Owego, N. Y.
- KYF—1100, R. L. Hartman, Hoisington, Kans.
- KYG—2175, J. F. Means, Oil City, Pa.
- KYJ—1750, W. Schultze, Chicago, Ill.
- KYK—2025, V. V. Tompkins, Cleveland, Ohio.
- KYT—2325, Breisch Motor Co., Ringtown, Pa.
- KZY—1850, J. J. Beales, Jr., San Anselmo, Calif.
- KZZ—2700, Sarkis Kachajian, Worcester, Mass.
- KZN—1650, E. K. Kitts, Bluefield, W. Va.
- KZV—1175, C. Bennett, Aurora, S. D.
- KZY—1950, A. Galloway, Jr., Grand Rapids, Mich.
- NAA—2250, R. J. Gall, Blythe, Calif.
- PVX—2675, M. A. Jeffords, Wenatchee, Wash.
- WAAB—1325, C. H. Vale, Providence, R. I.
- WAAC—1775, W. F. Macleod, Prince Albert, Sask., Can.
- WAAD—1100, R. Doull, Halifax, N. S.
- WAAG—1650, L. W. Beretta, San Mateo, Calif.
- WAAL—1600, C. C. Beery, Spokane, Wash.
- WAAM—1725, M. B. Gilbert, Douglas, Wyo.
- WAAN—1550, Richard R. Martindale, Los Angeles, Calif.
- WAAM—1575, M. B. Gilbert, Douglas, Wyo.
- WAAN—1400, H. Baird, River de Chute, N. B., Can.
- WAAP—1400, Arthur Chapelle, Woodburn, Ore.
- WAAQ—1325, V. Douglas, Guthrie, Okla.
- WAAV—1300, A. B. Butters, Los Angeles, Calif.
- WAAZ—1700, W. E. Davison, Berwick, N. S., Can.
- WBAA—1575, C. C. Beery, Spokane, Wash.
- WBAB—1425, G. E. Wharton, Houston, Tex.
- WBAD—1125, N. Theobald, Attleboro, Mass.
- WBAG—1250, M. Neuman, Guthrie, Okla.
- WBAG—1125, M. L. Johnson, Atchison, Kans.
- WBAH—1050, F. T. Wycoff, Springfield, Mass.
- WBAJ—1075, G. E. Wharton, Houston, Tex.
- WBAM—1825, H. S. Olding, New Glasgow, N. S., Can.

- WBAP—2550, C. Blanch, Amherst, N. S., Can.
- WBAQ—1200, H. S. Olding, New Glasgow, N. S., Can.
- WBAX—1350, G. E. Wharton, Houston, Tex.
- WBAY—2175, C. C. Beery, Spokane, Wash.
- WBF—2575, A. B. Butters, Los Angeles, Calif.
- WBL—1900, H. S. Olding, New Glasgow, N. S., Can.
- WBT—1250, W. C. Wolverson, M. D., Linton, N. D.
- WBU—1400, Wilson Woodside, Calgary, Alta., Can.
- WBZ—2500, Arthur Chapelle, Woodburn, Ore.
- WCAE—2250, R. Taylor, Livermore, Calif.
- WCAF—1025, F. J. McKenney, New Prague, Minn.
- WCAH—1325, K. McNeil, Ottawa, Ont., Can.
- WCAH—1950, A. B. Butters, Los Angeles, Calif.
- WCAI—1150, G. D. Roberts, Edmonton, Alta., Can.
- WCAN—1225, E. M. Perkins, Jr., Sioux Falls, S. D.
- WCAP—1225, W. F. Macleod, Prince Albert, Sask., Can.
- WCAQ—1150, H. S. Olding, New Glasgow, N. S., Can.
- WCAR—1750, Sarkis Kachajian, Worcester, Mass.
- WCAS—1450, Arthur Chapelle, Woodburn, Ore.
- WCAT—1975, H. S. Olding, New Glasgow, N. S., Can.
- WCAZ—1325, Doyle Gatter, Arkansas City, Kan.
- WCAZ—1050, D. J. Morris, Weir, Tex.
- WCAZ—1375, W. E. Davison, Berwick, N. S., Can.
- WCI—1150, M. L. Johnson, Atchison, Kans.
- WCK—1225, W. F. Macleod, Prince Albert, Sask., Can.
- WCM—2174, H. S. Olding, New Glasgow, N. S., Can.
- WCN—1200, W. M. K. Young, Kansas City, Mo.
- WCP—2075, L. W. Beretta, San Mateo, Calif.
- WCT—1150, Edwin M. Perkins, Jr., Sioux Falls, S. D.
- WDAP—1700, Wm. Hurst, Jr., Winnipeg, Can.
- WDAP—1675, W. E. Davison, Berwick, N. S., Can.
- WDAP—1625, W. M. Brown, Pittsburgh, Pa.
- WDAI—1275, G. L. Harms, Portland, Ore.
- WDAK—1200, R. Hastings, Atchison, Kans.
- WDAL—2450, J. Beckman, Seattle, Wash.
- WDAN—1375, V. H. Spencer, Montreal, Que., Can.
- WDAA—1500, M. J. Solumbe, Plattsburg, N. Y.
- WDAP—1875, M. J. Berilockway, Lounita Park, Calif.
- WDAQ—2375, M. C. Bidwell, Grinnell, Ia.
- WDAR—1175, C. B. Martin, Springfield, S. D.
- WDAS—1250, C. M. Bennett, Aurora, S. D.
- WDAT—1200, E. M. Perkins, Jr., Sioux Falls, S. D.
- WDAP—1250, A. L. Lewis, Stanberry, Mo.
- WDAY—1275, H. H. Wall, Rensselaer, N. Y.
- WDAY—1200, G. E. Wharton, Houston, Tex.
- WDT—1400, G. E. Wharton, Houston, Tex.
- WDY—2325, Nestor Barrett, Republic, Wash.
- WEAB—1550, H. S. Olding, New Glasgow, N. S., Can.
- WEAD—1000, John Kiener, Cleveland, O.
- WEAP—2000, R. J. Gall, Blythe, Calif.
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- WEAP—1700, R. J. Gall, Blythe, Calif.
- WEAT—1625, R. Doull, Halifax, N. S.
- WEAV—1200, H. S. Rahiser, Pittsburgh, Pa.
- WEAT—1950, H. Gow, Seattle, Wash.
- WEAZ—1475, H. S. Olding, New Glasgow, N. S., Can.
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- WEY—1250, Mrs. A. S. Mawhinney, New York, N. Y.
- WFAA—1925, W. E. Davison, Berwick, N. S., Can.
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- WFAJ—1875, John Kiener, Cleveland, O.
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- WFO—1000, D. J. Morris, Weir, Tex.
- WGA—1700, W. F. Macleod, Prince Albert, Sask., Can.
- WGAJ—1275, J. Jang, Hanley Falls, Minn.
- WGAJ—1400, H. S. Olding, New Glasgow, N. S., Can.
- WGAN—1275, H. B. Porter, Lynn, Mass.
- WGAN—1700, H. S. Olding, New Glasgow, N. S., Can.
- WGAR—1150, H. Dammann, Bronx, N. Y.
- WGAZ—1250, W. E. Davison, Berwick, N. S., Can.
- WGAT—1675, R. Doull, Halifax, N. S.
- WGAY—1000, D. J. Morris, Weir, Tex.
- WGF—1425, Perkins Benneyan, Fresno, Calif.
- WGI—1750, E. L. Dye, Plainview, Tex.
- WGL—237, R. B. Martindale, Philadelphia, Pa.
- WGR—2175, Allan Harvey, Snohomish, Wash.
- WGV—1800, H. S. Olding, New Glasgow, N. S., Can.
- WGY—2575, J. J. Beales, Jr., San Anselmo, Calif.
- WHA—1650, Perkins Benneyan, Fresno, Calif.
- WHAA—1450, H. S. Olding, New Glasgow, N. S., Can.
- WHAB—1550, G. W. Perkins, Thompson, N. Y.
- WHAE—1050, H. Rawls, Phoenix, Ariz.
- WHAF—1600, Dick Lawrence, Sacramento, Calif.
- WHAK—2175, Arthur Chapelle, Woodburn, Ore.
- WHAL—1100, H. S. Olding, New Glasgow, N. S., Can.
- WHAM—2225, Arthur Chapelle, Woodburn, Ore.
- WHAN—1250, K. McNeil, Ottawa, Ont., Can.
- WHAR—1150, E. M. Perkins, Jr., Sioux Falls, S. D.
- WHAS—1950, Arthur Chapelle, Woodburn, Ore.
- WHAW—1325, E. M. Perkins, Jr., Sioux Falls, S. D.
- WHAZ—2550, H. Wilbert, San Francisco, Calif.
- WHB—1675, W. E. Davison, Berwick, N. S., Can.
- WHK—1550, L. W. Gushwa, Firth, Ida.
- WHX—1025, Mrs. A. S. Mawhinney, New York, N. Y.
- WIAC—1200, H. Mutze, Manassas, Va.
- WIAF—1000, E. M. Perkins, Jr., Sioux Falls, S. D.
- WIAJ—1250, Wm. Hurst, Jr., Winnipeg, Can.
- WIAQ—1250, H. S. Olding, New Glasgow, N. S., Can.
- WIAZ—1325, E. M. Perkins, Jr., Sioux Falls, S. D.
- WIC—1150, G. E. Wharton, Houston, Tex.
- WIP—1325, De Witt McKinley, Ft. Worth, Tex.
- WIZ—1175, H. S. Olding, New Glasgow, N. S., Can.
- WJAD—1625, G. F. Cory, New Bedford, Mass.
- WJAE—1700, A. Moffet, Ottawa, Ont.
- WJAJ—1000, D. J. Morris, Weir, Tex.
- WJAL—1350, E. M. Perkins, Jr., Sioux Falls, S. D.
- WJAN—1700, Arthur Chapelle, Woodburn, Ore.
- WJAP—1200, D. J. Morris, Weir, Tex.
- WJAS—1900, Louis Raymond, Pullman, Wash.
- WJAT—200, Allan Harvey, Snohomish, Wash.
- WJAZ—1400, Wilson Woodside, Calgary, Alta., Can.
- WJZ—2550, Robert Rowe, Santa Clara, Calif.
- WKAC—1175, J. J. Beales, Jr., San Anselmo, Calif.
- WKAF—1500, C. M. Bennett, Aurora, S. D.
- WKAL—1850, Arthur Chapelle, Woodburn, Ore.
- WKAN—1100, C. M. North, Malden, Mass.
- WKAQ—3850, Arthur Chapelle, Woodburn, Ore.
- WKC—1200, J. E. Latt, Fairfield, Tex.
- WKY—2400, R. Bartholomew, Garrochales, Porto Rico.
- WLAB—1100, C. H. Vale, Providence, R. I.
- WLAC—1175, D. J. Morris, Weir, Tex.
- WLAD—1275, M. J. Columbe, Plattsburg, N. Y.

- WLAG—1575, L. W. Beretta, San Mateo, Calif.
- WLAH—1500, D. J. Morris, Weir, Tex.
- WLAJ—1450, J. H. Wall, Rensselaer, N. Y.
- WLAH—1200, C. Larsen, Sioux City, Ia.
- WLAL—1525, Arthur Chapelle, Woodburn, Ore.
- WLAP—1925, A. G. Hilton, Bicknell, Calif.
- WLAV—2000, G. A. Gallagher, Berkeley, Calif.
- WLAW—1450, C. C. Sawyer, Liberal, Kans.
- WLAY—1200, M. F. Jacot, Copley, O.
- WLBA—1150, Wilson Woodside, Calgary, Alta., Can.
- WLK—1950, Wm. Schauer, Daly City, Calif.
- WLW—2025, L. W. Beretta, San Mateo, Calif.
- WLAB—1450, Arthur Chapelle, Woodburn, Ore.
- WMAC—1300, R. T. Andrae, Cobalt, Ont., Can.
- WMAD—1150, H. J. Latshaw, Clearfield, Pa.
- WMAP—1250, R. Henry, Butler, Mo.
- WMAG—1150, L. C. Burwell, Jr., Charlotte, N. C.
- WMAK—1175, Wm. J. Wolverson, Linton, N. D.
- WMAM—1350, H. Dammann, Bronx, N. Y.
- WMAQ—1850, R. Rowe, Santa Clara, Calif.
- WMAT—1300, Perkins Benneyan, Fresno, Calif.
- WMB—1300, R. Hastings, Atchison, Kans.
- WMC—1625, Perkins Benneyan, Fresno, Calif.
- WNAB—1350, H. S. Olding, New Glasgow, N. S., Can.
- WNAC—1600, G. E. Wharton, Houston, Tex.
- WNAD—1500, C. T. Mower, Malden, Mass.
- WNAP—1525, W. Rankin, Woodfords, Me.
- WNAK—1200, J. H. Wall, Rensselaer, N. Y.
- WNAS—1375, H. S. Olding, New Glasgow, N. S., Can.
- WNAQ—1000, R. T. Andrae, Cobalt, Ont., Can.
- WNAS—1200, E. S. Maynard, Detroit, Mich.
- WNJ—2375, B. H. Seydel, Tacoma, Wash.
- WNAJ—1900, B. H. Seydel, Tacoma, Wash.
- WNAK—1525, G. F. Cory, New Bedford, Mass.
- WNAO—1600, O. P. Klein, Leduc, Alta.
- WNAQ—2250, H. S. Olding, New Glasgow, N. S., Can.
- WNAF—1950, L. W. Beretta, San Mateo, Calif.
- WNAZ—1275, L. Hull, Eureka, Kans.
- WNAZ—1250, E. S. Macartney, Ottawa, Ont., Can.
- WOC—1675, H. S. Trost, San Jose, Calif.
- WOL—1550, L. W. Beretta, San Mateo, Calif.
- WOK—1725, H. S. Olding, New Glasgow, N. S., Can.
- WOQ—1575, M. B. Gilbert, Douglas, Wyo.
- WOR—1475, Arthur Chapelle, Woodburn, Ore.
- WOR—4800, Jack Costa, Haku, Maui, T. H.
- WOS—1375, L. Raymond, Pullman, Wash.
- WPA—1950, W. E. Davison, Berwick, N. S., Can.
- WPAC—1250, J. Skinner, Corsicana, Tex.
- WPAC—1250, Perkins Benneyan, Fresno, Calif.
- WPAC—1650, Arthur Chapelle, Woodburn, Ore.
- WPAC—1250, Arthur Chapelle, Woodburn, Ore.
- WPAT—1375, L. C. Kemp, Seattle, Wash.
- WPE—1475, Arthur Chapelle, Woodburn, Ore.
- WQAM—1300, Wm. Atwill, Swampscott, Mass.
- WQAQ—2150, H. S. Olding, New Glasgow, N. S., Can.
- WRL—1100, W. M. K. Young, Kansas City, Mo.
- WRP—1375, Guy V. Carrolo, Houston, Tex.
- WRR—2000, H. S. Olding, New Glasgow, N. S., Can.
- WRW—2550, L. W. Beretta, San Mateo, Calif.
- WSAS—1225, F. T. Wycoff, Springfield, Mass.
- WSAV—2175, Billy Withington, Jackson, Mich.
- WSB—2225, L. K. Poyntz, Victoria, B. C., Can.
- WSL—1175, L. Hull, Eureka, Kan.
- WSY—2050, Arthur Chapelle, Woodburn, Ore.
- WTA—1525, L. W. Beretta, San Mateo, Calif.
- WTC—1375, Arthur Chapelle, Woodburn, Ore.
- WVAD—1050, M. L. Johnson, Atchison, Kans.
- WVAX—1325, August Vinthoff, Linton, N. D.
- WVB—2150, R. Taylor, Livermore, Calif.
- WVJ—2300, F. W. Hill, Cristobal, C. Z.
- WVL—1275, G. W. Perkins, Thompson, N. Y.
- ZLO—3175, S. F. Richards, Janesville, Wis.

tion and the mileage, as defined in Rule 2, must be given in reporting record. Other-wise record will not be considered.

4. Distances are verified by the contest department of this publication using a Geo. F. Cram Co. standard Radio map of the United States. Owing to much variance in maps, the distances are only given to the nearest 25 miles and are claimed accurate only within 50 miles.

5. There are no prizes awarded. The only compensation record holders receive is the distinction of recognition through the columns of Radio Digest.

Station WLK Closes Down Due to Insufficient Aid

INDIANAPOLIS, IND.—It was officially given out last week that Station WLK will suspend operation at once. It was the unfortunate condition of the Hamilton Manufacturing Company, owners of WLK, to be unable to sufficiently entuse the local Chamber of Commerce to underwrite the station.

The entire broadcasting apparatus incorporated in the plant with the exception of antenna and towers, is now for sale. The equipment is very flexible as the Meisner circuit was used with two large variable condensers, one in the antenna and one in the plate circuit.

When questioned by the Digest, Francis F. Hamilton, manager of the station, said, "We have been broadcasting for a year and a half for only the fun of it. It is extremely regrettable that we could not receive the support necessary for continuation of operation."

Rules to Remember

The rules to follow in the contest are but few and easily followed. They are:

1. Amateurs who are able to beat the records given, or who can claim with good evidence, distance receiving records of 1,000 statute miles or more for Radio-telephone broadcasting stations found in the "Broadcasting Station Directory," page 8, of three consecutive issues, may send in such records.

2. Distances must be measured AIR-LINE and expressed in statute miles. Disregard of this rule may cause amateurs to be declared ineligible.

3. Call signals of station heard, its loca-

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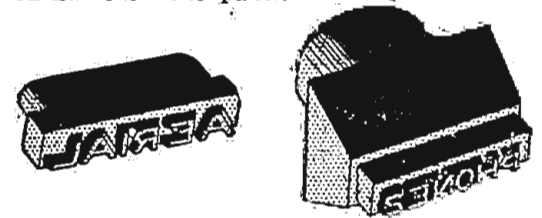
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Construction of the Ultra Reinartz Receiver

Part IV—Wiring the Rear of the Panel

By H. J. Marx

IT WAS stated previously that all binding posts connections were in the rear of the panel in order to avoid the usual collection of unsightly wires adorning the front of the set. In the illustration of the front of the panel (Fig. 1), it can be seen that the only connecting points are the jacks for plugging in the phone receivers. Even the connections for the loud speaker are made in the rear.

Connection Panel

All these connections in the rear are concentrated on the panel detailed in Figure 2. This is made up of 1/4-inch panel stock. Eight binding posts are mounted on this panel. The 1/8-inch holes are drilled for the posts.

The proper connections to these posts are indicated in the illustration. The countersunk holes at each end are for the 6-32 thread brass machine screws fastening the panel to the two brass angle strips. These strips or supports are fastened to the panel sockets. No details are given of these strips—since the method of mounting this connection panel will vary with different types of apparatus used. It is therefore left to the ingenuity of the constructor. The method of mounting is clearly indicated in the back view illustration, Figure 3.

Wiring

After all of these details of the mounting of the apparatus on the panel have been completed, the question of wiring is next. The wire used by the author was a No. 14 gauge tinned and rubber covered copper wire. This particular kind of wire isn't required necessarily. Any good No. 14 gauge copper wire can be used, but it must be covered with spaghetti tubing or otherwise insulated on account of the con-

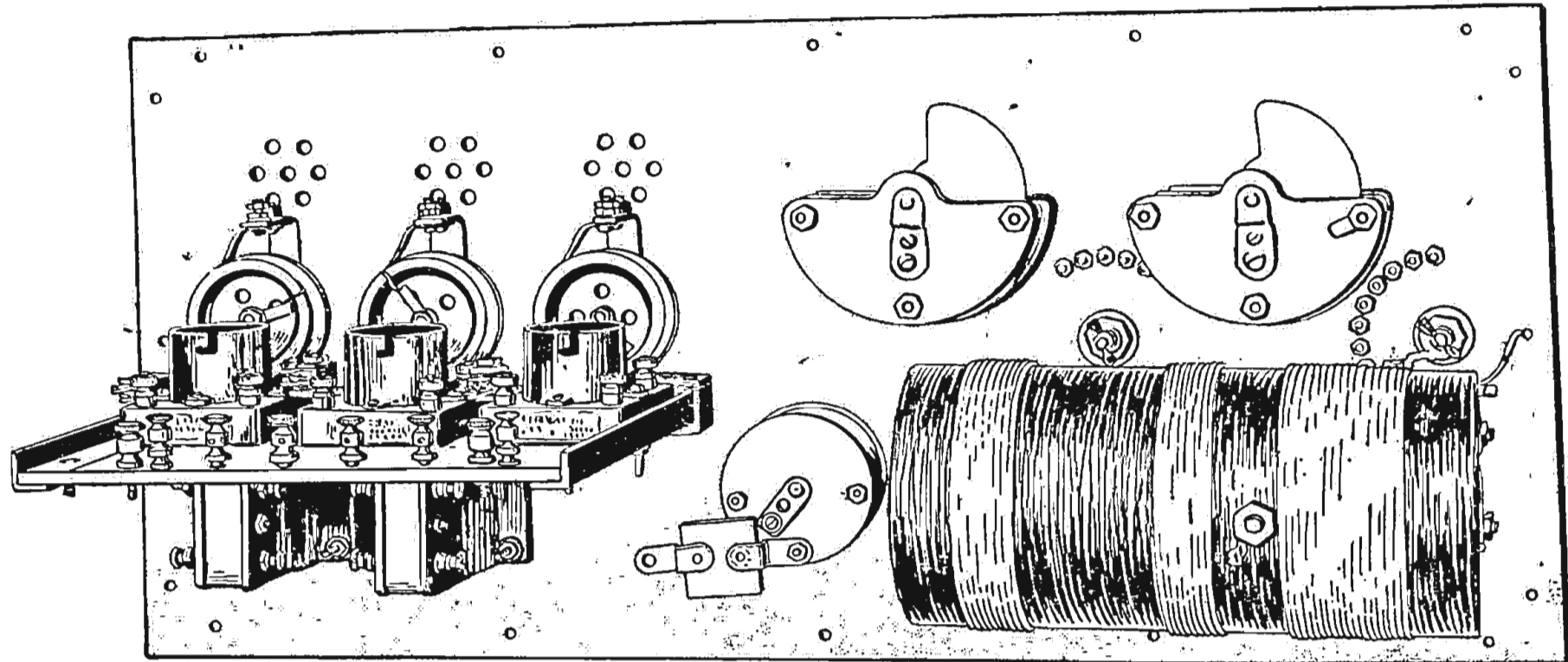


Figure 3

fixed plate side of the amplifier condenser can now be connected up to the plate circuit of the first amplifier tube. The tube and rheostat connections to the battery terminals should now be inserted.

Wiring Amplifying Stages

After these connections have been made, it is advisable to take up the amplifying stages. In the illustration, double-circuit

the soldering iron in difficult corners afterwards.

Don't let leads rest against the panel or against any part of the instruments except at joints. Panel material may be a perfectly good insulator, but after it is covered with dust and grease, it is apt to become a perfect grid leak with just sufficient conductance to prevent perfect operation of the set.

The Cabinet

Details of the construction of the cabinet have purposely been omitted especially because most of the constructors have particular cabinet ideas in mind. The panel size is 8 by 22 inches while the depth of the cabinet should be about 8 inches. It should have either a hinged cover or back to provide easy access to the tubes and the connection panel.

Tuning Directions

In operating this circuit both the detector and amplifier plate condensers should be set at 0, that is with the plates all the way out. The grid condenser is set at 50 around or with the plates halfway in. The tickler switch lever is set at the center tap. The dial on the rotor of the tuning unit should be adjusted so that when indicating the maximum of the graduations the rotor winding is in line and runs in the same direction as the secondary winding. In tuning, this dial is set at about 50 or halfway, which would put the rotor tube in a position at right angles to that of the tuning unit.

The primary tap switch should now be moved over the contact points for rough investigation for any carrier waves. At the same time, the grid control should be varied by means of the rotor dial. When reception has been brought to the maximum point of intensity and clearness, then the grid condenser can be adjusted as required. The next step then is to vary the tickler tapped switch. This will work very closely in conjunction with the detector plate condenser. This dial should be increased until the regenerative effect is brought up to its best point without distortion. If the amplifier stages are in

use, the amplifier plate condenser capacity should gradually be increased by rotating the dial counter clockwise up to the point of maximum intensity.

THE END.

Correction

In the March 31 issue, page 14, in "How to Make a Prize Flewelling Set," by F. P. Hall, the grid condenser value was given as .0005 mfd. through a typographical error. This should have been .00005 mfd.

Again, on page 17 of the same issue, in "Construction of the Ultra Reinartz Receiver," by H. J. Marx, top of fourth column, the two plate condensers are referred to as each having a .00005 mfd. capacity. This figure should have been .0005 mfd.

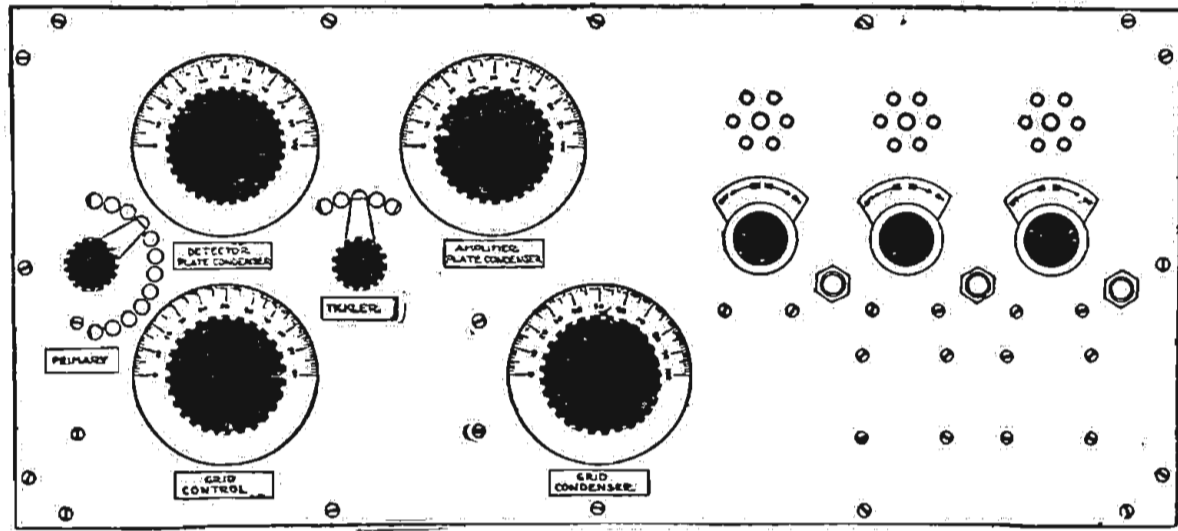


Figure 1

siderable amount of wiring necessary. Ignoring this point will be the cause of a lot of difficulties through short circuits.

Since the wiring is somewhat complicated, and although the instruments are not crowded, the wiring can only be satisfactorily done if some form of procedure is followed.

Procedure in Wiring

Obviously the first step in wiring would be the tap leads to the contact points of

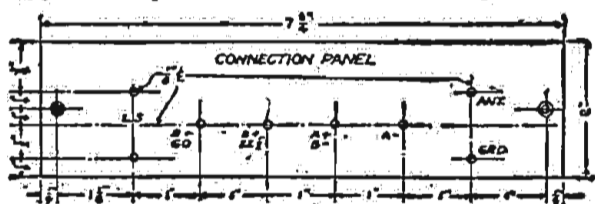


Figure 2

the switches. In making these connections it is advisable to remove the two plate circuit condensers so that the soldering connections to the tickler coil winding iron can be handled more easily. The ing are the first to be soldered. Then the leads connecting the plate of the first tube and the tickler switch lever should be inserted. A space of bared wire should be left on this lead for connection to the detector plate condenser after it has been replaced.

The connections should now be made for the primary tap switch. Then the primary switch lever is connected to the ground binding post. The lead from the first contact point on the primary switch should be soldered to it. The two plate condensers are then replaced and this lead can run from the two condensers over to the antenna binding post. The lead running from the stationary plates of the detector plate condenser can now be tapped into the lead between the detector tube plate and the tickler switch lever. The terminal attached to the shaft bearing on the rear side of the tuning unit coming from the rotor winding can be connected then to the rotating plates of the .001 mfd. variable condenser. The fixed plates are connected to the grid of the first tube. In addition, as shown in the diagram given in Part I of this series, a .0015 mfd. fixed condenser is connected across the two terminals so that the total maximum capacity will be .0025 mfd. The

jacks have been added. As stated in the first article, these are not essential and were omitted to simplify the wiring diagram. First the transformer circuit connections should be made, taking care to keep the grid lead from the secondary of each transformer to the grid of its amplifier tube as short as possible.

The fixed condensers in the secondary circuits require no special support outside of that of the leads. They should be placed in a position such that there will be no tendency for them to contact with any metal parts. In addition their positions should be such as to avoid any inter-capacity reaction to any adjacent parts of the circuit.

Soldering Directions

A word of caution might well be added at this time that care be taken so that all soldered connections make good electrical contact. More than one Radiophan has condemned a circuit because what appeared to be a good soldered connection was really only a resin joint.

As a suggestion, wipe all soldered joints with a cloth while they are still warm and in addition, scrape off all surplus resin when hardened. This will immediately disclose any poor connection and avoid the necessity of trying to insert

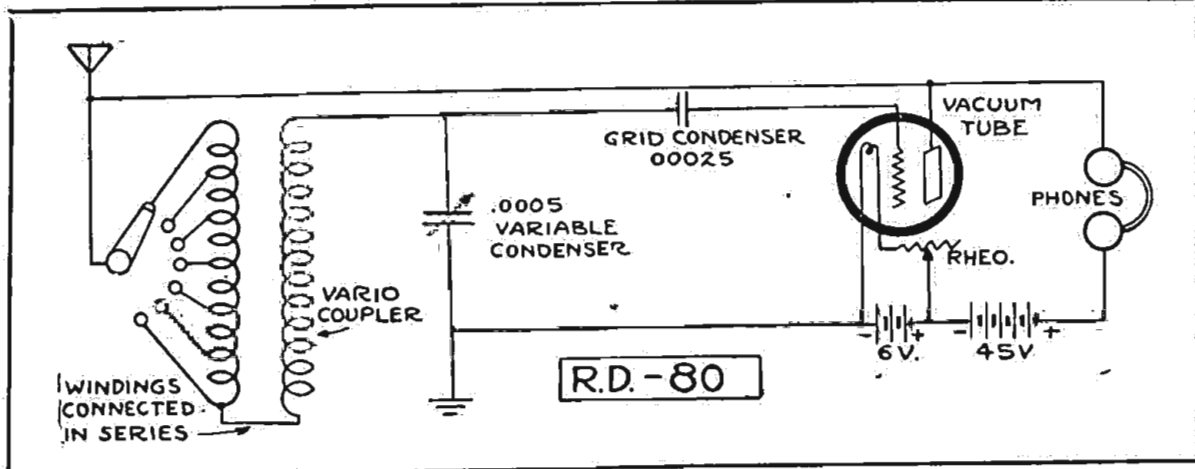
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Home Radio—How to Make It. By A. Hyatt Verrill. This book is particularly adapted for the amateur who desires to know how to make radiophones. Twelve full page illustrations and diagrams. Price, 75c.

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Elements of Radiotelegraphy. By Elery W. Stone. The text was written for the guidance and instruction of Radio students in the communication service of the Navy. It is an instruction book for Radio schools. Price, \$2.50.

Radio Receivers for Beginners. By Snodgrass and Camp. Answers the universal question, "How can I receive Radio?" Price, \$1.00.

Radio Reception. By Harry J. Marx, Technical Editor Radio Digest and Adrian Van Muffling. A simple treatise on Radio reception. Beginning with the elementary principles of electricity it

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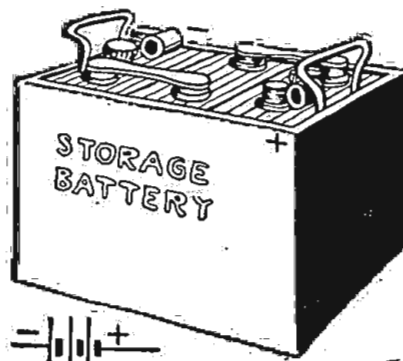
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Questions and Answers

Thousand Mile Reception

(2840) ATB, St. Louis, Mo.
I have built a three-tube reflex circuit, using the crystal detector according to the diagram shown in one of your recent issues.

I have been able to bring in broadcast concerts within a range of 1000 miles, using either the loop or outside aerial, but all out of town stations even WOC Davenport, fail to come in as loud as my three stage Radio frequency set, without audio amplification, although on local concerts I have all the amplification expected from two stages of audio. Can you tell me the cause of the trouble?

A.—It is impossible for us to determine the source of limitation without a personal inspection of the set. Barring defective apparatus, possibly an inefficient crystal, the condition cited should not prevail in a properly executed circuit from diagram given.

Flewelling and Reinartz

(2324) EPS, Boston, Mass.

In making a comparison of the Flewelling and Reinartz circuits for broadcasting station reception, which circuit has the greater range? Which is the more selective?

What are the chief points of advantage of each over the other?

A.—A comparison of the relative virtues of the Flewelling and Reinartz circuit is largely a matter of personal discrimination. They are of the same type. They require respectively:

- Flewelling.—Does not require much of an antenna, a loop will serve. Tuning very critical. External and tubing noises rather pronounced. Amplification very, very high. Selectivity very good. Range one thousand miles or over.
- Reinartz.—Requires a fairly good antenna. Tuning very easy. External and tube noises none. Amplification fair. Selectivity very good. Range one thousand miles or over. The above will help you to make your own comparison.

Inductances and Capacities

(2593) JG, Chicago, Ill.

In your January 27 issue you show several diagrams of Reflex circuits. In your circuit No. 2 will you kindly advise the ratio of windings and frequency range of Radio and audio transformers?

What number of turns are required on the primary and secondary of the vario-

coupler in this unit, also number of turns between taps on the primary?

What is the capacity of a 23-plate condenser? Can WD-11 tubes be used satisfactorily with the above circuit?

A.—Answering your inquiries, will advise that in Reflex circuit referred to standard Radio frequency transformers are used. For audio frequency transformers have three or four to one ratio.

Use a standard variocoupler having fifty-six turns of No. 22 wire tapped at every seventh turn on primary and thirty-six or forty turns of No. 26 wire on secondary.

A 23-plate condenser has a .0005 mfd. capacity.

We would not advise the use of WD-11 tubes with the circuit in question.

Reflex Selectivity

(2847) ND, Wilmette, Ill.

In making a set using two stages of A. F. amplification I believe that transformers of different ratio are used. Please give this proper ratio for the first and second stages.

What would be the correct ratio for each A. F. transformer used in the four-tube reflex set published in the Radio Digest for January 20, 1923?

In R. F. amplification which is best, tuned impedance or the regular transformer?

How does the four-tube reflex set compare with a six-tube set using regeneration in regard to selectivity, sensibility, D. X. and set noises?

In any set does a 43-plate condenser detract from the efficiency of the set?

A.—Use transformer of ten to one ratio and three or four to one ratio on first and second steps of audio frequency amplification respectively.

Use three or four to one ratio transformers for Reflex set described in January 20th issue of Radio Digest.

With Radio frequency amplification transformers are preferred rather than tuned impedance for wave lengths under one thousand meters.

The Reflex circuit compares favorably with six-tube regenerative as to selectivity and is less noisy. However, probably does not afford so great a range.

For short waves a forty-three plate condenser connected across an inductance does not afford close tuning adjustment. However, it is necessary in the antenna circuit.

Trouble

(2378) ICS, Carlinville, Ill.

The last few days I have had trouble with my set. I am able to tune in a station clear enough then suddenly my set seems to go practically or totally dead for several seconds, say from 5 to 10, when the station "comes back" again. This happens not only with stations farther off, such as KDKA, but also with those near by, such as St. Louis (KSD). My battery ought not to be at fault as it was recharged a short time ago. I cannot see any cause for trouble in the set. It seems to be the same as ever. At times the glow of the filament varies, will be dimmer for some seconds, and then comes back again. This fading out is exceedingly annoying.

I have had very good luck with my little set. Have listened to concerts from stations from San Francisco to Troy, N. Y., and from Canada to Havana.

This may be something old to many. I am only a novice at the game.

I find in your A.B.C. just what I have been looking for.

A.—Noting your specifications and difficulties experienced would advise that the condition has been encountered by the writer personally and has invariably re-

set and is usually located in the most unexpected place.

There may be some fault in your storage battery. If you have another available, or even a set of three dry cells, you can easily determine if trouble lies in battery or A battery leads. Would not be at all surprised if the trouble is found to be in leads.

There are 33 Radiophone stations in the United States broadcasting religious services. The territory covered, it is estimated, represents 65.2 per cent of the total area of the country.

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New design; heavy phosphor-bronze springs; no spacer washers required. Write for Bulletin on these Jacks, "TU-WAY" Plugs and other Carter products.

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Address.....

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

Memo Pad

What I will need to make a good tube set

- A Kellogg No. 501 variocoupler
- A Kellogg No. 605 variable condenser
- A Kellogg No. 2 tube socket
- A Kellogg No. 505 miniature condenser
- A Kellogg No. 503 mounting
- A Kellogg No. 609 radio resistance
- A Kellogg No. 502 dial
- A Kellogg No. 69A head set
- A Kellogg No. 501 rheostat
- A Kellogg switch and switch points
- A and B batteries and cabinet
- A Detector tube

Kellogg radio equipment is recommended for several reasons

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Fifth — Every Kellogg radio part is GUARANTEED by the manufacturer.

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Radio Illustrated

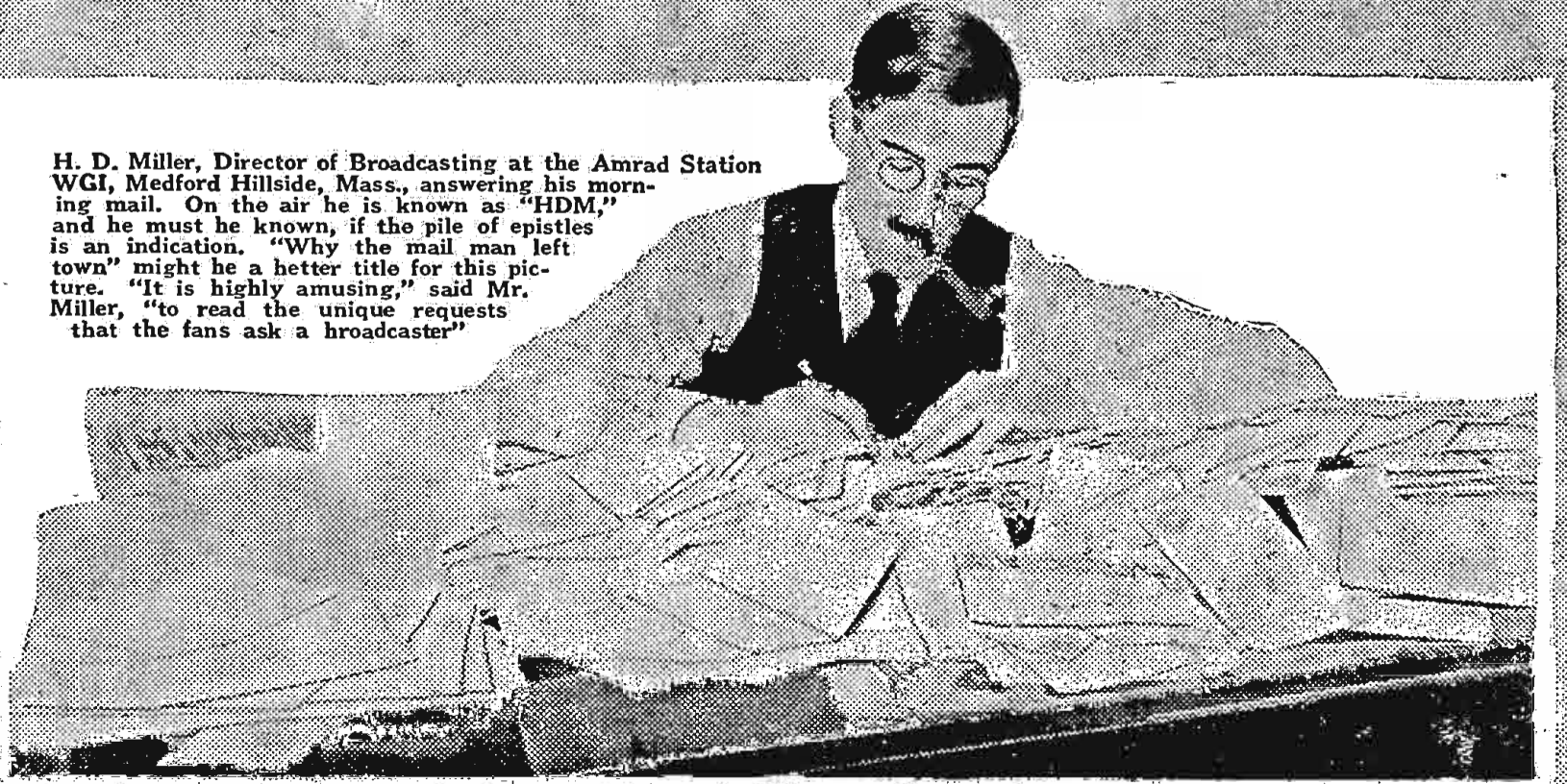


The tiny tot with the viol is a member of the Kindergarten Class for beginners at the Music School Settlement, New York City, where East Side children get music lessons at a nominal charge. These youngsters recently were on the air from Station WEAJ. Above is the largest Radio dial and socket in the world. It is being shown at the Third Radio Show at the Hotel Pennsylvania, New York City. Mrs. Dorothy Decker illustrates the comparison. This unusual exhibit caused a continual blockade by the crowd that gathered daily before the booth

Right Photo © Fotograms



That Radio outdoes Tut-Ankh-Amen in decoration for milady's hats is shown by the novelty above worn by Miss Marie Fleming
© K. & H.



H. D. Miller, Director of Broadcasting at the Amrad Station WGI, Medford Hillside, Mass., answering his morning mail. On the air he is known as "HDM," and he must be known, if the pile of epistles is an indication. "Why the mail man left town" might be a better title for this picture. "It is highly amusing," said Mr. Miller, "to read the unique requests that the fans ask a broadcaster"