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Radio Digest

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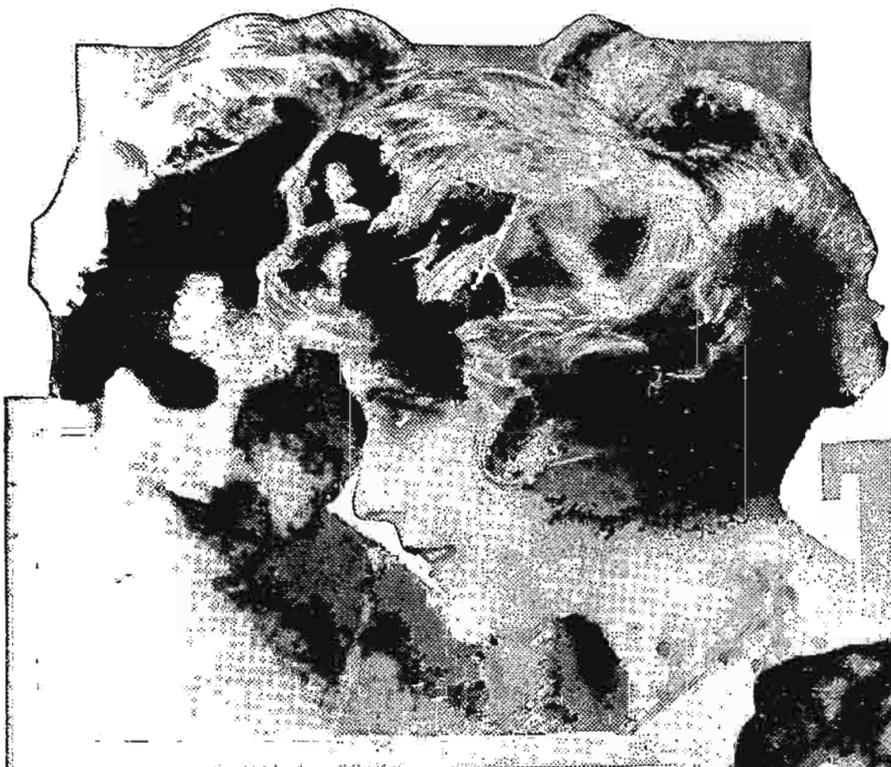
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CHICAGO, ILL., SATURDAY, APRIL 28, 1923

No. 3

ASSURE POPULAR MUSIC



Above is Violet Palmer and her reflection. It is a hard matter to decide which is the more attractive, isn't it? Miss Palmer was on a recent program of Station WOR, of the L. Bamberger and Company, Newark, N. J. Her part of the program kept several postmen busy next day bringing letters of appreciation from fans who had listened in.

Broadcast Boosts Sale of Records

Knight-Campbell Music Company Has Large Returns as Direct Results of Radio

By A. S. Hall

DENVER, COL.—Should the broadcasting stations be assigned any specific sum monthly or yearly by the songwriters, as suggested at the Washington conference on March 21? Does the broadcasting of popular music cut into the sales of phonograph records and player-piano rolls, as claimed by the song writers?

From the roof of the continent, the "Mile-High City," comes an emphatic "NO," voiced by no other authority than KFDL, through its operator, "Shorty" Gegg. The Knight-Campbell Music Company, of Denver, Colo., owners and operators of KFDL, refute the statements of the songwriters and phonograph record manufacturers that Radio is putting the record business "on the bum."

"There's nothing to this talk about the (Continued on page 2)

Jessie Royce Landis (below) played one of the principal roles in "Bargain Day," which was recently broadcasted from the studio of KYW. She is a daughter-in-law of Kenesaw Mountain Landis, famous baseball arbiter

WILL REMAIN AS PART OF BROADCASTS

Unite to Supply Songs

Broadcast Owners Call Conference to Fight Music Society Ruling on Copyright Features

CHICAGO.—As a result of a preliminary conference held here recently between interests representing Westinghouse Stations WJZ, KDKA, KYW and WBZ, the Daily News station, WMAQ; the Drake Hotel, WDAP, and station WJAZ of the Chicago Radio Laboratories, together with the Crosley company plant WLW, of Cincinnati, Radiophans are assured that popular music will be a part of all programs on all broadcasting stations in the country de- (Continued on page 2)

BOSTON FAN TUNES IN KYQ, HONOLULU PLANT

Reception Proves Successful Two Days at Same Time

BOSTON, MASS.—Marcy H. Hall of 136 Federal street, Boston, reports that on Saturday March 24, at 1.15 A. M., Boston time, he tuned in on Station KYQ, an electric shop in Honolulu, H. I., and listened in for about ten minutes, during which time phonograph records were played. On the following day, in company with a friend, he again tuned in on the same station at the same time and held them for 35 minutes, until 1:50 A. M., Boston time. They first heard a bedtime story and then two phonograph records, "When Hearts Were Young" and "Running Wild." This was all done with a regenerative detector and two stage amplifier, one transformer having an open secondary.



Jane Cowl, in the Selwyn's production of "Romeo and Juliet," Shakespeare's immortal love story at Henry Miller's Theater, produced under the direction of Frank Reicher, was recently heard from Station WJZ, Newark, N. J.

WGY TO HAVE DANCE ORCHESTRA ON ETHER

SCHENECTADY, N. Y.—Through the remainder of April and every week during May, WGY here, will broadcast the Saturday evening dance music of Cain's Castle Orchestra from 9 to 11 o'clock, Eastern time. This feature is introduced especially for isolated communities which cannot get a dance orchestra and which now, with the aid of loud speakers, will be able to hold weekly dances.

ASSURE POPULAR MUSIC

(Continued from page 1)

spite the demand of the American Society of Composers, Authors and Publishers, of New York, that their copyright selections be eliminated from the air unless a substantial license fee be paid them by the broadcasters.

The conferees agreed to resist the unreasonable attempt of the music organization to hold them up for fat fees for the broadcasting of their copyright selections by refusing to pay the assessment or to broadcast the society's music. A call was sent to all broadcasting stations in the country to attend a meeting at the Drake Hotel, Wednesday, April 25, for the purpose of organizing the broadcasters and to furnish them with music from the independent publishers, authors and composers that are not members of the society.

Action Culminates Long Controversy

This action of the local broadcasters followed quick on the broadcast announcement from Stations KYW, WDAP, WJZ, and the other stations over the country that no more music controlled by the New York society would be broadcast from these stations. The whole was a culmination of a controversy that has been on for months between the station owners and the music society, for the assessment of license fees for broadcasting copyrighted musical selections.

The subject was first broached at a conference held in New York in September of last year, between the Music Society, the Authors League of America, Music Chamber of Commerce, Music Publishers' Association of the United States, the Music Publishers' Protective Association, the Department of Commerce, American Telephone & Telegraph Company, Radio Corporation of America, General Electric Company, Westinghouse and the National Radio Chamber of Commerce.

Broadcasting Not for Profit

The music publishers demanded that the Radio interests recognize their right to collect fees for the broadcasting of their copyrighted selections as constituting a public performance for profit. The broadcasting interests resisted this interpretation and took the stand that broadcasting was not a public performance for profit and further that the music publishers were more than adequately compensated by the publicity given their music by broadcasting resulting in additional sales of sheet music, music rolls and phonograph records from which the publishers made a profit. The initial conference resulted in a deadlock and adjourned until the latter part of October when a second meeting of the same interests were held. The discussions of the second conference were much like the first and resulted in an agreement that a test suit would be brought to determine whether the broadcasting of a copyrighted musical selection constituted a public performance for profit and as such an infringement of the rights of the copyright holders.

Digest and Drake Query Plants

No test suit being instituted, the controversy dragged along until just recently the music society sent out an ultimatum letter demanding copyright fees or the discontinuance of the broadcasting of their music. This was met by a standpat refusal on the part of the broadcasters and many stations announced the withdrawal of the society's music from their program.

To determine what effect the order would have on broadcasting and how generally the revolt against paying the assessments was among the broadcasting stations telegrams were sent by Radio Digest and the Drake Hotel station WDAP to most of the important broadcasters throughout the country. The replies were almost unanimous in refusing the payment of license fees to the music society.

"WSB does not propose to pay American Society license," wired Lambda Kay, the famed "Voice of the South," director of the Atlanta Journal station.

"The Detroit News has received no ultimatum from any composers' society demanding we pay license for copyrighted music. Station believes it is not required to pay royalties because station is not operated for profit. We believe license fee could not be collected from Station WWJ," replied Charles D. Kelly, editor and supervisor of the Radio Department of the Detroit News.

Plants Show Fight

"We are advised that we are not infringing copyright laws by broadcasting without first securing a license, and until we are advised to the contrary we shall not take out a license," telegraphed Credo Harris, director and manager of the Louisville Courier-Journal station, WHAS.

"As owners of Station KGW we have declined to buy license from American Society of Composers. We look upon the demands of society's lawyers as offer to sell us immunity from litigation over a fantastic issue," said the Portland Oregonian.

"We shall not buy license if necessary," says the spunky woman director of WLAG, "The Call of the North." "If necessary we will boycott all compositions under control of American Society of Composers. This is the opinion of our backers and my personal opinion as a professional musician."

"Approve action of broadcasting sta-

tions. I am with you 100 per cent. Have discontinued American Society of Composers' compositions," Powell Crosley, Jr., Cincinnati, WLW.

"We think position taken by American Society toward Radio broadcasters is unreasonable and we are opposed to it," W. A. Dealy, Dallas News, Station WFAA.

WGY Statement

Martin P. Rice, director of broadcasting for the General Electric Company station, WGY, says: "WGY does not use the music which the American Society of Composers, Authors and Publishers purports to control. The installation of a broadcasting station like WGY involves an expenditure of one hundred thousand dollars and the annual operation costs as much more. At the present time there is no operative plan for collecting any definite revenue from those who listen to the program and no assurance that the listeners will purchase apparatus from the manufacturer who pays for the broadcasting. As everyone knows thousands enjoy broadcasting received on homemade sets without contributing a penny to broadcasting stations producing the programs. With such an arrangement the demand of the society that broadcasting stations pay a license fee based on the number of listeners in seems unreasonable.

"It is not practical to place the broadcaster with his non-paying audience in the same class as the moving picture theater with its very definite capacity for collecting revenue. This is particularly true in view of the fact that even if licenses were

purchased, a modern station's broadcast programs would include relatively few of the society's compositions."

KFAF and Others Join Fight

"We will not submit to demands of American Society of Composers for broadcasting music. They have about as much legal claim as the manufacturers of patented washing machine would have in case a purchaser took in washing for pay. The purpose of copyright is to protect holder from infringement by other authors or publishers putting out music already copyrighted. If American Society of Composers have legal right to enforce their demands we will close down rather than submit," Western Radio Corporation, Station KFAF.

"Acting on advice of legal department, we have declined to secure license from American Society of Composers," Star-Telegram, Fort Worth, Texas, WBAP.

"Will not take out license for broadcasting copyright music. American Society of Composers should pay for the widespread publicity gained by them through broadcasting instead of we paying them," Amrad, Medford, Mass., WGI.

"The attitude of KSD as to copyright music will depend on report of its attorneys who are giving great care to the study of this unusual legal question," Post-Dispatch, St. Louis.

Broadcast Refusal of License Purchase

"WMC, broadcasting station of the Commercial Appeal, Memphis, does not intend to apply to the American Society of Composers for license to broadcast copyright music. As owners of one of the big Radio

broadcasting stations of the country, the Commercial Appeal will give unhesitatingly its moral support to any project to fight this move on the part of the American Society. Our refusal to apply for license and pledge of moral support to fight them is being broadcast," G. P. Newbern, Radio editor.

"We absolutely refuse co-operation with American Society of Composers," Richard Johnson, Alabama Power company, Birmingham, Ala., WSY.

"Our attitude same as Westinghouse and Drake Hotel," F. G. Wickersham, engineer, Atlanta and Westpoint Railroad, WDAJ.

"Why Should We Pay?" Asks WOO

"Wanamakers does not expect to take out license for broadcasting copyright music. Why should they charge us anything. There is a legal aspect for the lawyers to settle, but as a matter of moral right we should not be charged a license fee. Broadcasting is an expense entirely; it is not done for profit. The awakened interest in music will benefit the composers more than anything else. We have to buy the scores of music we broadcast anyway," says Gordon H. Culley, Philadelphia, Station WOO.

Philadelphia stations, according to the Public Ledger, will continue to send out copyright music until it is legally shown they are violating copyright law in so doing. This includes Stations WFL, Strawbridge & Clothier; WDAR, Lit Brothers; WIP, Gimbel Brothers and WOO, Wanamakers.

Replies to Donnelly Telegrams

The following replies were received by Thorne Donnelly, WDAP, Drake Hotel, Chicago, to his wire of inquiry:

"Yes, we will stand with you and other stations on copyright matter," WOC, Davenport.

"We will back organizing independent publishers," WIGAT, Lincoln, Neb.

"We heartily agree with sentiments," Doubleday Hill Electric Co., Washington, D. C., WMU.

"Will back you," WCAV, Milwaukee.

"Willing to co-operate within reason. Willing to send representative if personal action necessary to these demands," WCK, Stix, Baer & Fuller, St. Louis.

"With you. Will send representative," Peoria Radio, WJAN.

"We are certainly with you," Doubleday Hill Electric Co., Pittsburgh, Pa., KQV.

"Cannot send representative to confer about music composers' demands. This being a state institution prevents very active participation in this movement. It has our hearty approval," A. H. Ford, WHAA, Iowa City.

"We are interested. What date will meeting be held?" Deseret News, KZN, Salt Lake City, Utah.

"Interested and agree broadcasters should co-operate," Register Tribune, W. W. Waymack, editor, Des Moines.

"Will do everything possible to co-operate," Lee J. Meyberg.

"Will co-operate in any way possible to frustrate demands Society of Composers," Scranton, Penn., WQAN, J. D. Keator, Mg. editor, Scranton Times.

"We are with you," Electric Equipment Company, WQAM, Miami, Florida.

"We will send representative," Western Radio Co., Kansas City, Mo.

BOOSTS RECORD SALES

(Continued from page 1)

sale of phonograph records falling off since the advent of Radio," said Gegg, "at least, as far as the Knight-Campbell Music company is concerned. We started broadcasting from KFDD on January 23, 1923, and while that is not such a long time ago, our books show that the sale of records in the phonograph department has increased more than thirty per cent in February and March as compared with February and March of last year.

"We use a number of records for our entertainments. The names and numbers of each record played is kept on the station log. Nearly every time we broadcast, the following day someone will come in to the store and ask for 'the third record you played last night on the Radio,' or some other such record.

"The same thing has happened at our branches at Colorado Springs and Pueblo. At Colorado Springs, our branch house furnishes records to KFFQ, and the folks drop into the store there and ask for numbers they have heard over that station the same as they do here.

Broadcast Secures Mail Orders

"The sale of records by means of Radio is by no means local. Our mail order department ships out numerous orders that were secured through the medium of the Radio.

"In Denver, we also furnish records to KFAF and KLZ and we find our sales have jumped likewise through the broadcasting of these two stations.

"The idea that Radio is cutting into the sales of phonograph records is all wrong. It's the biggest booster for records we have ever found. Any assessment against broadcasting stations is going to put a pretty bad crimp in the broadcasting game, and of course, it is going to be felt in the music business.

"Summing it all up, Radio has not harmed the music business, it has helped it wonderfully.

Excellent results are obtained from a kite antenna. Fly the kite with wire instead of cord.

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Looking Ahead

Tell Your Beginner Friends—that Thomas W. Benson, a man in Radio for over a score of years and well acquainted with every scientific development the wonder science has ever had, will begin a series of "first reader" articles for novices next week. His general topic will be what every Radiophan should know, and his first article will tell of the fundamental facts of electricity as applied in Radiophony. Start with the May 5 issue.

A Three-Tube Set Reflexing on Two Tubes—is the title of a series by H. J. Marx starting with the May 5 issue. The set does with three tubes what normally is accomplished only by the use of six, and does it better. Developed after three months' research; exceptional volume and long distance reception are obtained by this set, which can be used with either a loop or outdoor aerial. While not low in cost, the apparatus meets the popular demand for an all-around good receiving set.

The Re-Allocation of Wave Lengths for Class B Stations—an interesting article on the new wave length assignments and plan by which it is believed the interference between broadcasters will be eliminated will be given in the May 5 issue. Order a copy today so you will have the details of this great plan in a nut shell, and so you will know where, after May 15, you may expect to hear your favorite Class B broadcasters.

Advance Programs—More Every Week—With this issue of the Digest is given the week's advance programs in detail for twenty-four of the country's leading broadcasters. As with other similar features, this is available through no other source. Eventually it is planned to give advance programs for every Class B station, but this will of necessity take time until the broadcasters become so organized as to furnish these sufficient time in advance.

E. T. Flewelling's One Condenser Flivver Super Set—will be described more fully by the author and inventor in Part II of the new series next week. This interesting offspring of the original Flewelling is worthy of construction by the Radiophan who has not attempted the Flivver Super as yet. Watch for Mr. Flewelling's article telling the really correct method to secure amplification with his set. Until protected by patents he will not be able to whisper this confidence in the ears of the readers.

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35 WAVE LENGTHS FOR 30 LOCALITIES

CLASS A PLANTS GET NEW RATINGS MAY 15

Interference to Be Entirely Eliminated Under New Distribution of Broadcasting Wave Lengths

By Carl H. Butman

WASHINGTON.—Interference, the bugaboo of both Radio operators and fans, will be greatly reduced, if not eliminated, by May 15. On that date, the assignment of about 35 exclusive wave lengths to some 30 localities, where class B broadcasting stations are situated, will go into effect. Wave lengths for Class A stations will also be assigned by districts by May 15, it is hoped.

The tentative distribution of broadcasting waves will mean that anyone in the United States with a good receiving set will soon be able to pick up each and every high-powered Radio broadcasting station and most of his local stations without experiencing the interference which has been prevalent for many months.

Stations 3,000 Miles Apart

Practically every B station will have a national exclusive wave length, between 300 and 345 or 375 and 545, except where there are two or more such plants in one locality, but the waves are assigned to localities rather than stations and will have to be shared in some cities.

In four instances, New York, Philadelphia, Los Angeles and San Francisco, two or three additional wave lengths will also be assigned, but they will not be exclusive nationally. These waves all located on the Atlantic Coast will be repeated in the Pacific Coast cities. While not exclusive, these additional waves will aid in supplying additional facilities and will scarcely cause interference as the stations will be about 3,000 miles apart.

Time Difference an Aid

The difference in time across the continent of 3 hours will also tend to eliminate any interferences. As soon as the nine Radio inspectors can arrange with the class B station owners in their districts, authority to broadcast will be issued on the specified wave lengths and stations will be required to use them only. Where two or more stations exist, a time schedule will be arranged. Until the assignments are made definitely, B stations will continue to operate on 400 meters, and C stations on 360, but by the middle of May it is hoped that all readjustments will be completed and the transfers made. A few wave lengths in each district have been reserved because of anticipated interference with other lines of communication or held for new stations.

Assignment of Class A Waves

By May 15, the nine Radio inspectors of the Department will also undertake the relocation of specific waves to old class A or new class C stations in their districts now operating on 360 meters. These wave lengths, between 222 and 300 meters, will not be exclusive nationally but will be exclusive in each district, giving practically every station a selective wave. Along the borders of adjacent districts, inspectors plan to arrange the allocation of wave lengths so that no material interference will be created due to the assignment of waves in close proximity.

Class C stations now licensed on 360 meters will be permitted to continue the use of this wave length if they so desire, but they will not be permitted to vary the wave length.

Copley-Plaza Hotel, Boston, Installs Broadcast System

BOSTON, MASS.—A combination of systems for internal and external broadcasting has been purchased by the Copley-Plaza Hotel of this city, which will benefit Radiophone listeners all over the country, especially in New England, as well as the hotel management and its guests.

The main idea is the installation of a public address system in the ballroom, whereby it will be possible to broadcast voice and music so that they will be plainly heard in all parts of the big ballroom. Seven microphone pockets will be installed in this room, and one in the state suite. These will be inter-connected with a public address system so that if there is any special event or popular program taking place in the tea room, it can be broadcast in the ball room, thus permitting a greater number of people to hear it.

A special land wire between the Copley-Plaza and Station WNAC, the Shepard Stores, will be kept in connection, furnishing the outside Radio audience excellent material from the Copley-Plaza's numerous programs, and greatly increasing the evening's entertainment.

Government Considers Airphone

WASHINGTON, D. C.—A number of bureaus and departments of the government are considering, it is understood, the advisability of using the Radio to send out instructions to their field agents. The matter of using Radio in place of the telegraph is being given consideration.

"DIE MEISTERSINGER" BROADCAST BY WNAC

BOSTON, MASS.—Wagner's opera, "Die Meistersinger," was broadcast by WNAC (the Shepard Stores) recently, in its entirety, direct from the Boston Opera House, on the opening night of Boston's Wagnerian opera season. The large cast of European singers was headed by Frederick Schorr, who sang the part of Hans Sachs, the benevolent cobbler.

TALKING AUTOMOBILE PUZZLES BIRMINGHAM

BIRMINGHAM, ALA.—Automobile row in Birmingham has a mystery. It is a talking Studebaker car. Crowds have been attracted by the novelty. Supposedly the owners have it hooked up with a Radio set. But it is invisible and can't well be found on inspection. Still it talks, sings, tells all about the weather and gives the latest quotations in Standard Oil, preferred, etc.

TWINS SING FOR KYW LISTENERS



No, it is not the same young lady in two different poses—we thought so too, at first. They are twins, the Connor girls, Velma (left) and Thelma. These two attractive young ladies were the ones who entertained KYW listeners in the midnight revue recently

ETHER ENTERTAINS MILL'S EMPLOYEES

Fairhaven Mills Starts Noon Dance Idea—16 Others Fall in Line

NEW BEDFORD, MASS.—Over 35,000 men and women are being given entertainment and education through the Radio, by means of sets installed in the various welfare buildings. A special program is given each noon from 12 to 1 o'clock from Station WDAU of Solcum & Kilburn, this city, including concerts and dance music, which are picked up by the powerful receiving sets at the mills and amplified by loud speaking devices, so that the workers may dance or just listen in, as they may desire.

This new form of education and entertainment at the mills by Radio was started at the Fairhaven Mills, and the mill electricians built the powerful receiving set, with two steps of amplification. Other mills heard of the plan and soon realized its practical benefits, so that today sixteen mills have Radio receiving systems.

At the Fairhaven Mills, John A. Gifford, James Golden and David Beanland, members of the welfare association, have charge of the Radio program and with them co-operate W. M. Newington and Irving Vermilyea of the local broadcasting station. In addition the Fairhaven Mills have motion pictures, including many reels especially made for them.

NOTED VODVIL STARS TO SING FOR EUROPE

Marion Harris, Keith-Orpheum Headliner, on WJZ Program

NEW YORK.—Marion Harris and Paul Specht and his orchestra will broadcast to Europe as official representatives of the record manufacturers at the Talking Machine Dealers' Association banquet to be held at the Hotel Pennsylvania.

Miss Harris is well remembered as probably one of the best and most favorably known stars of the Keith and Orpheum circuits and is known worldwide in every home where there is a phonograph. She is the same Marion that first sang such songs as "I Am Looking for a Bluebird," "Sweet Cookie," and "Nobody's Baby," for the records. It is a scoop indeed to have this star on the air for the entertainment of the WJZ fans.

The talking machine men have made arrangements with Station WJZ of Newark for what is to be the greatest broadcasting event in the history of the Westinghouse Company. Specht will play for the Radio between the hours of eight and ten-thirty, and also between courses of the dinner and for dancing.

Other notable artists, such as John Steale, the McCarthy Sisters, Ted Lewis, Vincent Lopez and many others are also scheduled to appear on the program.

The banquet will be held in the main ballroom of the Hotel Pennsylvania. Last year, Paul Whiteman represented the record industry, but this year Specht and Miss Harris were selected for the honor.

AIRPLANE DIRECTED FROM WGR PLANT

TEST OPENS NEW POSSIBLE AID FOR FLYERS

Success of Experiment Means Considerable Extension of Ether Industry to Equip Planes

BUFFALO, N. Y.—Station WGR has been making successful experiments in directing of airplanes by Radio telephone with L. L. Irvin of Buffalo, driver of the plane with which experiments were conducted.

Mr. Irvin's plane is equipped with a receiving set, using the usual trailing wire antennae. Every afternoon he goes up and floats about in the air above Buffalo listening to the program given by the Federal Telephone & Telegraph Company, station WGR, far below.

Fans Hear Commands

Arrangements were made for the experiment to take place one afternoon last week. At a prearranged time L. B. Weller, the announcer at the Federal station, took control of the aircraft. Radiophans were astonished to hear the directions, "Turn right!" "Turn left!" etc., breaking into their afternoon program, but those in the northern section of Buffalo who happened to be in their windows watching the airplane while listening in could understand for with every command the plane executed the proper movement within 15 seconds after the command was broadcast.

Reception Poor in High Altitudes

The success of these experiments, which were repeated on the following afternoon, opens up a field for speculation as to the possible use of the Radio all over the United States in connection with flying, both commercial and pleasure.

Representatives of the Federal Company are of the opinion that these experiments may lead to a general broadening of the practicability of flying and more advanced experiments will be carried out in the near future. In the first attempts it was found that the directions could not be clearly received when the plane got into the higher and colder regions of the air and the subject is being studied further to see if these defects can be remedied.

Will Be of Aid to Airplanes

It is not improbable that the time may come when Radio stations all over the country will be prepared to render material assistance to visiting or transient flyers by giving them for instance landing information, local geographical "dope", local weather conditions, etc.

This in turn would mean a considerable extension of the Radio industry as it would imply the equipment of all service planes with Radio receiving apparatus.

Fast-Moving Train Picks Up Signals

For the First Time in Canada Broadcast Is Received on Trainboard

CALGARY, ALTA.—For the first time in the history of Radio in Canada, Radiophone signals were successfully picked up on board rapidly moving railway trains when the Winnipeg-Vancouver train of the Canadian Pacific railway reported reception of signals from several powerful American and Canadian stations, on its arrival in Vancouver.

Officials Co-operate

Railway officials co-operated with Raymond Wylie, Orpheum headliner and an ardent Radiophan, in the carrying out of the experiment. Mr. Wylie had a receiving set which was installed in a drawing room of the Winnipeg-Vancouver train. The aerial on the swiftly-moving train was perfect, Mr. Wylie said on his arrival at the Pacific Coast. In some places the vibration of the train rendered hearing of the concerts exceedingly difficult, but in spite of this, musical selections from Chicago, Minneapolis, San Francisco, Kansas City, and Calgary were heard. From Chicago the music of the Drake Hotel orchestra was heard, while the Naval Band at Frisco playing the soldiers' chorus from Faust was also heard.

Antioch College Station WRAV Opens as Class A

YELLOW SPRINGS, O.—Station WRAV, of Antioch college, this city, recently opened with elaborate dedication services, will broadcast concerts regularly on Wednesday and Sunday evenings. A wave length of 350 meters is used. The station has so far been heard in Ohio, Indiana, Kentucky, Illinois, West Virginia, Pennsylvania and Michigan. The outfit was given to Antioch college by the Rike-Kumler company, of Dayton.

The Week's Advance Broadcast Programs

Tuesday, April 24

KDKA (Eastern, 360), 6:00 P. M., Organ recital, H. R. Webb, organist, Cameo Theater; 7:15 P. M., Talk, "The Care of Furs in Summer," G. P. LeCour; 7:45 P. M., Visit to little folks by the Dreamtime Lady; 8:15 P. M., Talk, "Making Good," Louis D. Bliss, Pres., Bliss Electrical School, Washington, D. C.; 8:30 P. M., Concert, Bakule chorus of Czechoslovakian children, auspices of American Red Cross.

KFI (Pacific, 400), 6:45-7:30 P. M., Peter Rabbit; Los Angeles County Medical Sy.; Concert, Junior Music Clubs of Southern Calif.; 8:00-9:00 P. M., Concert, Esau School; 10:00-11:00 P. M., Reading, Dr. Frank Nagel of Hollywood Opera, Reading Club; Programs of Matinee Musical Club, MacDowell Club and Los Angeles Music Teachers' Assn.

KHJ (Pacific, 400), 8:00-10:00 P. M., Concert, Monrovia Chamber of Commerce.

KSD (Central, 400), 8:00 P. M., Concert, South Side Jazz Orchestra; 8:30 P. M., Vocal selections, Majestic Four; Florestine Mandolin Orchestra.

KYW (Central, 400), 2:35-3:00 P. M., Concert, Lyon & Healy; 8:00-8:58 P. M., Musical program, Lyon & Healy; Dance music, Isham Jones and orchestra.

WBAP (Central, 400), 7:15-8:00 P. M., Concert, Eastland Music Club, Eastland, Tex.; 9:10-10:30 P. M., Concert, Harmony Club of Fort Worth.

WBZ (Eastern, 422), 8:00 P. M., Concert, James Clarkson Orchestra, Springfield, Mass.

WDAP (Central, 390), 10:00 P. M., Musical program, Maybelle Crockett Dodds, soprano; Ingberg Olson, soprano; Hugh B. Marshall, Scotch songs; Englewood High School Orchestra and soloists; Dance music, Jack Chapman's Orchestra.

WFAA (Central, 400), 12:30-1:00 P. M., Address, DeWitt McMurray; 8:30-9:30 P. M., Recital, Mrs. O. T. Holt, Mrs. C. Leighton E. Cook and W. H. McRaven; 11:00-12:00 P. M., Musical program under auspices of Sanger Bros.

WFI (Eastern, 400), 1:15-2:00 P. M., Concert, Meyer Davis Bellevue-Stratford Orchestra; 3:30-4:15 P. M., Recital; 6:30-7:00 P. M., Children's own half hour.

WGI (Eastern, 360), 3:00 P. M., Amrad Women's Club; 5:00 P. M., "Twilight Tales," by Uncle David; 6:15 P. M., "Iron Trade Review"; 8:30 P. M., Business report, Robert W. Babson; Instrumental quartet, Ida Maunich, director; Lecture, "King Tut-ant-amen and His Family Tree," John E. Pember, Boston Sunday Herald.

WGR (Eastern, 360), 7:30 P. M., Digest of news; 7:45 P. M., Talk, "Topics of Scientific Interest."

WGY (Eastern, 370), 7:40 P. M., Address, "War on the Gypsy Moth," Alexander MacDonald, Commissioner of New York State Conservation Commission; 7:45 P. M., Radio drama, "Strongheart"; Overture, "Hithinefels," WGY Instrumental Quartet.

WHAS (Central, 360), 4:00-5:00 P. M., Organ selections, H. C. Conrad at Alamo Theater; Three-minute biography of Old Testament characters; Vocal selections, soprano solos; "Just Among Home Folks," column in Louisville Courier-Journal; 7:30-9:00 P. M., Concert, Reading, "An Interesting Historical Episode"; Setting-up exercises.

WIP (Eastern, 400), 2:00-3:00 P. M., Song recital; 6:00-6:30 P. M., Dinner dance program; 7:00-7:30 P. M., Uncle Wip's bedtime stories and roll call; 7:30 P. M., Talks; 10:10 P. M.-1:00 A. M., Dance music, Charlie Kerr's Orchestra in L'Aligion Cafe.

WJAX (Eastern, 360), 7:00 P. M., Dance music, Cleveland News.

WJZ (Eastern, 360), 4:05 P. M., "Fashions," from Women's Wear Daily Newspaper; 5:30 P. M., "The Music Lover," Dr. Sigmund Spaeth; 5:45 P. M., "Importance of Retaining Free Shooting in America," John D. Burnham, president of American Game Protective Ass'n, N. Y.; 7:00 P. M., "Peeps at Many Lands" series, courtesy The Macmillan Company; 7:30 P. M., Recital, Mrs. Ed. H. Graves, soprano; Russell B. Kingman, cellist.

WLW (Central, 360), 10:00 P. M., Musical program, Aichele's Novelty Dance Orchestra, with vocal selections by Marguerite Gerdig, "Fate," "Baby Blue Eyes," "Lovin' Sam," "Chicago," "Carolina in the Morning," "Wonderful World of Romance," "In the Garden of My Heart"; Ed. Decker, tenor; Lloyd Brown, accompanist; "Dondino," "Ave Maria," Mitchell Humphrey, violinist; "Irish Love Song," "I Love You Truly," Esther Fairchild; "Andante with Variations," P. H. Danforth and Mitchell Humphrey, violinists; "A Rose in Heaven," "Love's Old Sweet Song," Ed. Decker; Aichele's Orchestra, with Miss Gerdig, "Somebody Else," "Old Fashioned Days," "If You Tried," "Why Can't I."

WMAQ (Central, 400), 4:35 P. M., Program by Bush Conservatory of Music; 7:00 P. M., Talk on Foreign Relations, Edward P. Bell; Gardening talk, Mrs. Jean C. Weis; 9:15 P. M., Musical program, Mrs. Jewell M. Lovejoy, soprano; Blanche L. Bonn, pianist.

WMC (Central, 400), 8:00 P. M., Musical program, fifteen artists, arranged by Mrs. G. L. Meyers; 11:00 P. M., Midnight Frolic concert.

WOC (Central, 400), 3:30 P. M., Educational talk, F. C. Walker; 5:45 P. M., Chimes concert.

WOO (Eastern, 400), 11:00 A. M., Grand organ recital; 4:45-5:00 P. M., Grand organ recital and trumpets.

HERE is the third appearance of this new service for Digest Readers. It has in its third week grown to such a size that the type size had to be decreased. There are only fifty eligible stations for the listing, but already twenty-four of these will be found in the "Advance Programs." Only features are listed below. Such parts of station programs as are regular week in and week out, are, as they have been from the start, found in the Digest Radiophone Directory. The following data on the stations for which advance programs are given, may be of help to the listener in:

Call Letters	Owner and Location	Wave Length
KDKA	Westinghouse Co., E. Pittsburgh, Pa.	360
KFI	Earl C. Anthony, Inc., Los Angeles, Calif.	400
KGW	Oregonian, Portland, Ore.	400
KHJ	Times, Los Angeles, Calif.	400
KSD	Post-Dispatch, St. Louis, Mo.	400
KYW	Westinghouse Co., Chicago, Ill.	400
WBAP	Star-Telegram, Ft. Worth, Tex.	400
WBZ	Westinghouse Co., Springfield, Mass.	422
WDAP	Chicago Board of Trade, Chicago, Ill.	390
WFAA	News and Journal, Dallas, Tex.	400
WFI	Strawbridge & Clothier, Philadelphia, Pa.	400
WGI	Am. Radio & Research Corp., Medford, Mass.	360
WGR	Federal Tel. & Tel. Co., Buffalo, N. Y.	400
WGY	General Electric Co., Schenectady, N. Y.	370
WHAS	Courier-Journal and Times, Louisville, Ky.	360
WIP	Gimbel Bros. & Public Ledger, Phila., Pa.	400
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
WOO	Wanamakers, Philadelphia, Pa.	400
WWJ	News, Detroit, Mich.	400

WIP (Eastern, 400), 2:00-3:00 P. M., Musical program; 6:00-6:30 P. M., Dinner dance music; 7:00-7:30 P. M., Uncle Wip's bedtime stories and roll call.

WJZ (Eastern, 360), 6:00 P. M., Musical program; 7:00 P. M., "Animal Bedtime Stories," Florence S. Vincent; 9:00 P. M., "Foods for Health and Pleasure," and "How the Lean Should Live," Anne L. Pierce; 9:15 P. M., Talk, "The Importance of Impurities," Dr. Jerome Alexander; 9:30 P. M., Concert, Laura Combs, soprano; Lucille Colett, violinist.

WLW (Central, 360), 8:00 P. M., "A Half Hour of Happiness for Children" Dance music, Tull's Varsity Orchestra, "Love Was Once a Little Boy," "Swing Along," "Kentucky Babe," "Little Tommy Went A-fishing," "Sweet and Low"; Vocal selections, Cincinnati Conservatory of Music Male Quartet.

WMAQ (Central, 400), 4:35 P. M., Program by Metropolitan School of Music and Dramatic Art; 7:00 P. M., Stories, Georgene Faulkner; 9:15 P. M., American Legion program, talk by Rev. Martin Luther Thomas.

WOC (Central, 400), 3:30 P. M., Educational talk, D. K. Kirk; 6:35 P. M., Sandman's visit; 7:00 P. M., Pipe organ concert, Erwin Swindell; Ted Sloat, baritone; 8:00 P. M., Lecture, commemorating 25th Anniversary Spanish-American War, Rev. W. J. Ferris; 10:30 P. M., Concert, J. E. Zimmerman Orchestra, Davenport, Ia.

WOO (Eastern, 400), 11:00 A. M., Grand organ recital; 4:45-5:00 P. M., organ recital and trumpets.

WWJ (Eastern, 400), 3:00 P. M., Concert, News Orchestra; 8:30 P. M., The Town Crier; News Orchestra; Vocal selections, First National Bank of Detroit.

Thursday, April 26

KDKA (Eastern, 360), 6:00 P. M., Organ recital, H. R. Webb, organist, Cameo Theater; 7:45 P. M., Visit to little folks by Dreamtime Lady; 8:15 P. M., Shakespearean drama, "The Taming of the Shrew," School of Drama from Carnegie Institute of Technology.

KFI (Pacific, 400), 6:45-7:30 P. M., Peter Rabbit; Program, Y. M. C. A.; 8:00-9:00 P. M., Concert, Sheewood Music School; 10:00-11:00 P. M., Vocal selections, Hollywood Girls Quartette; Los Angeles Oratorio Sy.; First Congregational Church Choir; Instrumental music, Geo. J. Birkel Co.

KHJ (Pacific, 400), 8:00-10:00 P. M., Musical program, Southern Pacific Company's Band.

(Continued on page 6)

Wednesday, April 25

WJZ (Eastern, 360), 3:00 P. M., Concert, News Orchestra; 8:30 P. M., The Town Crier; News Orchestra; News Male Chorus.

KDKA (Eastern, 360), 6:15 P. M., Dinner Concert, KDKA Little Symphony Orchestra, Victor Saudek, director; 7:45 P. M., Visit to little folks by the Dreamtime Lady; 8:30 P. M., Concert, KDKA Little Symphony Orchestra, Prelude, "Meistersinger," (Wagner); "Walter Prize Song," from "Die Meistersinger," (Wagner); Quintet from "Die Meistersinger"; Finale from "Die Meistersinger."

KFI (Pacific, 400), 6:45-7:30 P. M., Peter Rabbit; Nick Harris Detective Stories from Pantages Theater Bldg.; Concert, Junior Music Clubs of Southern Calif.; 10:00-11:00 P. M., Program, Iva-Wan Club; Vocal selections, Radio Girls Quartet; Program, Musical Optimists.

KGW (Pacific, 400), 3:30-4:00 P. M., Children's Program; Piano selections, Ena Pullin; Stories, Aunt Nell; 8:00-9:00 P. M., Concert.

KHJ (Pacific, 400), 8:00-10:00 P. M., Musical program, Artists' Ensemble, The Los Angeles Trio, May MacD. Hope, pianist; Calmon Luboviski, violinist; Ilya Bronson, cellist.

KSD (Central, 400), 8:00 P. M., Concert, Mrs. Frank Howard, mezzo soprano; Mrs. Harriet H. Young, pianist; Mrs. Bessie B. Ricker, reader.

KYW (Central, 400), 8:00-8:58 P. M., Musical program, "The Nightingale's Song," "When Blossoms Grow," Grace Z. Wallace, soprano; Selections from "Lohengrin," "Humoresque," Paul G. Hummel, pianist; "The Sunshine of Your Smile," "Love Sends a Little Gift of Roses," George Daubach, tenor; "Voices of the Woods," "Beloved, It Is Morn," The Aeolin Quartet; Dance music, Isham Jones and orchestra; "Rose of My Heart," "Sing on," Grace Z. Wallace; Selections from the "Meistersinger," Southern Melodies, Paul G. Hummel; "The World Is Waiting for the Sunrise," "I'm Always Longing for You," George Daubach; "Smilin' Through," "Medley from the South Pike," The Aeolin Quartet.

WBAP (Central, 400), 7:15-8:00 P. M., Concert, Parker County Square Dance Orchestra, Weatherford, Tex.; 9:30-10:30 P. M., Concert, Rex Maupin's Original Texas Hotel Orchestra.

WBZ (Eastern, 422), 7:45 P. M., Lecture, "The Value of Sanatorium Treatment in Tuberculosis," Dr. Sumner Hennick, Director of Dept. of Public Health; 8:00 P. M., Concert, Tech Banjo Club.

WFAA (Central, 400), 12:30-1:00 P. M., Music from the Melba Theater bill of the week.

WFI (Eastern, 400), 1:15-2:00 P. M., Concert, Meyer Davis Bellevue Stratford Orchestra; 3:30-4:15 P. M., Concert, to be announced by Radio; 6:30-7:00 P. M., Surprise feature for children; 7:30 P. M., Boy Scout Radio Corp.; 8:00-9:55 P. M., Short talk and concert; 10:30-12:00 P. M., Concert, Meyer Davis Bellevue-Stratford Orchestra.

WGI (Eastern, 360), 5:00 P. M., "Twilight Tales," by Uncle David; 6:45 P. M., Camp Fire Chat, Eunice L. Randall; Talk, "Scarlet Fever," Henry C. Greene; Concert, Gitana Fabian, mezzo soprano; Telnah Fabian, pianist and reader; Talk on Farm, Garden and Lawn, furnished by Breck's.

WGR (Eastern, 360), 7:30 P. M., Digest of news; 8:00 P. M., Dance music, Dr. Knell's Orchestra, Oscar Witte, director.

WHAS (Central, 360), 4:00-5:00 P. M., Organ selections, M. C. Conrad at Alamo Theater; Three-minute biography of Old Testament characters, "Darius the Great," W. H. Wakefield, Lewisburg, Tenn.; Vocal selections, Katherine Gunther, soprano; "Just Among Home Folks," column in Louisville Courier-Journal; 7:30-9:00 P. M., Concert, Louisville Rotary Club, Robt. Montgomery, director; Address, Jas. H. Richmond, Rotary Club district governor; Vocal selections, Mrs. Newton G. Crawford, soprano; Mrs. Geo. T. Settle, contralto; Reginald W. Billin, baritone; Violin solos, J. T. Johnson, Jr.; Recitation, Nathan P. Bloom; Piano solos, Wilton Terstegge; Humorous address, Julius H. Ellis; Old folk melodies, on ocharina, Jos. T. Burge; Original verse, Chas. G. Harris; Mandolin solos, Harry G. Talmiri; Piano accompanist, Carl Shackleton; Setting-up exercises.

WJAX (Eastern, 360), 8:00 P. M., Concert, WHK Orchestra.

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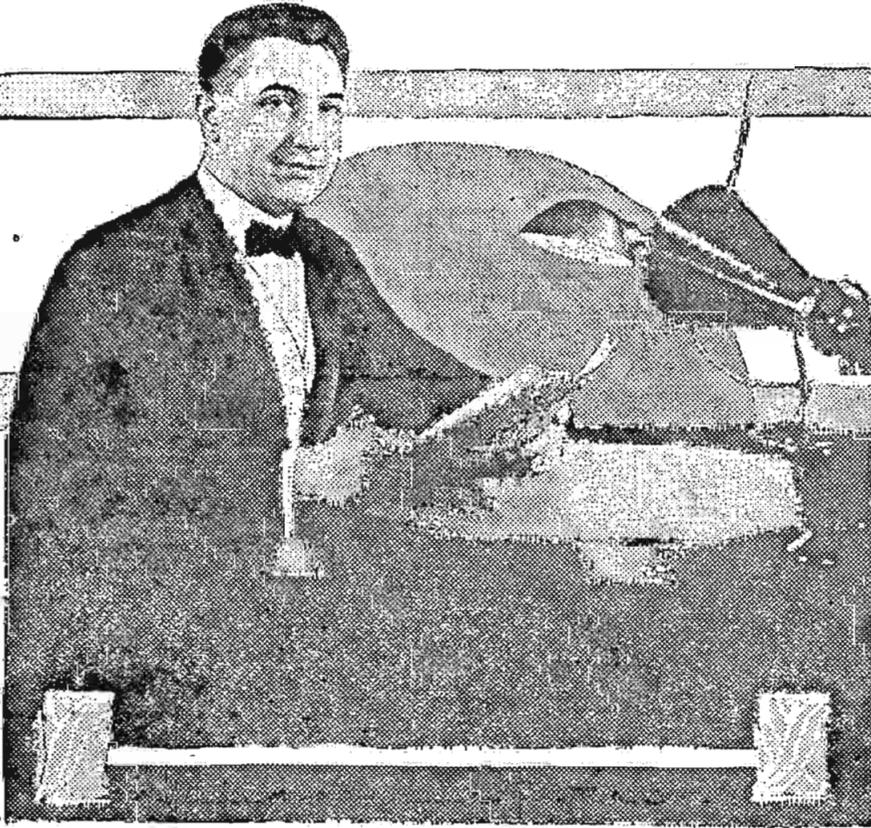
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BACK STAGE FOLKS OF THREE PLANTS



"This is Station WLAG, the 'Call of the North,' located on the Oak Grove Hotel, Minneapolis, Minn." How many times have you heard that? Perhaps you, like many other Radiophans, have begun to wonder just what the young lady looks like who has such a charming voice. It is with this point in mind that we publish Miss Eleanor Poehler's picture (left). She is program director and assistant manager of WLAG. Below is Warren Cox, the announcer of Station WHK, of the Radiovox Company, Cleveland, Ohio. Besides announcing Warren happens to own the plant and, of course, has to run it. The pleasant looking chap with the cap and glasses at the right is none other than Robert M. Reed himself. He, as you know, is assistant Radio editor and program manager of Station WDAF, owned by the Kansas City Star. Reed was formerly connected with Station WKY, Oklahoma City, Oklahoma. He became so good at the Oklahoman plant that he was stolen by the talons of the Night Hawks. And then, too, WDAF made the steal to remove the fast and close competition in the neighbor state



ARCTIC EXPLORER TO HAVE AIRPHONE

PLANS TO LISTEN IN FROM FROZEN LANDS

Crew of Seven Men to Chat with Chicago Stations from Near North Pole

BOSTON, MASS.—Donald MacMillan, the Arctic explorer, is planning to take a powerful Radio receiving and transmitting outfit with his expedition on the ship Bowdoin, next summer. No matter how far North the party penetrates, the receiving part of the outfit at least will go with them, and while they are sitting inside their snow igloos in the frozen North, they can be listening to the latest jazz broadcasts from civilization.

Not only will the explorer's ship be equipped with a powerful receiving set, but it is planned to have a powerful sending set also, and there will be daily chats between the Bowdoin, which sails from Eastport, Me., about the middle of next June and the Chicago broadcasting station at the Edgewater Beach hotel. E. F. McDonald, a millionaire Chicago Radiophan, is now on his way to Maine to oversee the installing of apparatus on the Bowdoin while she is in winter quarters.

Novelty for Esquimos

Radiophans will be asked to "stand by" each night for the voice of MacMillan from the Arctic. It is believed that he may be received better in some parts of the country than in others, owing to various forms of interference.

"If we have the same experience with the Eskimos regarding Radio that we did with the regular wire telephone, it will be interesting and amusing," said Mr. MacMillan. I found one Eskimo at one end of the wire. He would yell and then run to the other end of the wire to try to hear the sound of his own voice. When I caught up with him he explained gravely that it could not be done. There was no hole in the wire."

The next expedition will have a crew of seven men abroad, to go within 720 miles of the pole. Five phonographs will be taken, one to be given to each of the Eskimo tribes. Two thousand pounds of pemmican, a highly concentrated food, will be taken along to avoid any possible food shortage ashore.

Build \$250,000 Terminal

MIAMI, FLA.—The Tropical Radio Telegraph Company, affiliated with the United Fruit Company, is building a huge Radio terminal, said to be the second largest in the United States, at Hialeah, Fla., near here. Construction was started recently. The plant is to handle the South American, Central American and West Indian business of the company, and will cost about \$250,000. The towers will be 437 feet high and have a span of 1,050 feet.

Germany has a public Radiophone service with subscribers in 176 cities and towns.

Eleanor Poehler Good as Director of Station WLAG; "The Call of the North"

Woman Who Arranges All Programs for Minneapolis Plant Receives Variety of Presents from Male Listeners in Including Flowers and Sausages—Is Professional Musician

By Vera Bray Shipman

This is the Minneapolis Station WLAG, the Call of the North. There is a woman in Radio at WLAG. Eleanor Poehler, a professional musician, a soprano of distinction, is especially well equipped for her service to the Radiophans, as program director.

WLAG is operated by the Cutting and Washington Radio Corporation, on the Oak Grove Hotel, and is supported by the following business organizations of Minneapolis: the Northwest Farmstead; L. S. Donaldson Company; E. E. Atkinson and Company; The Northwestern National Bank; The Minnesota Loan and Trust Company; The Purity Baking Company; Powers Mercantile Company; Sterling Electric Company; and the Findley Electric Company.

Get Woman Director

When the business men contemplated opening Station WLAG they sought for a man to direct the programs. But there was none available. They turned to the women's clubs for suggestions for the next best thing, a woman. And a most remarkable thing happened. Three different women recommended Eleanor Poehler, and here she is.

Officially they call her associate manager. Her carefully directed programs are heard each night, far reaching even to Hawaii, where one entire program was received.

Truly a woman, she might tell her age so long as the Digest is in Chicago and she in Minneapolis, but WE shall not tell. We might want a like favor some time.

Receives Varied Presents

Eleanor Poehler (she never signs herself Mrs.) early widowed, has one son upon whom she dotes. Alarm clocks are her pet aversion. They never catch HER napping. Flowers of every kind she loves. "If I had money enough I'd have a bunch for every dress.

"Men? Politics?"
"The Radio business keeps me too busy to be seriously interested in either. I

have of course interesting letters from male fans. The gifts they send me are mostly candy and sausage."

Mixed romance?
A native of Minneapolis, Eleanor Poehler's wide acquaintance and good musicianship combine to best advantage in Radio for WLAG. It takes brains to direct Radio broadcasting programs and WLAG is fortunate in having its director filling all requirements.

The ringing of three silver chimes announces programs from KFI.

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Dr. Hund Gets Appointment

WASHINGTON, D. C.—The Department of Commerce has announced that Dr. August Hund of Berkely, Cal., has been appointed as Electrical Engineer of the Radio Section of the Bureau of Standards. Dr. Hund graduated from the Technische Hochschule, Karlsruhe, in 1911 and took the degree of Doctor of Engineering in 1913.

One young woman who has made a marked success of broadcasting readings has been given the graceful title of "The girl with the voice with a Radio smile."

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ADVANCE PROGRAMS

(Continued from page 4)

KYW (Central, 400), 8:00-9:50 P. M., Musical program, "So Fair a Flower," "Coming Home," "There Is No Death," "Come to the Fair," Dolly Wade, soprano, Sallie Menkes, accompanist; Dance music, Isham Jones and orchestra; 9:05 P. M., "Twenty Minutes of Good Reading," Rev. C. J. Perrin, S. D., Head of Dept. of English, Loyola University.

WBAP (Central, 400), 7:15-8:00 P. M., Concert, North Ft. Worth High School Orchestra and Glee Club; 9:30-10:30 P. M., Concert, Baptist Sunday School Orchestra, Abilene, Tex.

WBZ (Eastern, 422), 8:00 P. M., Concert, Willmansett Minstrel Club.

WDAP (Central, 390), 10:00 P. M., Program by "Sun Dodgers Club"; Dance music, Jack Chapman's Orchestra.

WFAA (Central, 400), 12:30-1:00 P. M., Address, Judge E. A. Muse, on Texas Republic; 8:30-9:30 P. M., Program of music, readings and address, Mrs. J. Yancey Fincher and pupils; 11:00-12:00 P. M., Musical program under auspices of D. L. Whittle Music Co.

WFI (Eastern, 400), 1:15-2:00 P. M., Concert, Meyer Davis Bellevue-Stratford Orchestra; 3:30-4:15 P. M., Song Recital; 6:30-7:00 P. M., Children's Own Half Hour, Stories by Cousin Sue.

WGI (Eastern, 360), 5:00 P. M., "Twilight Tales," by Uncle David; 9:30 P. M., Talk, "Romance of the Shoe," Harry M. Wood; Concert, Deschamps Orchestra.

WGR (Eastern, 360), 7:30 P. M., Digest of news; 7:45 P. M., Boy Scout program; Industrial employment news.

WGY (Eastern, 370), 7:45 P. M., Concert, American Locomotive Company Band, Joseph Konieck, director; Overture, "Mignonette," Band; "Faded Love Letters," John O'Rourke, tenor; "The Butterfly," Band; "A May Morning," Gladys J. Hayner, soprano; Suite, "Atlantide, the Lost Continent," I. "Nocturne and Morning Hymn of Praise," 2. "A Court Function," 3. "I Love Thee," 4. "The Destruction of Atlantis," Band; Address, "The Broadcast Listeners' Antenna," B. H. Langley; "The Bugler," Mortimer L. Moore, bass; "American Patrol," Band; "Slava Song," "The Scarecrow," Gladys J. Hayner; "Old Times," Band; "Wonderful World of Romance," "John O'Rourke," "Home Sweet Home the World Over," Band; "The Japanese Love Song," "April, My April," Gladys J. Hayner; "American Legion March," Band.

WHAS (Central, 360), 4:00-5:00 P. M., Organ selections; H. C. Conrad at Alamo Theatre; Three-minute biography of Old Testament characters, "Zerxes"; Vocal selections, Ruth Cartwright, mezzo soprano, Hazel McClellan, soprano; "Just Among Home Folks," column in Louisville Courier-Journal; 7:30-9:00 P. M., Dance concert, Shawnee Terrace Dance Combination; Three-minute digest of International Sunday School lesson, Sunday, April 29; Child welfare talk; Reading, "An Interesting Historical Episode"; Setting-up exercises.

WIP (Eastern, 400), 1:00-1:15 P. M., Talk on Selection and Preparation of the Practical Home Garden; 2:00-3:00 P. M., Artist recital; 6:00-6:30 P. M., Dinner dance music; 7:00-7:30 P. M., Uncle Wip's bedtime stories and roll call.

WJAX (Eastern, 360), 6:30-7:30 P. M., Concert, Cleveland Hotel Orchestra; 8:00 P. M., Concert, Music Dept., Cleveland, Federation of Women's Clubs, and Cleveland Institute Quartet; "Life," "A Mountain Madrigal," "Twas April," "Before the Daybreak," "Firefly Fairies," Federation Chorus, Mrs. Zoe Long Fouts, conducting, Mrs. J. E. Hikes, accompanist; Violin solos, Etude for two violins, second violin, Quincy Porter; Berceuse for violin alone, Milon de Ribault; Polonaise, Andre de Ribault; Choral numbers, "By Moonlight" and "Narcissus," violin obligatos by Quincy Porter; "Land of Illusion," "The Wind on the World," "In the Red April Dawn," "All in a Garden Green," "This is a World of Gladness," "Prelude," Jean Binet; "Bagatelle," Roger Sessions; Ukrainian Folk-song, "The Virgin of Potchiv," Quincy Porter; Variations in D Minor, "Cavatina" from B flat Major Quartet, Finale from D Major Quartet, Cleveland String Quartet.

WJZ (Eastern, 360), 7:00 P. M., "Jack Rabbit Stories," David Cory; 8:30 P. M., "Old English Sheep Dogs," Frank E. Dole; 8:45 P. M., Recital, Helen S. Donovan, violinist; 9:30 P. M., Recital, Anna Todoto, soprano; Pasquale Romano, baritone, Anna Pinto, harpist.

WLW (Central, 360), 10:00 P. M., Musical program, "The Fresh Paint Orchestra," University of Cincinnati; "Farewell," "Dark Eyes Tender," Marjorie Wilson, contralto; "Calm as the Night," Mrs. H. Morris, cellist; "Silver Threads Among the Gold," "Somewhere a Voice is Calling," "A Perfect Day," Mrs. H. Morris, cellist; Ruth Draper, pianist, Corrine L. Sims, soprano, "Annie Laurie," "Old Folks at Home," Corrine L. Sims; Dance music, Hotel Sinton Dance Orchestra.

WMAQ (Central, 400), 4:35 P. M., Program by Lyceum Arts Conservatory; 7:00 P. M., Talk for Boy Scouts; Gardening talk, Mrs. J. C. Weis; "Supply and Demand," H. W. Graham, reader; Talk, "Interesting Auto Trails," Rockwell Stephens; 9:15 P. M., Program by Richard De Young and Hayden Trio.

WMC (Central, 400), 8:00 P. M., Concert, Hotel Chisca Philharmonic Orchestra, Clara Ahern, director.

WOC (Central, 400), 3:30 P. M., Educational Talk, Karl G. Stephan; 5:45 P. M., Chimes concert; 6:35 P. M., Sandman's visit; 7:00 P. M., Musical program, Erwin Swindell, musical director, "Old-Time Fiddlers' Contest"; 8:00 P. M., Lecture, "Citizens' Military Training Camps," by Capt. D. D. Dewey, Q. M. Department, Officers' Reserve Corps, U. S. A.

WOO (Eastern, 400), 11:00 A. M., Grand organ recital; 4:45-5:00 P. M., Organ and trumpets; 7:50-9:00 P. M., WOO Orchestra, Robert E. Golden, director and violin soloist; 9:00-9:35 P. M., Grand organ recital, Miss Mary E. Vogt at the console.

WWJ (Western, 400), 3:30 P. M., Concert, Detroit News Orchestra; 8:30 P. M., The Town Crier; The Detroit News Orchestra; Loretta A. Haas, soprano; Joe Qualters, tenor; E. Laccohee, one string violinist; 11:00 P. M., Detroit News Orchestra; Joe Qualters, tenor; E. Laccohee, one string violinist.

Friday, April 27

KDKA (Eastern, 360), 6:15 P. M., Dinner concert, Trio of KDKA Little Symphony Orchestra; 7:15 P. M., "Why I Hold on to My Illusions," as answered in Rostand's "Chanticleer," Miss Marjory Stewart; 7:45 P. M., Visit of the Dreamtime Lady; 8:30 P. M., Concert, King Haw Entertainers, assisted by trio of KDKA Orchestra.

KFI (Pacific, 400), 6:45-7:30 P. M., Peter Rabbit; Concert, Junior Music Clubs of Southern Calif.; 10:00-11:00 P. M., Program, Public School Music Teachers Ass'n.; Male chorus, 100 voices, Orpheus Club; Dominant Club; California Federation of Music Clubs.

KGW (Pacific, 400), 7:00-7:30 P. M., University of Oregon Extension Course Lecture; 8:00-8:15 P. M., Vocal selections; 8:15-9:00 P. M., Concert, George Olsen's Portland Hotel Orchestra; 11:00-12:00 P. M., Meeting of Hoot Owls.

KHJ (Pacific, 400), 8:00-10:00 P. M., Musical program, Conservatory of Music, University of Southern California.

KSD (Central, 400), 8:00 P. M., Concert, Thaleta Kronsbein, contralto; Hartzel Lyon, baritone; Mathilda Eriksson, soprano; Miss McGregor, contralto; Miss DeVoltine, pianist; 11:30 P. M., Vocal selections, Bertha M. Donnelly, soprano, Mrs. George Lamke, accompanist.

KYW (Central, 400), 8:00-8:58 P. M., Musical program, arranged by Inland Elec. Co., Isham Jones and orchestra; 9:05 P. M., Book review, Llewellyn Jones.

WBAP (Central, 400), 7:15-8:00 P. M., Concert, C. B. Brooks and family of the Southwestern Baptist Seminary, Fort Worth, Tex.; 9:30-10:30 P. M., Bi-monthly Radio concert, Texas Christian University.

WBZ (Eastern, 422), 7:45 P. M., Talk, "The Necessity of Keeping Good Records," Thomas McCarry; 8:00 P. M., Recital, Edith Novill, soprano.

WFAA (Central, 400), 12:30-1:00 P. M., Address, Dr. Robert S. Hyer, Southern Methodist University, on Sunday school lesson; 8:30-9:30 P. M., Varied program, Edith Bellharz, violinist.

WFI (Eastern, 400), 1:15-2:00 P. M., Concert, Meyer Davis Bellevue-Stratford Orchestra; 3:30-4:15 P. M., Music recital and talk; 6:30-7:00 P. M., Children's own half hour with Cousin Sue.

WGI (Eastern, 360), 3:00 P. M., Amrad Womans' Club, Address, Miss D. H. Goodwin; Talk, Ruth E. Newman; 5:00 P. M., Girl's story hour, Eunice L. Randall; 9:30 P. M., Travelogue, David M. Cheney; Shakespearean comedy, "The Twelfth Night," Amrad players.

WGR (Eastern, 360), 7:30 P. M., Digest of news; 8:00 P. M., Program, Buffalo Community Chorus, Address, "Motoring Preparedness," F. C. Edwards.

WGY (Eastern, 370), 2:00 P. M., Talk, "The Child in the Home," Mrs. E. P. Pressey; 6:30 P. M., Talk for children; 7:40 P. M., Talk, "Insects and Diseases," Dr. E. F. Peit; 7:45 P. M., Concert, Commercial Bank Club of National Commercial Bank and Trust Co., Albany, N. Y.; "On Parade," bank orchestra; "The Winter Song," bank quartet; "Tommy Lad," Thomas G. Kenny, tenor; "One Little Word," De Roe Orchestra; "Something from the Old Days," Jacob H. Herzog, reader; "The Day is Ended," Godfrey J. Smith, baritone; "Meditation," Willis S. Reynolds, violinist; "Laborers Night Song," quartet; "In Maytime," orchestra; "The Barefoot Trail," T. Reed Vreeland, tenor; Address, "Modern Banking," Jacob H. Herzog; "The Parking Rose," quartet; "Other Lips," orchestra; "The Two Grenadiers," Leo K. Fox, baritone; Violin duet, "Meditation Religiosa," Willis S. Reynolds and Peter Van Deloo; "De Little Sunflower Coon," quartet; "Who Cares," orchestra; 10:30 P. M., Musical program, selection from "You're in Love," WGY Orchestra; "Valse Bluette," Edward Rice, violinist; Comedy talk, "The Income Tax Collector," "By the Side of a Streamlet," orchestra; "Elegie," Ernest Burleigh, cellist; Selection from "Maytime," orchestra; "Scene de Ballet," orchestra.

WHAS (Central, 360), 4:00-5:00 P. M., Organ selections, H. C. Conrad at Alamo Theatre; Three-minute biography of Old Testament characters, "Esther," by J. A. Buck, Stuart, Okla.; "Just Among Home Folks," column in Louisville Courier-Journal; 7:30-9:00 P. M., Vocal selections, Genevieve Tims, soprano, Carl G. Herder, Jr., tenor, Sara Gilmora, soprano; Reading, Mirion Broughton; Vocal selections, Mary Waechter, soprano; Piano solos, Helen I. Mitchell, New Albany, Ind.; Vocal selections, Rose Boden, soprano; Saxophone solos, Robert Seaton; Reading, "An Interesting Historical Episode"; Setting-up exercises.

WIP (Eastern, 400), 2:00 to 3:00 P. M., Miscellaneous musical program; 6:00 to 6:30 P. M., Dinner dance music; 7:00 to 7:30 P. M., Uncle Wip's bedtime stories and roll call.

WJZ (Eastern, 360), 8:00 P. M., Recital, Mme. Ama W. Powell, soprano; 8:30 P. M., Literary talk, Outlook and Harper Bros.; 9:00 P. M., Concert, Maplewood, N. J., Ladies' Quartet; 9:15 P. M., "Daylight Savings," Marcus Marks, Pres. of National Daylight Ass'n. of New York City; 9:25 P. M., Concert, Symphony Mandolin Orchestra of Jersey City.

WMAQ (Central, 400), 4:35 P. M., Program by Columbia School of Music; 7:00 P. M., 7:30 P. M., Musical lecture, Mrs. Marx E. Oberdorfer; 9:15 P. M., Czechoslovakian program, Anna Lukesova, soprano; Talk, Dr. Smetanka, consul.

WMC (Central, 400), 8:00 P. M., Concert, Hotel Gayoso Orchestra, Gaspar Pappalardo, director; 11:00 P. M., Midnight Frolic concert.

WOC (Central, 400), 3:30 P. M., Educational talk, C. C. Flanagan; 5:45 P. M., Chimes concert; 6:35 P. M., Sandman's visit; 7:00 P. M., Concert, P. S. C. Orchestra; 8:00 P. M., Lecture, "Improved Order of Red Men," by Great Incobones, John E. Sedwick.

WOO (Eastern, 400), 11:00 A. M., Grand organ recital; 4:45-5:00 P. M., Organ recital and trumpets.

WWJ (Eastern, 400), 3:00 P. M., Concert, News Orchestra; 8:30 P. M., The Town Crier; News poet; News Orchestra; Vocal selections, pupils of Marcus Kellerman.

KFI (Pacific, 400), 6:45-7:30 P. M., Peter Rabbit; Los Angeles County Dental Sy.; Concert, Junior Music Clubs of Southern Calif.; 8:00-9:00 P. M., Program, University of Southern Calif.; 10:00-11:00 P. M., Vocal selections, Packard Radio Club, Harry Coe, Ben McLaughlin, Leonard Van Berg.

KGW (Pacific, 400), 3:30-4:00 P. M., Children's program; Piano Selections, Mary Harney; Stories, Aunt Nell.

KSD (Central, 400), 8:00 P. M., Musical program, DeMartini Sisters; 8:40 P. M., Vocal selections, Manon D. Methudy, contralto, May Langefort, pianist.

KYW (Central, 400), 8:00-9:00 P. M., Musical program; "I Hear a Thrusa at Eve," "Elysium," Louise Joyner, soprano; Popular selections, Aarseth's Real-art Syncopeators; "Bird of Love Divine," "Capricious Shepherd Maid," Charlee W. Green, tenor; Dance music, Isham Jones and orchestra; "The Old Love," "Sing Me Love's Lullaby," Louise Joyner; "Mary of Alendale," "Hymn for Maggie O'Grady," C. W. Green; 9:05-9:25 P. M., "Under the Evening Lamp," by Youth's Companion.

WBAP (Central, 400), 8:30-6:45 P. M., Sunday school lesson, Mrs. W. F. Barnum, leader of Barnum Bible Class, First Methodist Church.

WBZ (Eastern, 422), 7:45 P. M., "Under the Evening Lamp," by Youth's Companion; 8:00 P. M., Concert, WDAP (Central, 390), 10:00 P. M., Musical program, Harrison High School, Bank and soloists, James C. Goss, Basso, Ray G. Zender, Baritone; Dance music, Jack Chapman's Orchestra.

WFAA (Central, 400), 12:30-1:00 P. M., Address, Prof. Clyde Eggleton, Southern Methodist University, on Current History Comment; 8:30-9:30 P. M., Music and readings, arranged by Texas Poets' Ass'n.; 11:00-12:00 P. M., Concert, Old Mill Theater Orchestra, Don Albert, conductor.

(Continued on page 9)

Saturday, April 28

KDKA (Eastern, 360), 6:00 P. M., Organ recital, H. R. Webb, organist, Cameo Theater, Pittsburgh, Pa.; "One Day Trip by Automobile," Pittsburgh Automobile Club; 7:15 P. M., Talk, J. L. Ray; 7:30 P. M., Talk to Boys; 7:45 P. M., Visit of the Dreamtime Lady; 8:15 P. M., "Spring House Cleaning Your Automobile," Ray McNamara; 8:30 P. M., Minstrel show by Men's Glee Club of Calvary Presbyterian Church, Braddock, Pa., Evan H. Lloyd, director.

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Rosalind Lunceford, dubbed "Radio's Mary Pickford" by the many admirers in WSB's circle of listeners, is so successful in emulating a tiny tot when telling of the adventures of "Lil Red Ridin' Hood" and other nursery classics that many listeners are reluctant to believe this popular reader of the Atlanta Journal is quite a dignified and grown-up exponent of the dramatic art. Two of her most ardent followers are shown. These two lucky youngsters live in the first Radio apartment house to be built. It is located in Newark, N. J., and all guests are given Radio service by simply plugging receivers in a wall socket in whatever room they may be.

Right Photo © K. & H.

DR. WINSLOW AIDS DEAF BY AIRPHONE

NEW EXPERIMENTS PROVE PRACTICABILITY

Noted Specialist to Give Special Demonstrations at Clinics Within Next Few Weeks

By Lenore Stuart

Dr. Paul V. Winslow, an eminent New York specialist in nose, ear and throat surgery, announced last week that deafness can be cured by means of Radio. Dr. Winslow bases his announcement on the results of several experiments performed by him. He states that he has given the Radio treatment successfully to a number of his patients who were afflicted with deafness.

Dr. Winslow has long been noted for his cures of deafness. Heretofore he has relieved thousands by his methods of surgery alone; but with the introduction of Radio he believes that there will come a revolution in the science as it has been practiced up to this time.

Listening in Plus Surgery

Dr. Winslow's formula is a simple one. He has equipped his office with a Radio receiving set, and as a preliminary treatment to his cure of deafness he gives his patients a prescribed course of "listening on the Radio." This is followed by a simple surgical operation. The first treatment is a complement to the second, and by this judicious combination of Radio and surgery he claims to effect a complete cure for deafness, providing it has not gone beyond the catarrhal stage.

According to Dr. Winslow the receiving apparatus has a stimulating effect on the vibratory nerves of the ear; it reawakens and reanimates the dormant sensibilities, so that by the use of this preliminary treatment the subsequent surgical operation is rendered surprisingly simple, completely restoring the impaired facilities of the auditory regions. Many cases, until now considered incurable, have shown surprising results upon undergoing the combined treatments. The doctor states that in the more severe cases surgery is at the present time a necessary adjunct to the Radio, but by further experiment he hopes soon to entirely eliminate the use of his surgical methods in curing deafness.

To Give Clinics

Several clinical demonstrations of the curing of deafness by Radio are to be given by Dr. Winslow within the next few weeks. He has also arranged special demonstrations before certain of the more prominent members of his profession for the purpose of proving to them that his theory regarding the use of Radio is practical and will produce the results he claims for it.

The hundreds of cures to Dr. Winslow's credit together with his unequivocal endorsement of the Radio as an ever increasing aid in his work open the way to a myriad of novel uses of Radio. Until now it has been considered, for the most part, an entertaining factor in life with the addition of possible educational values, but with Dr. Winslow's theory substantiated, Radio must become a unique and separate element in the vanguard of the ever growing crusade for the physical welfare of the nation.

Toronto Fans to Join Trust Fight

Experimenters Club of Canada Holds Out on Offers Made by Manufacturing Concerns

By Albert H. Munday

TORONTO, ONT.—What is being termed as the greatest blow ever sustained by the Radio trust has been launched here. It is the formation of what is to be known as the Experimenters Radio Club of Canada, and is the first of its kind in Canada. The chief aim of the new organization is to help the Radiophan in every way, and it is the contention of the officers of the club that in order to render help, the "bugbear" of the big trusts must be eliminated.

The new association, after having been organized only three days, had a membership of over one thousand members. This number is increasing every day. It is expected that within the next month every Radiophan in Canada will be a member. In this way the new organization will have practically complete control of the Radio industry in Canada.

Sells Apparatus at Low Price

The force of the blow that has been aimed at the big trusts is already being felt. This is borne out in the statement that many influential persons, and officials of large manufacturing concerns, have made a point of getting in touch with the officials of the club, and have asked them to meet them and discuss matters that will interest both the organization and the Radio trusts. But the new club is standing its ground and gaining strength with every move.

All Radiophans are eligible to join the club and are charged a nominal fee of one dollar, but they are entitled to a service, that, it is stated, will revolutionize the science in Canada. There is a sales department which sells all goods at the lowest possible price. In fact goods have been sold so low during the first three days of the club's organization that many manufacturers have phoned to the secretary and other officers asking them to supply them.

Broadcast Robin Hood

SAN FRANCISCO, CALIF.—A complete "Robin Hood" program was broadcast here recently by Station KPO, the Hale Bros. Company plant. Douglas Fairbanks gave permission for the broadcast, rights for which he owns.



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BUFFALO AIRS OUT VACANT POSITIONS

Broadcast Results in Applications from All Parts of United States

BUFFALO, N. Y.—V. A. Zimmer, superintendent in charge of the Buffalo office of the New York State Employment Bureau, is meeting with considerable success in obtaining men for local jobs by Radio.

Once a week a general survey of the employment situation and list of the jobs open in Buffalo is broadcast by Radio from Station WGR of the Federal Telephone and Telegraph Company. So far as is known, Buffalo is the first city to attempt filling positions in this manner.

Although it is difficult to check up the

actual results of the work, Mr. Zimmer says that recently he has been receiving applications from all parts of the world.

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43-Plate Condenser	2.65			
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23-Plate Condenser Vernier	3.25			
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Radiophone Broadcasting Stations

Corrected Every Week—Part II

(NOTE.—The second part of the schedule list appears below. The first appeared last week and the last part, together with the city-station index will appear next week.)

WAAJ, Boston, Mass. 50 mi. Eastern Radio Inst. Tues. 10-11 pm, Thurs. 8:30-9:30 pm, Sat. 7-8 pm, music. Eastern.

WAAK, Milwaukee, Wis. 300 mi. Gimbel Bros. Daily ex Sun. 10 am, 11:10, 12:10 pm, 1:25, 3. Daily ex Wed and Sat. 7:15, 7:30 pm. Central.

WAAM, Newark, N. J. 300 mi. I. R. Nelson Co. Daily ex Sun. 11-11:55 am, 3-4 pm, music. Wed. 7:30-8 pm, code instruction: 8-9, special program. Eastern.

WAAN, Columbia, Mo. Univ. of Mo.

WAAP, Wichita, Kan. 485 also. 500 mi. United Electric Co. Daily ex Sun. 12-12:30 pm, educational program; 10:30 pm, weather. Tues, Fri, 8 pm, entertainment. Central.

WAAQ, Greenwich, Conn. 600 mi. New England Motor Sales Co. Daily ex Sun. 9:30 am-5:30 pm, every half hr. Eastern.

WAAS, Decatur, Ga. Georgia Radio Co.

WAAW, Omaha, Neb. 485 also. 500 mi. Omaha Grain Exchange. Daily ex Sun. 9:45 am, 10:45, 11:45, 12:45 pm, 1:20, 8, market reports; 8:15-9 pm, music. Central.

WAAZ, Emporia, Kans. 250 mi. Hollister-Miller Motor Co. Tues, Thurs, Sat, 8-9 pm, music, reports. Eastern.

WAAZ, Emporia, Kans. 250 mi. Hollister-Miller Motor Co. Tues, Thurs, 7-8 pm, entertainment. Temporary schedule. Central.

WAJT, Marshall, Mo. Kelly-Vawter Jewelry Co.

WAJU, Yankton, S. D. Yankton College.

WBAI, W. Lafayette, Ind. 100 mi. Purdue University. WBAI, Fri. 7:15-7:30 pm, educational lecture. Central.

WBAD, Minneapolis, Minn. Sterling Elec. Co.

WBAF, Moorstown, N. J. Fred M. Middleton.

WBAH, Minneapolis, Minn. 200 mi. The Dayton Co. Daily ex Sun. 1-1:30 pm, 3-3:30, 5-5:30, 9:30-10:10, 11-11:30 am, Wed, 8-10 pm. Central.

WBAN, Paterson, N. J. 200 mi. Wireless Phone Corporation. Daily ex Sun. 9:15-9:45 am, 10:30-11:1-15 pm, 2:15-2:30, 4:30-5:30, music. Sat. morn. only. Eastern.

WBAD, Decatur, Ill. 100 mi. James Millikin Univ. University activities. No definite schedule. Central.

WBAP, Fort Worth, Tex. 400 and 485 only. 1,500 mi. Fort Worth Star-Telegram. Daily ex Sun. 9-9:15 am, 11-11:30, 12-12:15 pm, 1-1:15, 3-3:30, 3:45-4, markets; 5:30-5:45, 6:30-6:45, sports. Daily ex Sat, Sun. 7:15-8 pm, 9:30-10:30, concerts. Sat. 6:30-6:45 pm, bible lesson. Sun. 11 am-12:15 pm, church; 3:30-4:30, concert. Central.

WBAU, Hamilton, O. Republican Pub. Co.

WBAV, Columbus, O. 100 mi. The Ernor Hopkins Co. Daily ex Sun. 12:30-1 pm. Mon, 7-9 pm. Central.

WBAW, Marietta, O. Marietta College.

WBAX, Wilkes-Barre, Pa. 200 mi. John H. Stenger, Jr. Three nights of week, not regular.

WBAY, New York, N. Y. 400 only. 1,500 mi. A. T. & T. Co. Experimental purposes only.

WBL, Anthony, Kans. 200 mi. T & H Radio Co. Wed, Fri, 10-11 pm, concert, lecture. Sun, 10 am, church service. Central.

WBS, Newark, N. J. 200 mi. D. W. May, Inc. Daily ex Sun. 10:30-11 am, music; 1-1:15 pm, reports; 2:15-2:30 pm, music, reports. Mon, Thurs, Sat. 7:30-8:30 pm, program, Sun. 9-10:30 am, sacred music; 1-3 pm, program. Eastern.

WBT, Charlotte, N. C. 485 also. 1,200 mi. Southern Radio Corp. Daily ex Sun. 11 am, 8 pm, weather, markets. Tues, Fri, 8:30 pm, music. Sun. 7:30 pm, church services. Eastern.

WBU, Chicago, Ill. 100 mi. City of Chicago. Daily ex Sun. 10:15-10:30 am, 11:45-12 m, 4:15-4:30 pm, police reports. Mon, Wed, Fri, 3:30 pm, 7:30, speeches. Central.

WBZ, Springfield, Mass. 422 only. 1,000 mi. Westinghouse Elec. & Mfg. Co. Daily ex Sun. 7:30 pm, children's hour; 7:45, markets, weather, lecture; 8-9, concert. Sun, 8 pm, church service. Eastern.

WCB, Newburgh, N. Y. Temporarily discontinued.

WCAC, Fort Smith, Ark. John Fink Jewelry Co. Tests only.

WCAN, Canton, N. Y. 200, 485 also. 300 mi. St. Lawrence Univ. No regular schedule. Eastern.

WCAE, Pittsburgh, Pa. 400 only. Kaufman & Baer Co.

WCAF, Rodgers, Mich. Michigan Limestone & Chem. Co.

WCAG, New Orleans, La. 200 mi. Clyde R. Randall. Daily ex Sun. 6:45-7 pm, news, time. Thurs, 8:30-10 pm, concert. Central.

WCAH, Columbus, O. 500 mi. Entekin Elec. Co. Daily ex Sun. 11:30-12:30 am, music, news. Tues, 7-9 pm, concert. Sun. 10-12:30, church service. Central Daylight Savings.

WCAI, San Antonio, Tex. Southern Equipment Co.

WCAJ, Univ. Place, Neb. 150 mi. Nehr, Wesleyan Univ. Daily, 10:30 am, weather. Tues, 7 pm, bedtime stories. Thurs, 9 pm, music, lectures. Central.

WCAK, Houston, Tex. 100 mi. Alfred P. Daniel. Daily ex Sun. 7-7:30 pm, music. Wed, 8-9 pm, concert. Sun, 3-4 pm, features. Central.

WCAI, Northfield, Minn. 500 mi. Dept. of Physics, St. Olaf College. Mon, Fri, 7:30 pm, college extension courses. Tues, 7:30 pm, Thurs, 11 pm, Sat, 12 m, music. Tues, Thurs, Sat, 9:40 am, chapel, sports, news. Sun. 8:30 pm, church services. Central.

WCAM, Villanova, Pa. Villanova College.

WCAD, Baltimore, Md. 100 mi. Sanders & Stysman Co. Daily ex Sun. 12-12:20 pm, 5-5:20. Mon, Wed, 8-9 pm. Eastern.

WCAR, San Antonio, Tex. 1,000 mi. Alamo Radio Elec. Co. Mon, Thurs, Sat, 8:30-9:30 pm, concert. Central.

WCAS, Minneapolis, Minn. 500 mi. Wm. H. Dunwoody Industrial Inst. Mon, 8:30-10 pm, music, lectures. Mon, Wed, Thurs, Fri, 5:30-6 pm, code instruction. Central.

WCAT, Rapid City, S. D. 485 also 300 mi. S. D. State School of Mines. Daily ex Sun. 9:30 am, 12:30 m, 3 pm, weather, reports. Wed, 7:15 pm, concert. Mountain.

WCAU, Philadelphia, Pa. 485 also. 500 mi. Durham & Co., Inc. Daily ex Sun. 11:15 am-12:15 pm, 1-1:30, 2:15-3, 5-6, reports, music. Mon, Thurs, 6:30-8:30 pm, music. Tues, Fri, 8-10 pm, concert. Thurs, 9-10:30 pm, music. Sun. 11:15 am-12:15 pm, reports, business sermon; 1-1:30, markets. Eastern.

WCAV, Little Rock, Ark. J. C. Dice Elec. Co.

WCAW, Quincy, Ill. 485 also. 300 mi. Quincy Elec. Supply Co. (Quincy Herald). Daily ex Sun. 5 pm, music. Wed, 7-8:30 pm, concert. Sun. 11 am, church services. 2:45 pm, special programs. Central.

WCAX, Burlington, Vt. Univ. of Vt.

WCAY, Milwaukee, Wis. 485 also. 500 mi. Kesselman-O'Driscoll Music House. Daily ex Sun. 11 am, reports. Mon, Tues, Thurs, Fri, 8:30-9:30 pm, music. Sun. 7:30-8:30 pm, church services. Central.

WCAZ, Carthage, Ill. Carthage College.

WCE, Minneapolis, Minn. Findley Elec. Co.

WCK, St. Louis, Mo. 50 mi. Stix, Baer & Fuller. Daily, 12-12:30 pm, 3-4. Mon, Wed, Fri, 6:45-8 pm, concert, lecture. Central.

WCM, Austin, Tex. Univ. of Tex.

WCN, Worcester, Mass. 485 also. 100 mi. Clark Univ. Daily, 11:15 am, 5:15 pm, weather. Evening program irregular. Eastern.

WCX, Detroit, Mich. 400 and 485 only. 1,000 mi. The Detroit Free Press. Daily ex Sun. 10:35 am, WCX Woman's Club; 2 pm, news; 2:15, stock reports; 2:50, weather markets; 4:15, markets, music. Daily ex Sat, 8:30-10 pm, week starting Dec. 11 and alternate weeks thereafter, concert; 7-8:30 pm, week starting Dec. 18 and alternate weeks thereafter, concert. Sun. 2:30 pm, 4 pm, church services. Central.

WDAC, Springfield, Ill. Illinois Watch Co. Time and weather, spark only.

WDAD, Lehigh, Kans. 485 also. 200 mi. Wm. Louis Harrison. Tues, Thurs, Fri, 9:30 pm, entertainment, weather. Sun. 3:30 pm, vesper services. Central.

WDAE, Tampa, Fla. 485 also. 500 mi. Tampa Daily Times. Wed, Fri, 8-10 pm, music, lecture. Eastern.

WDAF, Kansas City, Mo. 400 and 485 only. 2,000 mi. Kansas City Star. Daily ex Sun. 3:30-4:30 pm, music; 6-7, educational, bedtime story, etc.; 11:45 pm-1 am, Nighthawk Frolic. Mon, Wed, Fri, 8-10 pm, concert. Sun. 4-5 pm, music. Central.

WDAG, Amarillo, Tex. J. Laurance Martin.

WDAH, El Paso, Tex. Trinity Methodist Church South.

WDAI, Syracuse, N. Y. 485 also. 200 mi. Hughes Radio Corp. Daily ex Sun. 12 m, reports. Wed, Sat, evening concert.

WDAJ, College Park, Ga. 485 also. 2,000 mi. A. & W. P. R. Co. Daily, 7:30-8:30 pm, 10:30-11:30 pm, concert. Central.

WDAK, Hartford, Conn. 150 mi. Hartford Courant. Sat, 8 pm, concert. Eastern.

WDAL, Jacksonville, Fla. 485 also. 250 mi. Florida Times Union. Daily, 11 am, weather; 4-4:30 pm, music; 8-9, entertainment; 9:30, reports. Eastern.

WDAD, Dallas, Tex. Automotive Elec. Co.

WDAP, Chicago, Ill. 2,000 mi. Drake Hotel. Daily ex Sun, every half hour from 9:30 am to 1:30 pm, quotations, reports; 6 pm, news. Tues, Thurs, Sat, 10 pm, concert. Sun, 9 pm, 10, concert. Central.

WDAW, Philadelphia, Pa. Lit Bros.

WDAZ, Worcester, Mass. Samuel A. Waite.

WDAU, New Bedford, Mass. 500 mi. A. H. Smith. Mon, Wed, Fri, 12:15-1:50 pm, industrial reports; 7:45-10 pm, music. Sun, 10:30-12 am, 5-6 pm, church services. Eastern.

WDAX, Centerville, Iowa. 500 mi. First Nat'l Bank. Daily ex Sun. 11:30 am, reports, news. Mon, Thurs, 7:30-9 pm, concert.

WDAY, Fargo, N. D. 485 also. 300 mi. Fargo Radio Service Co. Daily ex Sun. 9:30 am, weather. Tues, Thurs, Sat, 7:30-8:30 pm, concert. Sun, 10:30 am, church service; 4-5 pm, music. Central.

WDM, Washington, D. C. 50 mi. Church of the Covenant. Sun, 11 am, church service; 8 pm, church service. Eastern.

WDT, New York, N. Y. Ship Owners Radio Service.

WDZ, Tuscola, Ill. 100 mi. James L. Bush. Daily ex Sun, every half hour. 9:30 am-1:15 pm, Chicago Board of Trade quotations. Central.

WEAA, Flint, Mich. Fallain & Lathrop.

WEAB, Fort Dodge, Ia. 485 also. 600 mi. Standard Radio Equip. Co. Daily ex Sun, markets every 30 min. from 9:40 am-1:20 pm, 5-15 pm, 7-8, music; 8:35, markets; 9:45, weather. Fri, 10-11:15 pm, dance music. Sun, 10:30 am, 4:30 pm, 7:30, church services. Central.

WEAD, Atwood, Kan. N. W. Kansas Radio Supply Co. Temporarily discontinued.

WEAE, Blackshurg, Va. Polytechnic Inst.

WEAF, New York City, N. Y. 400 only. 1,500 mi. A. T. & T. Co. Daily ex Sun. 4:30-5:30 pm, Mon, Wed, Thurs, Sat, 7:30-10 pm, Tues, Fri, 7:30-8 pm. Eastern.

WEAG, Edgewood, R. I. Nichols-Hineline-Bassett Lab.

WEAH, Wichita, Kan. 485 also. 500 mi. Lander Radio Co. Daily ex Sun. 9:40 am, 10:40, 11:40, 12:40 pm, 2, reports. Wed, Sat, 8 pm, concert. Every third Sun, 8 pm, concert. Central.

WEAI, Ithaca, N. Y. Cornell Univ.

WEAJ, Vermillion, S. D. Univ. of S. D. Temporarily discontinued.

WEAK, St. Joseph, Mo. 100 mi. Julius B. Abercrombie. Thurs, 8-9:45 pm, concert. Central.

WEAM, North Plainfield, N. J. 75 mi. Borough of N. Plainfield. Daily, 7:30-8 pm, music, police news, etc. Eastern.

WEAN, Providence, R. I. 485 also. 50 mi. The Shepherd Co. Daily ex Sun. 12-1 pm, 4-5, 6-7, music, weather, concerts. Tues, Thurs, 8:15-10, concert. Wed, Sat, 7-8 pm, concert. Sun, 10:45-11:30 am, 7:30-8:45 pm, church service. Eastern.

WEAO, Columbus, O. 375, 485 also. 1,000 mi. Ohio State Univ. Daily ex Sun. 1:30 pm, 4:30, reports, music. Thurs, 7-9 pm, lecture, concert. Eastern.

WEAP, Mobile, Ala. 485 also. 30 mi. Mobile Radio Co. Daily ex Sun. 12 m, reports; 4-5 pm, music. Daily ex Sun, Mon, 7:45-8:45 pm, music. Sun. 3-3:30 pm, church service. First Mon of each month, 11 pm-1 am, concert. Central.

WEAR, Baltimore, Md. 485 also. 200 mi. News & American Pub. Co. Daily ex Sun. 6:30-7, weather, music, news. Tues, Thurs, 7:30-9:30 pm. Eastern.

WEAS, Washington, D. C. 200 mi. The Hecht Co. Daily ex Sun. 3-4 pm, Wed, Fri, 7-8 pm. Eastern.

WEAT, Tampa, Fla. John J. Fogarty.

WEAU, Sioux City, Ia. 200 mi. Davidson Bros. Co. Daily ex Sun. 10 am, 11, 2 pm, reports, markets, news. Mon, Wed, Fri, 8:30 pm, concert. Sun. 11 am, 8 pm, church services; 9 pm, concert. Central.

WEB, St. Louis, Mo. 800 mi. The Benwood Co., Inc. Daily ex Sun. 9-9:40 am, 12-12:45 pm, 3-4. Wed, 7-9 pm. Central.

WEH, Tulsa, Okla. (300 S. Main St., Eldorado, Kans.) Midland Refining Co.

WEV, Houston, Tex. 485 also. 500 mi. Hurlhurst-Still Elec. Co. Daily ex Sun, 10 am, 5:30 pm, weather, roads. Tues, Thurs, 8 pm, concert. Central.

WEW, St. Louis, Mo. 485 also. 100 mi. St. Louis Univ. Daily ex Sun, 9 am, 10, 2 pm, reports. Central.

WEY, Wichita, Kan. 485 also. 500 mi. Cosradio Co. (Wichita Beacon). Daily ex Sun, hourly, 8:40 am, 12:40 pm, stock markets. Daily, 10:45 am and 4:30 pm, weather; 8-10 pm, sports, concert, lecture; 10:45 weather. Sun, 8:10 pm, church service, concert. Central.

WFAA, Dallas, Tex. 400 and 485 only. 1,500 mi. Dallas News and Dallas Journal. Daily, 10 am, reports; 12:30-1 pm, address; 6:30-7, bedtime story; 8:30-9:30, music. Tues, Thurs, Sat, 11-12 pm, music. Sun, 2:30-3 pm, bible class; 9:30-10:30 pm, music. Central.

WFAE, Syracuse, N. Y. 100 mi. C. F. Woese. No definite schedule.

WFAF, Superior, Wis. 400 mi. Superior Radio Co. Daily, 7-7:45 pm, news. Central.

WFAH, Poughkeepsie, N. Y. H. C. Spradley Radio Co. Temporarily discontinued.

WFAI, Waterford, N. Y. 340 only. 300 mi. Radio Engineering Lab. Wed, Sat, 7:45-10 pm, concert. Sun, 2-4 pm, church service. Eastern.

WFAJ, Port Arthur, Tex. 100 mi. Elec. Supply Co. Tues, Thurs, 10-11 pm, concert. Central.

WFAK, Asheville, N. C. Hi-Grade Wireless Instrument Co.

WFAN, Hutchinson, Minn. Hutchinson Elec. Service Co.

WFAM, St. Cloud, Minn. 485 also. 100 mi. Granite City Elec. Co. Daily ex Sun. 3:30-4 pm, markets. Mon, Wed, 7:30-9 pm, entertainment. Central.

WFAQ, Cameron, Mo. Cameron Radio Co. and Mo. Wesleyan College.

WFAT, Sioux Falls, S. D. 485 also. 400 mi. Argus Leader. Daily ex Sun. 10:15 am, 12:15 pm, 1:30, 2:30, reports, music. Tues, Thurs, Fri, 8-9 pm, concert. Fri, 11 pm, concert. Central.

WFAU, Boston, Mass. Edwin C. Lewis.

WFAV, Lincoln, Neb. 485 also. 300 mi. Univ. of Neb. Daily ex Sun, 10:00 pm, weather. Mon, Thurs, 7 pm, lectures. Thurs, 8 pm, concert. Central.

WFAW, Lincoln, Neb. Nebr. Wesleyan Univ.

WFW, New Orleans, La. 500 mi. Interstate Elec. Co. Mon, Wed, Sat, 8-9 pm, music, talks; 12-1 mid., music. Central.

WFAZ, Charleston, S. C. 485 also. 400 mi. S. C. Radio Shop. Daily ex Sun. 12 m, reports, news, music. Tues, Thurs, 8-10 pm. Eastern.

WFI, Philadelphia, Pa. 400 and 485 only. 1,000 mi. Strawbridge & Clothier. Daily ex Sun, 10 am, reports; 1 pm, news; 2, music; 3:30-4:30, concert; 6:30-7, children's hour. Wed, Sat, evening, concert. Wed, 10:30 pm, dance music. Sun, 9:30 pm, organ recital; 7:30 church services. Eastern.

WGB, Houston, Tex. 250 mi. QRV Radio Elec. Co. Daily ex Sun. 8:45-9:15 am, news. Sat, 7 pm, news; 8-9:15 pm, concert. Central.

WGAD, Ensenada, Porto Rico. 250 mi. Escuela Hispano Americana de Radio Telegrafia, Inc. Sat and Sun eve.

WGAF, Tulsa, Okla. Goller Radio Service.

WGAH, New Haven, Conn. New Haven Elec. Co.

WGAJ, Shenandoah, Ia. 100 mi. W. H. Gass. Mon, Thurs, 7:30-8 pm. Central.

WGAK, Macon, Ga. Macon Elec. Co.

WGAL, Lancaster, Pa. 35 mi. Lancaster Elec. Supply & Constructio Co. Mon, Wed, Fri, 7-8 pm, concert, lecture. Sun, 3-3:30 pm, church service. Eastern.

WGAM, Orangeburg, S. C. 150 mi. Orangeburg Radio Equipment Co. Daily ex Sun. 10 am, markets, weather; 11:55, time; 4 pm, Radio talk, markets, sports; 6, music, lecture; 10, time, weather, entertainment. Sun, 11 am, church service; 11:55, time; 10 pm, time, weather, music. Eastern.

WGAN, Pensacola, Fla. Cecil E. Lloyd.

WGAQ, Shreveport, La. 500 mi. Glenwood Radio Corp. Daily ex Sun, 5:30-6 pm, 8, music. Sun, 11 am, 7:30 pm, church service. Central.

WGAR, Fort Smith, Ark. Southwest American.

WGAU, Wooster, O. Marcus G. Limb.

WGAW, Altoona, Pa. Ernest C. Alright.

WGAX, Washington C. H., O. 75 mi. Radio Elec. Co. Daily ex Sun. 12 m, music, news; 9:30 pm, concert, news. Sun, 10:30 pm, sermon. Central.

WGAY, Madison, Wis. 100 mi. North Western Radio Co. Daily ex Sun, 10 am, weather; 11:30, news; 12 am, Univ. activities; 4:30, news. Sun, 10:30-12 am, sermon. Central.

WGAZ, South Bend, Ind. 200 mi. South Bend Tribune. Daily ex Sun. 9-9:30 am, household hints, menus; 5-5:30 pm, music. Tues, Thurs, Sat, 7-8 pm, music. Central.

WGF, Des Moines, Iowa. 485 also. 300 mi. Register and Tribune. Tues, Fri, 7:30 pm, entertainment. Sun, 5 pm, church service. Central.

WGI, Medford Hillside, Mass. 485 also. 500 mi. Am. Radio & Research Corp. Daily, 5-6:45 pm, Children's Hour, reports codes. Tues, Sat, 8:30-10 pm, concert. Wed, 6:45-8:30 pm, Thurs, Fri, 9:30-11 pm, concert. Tues, Fri, 2 pm, Amrad Women's Club. Sun, 4-5 pm, 8:30, church services; 9, concert. Eastern.

WGL, Philadelphia, Pa. 2,000 mi. Thos. F. J. Howlett. Tues, Thurs, Sat, 7:45-11:30 pm, concert. Eastern.

WGM, Atlanta, Ga. 400 only. 1,500 mi. The Atlanta Constitution. Daily ex Sun and Wed, 6-7 pm, orchestra concert; 9:30-10:30 pm, music. Sun, 3:30-4:30 pm, organ recital; 9:30-10:30 pm, music. Wed, 12-1 am, concert. Central.

WGR, Buffalo, N. Y. 485 also. 1,000 mi. Federal Tel. & Tel. Co. Daily ex Sat, 12:15 pm, weather; (Mon, Thurs, agriograms; 2, 4, 5, music, reports; 7:30, bedtime story, news. Mon, Wed, Fri, 8-10 pm, concert. Sun, 3 pm, vesper services. Eastern.

WGV, New Orleans, La. 400 mi. Interstate Elec. Co. Mon, Tues, Wed, 8-9 pm, music, talks. Mon, Wed, Sat, 11-12:30 pm, Sat, 7:30-8:30 pm. Central.

WGY, Schenectady, N. Y. 400 and 485 only. 1,000 mi. General Elec. Co. Daily ex Sun, 12 m, 12:30 pm, 6, 10, reports, time, sports. Mon, Tues, Thurs, Fri, 2-2:30 pm, 7:45, concert. Sat, 9 pm, special. Fri, 10:30 pm, special. Sun, 10:30 am, 4 pm, 7:30 pm, church service. Eastern.

WHA, Madison, Wis. 485 also. 1,000 mi. Univ. of Wis. Daily ex Sun, 11:59-12 m, time signals, weather. Daily ex Sat, Sun, 7 pm, lectures, news. Mon, Thurs, 7:30 pm, agriograms, concerts, sports. Sat, 12:15-1 pm, music, codes. Sun, 1:30-2:30 am, concert. Central.

WHAA, Iowa City, Ia. 200 mi. Univ. of Iowa. Mon, Tues, Wed, Fri, 8:30 pm, lecture, concert, news. Sat, 9 pm, sports. Central.

WHAB, Galveston, Tex. 300, 485, 600 also. 500 mi. Clark W. Thompson Co. Daily ex Sun, 9:45 am, 11, 3:30 pm, 5, reports, music, news. Tues, Thurs, Sat, 8 pm, entertainment. Sun, 11 am, 7:30 pm, church service. Central.

WHAC, Waterloo, Ia. 150 mi. Cole Bros. Elec. Co. Daily, 6 pm, news, sports. Mon, Wed, Fri, 9:30 pm, concert. Sun, 11 am, church services. Central.

WHAD, Milwaukee, Wis. 100 mi. Marquette Univ. Wed, 7:30-8:30 pm, music, entertainment. Central.

WHAE, Sioux City, Ia. 200 mi. Automotive Elec. Service Co. Daily ex Sun. 12:30-5:30 pm, music, reports. Thurs, 7:30 pm, music. Central.

WHAG, Cincinnati, O. 100 mi. Univ. of Cincinnati. No definite schedule.

WHAH, Joplin, Mo. Hafer Supply Co.

WHAI, Davenport, Ia. 30 mi. Radio Equip. & Mfg. Co. Daily ex Sat and Sun. 2-2:30 pm, 4:30-5:30, 10-11, Sat, 10-11 am. 2-2:30 pm, 5-5:30, 11-11:30. Central.

WHAK, Clarksburg, W. Va. Roberts Hdwe. Co. 50 mi. No definite schedule.

WHAL, Lansing, Mich. 200 mi. The Capital News. Daily ex Sun, 12:30 pm, 2:55, 4:30. Mon, Wed, Fri, 7:45 pm. Sat, 12 midnight. Sun, 2:30 pm. Central.

WHAM, Rochester, N. Y. Univ. of Rochester.

WHAO, Savannah, Ga. 100 mi. Frederick A. Hill. Daily, 8-9 pm. Eastern.

WHAP, Decatur, Ill. 100 mi. Otta & Kuhns. No definite schedule.

WHAQ, Washington, D. C. 75 mi. Semmes Motor Co. Mon, 7-8 pm, lecture on automobile upkeep, music. Eastern.

WHAR, Atlantic City, N. J. Paramount Radio & Elec. Co.

WHAS, Louisville, Ky. 485 also. 1,500 mi. Courier Journal and Louisville Times Co. Daily ex Sun. 4-5 pm, 7:30-9, Sun, 9:57-10:45 am. 4-5 pm, church service. Mon night, silent. Central.

WHAV, Wilmington, Del. 200 mi. Wilmington Elec. Co. Daily ex Sun, 12 m, 12-1 pm, music. Mon, Wed, Fri, 6-8 pm, concert. Tues, Thurs, 6-7 pm, music. Eastern.

WHAW, Tampa, Fla. 200 mi. Pierce Elec. Co. Temporarily discontinued.

WHAY, Huntington, Ind. 75 mi. Huntington Pub. Co. Daily ex Sun, 12 m, 3 pm, music; 6 pm, markets, news, weather. Mon, Wed, Fri, 8 pm, cc. cert. Sun, 3 pm, sermon; 4 pm, concert. Central.

WHAZ, Troy, N. Y. 400 only. 2,000 mi. Rensselaer Polytechnic Inst. Mon, 8:15-9:30 pm, music. Transcontinental second Monday of each month, 12-1:30 am, music. Eastern.

WHB, Kansas City, Mo. 400 and 485 only. 1,000 mi. Sweeney Auto & Tractor School. Daily, 10 am, 3 pm, 5, weather. Daily ex Sun. 2 pm, ladies' hour; 7, bedtime stories. Tues, Thurs, Sun, 8-10 pm, concert. Central.

WHD, Morgantown, W. Va. W. Va. University. Temporarily discontinued.

WHK, Cleveland, O. 300 mi. Warren R. Cox. Daily ex Sun, 8:30-9 am, test; 1:30-2 pm, 4-4:30, music; 6-6:30, news, music. Wed, Sun, 8-9:45 pm, sermon, concert. Eastern.

WHN, Brooklyn, N. Y. 250 mi. Associated Broadcasters, Inc. Daily ex Sun, 7-8 am; 9:15-10:55, 12:55-1:15 pm, 2:15-2:30, 4:15-5:30, 6:15-7, 7:30-8:30, 10:30-12 m. Tues, Wed, Fri, 7:30-8:30 pm omitted. Sun, 1-3 pm, 5-6; 10:30-12 m. Eastern.

WHB, Rockford, Ill. 50 mi. Joslyn Automobile Co. Tues, Fri, 7:30-8:30 pm, music. Central.

WHC, Galveston, Tex. 485 also. 200 mi. Galveston Tribune. Daily ex Sun. 12:35 pm, reports. Tues, Sat, evening concert. Central.

WIAD, Ocean City, N. J. 200 mi. Ocean City Yacht Club. Fri, Sat, Sun, 8-12 pm. Eastern.

WIAE, Vinton, Ia. 75 mi. Zimmerman Radio Co. Tues, Thurs, Sat, 9 pm, music, news. Wed, 8 pm, hand concert. Sun, 2:30 pm, music. Central.

WIAF, New Orleans, La. 300 mi. G. A. DeCortin. Tues, 8-9:30 pm. Sun, 10-11:30 am, church services. Central.

WIAH, Newton, Ia. 200 mi. Continental Radio & Mfg. Co. Daily, 12:30-1 pm, music, news. Mon, 7:30-8 pm. Central.

WIAI, Springfield, Mo. 300 mi. Heer Stores Co. Daily ex Sun. 10:30-11 am, reports, news. Tues, Thurs, 7:30-8:45 pm, Sat, 6:15-7:15 pm, music, entertainment. Central.

WIAJ, Neenah, Wisc. Fox River Valley Radio Supply Co.

WIAK, Omaha, Neb. 485 also. 300 mi. Daily Journal-Stockman. Daily ex Sun, 7:45 am, 9:10, 10:20, 12 m, 1:30 pm, 3:50, markets, weather. Central.

WIAO, Milwaukee, Wis. 200 also. 200 mi. School of Engineering. Mon, Tues, Thurs, Fri, 11:30-11:45 am, news; 11:45-12:10 pm, lecture; 5-6 pm, news; 7-7:30, music. Central.

WIAQ, Marion, Ind. Chronicle Pub. Co.

WIAP, Paducah, Ky. 150 mi. Paducah Evening Sun. Daily ex Sun, 8:30-4 pm, reports, news, music, 7-8 pm, concert, lecture, etc. Central.

WIAS, Burlington, Ia. 400 mi. Hawk-Eye Home Elec. Co. Tues, Thurs, 8-9 pm, concert. Central.

WIAT, Tarkio, Mo. Leon T. Noel.

WIAU, Le Mars, Ia. Am. Trust & Savings Bank.

WIAV, Binghamton, N. Y. N. Y. Radio Lab.

WIAW, Saginaw, Mich. Saginaw Radio & Elec. Co.

WIAY, Washington, D. C. 200 mi. Woodward & Lothrop. Daily ex Sun, 10:30-11:30 am, 2-3 pm, music. Tues, Fri, 6:45 pm, reports. Sat, 8-9 pm, concert. Sun, 4:45 pm, vesper services. Eastern.

WIAZ, Miami, Fla. Flagler St. Elec. Supply Sales Co.

WIK, McKeesport, Pa. 500 mi. K. & L. Elec. Co. Daily ex Sun, 6:30-7 pm. Tues, Thurs, 9:30-10:30 pm, Sun, 1:30-2:30 pm and 6:30-7 pm. Eastern.

WIL, Washington, D. C. 100 mi. Continental Elec. Supply Co. Daily 5:30-7 pm, music, entertainment. Eastern.

WIP, Philadelphia, Pa. 400 only. 2,000 mi. Gimbel Bros. and Public Ledger. Daily ex Sun, 6-6:30 pm. Daily, 2-3 pm, 7-7:30 pm. Tues, 7-12 pm, Sat, 10:10-12 m. Sun, am, pm, church service. Eastern.

WIZ, Cincinnati, O. 485 also. 200 mi. Cino Radio Mfg. Co. Daily ex Sun, 12 m, 3:30 pm, 7-8, reports, entertainment. Central.

WJAB, Lincoln, Neb. 800 mi. Am. Elec. Co. Mon, Thurs, 9:30-10:15 pm, music, special. Sun, 8-9 pm, church services. Central.

WJAD, Waco, Tex. 200 and 375 also. 500 mi. Jackson's Radio Engrg. Lab. Daily ex Sun, 3:30-4 pm, news, music. Mon, Fri, 8:45-9:45, concert. Sun, 11-12 am, church service. 3:30-4 pm, music. Central.

WJAF, Muncie, Ind. 200 mi. Muncie Press and Smith Elec. Co. Daily ex Sun, 3:30-4 pm, news, music. Mon, Wed, Fri, 7-8 pm, Sat, 6-7 pm, music. Sun, 10-12 am, 2-3:30 pm, church services. Central.

WJAG, Norfolk, Neb. 485 also. 150 mi. Norfolk Daily News. Daily ex Sun, 12:15 pm, 3:30, 5, 5:30, reports, code school. Central.

WJAJ, Dayton, O. Y. M. C. A.

WJAK, Stockdale, O. 485 also. 250 mi. White Radio Lab. Daily ex Sun, 10:30-10:50 am, music; 11:05-11:20, reports, news; 6-6:30, music, news. Wed, 8-9 pm, concert. Sun, 2-2:45 pm, church service. Central.

WJAM, Cedar Rapids, Ia. 50 mi. D. M. Perham. Mon, Wed, Fri, 7-8 pm, music. Central.

WJAN, Peoria, Ill. 300 mi. Peoria Star. Daily ex Sun, 9 am, 11:30, 1:30 pm, markets, weather, agriograms. Tues, Thurs, Sat, 9:15-9:45 pm, concert. Central.

WJAP, Duluth, Minn. 200 mi. Kelley Duluth Co. Mon, Thurs, 8-9:30 pm, music. Mon, Thurs, Sat, 10:30-12 midnight. Sun, 11-12 m, pipe organ, 12-1 pm, 7:30-9 pm, church service. Central.

WJAO, Topeka, Kan. 200 mi. Copper Publications. Thurs, health talks. Sun, 3 pm, church services. Schedule not regular. Central.

WJAR, Providence, R. I. 485 also. 600 mi. The Outlook Co. Daily ex Sun,

ADVANCE PROGRAMS

(Continued from page 6)

WFI (Eastern, 400), 1:15-2:00 P. M., Concert, Meyer Davis Bellevue-Stratford Orchestra; 3:30-4:15 P. M., Musical recital; 6:30-7:00 P. M., Concert, Meyer Davis Bellevue-Stratford Orchestra; 7:50-10:30 P. M., Musical concert.

Sunday, April 29

KDKA (Eastern, 360), 10:45 A. M., Church service, East End Christian Church, Pittsburgh, Pa., Rev. John R. Ewers, minister; 2:30 P. M., Bible story for children, Rev. W. A. Logan, Alpha Lutheran Church, Turtle Creek, Pa.; 2:45 P. M., Concert; 4:00 P. M., Organ recital, Dr. Charles Heinold, organist, and director of Carnegie Institute; 4:45 P. M., Vesper services, Shady Side Presbyterian Church, Pittsburgh, Rev. Hugh Thomson Kerr, minister; 7:45 P. M., Church services for the shut-ins, Rev. E. J. Van Etten, Calvary Episcopal Church, Pittsburgh.

Monday, April 30

KFI (Pacific, 400), 6:45-7:30 P. M., Peter Babbitt; Talk, Los Angeles Chamber of Commerce; Concert, Junior Music Clubs of Southern Calif.; 10:00-11:00 P. M., Program, Gaumut Club; Female chorus, Woman's Lyric Club of Los Angeles; Program, Hollywood Chamber of Commerce.

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.)

WHAS (Central, 360), 4:00-5:30 P. M., Organ selections, H. C. Conrad at Alamo Theater; Three-minute biography of Old Testament characters, "Nehemiah," K. G. Tucker, El Paso, Texas; "Just Among Home Folks," column in Louisville Courier-Journal.

STATION KHJ GIVES SUNRISE PROGRAM

Resurrection Morn Services Pierces Pall of Rain Over Broadcast

LOS ANGELES, CALIF.—With the dawning of Resurrection morn, 1923, there was conducted in this city, the first Easter Radio sunrise service in the West.

A LARGE TWO COLOR MAP Size 25x38 inches, showing the location of all the broadcasting stations of United States and Canada, their wave lengths, exact geographical position, change of time area, amateur radio districts, etc.

WE REPAIR WD-11, \$3.50 and OTHER VACUUM TUBES Excepting VT-I and VT-II MAIL ORDERS Solicited and Promptly Attended To H & H RADIO CO. 516 Clinton Avenue NEWARK, N. J.

COMMISSION PLANS TRUST QUIZZ SOON

NEW YORK OFFICE WILL PLAY LARGE PART

Definite Plans Not Yet Formulated but Information Will be Compiled for Early Start

By L. M. Lamm

WASHINGTON, D. C.—Investigators of the Federal Trade Commission will soon begin work on the survey of the Radio field and alleged Radio trust, which was provided for in the White resolution which passed the House of Representatives during the closing hours of Congress.

Work on the investigation has been somewhat held up because some of the officials of the Commission felt that changes are so rapid in the Radio industry at present that if the investigation were begun at this time, the report would be old before the next session of Congress at which time a report must be made.

New York Office to Take Part

While definite plans have not yet been formulated by the Commission for the investigation it is probable that all of the information now available in the various government departments will be gone over and tabulated following which the necessary field work will be carried out.

Another New Broadcaster Added to California's List

LOS ANGELES, CALIF.—Another new station was added to the list of Southern California plants with the opening during the last week of March of the new plant of the Radio Corporation of America, located on the Catalina terminal in the Wilmington section of Los Angeles Harbor.

The first message sent from the station was one of greeting from David P. Fleming, manager of the Wilmington Transportation Co., to William Wrigley, Jr., on Catalina Island. Commercial operation of the station is on a 24-hour service with three operators working on eight-hour shifts.

French Tax Sets

A decree of the French government provides that each owner of a receiving set shall pay 10 francs as an annual fee, keep secret all intercepted messages and cease operations when the government so instructs.

Passengers riding in Radio-equipped taxis in Paris pay 2 francs extra for the trip.

How to Make a Reinartz Receiver COMPLETE BLUE PRINT for the construction of a Reinartz Receiving Unit and two step amplifier. INSTRUCTIONS FOR ASSEMBLY Description of apparatus and accessories and details of tuning. WINDING A REINARTZ COIL Cabinet Dimensions Panel Layouts List of Parts Send only money orders—no checks or stamps. Coins at your own risk. Book Department RADIO DIGEST 123 W. Madison Street CHICAGO, ILL. Only 50¢

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Bad Impressions

Distorted Sounds from Large Horns Not Effective
PEOPLE still exist who will not allow a phonograph in their homes. The first impression given by the big horns attached to the machines in their earlier designs made many people feel the phonograph would never produce clear music. Big horns protruding from the windows of Radio shops have in the same way given a bad impression and introduction to Radio. The music from such horns has been distorted and mixed with a "tin" sound. The right receiving set produces mellow tones, why distort them to produce loudness?

Incentive for Factory Workers

Installation of Radio Solves Production Problems
IN THIS busy age there is always a demand for something that will relieve the monotony of the daily grind. This was proved by one of the largest manufacturers of knit goods who recently installed Radio in his factories.

The girls were given five minutes out of every hour for recreation and rest. The experiment was tried with Radio by installing a set in the girls room in lieu of a phonograph. A great interest was taken in the concerts over the Radio.

It was thought that the workers would take advantage of this new arrangement and stay overtime, but by careful observation it was found to be opposite in this case, for being interested in the new-found diversion, they worked hard to pass the time and did not waste time as usual, by lagging, but hurried back to work to discuss the different things they had heard during the five minutes' rest.

As a result, the girls, instead of growing dissatisfied and leaving, stayed and seemed happy, and the news spread that none of the girls employed in this factory were leaving, and for this reason the owner of the factory could get all the help he wanted.

No Limits to the Field Covered

Distance Depends on the Power Back of Station
RADIO is a system of communication whereby intelligence is transmitted with the speed of light, in all directions, for any desired distance, without the aid of any artificial medium, by the propagation and detection of electrical disturbances in space.

An analysis of this definition will indicate the unique inherent characteristics of Radio which make it serviceable where other systems of communication cannot be applied.

While the speed of transmission in Radio is no greater than that of the wire communication systems, it is equal to it. A Radio message travels at the rate of 186,000 miles per second; more than 1,000,000 times the speed of sound.

A Radio transmitter will radiate its message in all directions, a characteristic which has made broadcasting possible. A broadcast message can be heard by those in airplanes, in ships at sea, by those in submarines submerged in the sea, and in mines or other points under the surface of the earth.

So far as is known Radio communication can be accomplished over any desired distance. Radio stations already have transmitted completely around the world, and since the medium which transmits light to us from stars and planets is the same medium which transmits Radio communication, it is reasonable to believe that a Radio message can be propagated through space for a distance depending only on the amount of power which is put behind it.

The third inherent characteristic of Radio, by which it transmits intelligence without the aid of any artificial medium, places it in a field absolutely all its own. Not only does this permit communication with points otherwise inaccessible, such as for example, aircraft, ships and inaccessible parts of the country, but it eliminates the need of securing rights of way for transmission lines and their construction and maintenance. A Radio system is, therefore, rendered more positive than wired systems in that it is not subject to failures which frequently occur during the winter months in wire lines.

Condensed

By DIELECTRIC

For those having perfect hearing the tortures of being very deaf are hard to imagine. Having among my acquaintances people who are mutes and those who are partially deaf I am of the opinion that it is more discomforting to be among the latter group. They are generally supposed to get the gist of a conversation and receive little sympathy if they fail, while the mute is saved this ordeal. It is very encouraging to learn of the results of recent tests at the Indiana Schools for the Deaf and to note that apparently not all of the children supposed to be totally deaf are actually so. Other tests have been made prior to this and phenomenal results claimed, however, it is certain that Radio is to play a great part in restoring the ability to hear and distinguish sounds to those who have latent hearing, and that of itself would be sufficient to make us thankful to the discoverers of Radiophony.

As time goes on the demand on the part of listeners-in for programs of a general high character will be met with a fuller response from the broadcasting stations. Already the public's demand for certain features has resulted in their incorporation in the regularly listed numbers to be broadcast. Those who wanted to hear grand opera given to the Radio world were finally successful in getting it. One of the large opera companies still holds aloof and refuses to allow its performances to be sent out through the ether. Opera has been broadcast in most of the large cities of the country this season and with profit to the managers as well as to the public. The first station to give this class of entertainment was KYW, transmitting performances by the Chicago Opera Company. This same station was the first to respond to the appeal to broadcast plays direct from the stage. Now we are to be provided with theatrical performances as a regular feature from their studio. Station WGY has put out some very good "Radio dramas" to the enjoyment of audiences tuned to the Schenectady station. In due season we will have everything we want to hear, even if it costs us contributions to broadcasting.

We look to the youth of the land for fearless investigation into untried methods of hooking up a set. Much that has been done to develop compact, portable receiving sets has been due to the ingeniousness of the young amateur. Of course he has contributed much else besides to the progress of Radio. As an organization of boys, there is perhaps no equal to the Boy Scouts in promoting practical tendencies. They have taken to the science of Radio enthusiastically and in most cases have had careful supervision. In New York alone some twenty-five thousand Boy Scouts are delving into the mysteries of Radio, building their own sets and adding to their store of knowledge most useful information. One of the Scout sets is a portable one adapted to use on hikes and weighs but ten pounds. One of the most promising phases of the future of Radio is the keen interest displayed by boys who will become the men directing the affairs of amateur leagues. So long as the boy is encouraged to spend part of his time in Radio experimentation there need be no apprehension about further growth in this line.

It would be a splendid thing for Radio if every community had a live, aggressive club comprising the set owners and set makers boosting the game and developing new members. There are clubs that actually accomplish little, but the recently organized "Springfield Associated Radiowls" in Massachusetts is on the right track in attempting to accomplish its purposes. Cooperation and experimentation are the essentials to a successful Radio club.

It begins to look encouraging for the listeners in since Secretary Hoover's conference completed its session with a constructive program. If the proposed changes in wavelengths are accepted as final, then we are on the way out of the tangle which would certainly have led to disaster, so far as broadcasting is concerned. It is very comforting to note that the amateur is well cared for in the schedule as outlined. In fact he is favored as he has not been before, and this is as it should be. A great deal is due to those not professionally concerned with Radio for its permanent advancement, and they should be granted every legitimate concession. Radio Digest was active in this conference with intent to aid in successfully overcoming the difficulties to efficient broadcasting. This paper has always done its share to promote the welfare of its readers—the great body of Radiophans—in whatever problem has presented itself, and you may rest assured it will continue to do so.

When I meet a genuine Radio BUG I like to find out just how much he is contributing to the game. Some of them are gifted with technical ability and aid the beginner in assembling his set. Others have Radio frolics, at which invited guests may revel in the joys of listening to what comes in through the set. I found one of these lately. He is an artist and while working away on his illustrations, sits with head phones all day long. Then when he goes home he sends out for folks who do not own a receiving set and brings them in to share the evening's entertainment. This he has done all winter, and when the Sunday afternoon recitals are broadcast the loudspeaker is aimed out of the window to give passersby as much as they like of the sacred music. Following up the results I found that nearly a dozen new enthusiasts had been added to our roll due to his enthusiasm and generosity. This is what I call a g-e-n-u-i-n-e Radio Bug! Let's have more of them.



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.)

QUESTIONS and ANSWERS

Q. & A. dept., Radeeo In-Digest, Dere ser—I bot a arial ackording to the speshificatins of mister h. J. marx butt it wonte fit my house and lot being 2 long sew plese give me a picshure of same aliterd 2 ft. P. S.—i hav an garadge on my lot? —PDQ (000).

A—Would suggest you moving your garage back in the alley. In case you have no alley, borrow your neighbor's garden. We never heard of H. J. Marx.

Dear Mr. Indi-Gest:

Please be so kind to pardon my seeming familiarity, but my wife (one will acquire wives, won't one?) has made an urgent plea that you answer her interrogation. In your most interesting paper of April 21, she read a story regarding the introduction of illicit liquors into this country by the aid of Radio and wishes to be enlightened regarding whether or not the initials "A. R. R. L." represent the "American Rum Running League"? —Alogonquin Tonsils III.

A—(1) Yes. (2) We are investigating, if so shall we send in your application to join the A. R. R. L. with ours?

(181200003689%\$"&123) BLAH, Maywood.

In your issue of April 21 I notice a very good looking Sheik on your front cover. Please give me his telephone number. —LaVerne.

A—All mail addressed to Perin in care of Indigest will be forwarded. Members of the other persuasion can reach Inez and Eula in the same manner.

READERS' VIEWS

Did You Rub with the Alcohol?

Dear Indigest—After reading the Indigest I contracted a headache and rubbed my head with alcohol and went to sleep with a heating pad as a pillow. I was awakened by Station POZ playing All All. It came in over the pad like a ton of bricks. Can give name of pad and brand of alcohol on request. —Lillian G.

Yes, It Is There—If You Look For It

Dear Indigest—I have been a subscriber to Indigest for the past year and in looking over one of the latest copies I notice you have a department known as the Radio Digest. I am glad I discovered this as it is a very nice little feature. —Polly W.

BOOK REVIEWS

How and Why to Make Radio Sets, by Xlophone Zapp, is one of the recent publications of Spark and Coil Publishers, Inc. Mr. Zapp describes the parts of a Radio set where there is no danger of confusing one with the other. For instance he clearly shows the difference between a tube and a variometer by illustrations drawn by his four year old daughter.

Radio As I Know It is a book that could contain another hundred blank pages and would not cover the subject to fuller extent. Written by Ivan Afulitch, the Russian Radiophan. The English edition De Luxe, bound in heavy flexible insulated oil cloth, is now to be had. Translated from the Russian by Polly W.

NOTICE!

Due to spring alterations the department of Indigest known as the Radio Digest will be moved over one column to the right. This will put Indigest in the center column of page 10 next issue. During repairs and alterations business will go on as usual. —Indi.

A. B. C. Lessons for Radio Beginners

Chapter XVII—Storage Batteries and Their Care

By Arthur G. Mohaupt

PROBABLY the most important auxiliary device used in connection with a modern vacuum tube receiving set is the storage battery which is used to supply the current to the filaments of the tubes. Although this battery is by most broadcasting fans considered to be of secondary importance and hence is given only casual attention, it is a very scientific piece of apparatus. In order that best

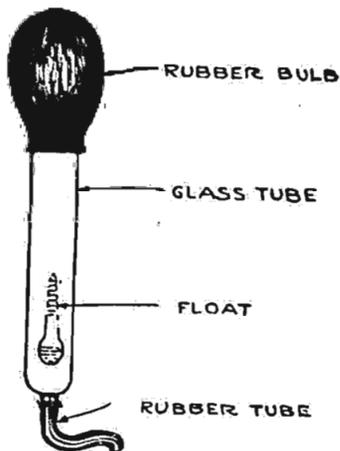


Figure 58

results and longest life can be obtained from it, it should really receive more maintenance and upkeep attention than the receiving set itself, for if the battery goes bad the receiving apparatus is lifeless.

It is true that most Radio instruction literature falling into the hands of the owner of a receiving set deals only with the operation of the set and completely omits the batteries, and it is for this reason that the present chapter on storage batteries will prove a very important guide to the purchaser or owner of a battery.

Differs from a Dry Cell

Fundamentally the inherent principles of operation of a storage cell are no different from those of an ordinary dry or wet cell of the primary type, for they both consist of two sets of plates or electrodes, one positive and one negative, and a solution or electrolyte capable of chemically acting more upon one electrode than upon the other. The one least acted upon, in this case, is the positive terminal. A storage cell differs, however, in this respect:

After it is exhausted through active use, both plates and electrolyte can be restored to their original condition by sending a direct current from some external source back through the cell in a direction opposite to that in which the cell itself would cause a current to flow. This is not possible with the ordinary primary cells, for when these are exhausted, the worn out parts must be replaced with new ones. It is true that a dry cell can often be rejuvenated to a slight degree, but as to restoring it back to complete normalcy, that is impossible.

Kinds of Storage Cells

There are two types or kinds of storage cells in common use today, one is known as the lead-sulphuric acid type and the other as the nickel-alkaline or Edison type. The former has been in use for a long time, while the latter has come on the market only in more recent years. Each has its own individual advantages and disadvantages, but since the lead cell is in most extensive use among Radio fans today, the present chapter will be devoted only to this type of cell.

The lead storage cell consists of two groups of plates, one positive and one negative. The positive plate is brown in color and consists of a pasty mass of lead peroxide (a chemical compound of lead and oxygen) supported in a grid or frame work composed of lead and antimony. The negative plate is gray in color and consists of pure lead in a very finely divided state (known as sponge lead) also supported in a similar grid. The electrolyte consists of

a dilute solution of chemically pure sulphuric acid dissolved in distilled water.

Chemical Action

The lead peroxide and spongy lead are known as the active materials, for it is through their chemical reaction with the sulphuric acid of the electrolyte that the electrical energy is developed.

When the storage cell is called upon to furnish electrical energy to the filaments of the tubes or other apparatus, it is said to be discharging, and when a current is being sent through it from some external source to restore the various parts to their original condition it is said to be charging.

During the discharging process the active materials of both groups of plates unite with some of the sulphuric acid of the electrolyte and form a new chemical compound which appears on the plates in the form of a white salt, known as lead sulphate. There are thus several changes going on within a cell during discharge; both plates are being slowly converted into lead sulphate and the solution is being weakened to the sulphuric acid being used up by the plates.

During the charging process, on the other hand, the entire chemical actions are reversed, that is, the positive plate is converted back into lead peroxide, the negative to pure lead, and the electrolyte becomes stronger due to the acid being returned to it from the plates.

Thus it is evident that although called a storage cell, it really does not store electricity. What it stores is chemical energy.

The Commercial Lead Battery

A complete lead storage battery as is commonly used in Radio practice consists of three individual units or cells connected together "in series" and supported in a wooden or composition box or case.

Each unit or cell, in turn, consists of groups of plates, one positive and one negative. The two groups are assembled so that the plates of one fit in between those of the other, the plates being prevented from touching each other by means of insulating separators placed between each pair. Each group of plates terminates in a lead post which projects through the tops of the cell covers.

The three cells are connected in series when the entire battery is assembled. The positive terminal of the first cell and the negative terminal of the third cell form the terminals of the complete battery. The positive terminal is generally colored red and is marked POS or P or +. The negative terminal is usually colored black and is marked NEG or N or -. It is to these two terminals that the wires leading to the tube filaments are connected.

Rating of Storage Batteries

Storage batteries are always rated as to their terminal voltage and the quantity of electrical energy which they can supply under proper conditions of operation.

The three-cell storage battery as used in Radio practice has a terminal voltage of about 6 volts. Each cell has a pressure of 2 volts, and the three in series thus have a combined pressure of 6 volts. When a battery is fully charged, the pressure is slightly above this value, and when the battery is discharged the pressure is a little below. The average voltage on discharge is, however, about 6 volts.

The quantity of electricity which a storage cell can furnish is measured or

designated in "ampere-hours." An ampere-hour is the quantity of electricity that has been supplied or consumed when a current of one ampere has flowed for a period of one hour. To calculate ampere-hours it is only necessary to multiply the current used in amperes by the length of time in hours.

The storage batteries most commonly used in Radio practice have a capacity of 60 or 80 ampere-hours. A 60-ampere-hour battery could furnish a current of one ampere for 60 hours, or 2 amperes for 30 hours, 3 amperes for 20 hours, etc.

Normal Charge or Discharge Current
All lead batteries are designed and constructed so that if they are discharged at a certain "normal" rate they will be exhausted in 8 hours. This is known as the "normal" charge or discharge current, and the strength of this normal current in amperes can always be calculated by dividing the ampere-hour capacity of the battery by 8. Thus, with an 80-ampere-

material and replenish the exhausted solution.

Syringe Hydrometer

The syringe hydrometer is the device most commonly used for determining the condition of charge or discharge of the cells of a storage battery. As is illustrated in Figure 58, it consists of a glass tube about an inch in diameter and provided at one end with a rubber bulb and at the other end with a tapered stem to which is attached a piece of rubber tubing 2 or 3 inches in length.

Inside of this glass tube is another glass stem called the float. This float is weighted at the lower end with lead shot or mercury, and has the upper part provided with a graduated scale reading from 1,100 to 1,300.

The principle of operation of the hydrometer is that an object of a given weight will float to a greater depth in a lighter liquid or solution than it will in a heavier one. Since the strength of the solution in a storage cell depends upon the state of discharge, that is, upon the amount of sulphuric acid that has been extracted from the solution by the active material on the plates, the depth to which the hydrometer stem floats in the solution will readily indicate the condition of the battery.

Specific Gravity

The strength of the solution is termed its specific gravity, which refers to the number of times it is as heavy as pure water. Thus, in a fully charged battery the solution is nearly 1.3 times as heavy as pure water, and its specific gravity is said to be 1300. As the battery discharges, the solution becomes weaker and its specific gravity decreases. A battery should never be discharged beyond the point at which the specific gravity of the solution drops below 1150.

Before a hydrometer is used, it should be thoroughly cleaned in pure water so (Continued on page 14)

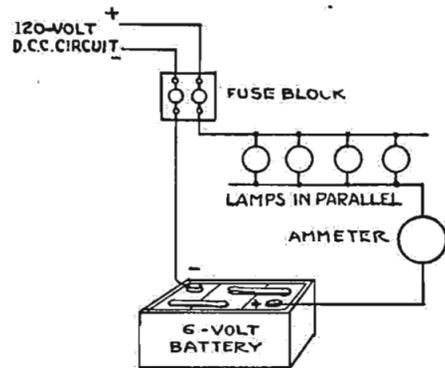


Figure 59

hour battery the normal current is 80 divided by 8 or 10 amperes.

It is a peculiar condition that if a battery is discharged with a greater current than the normal value, the full rated capacity of the battery cannot be obtained; while if the discharge current is less than the normal value, more than the rated charge of the battery can generally be extracted. This difference in available capacity is due to the formation of lead sulphate on the surface of the plates, and the readiness with which the electrolyte can ooze through the pores of the active

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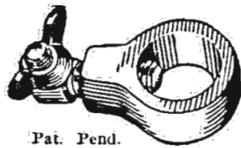
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Accessible Cabinet for Radio Sets

Entire Set May Be Seen When Cabinet Is Open

In making a Radio cabinet for my set recently I discovered a little scheme that helps wonderfully. It is simply this: I run the commercial cabinets one better by

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.

RADIO KINKS DEPARTMENT,
Radio Digest
123 West Madison St., Chicago, Ill.

hing the cover and the back instead of just the cover. The accompanying illustration shows the way it is constructed.

The cabinet has proven very satisfactory. Many of the sets in town are equipped with these cabinets and they like them well.—Howard R. Robertson, Hubbard, Iowa.

Oil Can Soldering Torch

In the December 9, 1922, issue of Radio Digest there appeared an article on an oil can made into a soldering torch. The illustration shows an improvement on this device. Most all oil cans are so arranged that the spout is unscrewed from the body for filling and cleaning. The spout is cut from the screw base and used for the blow torch. The screw base is used for a cap by soldering a disk of tin over the place from which the spout was cut.

A tin tube is made to fit the inside of the opening and is used for the wick. The



spout is soldered to the upper part of the handle. The illustration shows plainly the construction of the torch.—C. W. Pomeroy, St. Louis, Mo.

Improper Tapping

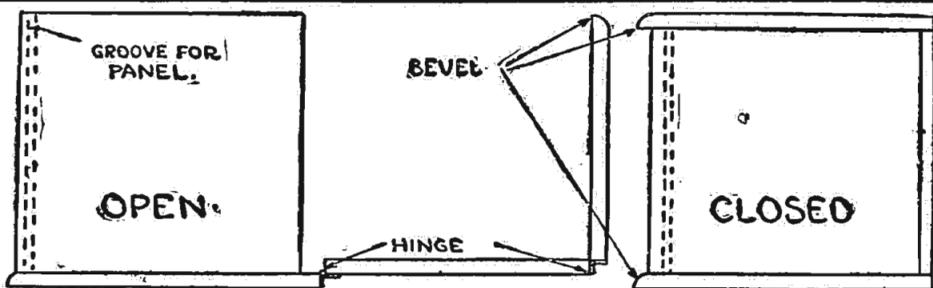
Often a station will come in best when the switch arm rests on two adjacent switch points. This may be due to improper tapping of the antenna tuning inductance, which may be the stator winding of a variocoupler.

Perhaps the safest way to overcome this difficulty is the use of the units and tens method in tapping, which necessitates two separate sets of switch points.

However, if only one switch arm is used, it is advisable to predetermine the best arrangement in advance. To this end, the beginning of the winding is tapped closely—say every five turns—increasing to seven or eight and then to every 10 turns.

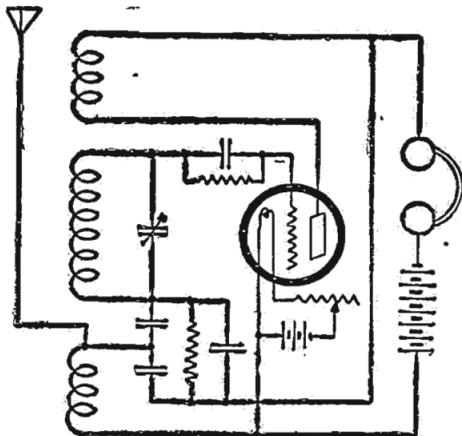
With the above idea in mind when tapping your tuning coil, it will be an easy matter to get in between turns when tuning by means of a small variable condenser properly placed in the circuit.

TOP AND BACK HINGE TO BASE



Hook-Up for Clear Signals

The accompanying hook-up is one that I find gives clearer signals than any I have tried. As you can see from the diagram there is a 50-turn coil inserted between the filament lead and the condenser



bank and the aerial is also connected to the condenser bank. This coil is tightly coupled to the main inductance and it is sometimes necessary to reverse the leads in connecting up since it also acts as a tickler.—Ira Simmons, Nowata, Okla.

Condensers Allow Variation

Operators using spider-web inductance coils of fixed position are restricted to a particular wave length, and even if the

coils are mounted for coupling, the range is still limited unless variable condensers are used. The best arrangement is to place one variable condenser in series with the primary, and shunt another across the secondary. This affords results equal to those obtainable with a variocoupler.

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3/16" THICK	2¢ PER SQ. INCH
1/4" THICK	2 1/2¢ PER SQ. INCH
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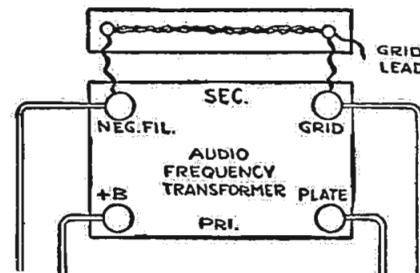
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Grid Leak Installed to Take "Fry" Out of Set

The amateur who has a one or two stage audio frequency amplifier on his set is well acquainted with the hiss or frying sound it gives forth when operating at its best or highest capacity. By placing a grid leak across the secondary of the last amplifying transformer nearly all the frying and hissing noise can be eliminated without noticeably reducing the signal strength.

When static is real bad the strength of the leak can be increased to where it will take the harshness out of the static but it will reduce the signals somewhat.

The ordinary grid leak consisting of



pencil marks on a strip of paper can be used, but I have had best results by making these lines with ordinary black drawing ink.—Chas. L. Smith, Jackson, Miss.

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EVERY PART COMPLETE

2 honeycomb coils, 1 2-coil mounting, 2 coil plugs, 3 .006 condensers, 1 variable grid leak, 1 grid leak, 1 23-plate .0005 MFD variable condenser, 1 Vernier rheostat, 1 tube socket, 8 binding posts, 20 feet bus bar wire, 1 high-grade panel ALREADY DRILLED AS PER DIAGRAM, 1 3" dial and the Radio Digest Booklet on Operation and Construction of Circuit.... **\$11.00**

TWO STAGE AUDIO FREQUENCY AMPLIFIER

EVERY PART COMPLETE

1 7x9 Panel, 2 Audio Frequency Transformers (5 to 1 Ratio), 2 Rheostats, 2 V. T. Sockets, 7 Binding Posts, 1 Variable Resistance Leak, Necessary Bus Bar Wire. Can be used with either of the above circuits or any other receiver. **\$11.00**

CONDENSERS

3 Plate Variable; value, \$1.75.....	\$1.05
13 Plate Variable; value, \$2.50.....	1.20
23 Plate Variable; value, \$3.50.....	1.35
43 Plate Variable; value, \$4.50.....	1.85
13 Plate VERNIER; value, \$5.50.....	3.75
23 Plate VERNIER; value, \$6.00.....	4.00
43 Plate VERNIER; value, \$6.50.....	4.25

Honeycomb Coils, 50 turns mounted, \$0.95
Honeycomb Coils, 75 turns mounted, 1.00
Double Coil Mountings..... 2.45
Triple Coil Mountings..... 3.35
Reinartz Coils and Mounting..... 1.75

Potentiometer with knob; value, \$1.75; special at..... 1.00
Potentiometer with 2 1/2" dial; value, \$2.15; special at..... 1.15

BEST QUALITY JACKS, Single Circuit; value, 65¢; special at..... .30
Double Circuit; value, 90¢; special at..... .45

MULTIPLE POINT INDUCTANCE SWITCH with Knob and Dial (15 switch Points).... 1.75

LIGHTNING ARRESTERS approved by underwriters.....\$0.90

THREE-INCH DIALS—Unbreakable—heat resisting composition—high finish; special...\$0.30

VARIOCOUPLER—Celeron Condensite and Litz Wire Wound Secondary; Value \$4.50. Special.....\$2.95

BALL BEARING INDUCTANCE SWITCH—value 75¢, special.....\$0.30
V. T. SOCKETS—Nickel, brass sleeve, composition base value, \$1.00; special at... .50

AUDIO FREQUENCY TRANSFORMER—Designed for use with W. D. 11 Tubes, list, \$4.50; price.....\$2.75

EXTRA SPECIAL—Telephone 3000 Ohms Headsets; \$9.00 value; reduced to.....\$3.50
ALUMINUM LOUD SPEAKING HORN—Nickel plated, highly polished; \$6.00 list.....\$3.75

TWO-INCH DIALS—Same design—for rheostats and potentiometer; special..... .25

RAYMOND VERNIER RHEOSTATS—Value, \$1.50; special..... .95

FILAMENT RHEOSTAT—Condensite base; value, \$1.10; special at..... .70

FILAMENT RHEOSTAT with 2 1/2" dial; value, \$1.50; special at..... .85

TELEPHONE PLUGS......60

FRESHMAN VARIABLE RESISTANCE LEAK and MICON CONDENSER Combined .75

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The wonderful SHELTON LOUD SPEAKER with every original NATH. 8 1/4" High—Beautiful Rubberized Finish

BALDWIN
Type C Headset Complete

I PERSONALLY test every pair of phones to GIVE YOU a headset that has no equal. YOU CAN USE HEADSET IN REGULAR WAY ALSO. My price on these special selected \$12.00 Phones is, postpaid..... Cash with Order or C. O. D. WALTER SCOTT, 10 St. Lukes Place, Montclair, N. J.

Special Circuit for DX Reception

Variocoupler Employed with Spider Web Coils

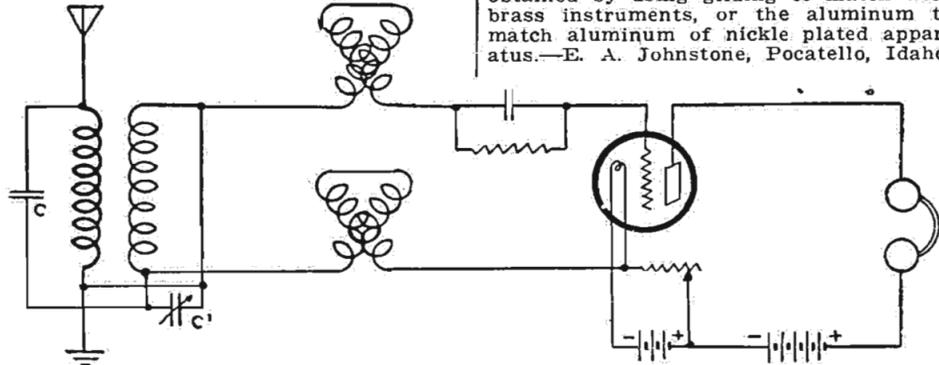
The circuit shown in the illustration is a real DX set. This circuit may be a pet of mine but it has given me better satisfaction than any so far that I have used. It consists of a variocoupler with 40 turns on the rotor, two spider web coils each 4 inches in diameter with 20 turns mounted permanently 4 inches apart, variable condensers, etc. The rotor of the variocoupler, as well as the spider web coils, provide regeneration for the set. To tune the set rotate the aerial condenser until signals are heard, then increase regeneration with the rotor, and vernier condenser. The results obtained with this set are extraordinary.—John J. Pulley, Philadelphia, Penn.

Flexible Leads for Rotors

Variometers and variocouplers in which the bearings alone are relied upon to conduct the energy from the moving coil, or rotor winding, to the rest of the circuit, are generally subject to trouble evidenced by intermittent signals. This is due to the fact that the bearing is either too tight to allow the rotor to turn readily or too loose to make good electrical contact. In any case, it is always advisable to put stops on the coil and make use of flexible "pig tail" connections to the rotor winding.—P. J. M. Clute, Schenectady, N. Y.

Condenser Serves Double

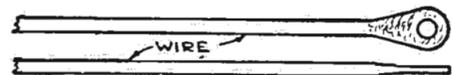
Having only one variable condenser and needing another I conceived the idea of using one for both the primary and secondary. By using a small phone condenser in series in the primary circuit I



did the trick and brought in stations I could not hear before.—John F. Dwiggins, Petersburg, Tenn.

Wire End Connections

Number 14 or larger copper wire or busbar is easily flattened at the end and a hole of suitable size drilled in it. This



takes the place of soldering a lug to the end of the wire and it makes a permanent connection that will slip under a small nut or binding post without a bunch of solder or the flaps of the lug sticking up in the way.—D. B. T. Dell, Columbia, S. C.

Shielding Panels

Many methods of shielding panels have been tried by the writer, but the following method has proved to be the most durable, neat and equally effective to any of the other methods tried.

The shielding must not touch any of the apparatus in the circuit, with the exception of the ground connection, otherwise trouble may occur from shorts and grounds. After drilling the panel for the various instruments, paint around these

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ATTRACTIVE AND PRACTICAL

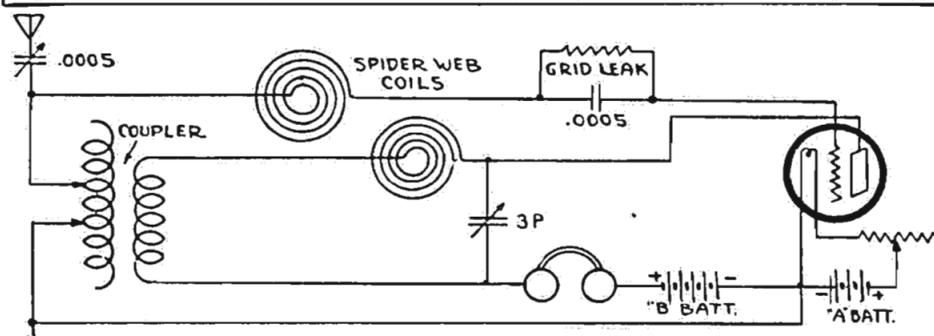
Built to inclose the entire set leaving ample space for loud speaker. Is equipped with a compartment for tools and an acid proof battery tray which insures protection to rugs, clothing and instruments. It has a bench of proper height making it possible to operate and enjoy your set in comfort. Superior in convenience, quality and design. Made in mahogany, walnut or oak finish. Top 18" by 35½". Height 38". Moderately priced. For further information write

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COILS PRODUCE REGENERATION



holes with molten paraffin, after the paraffin has cooled it may be trimmed down so as to make the space around the holes even and neat. After this has been done paint the panel with aluminum, silver or gold picture frame gilding. After the first coat has dried thoroughly, it is well to apply a second or even a third coat, as the thicker the shielding the more effective it will be and the less resistance it will offer for the accumulated charges to pass on to the ground.

After the gilding has thoroughly dried, the spots previously paraffined may be cleaned off with a knife, leaving the spots free from the gilding.

A slight reduction of hysteresis losses may be obtained by using a separate shield for each instrument, that is by dividing the shielding into separate portions for each instrument, shieldings all being grounded.

A very finished and neat effect may be obtained by using gilding to match with brass instruments, or the aluminum to match aluminum or nickel plated apparatus.—E. A. Johnstone, Pocatello, Idaho.

Increasing Crystal Set Range

Cut off about ¼ inch from the contact end of the cat whisker and replace it with a piece of filament support wire from a burned out 25 watt mazda electric light bulb. This is a very fine wire with considerable stiffness.—Arthur Thornton, McKeesport, Pa.

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Complete Set of Parts with Panel for

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Ultra-Audion \$10
Flewelling . . . \$10

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Eliminating Capacity Effects

A handle for turning the knobs may be made from a wooden dowel rod ¼ inch in diameter and about 12 inches long. A pencil eraser attachment designed to fit over a pencil end is slipped on one end of the rod. This provided me with a vernier



that is as good as any on the market. The adjustment was secured by putting the eraser end up to the edge of the dial and slowly twisting the outer end of the rod. Before using the eraser should be tapered with sandpaper.—Raymond Dannenbaum, Vallejo, Cal.

Use of Celluloid Putty

Sheet celluloid is as good an instrument as bakelite in making Radio apparatus. The different parts may be glued together with celluloid putty. This is made by filling a four-ounce bottle half full of equal parts of ether and denatured alcohol, and then adding all the "scraps" of cut celluloid that can be forced into the bottle. After 24 hours stir with a stick. Beware of fire, however.

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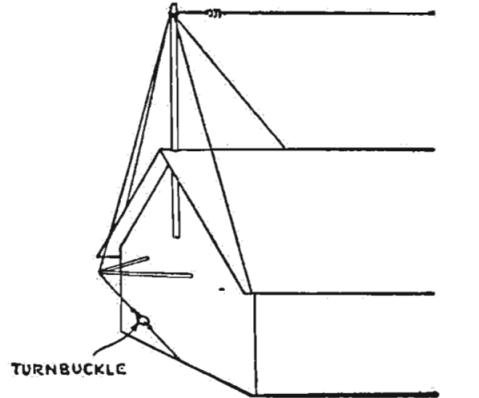
Knott products are up-to-the-minute. Knott plans are unique and unbeatable. Radio is just beginning to come into its own—are you? Want to make more money—want to be your own boss? Write TODAY for FREE instructions, How To Sell Real Radio.

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Bracing Aerial Pole at End of a Ridge Roof

The accompanying diagram shows an excellent way of bracing an aerial pole where an anchor for a fourth guy wire is not available. My aerial consists of a 20-foot two-by-four on the end of a 20-foot building. It is braced in the manner described and has withstood several storms that have torn other aerials down.

I call this a truss brace. When a turn-



buckle is placed near the ground it provides an easy method of keeping the guy wires taut.—P. C. Bowman, Springfield, Mo.

A loading coil is an inductance connected in the antenna circuit to receive longer wave lengths than the natural wave length of the antenna.

Your set will work just as good unmounted as in a cabinet.

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
22½-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
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At dealers or postpaid (C. O. D. if preferred). Absolutely guaranteed.
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The Superlative Inductance

Four years of careful attention to the details of manufacture of this type of inductance unit has yielded a product of unquestioned superiority. And with increased efficiency in manufacturing methods, moderate prices prevail for all sizes

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Cotoco
"Built First to Last"

COTO-COIL CO. PROVIDENCE

A. B. C. LESSONS

(Continued from page 11)

that no dirt or foreign matter of any kind will get into the solution. To use the hydrometer, the caps of the cells are opened and the rubber tube is inserted until the end projects below the surface of the electrolyte. The bulb is then squeezed and slowly relaxed so that some of the solution can gradually rise into the glass tube. The inner stem will then float in this extracted solution, and the point on the scale on the same level with the surface of the solution will be the specific gravity. To get most accurate readings, the hydrometer should always be held at the same level as the eye, this will avoid parallax and eliminate errors resulting from looking at the stem at an angle.

When taking a hydrometer reading, care should always be exercised so as not to spill any of the solution on the tops of the jars. Also the solution should always be returned to the cell from which it was taken. After a hydrometer has been used a number of times, it is always good practice to clean it well in pure water. When not in use, a hydrometer should always be kept in a clean place, preferably a closed box, so that no dirt will get into the battery solution.

Care of Storage Batteries

A storage battery should always be kept in a clean dry place and where it will not be subjected to too high or too low temperatures. The tops of the cells should be kept as free from dirt and moisture as possible. In case some acid solution is spilled on the jars, this should first be wiped off with a cloth soaked with dilute ammonia or baking soda solution, and then cleaned further with pure water. The accumulation of dirt and moisture on top of the cell jars may cause current leakage and premature exhaustion of the battery.

Another important point to observe is to see that the electrolyte within the cells is always kept at the proper level. It should never be allowed to become lower than the tops of the plates, but on the other hand should always be about 1/4 to 1/2 inch above. The amount of water in the solution will constantly become less due to evaporation and electrolysis, and it will hence be necessary from time to time to replenish this. Only pure distilled water should be added to the solution, never any acid; for it is only the water that evaporates, not the acid. However, in case some of the electrolyte has been spilled, it will be necessary to add more acid. When this is necessary, the solution added to the cells should be of the same specific gravity as that still remaining.

A battery should always be kept in a well charged condition in order to secure maximum capacity and longest life from it. It should never be allowed to remain in a discharged condition for any length of time, nor should it ever be discharged beyond the point at which the specific gravity drops below 1.150. Best efficiency and greatest activity will always be obtained when the plates are maintained well-charged so that a minimum amount of lead sulphate can accumulate on the surface.

Charging Storage Batteries

The process of charging a storage battery consists of sending an electric current from some external source through the cell in a direction opposite to that in which the battery itself causes a current to flow. During this charging the active material on the plates, as well as the electrolyte, are restored to their original condition again.

For charging purposes only direct current should be used. Alternating current will not do. Where a direct current light-

ing circuit is available, the battery can be charged directly from this line, providing, that sufficient resistance is cut in series with the battery to cut the current down to the necessary value. Unless this is done an excessively large current will flow, with the result that either the fuses are blown or the battery ruined. For charging purposes the positive terminal of the battery must always be connected to the positive side of the charging circuit.

One Way to Charge

In Figure 59 is illustrated a typical circuit arrangement for charging a storage battery from a 120-volt direct current lighting circuit and using incandescent lamps as a resistance for regulating the amount of current flow. As is shown, the circuit enters at the fuse block and the double-pole switch. Connected in series with the line is an ammeter used for indicating the amount of current flowing in the circuit. The current then flows through the bank of lamps (the lamps being connected in parallel) and then enters the positive terminal of the battery. The negative terminal of the battery is then connected to the negative side of the line.

The number of lamps to use depends upon their size and the amount of charging current desired. An ordinary 60-watt lamp permits about one-half ampere to flow. Hence enough lamps will have to be cut in until the current is of the right value. The normal charging current it will be remembered can always be determined by dividing the ampere-hour capacity by eight. If a charging current of 6 amperes is wanted, twelve 60-watt lamps will have to be connected in parallel, and the entire group of lamps then connected in series with the battery. The battery should be allowed to remain on charge until the specific gravity has become steady at a value of between 1.275 and 1.300.

Rectifiers

Where only alternating current is available, some device must be used for rectifying or transforming it into direct current. There are numerous types of rectifiers on the market, some are of the bulb type and others are of the vibrating reed type. The bulb type of rectifier is generally quieter and more positive in operation and less likely to give trouble.

If the above suggestions and directions are carefully followed, little trouble will be experienced in using a storage battery, and maxim efficiency and longest life will be obtained from the apparatus.

THE END

AERIOLA SR. STYLE TUNER UNIT

Green silk on Bakelite Tubes with diagram, \$5.65.
REINARTZ ULTRA CIR. SET PARTS \$29.50
 Ultra Reinartz Tuner Unit & Diag., \$4.95, wound to specifications March 24 Radio Digest. Ruby Mica-Copper-Bakelite mounted Condensers, N. P. binding posts, .0015, 50c; .0015, 60c; .0025, 70c. Reinartz coil Doub. green silk-Bakelite Spider, \$1.65. Reinartz plate circuit chokes (triple adjustable), \$1.70. Complete set Reinartz tuner & detector parts, \$10.95. Tuner, Det. & 2-Stage, \$18.90. Two-stage outfit, \$38.95.

GOV'T RADIO STORAGE BATTERIES
 New Signal Corps Edison 3-cell type BB-4, \$4.50; Single Cells for W. D.-11 tubes, \$1.50; 60 A. H. for W. D.-11 tubes, \$5.25; 6 Volt Edison, \$7.75; Edison "B" Battery single elements 4c ea.; double, 10c.

HI-POWER AMPLIFYING TRANSFORMERS
 Best! Loudest! No burn-outs. \$2.65 with spec. diagram.

GENUINE PEANUT TUBES
 Wonderful Det. & Amplifier. Smallest tube made (aeroplane style), 1 V. 1/4 amp. 1/2" dia. x 2 1/4" long.
FLEWELLING .006 COND'RS & PARTS
 .006 Bakelite-Ruby-Mica-Copper Calibrated Cond., 85c. Spider coils, green silk on Bakelite, \$1.75 ea.

NEW SPECIALS
 20 OHM RHEO. FOR 201-A OR W. D.-11 tubes, \$1.00. Variable grid leaks, 1/10 to 5 Megohms, 75c. HI-POWER LOUD SPEAKER & PR. BALDWIN PHONES, \$10.90. Variable grid Cond., .00025 or .0005 max., 45c. Vernier Attachment for any Var. Condenser, 95c. Armstrong Super. New 3 tube outfit, Owner sacrificing.
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 4 VOLT FILAMENT, 7 AMPERE. FORMALLY EQUIPPED IN AERIOLA GRANDS. FITS WD-11 SOCKET, OR STANDARD SOCKET WITH ADAPTOR.
WR-21 DETECTOR.....\$3.95
WR-21 AMPLIFIER..... 4.25
 THESE TUBES WILL OPERATE ON 6 VOLT STORAGE BATTERY

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Freshman Variable Grid Leak and Condenser......75c	2 Coil Honeycomb Mounting.....\$2.60
CRL Adjustable Grid Leak and Dubbler Condenser.....\$1.35	WD-11 Bakelite Sockets.....50c
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Radio Corporation of America New and Improved Radiotron Tube.
UV-199 Detector and Amplifier TUBE.....\$6.50
 Operates on 3 Volts (2 Dry Cells); Consumes .06 (1/16) Ampere. Same Characteristics for Sensitiveness and Loudness as UV-201.

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\$3.70 Value, 23 PLATE, now.....\$1.45
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\$3.10 Value, 5 PLATE, now.....\$1.25
\$2.70 Value, 3 PLATE, now.....\$1.15
\$7.00 Value, 43 PLATE Vernier Variable Condenser.....\$3.95
\$6.50 Value, 23 PLATE Vernier Variable Condenser.....\$3.45
\$6.00 Value, 11 PLATE Vernier Variable Condenser.....\$2.95

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Patent Single Circuit.....\$0.35	150 Turns......60
Patent Double Circuit......50	100 Turns......50
Federal Single Circuit Filament	75 Turns......40
Control......35	50 Turns......40
Federal Double Circuit Filament	35 and 25 Turns......40
Control......50	

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750 Turns.....1.00	6x16 1/2" by 6" deep.....2.95
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	9x12 1/2" by 7" deep.....3.95
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Rheostats.....45c	Spaghetti Tubing, yard.....10c
Sponge Rubber Ear Caps, Pair.....50c	Lightning Arresters.....95c
Dials, 2, 3 and 3 1/2 Inch.....25c	2-Slide Tuning Coils, at.....\$1.95
Grewol Detectors.....\$1.65	Phone Caps, for mostly all phones....25c
Signal Corps Super Sensitive	Anti-Capacity Switches.....\$1.50
Microphone Transmitters.....\$2.45	Lightning Switches.....\$2.65
Solid Copper Aerial Wire, 100 ft.....35c	Hydrometers, now at.....45c

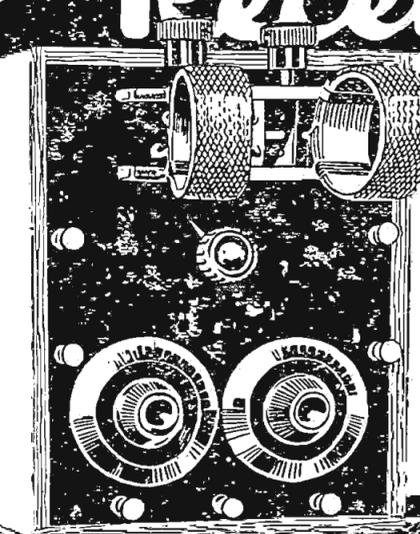
Formica Panel, 1/8" thick, black or brown, square inch . . 1 1/2c

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How to Make One Condenser Flivver Super Set

Part I—Amplifier Details; Making the Inductance

By E. T. Flewelling

IT WAS promised in the April 14 number of the Digest that further details regarding the construction of the Flewelling Amplifier would be discussed in a future installment of this series. So many thousands of Radlophans have poured in letters requesting further information on this subject that it is planned to devote this, the first installment of a new series describing the greatest development yet of the Flewelling Flivver, which is none other than the One-Condenser Super.

Another consideration, which must be allowed before proceeding. In the April 14 issue the One-Condenser Flewelling was shown with no B battery potential on the amplifier tube. This error of omission was made by the draughtsman in preparing the circuit for illustration, and was not noticed until too late.

The corrected circuit is shown herewith.

Explanation of Circuit

In the diagram illustrated the condenser 4 takes the place of the former bank of three fixed condensers of .006 mfd. capacity and the variable grid leak shunted across them. Condenser 4 has a capacity of .006 mfd.

It will be noticed that a single pole double throw switch is connected in the circuit at this point. By throwing this switch to point 1, the hook-up becomes purely regenerative, shunting the .006 mfd. condenser and breaking the plate connection to the grid circuit. By means of this switch it is possible to make comparisons between signals on an ordinary regenerative apparatus, and the wonderful stimulation in the same signals effected by converting the apparatus to a Flewelling Super.

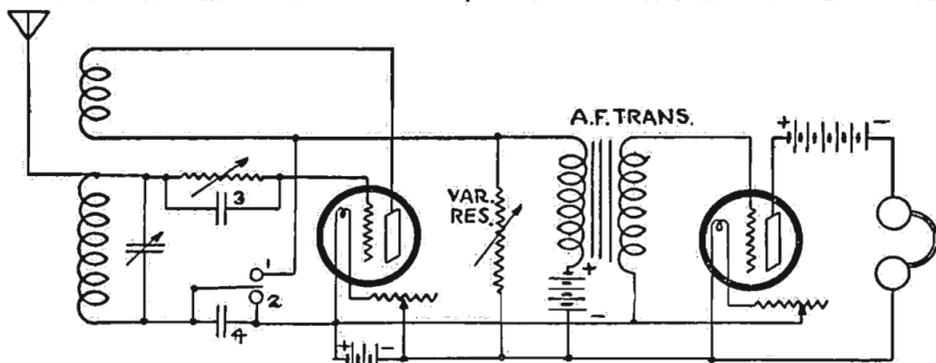
Guarding Against Back Coupling

The necessity of guarding against the possibility of back coupling from amplifier to detector, or vice versa, has often been pointed out in the previous series of articles in the Digest. In this seemingly trivial point of apparatus design and construction lies one of the secrets that is of paramount importance in the successful accomplishment of amplification.

The second point to consider is the necessity of guarding against the free action of the whistle, or blocking action, characteristic of the Flewelling Super detector, upon the grid of the amplifier tube.

Due consideration must be given both

these stumbling blocks, else no success may be righteously expected in the use of the completed amplifier. Otherwise the experimenter will simply amplify all of the tube noises, static or atmospheric, and other extraneous sounds, and will re-



ceive but very little relative amplification of the signal coming in.

Elimination of Troubles

Considering the elimination of these troubles, first remember what has been previously said regarding coupling back. Shielding of the amplifier will help considerably and a separate B battery for the amplifier becomes a necessity. Were it not for the expense, a separate A battery might also be of help, but the extra cost makes this impractical. In regard to keeping the whistle action from the grid of the amplifier, this is really the most important point.

This may be done in two ways, the first of which is by far the most satisfactory. This is the placing of a filter between the detector and the amplifier tubes.

In the second method instead of keeping the action from the grid we "side-track" it by the placing of a high resistance across the primary of the audio-frequency transformer. This high resistance would be of the order of from 100,000 to 5,000,000 ohms. A good variable leak will serve very nicely for this purpose.

Patent Situation Prevents Diagram

Due to the patent situation the writer will be unable to publish a diagram showing what has been found to be the best method of handling amplification with the Flewelling Circuit, but this will be taken

been absolutely phenomenal but, judging by the number of inquiries and reports of success received within the last few weeks since this circuit was originally published, we know that there is a very large demand on the part of the fans for complete instructions concerning how they themselves may construct the circuit. Therefore, we shall begin a series of articles describing completely in every detail how the simplified Flewelling circuit may be constructed, using only the simplest, most easily obtainable and cheapest but best materials.

There have been so many attempts to merchandise and commercialize the name Flewelling that hereafter it will be impossible to mention any specific make of apparatus.

Inductance Winding

We will start in with a common cardboard 4 inches in diameter and 6 inches long. Also secure a rotor ball 3/4 inches in diameter and mount it suitably so that it will rotate freely within the cardboard tube. Now if your tube and ball are not of the exact dimensions, don't go to the expense of buying others. These are given as general dimensions and anything will serve if it is reasonably near the size given.

(Continued on page 18)

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care of for the Radiophans within a very short time. The above method of handling amplification is very good. Because we find it necessary to postpone for a few issues complete details on the amplifier for the circuit let us consider the building of the new type of Flewelling Super.

The first circuit that was published contained three large fixed condensers plus an extra grid leak. After pounding out the theory and closely analyzing the action of the circuit we found that the extra grid leak and two of the large condensers were unnecessary. Exactly the same action and results are obtained by the use of a standard tickler coil circuit plus an added connection and one large .006 mfd. condenser. The diagram for this circuit is shown herewith and constituted what is undoubtedly the simplest known form of the circuit.

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7x 9	1.15	1.40	10x12	2.15	2.60
7x10	1.25	1.55	12x14	2.85	3.45
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How Ocean Vessels Are Guided by Radio Waves

Ether Signals from Submerged Cables Bring Ships into Harbor

By Peter J. M. Clute

ASIDE from the broadcasting of news and entertainment and the linking of widely separated points, Radio has many potential uses. Perhaps, one of the most useful developments in this line is the Radio piloting cable, with its great possibilities in the field of commerce and navigation.

Submerged Cable

The Radio piloting cable is essentially an insulated, electrically-charged, submerged submarine cable laid in a channel or an entrance to a harbor, and is used as an aid to navigation by serving as a guide to vessels entering during foggy, misty or hazy weather. Under such atmospheric conditions, the navigating officers are unable to pick up the buoys which are used

end, along the channel to a point several miles away, usually at the entrance to the harbor. Current at a frequency of about 500 cycles per second is supplied to the cable, thus producing an alternating magnetic field around the cable. Vessels equipped with special loop or "pick-up" coils mounted on each side and connected to suitable amplifiers are thus enabled to follow the lay of the cable by a simple comparison of the relative strength of signals received by the "pick-up" coils. Figure 1 shows a diagrammatic idea of the scheme.

Magnetic Field

The existence of a magnetic field about a conductor carrying current forms the basic principle of the Radio piloting cable.

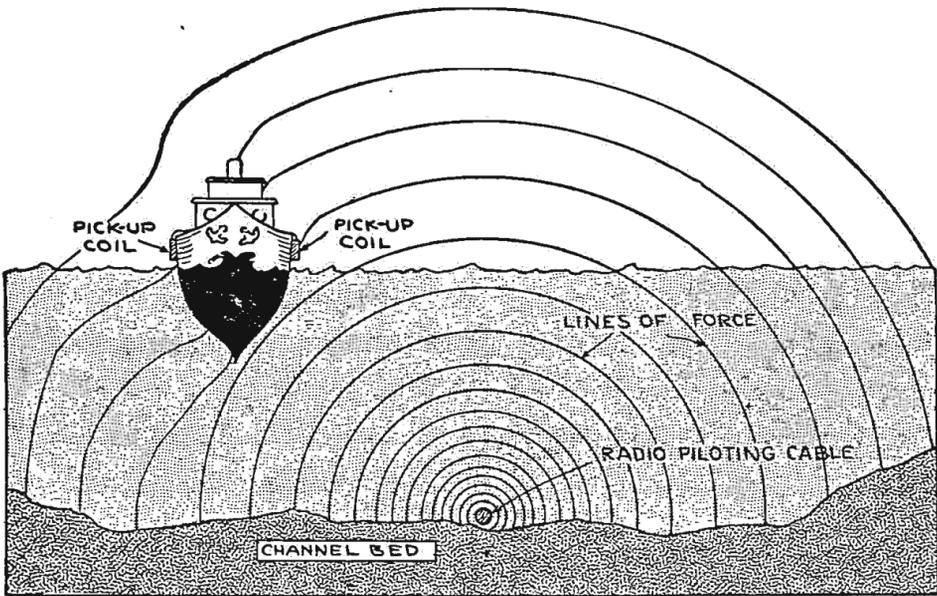


Figure 1

to mark the navigable channel. Ordinarily the vessel cannot proceed into the harbor until the fog or mist has raised. By the use of the Radio piloting cable, as demonstrated by practical tests and experiments with this system at several large harbor entrances, vessels with navigating bridges screened in so that the pilots could not see the channel, have successfully managed to keep to the course and dock in safety. The feasibility and practicability of the system was effectively demonstrated during these tests, inasmuch as the navigating officers, in each case, were able to pursue a course at either side of the piloting cable without any difficulty, although having no previous experience with the scheme.

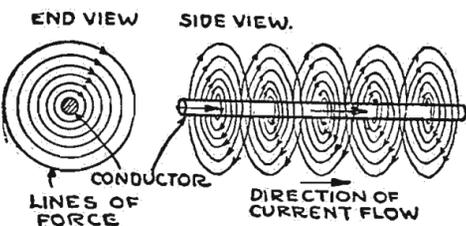


Figure 2

Referring to Figure 2, the circular lines of force are further and further apart as the distance from the conductor increases. This is representative of the fact that the strength of the magnetic field near a straight conductor is greatest next to the conductor and diminishes as the distance increases. While the lines of force about

a conductor permeate all space around it, the field becomes gradually weaker and weaker as the distance from the conductor increases, so that for all practical purposes it may be assumed that the field exists only in the space close to the conductor. The field strength decreases inversely proportional to the square of the distance from the conductor. Also, along all parts of a conductor in which the same current is flowing, the field is uniformly distributed.

The Radio piloting cable, in consequence of the 500-cycle alternating current flowing in it, radiates a corresponding alternating magnetic field. With proper apparatus this field can be detected or "picked up" at a distance of up to 1000 yards. By this means, the position of the piloting cable can be located by sensitive receiving and amplifying equipment.

Experiments to Find Range

Experiments which have been made with the Radio piloting cable with the object in view of determining the useful range of operation, have been instrumental in securing valuable data for the further elaboration and development of the scheme. The detecting equipment consists essentially of two "pick-up" or loop coils, one being suspended vertically on each side of the vessel, from ten to 15 feet above the water-line. Figure 3 shows the installation. Each coil is made up of two hun-

ded to three hundred turns of number 12 or number 14 B. & S. gauge wire wound on a four-foot square loop frame. A double-throw selector switch permits connecting either detecting coil in circuit with a sensitive audio-frequency amplifier outfit. With this vacuum-tube amplifier, the comparative or relative strength of the signals picked up by the two coils will furnish the means of determining the vessel's position with reference to the location of the submerged piloting cable. The "shielding" effect of the ship's steel frame or hull exerts an unusual influence in that louder signals are obtained when the vessel is slightly to one side of the cable than when it is directly over the cable. In the latter position, the signal strength will be approximately the same from the two coils.

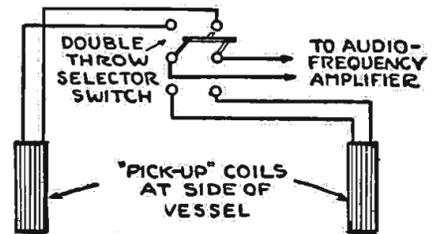


Figure 3

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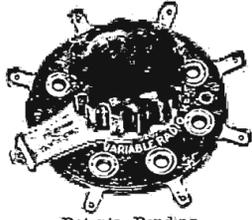
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Part II—Wiring the Set

By H. J. Marx

AFTER the apparatus has been mounted on the panel there are still three parts to be taken into consideration. The tube socket, the audio frequency transformer and the Radio frequency, or reflex transformer.

Figure 1 shows a baseboard measuring six inches by seven inches and 5/16 inches in thickness. Naturally the size of this baseboard is dependent on the cabinet size, for this reason no provision was made for it in the panel layout.

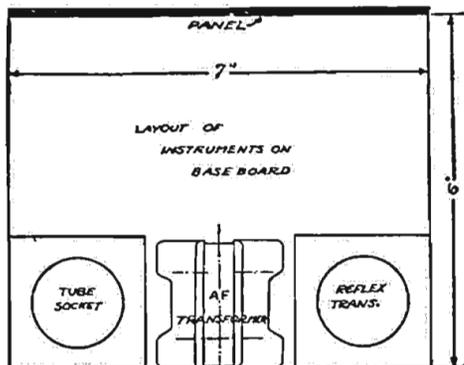


Figure 1

In the illustration a suggested arrangement of these three units is given. The secondary terminals of the Radio frequency or reflex transformer should be facing the primary terminals of the audio frequency transformer in order to keep the leads as short as possible. The crystal detector is connected in series between the grid terminal of the Radio frequency transformer and the plate terminal of the audio frequency transformer. The by-pass condenser should be connected across the primary terminals of the audio transformer.

Inductance Tap Switches

The inductance switches used are of the type with the contact points on a mounting plate in the rear of the panel. Since each switch has 15 contact points and there are only 6 each rough and fine tap connections only the alternate contact points were used and the last 4 points were left open. The odd points on the dial of the switch, 1, 3, 5, 7, 9 and 11, are connected while the remaining points are open. If desired, however, the first and second, third and fourth, etc., can be connected together and thus eliminate the open points which may confuse a person in turning.

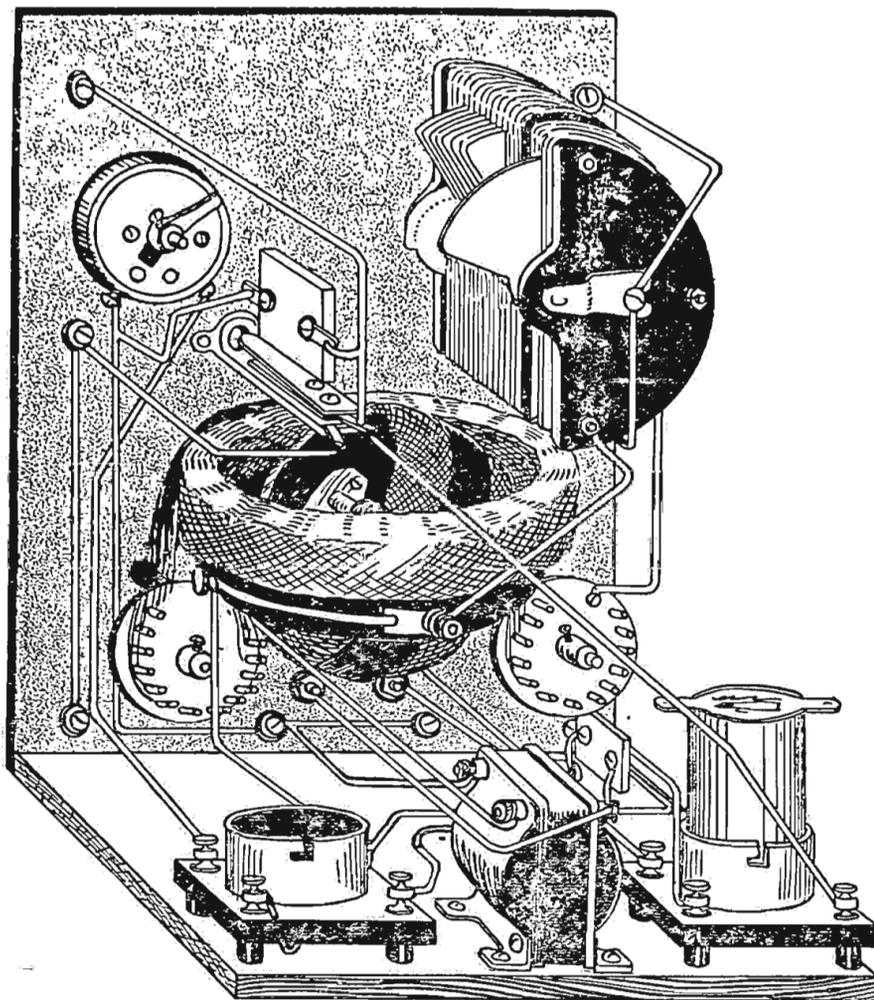
The leads from the taps on the variocoupler are usually long enough to make connections without a lengthening piece. The contact points on the switch are slotted so that it is a simple matter to slip in the leads.

Soldering the Wires

A little soldering paste is placed on each point and when the soldering iron is applied the flux will flow into the slot and around the wire. Then when the solder is applied it will fill up to the slot and lock the wires in position with good electrical contact.

Antenna and Ground Connections

Looking at the rear of the panel the antenna binding post is in the upper right hand corner. Following the circuit, the lead runs from this point to the terminal of the rotating plates of the variable condenser, then to the one secondary terminal of the varlocoupler. From here it goes to the lever terminal of the inductance switch, and over to the grid



terminal of the audio frequency transformer.

The lead from the ground binding post connects only to the lever terminal of the other inductance switch.

Battery Posts Connections

The binding post in the lower right hand corner (rear view) is the A+ terminal and the lead runs direct to this post on the tube socket.

The two posts in the center are for the connections to the negative sides of both A and B batteries. These two posts are connected together by one lead which then runs to the rheostat, then to the one side of the .002 mfd phone and battery by-pass condenser, in addition this lead connects to F— terminal on the secondary of the audio frequency transformer.

The lower left binding post is the B+ terminal and is linked to the phone post above it, in addition the lead connects to one terminal of the open circuit jack. The other terminal of this jack is linked to the top left binding post, the other side of the by-pass condenser and the B+ side

of the Radio frequency or reflex transformer.

Tube Socket Connections

The positive filament lead has been added, the negative filament terminal of the socket connects to the rheostat. The

grid terminal connects to the secondary of the varlocoupler and the fixed plate terminal of the variable condenser.

The plate binding post on the socket connects to P terminal of the Radio frequency or reflex transformer.

In reflex this compact arrangement of apparatus is an important feature as it avoids unnecessarily long leads. Because of the double duty imposed on the tubes naturally inductive interference will be unduly noticeable and should be avoided.

Voltage of A Battery

The A battery voltage should be 6 since peanut tubes are not recommended for reflex circuits. The B battery voltage at about 90 will give best results although with different tubes it may have to be changed.

The construction of a suitable cabinet is left to the discretion of the builder.

THE END

In winding your loose coupler, both coils are wound in the same direction.



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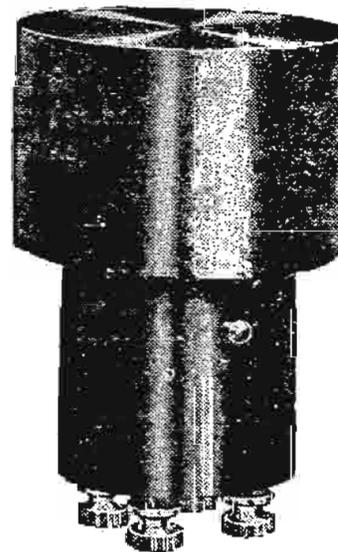
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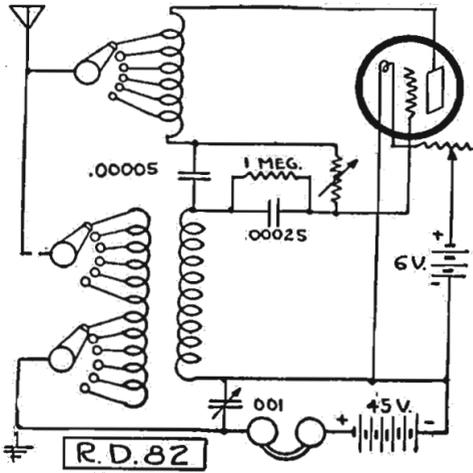
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ARRANGEMENT MADE BY KAUFMAN SHOWN



CONSIDERABLE interest is being aroused in Radio circles throughout the East over the efficiency of the new Kaufman Circuit, originated by Wolff Kaufman. This circuit is illustrated as hook up Diagram R. D. 82. At first glance, no especial differences are noted in the circuit. Actually there are two distinct departures from the usual form of circuit.

First, the plate circuit feeds through the primary tuning inductance before passing through the receivers to the opposite side of the plate battery. In series in the plate circuit and the antenna lead, is added a single layer inductance consisting of 80 turns of No. 22 cotton covered wire wound on four inch tubing. The last 20 turns are tapped at every turn. This tapped switch connects to the antenna side while the tapped side of the coil connects to the plate of the tube. The untapped end of the coil with a condenser in series connects to the grid side of the secondary of the variocoupler. In addition, a variable grid leak is added from the grid of the tube to the lead, connecting this condenser and the tapped coil.

Considerable experimentation and analysis is taking place in this circuit to determine the exact theory of operation. On the surface, we have obviously a form of regenerative feed back which may be compared somewhat to a reflex idea in which the plate energy not only feeds to the primary circuit and thus re-enforces its power, but in addition feeds directly back through a capacity and inductance coupling to the grid circuit.

It will be noticed that the capacity coupling between this plate and grid circuit has a very low value and apparently the most effective control of this grid feed back is

by means of the variable grid leak. Although the circuit is new apparently on the surface, it is but a combination of various developments and ideas that have been presented in the past and due credit should be given to the originator for the time and patience required in developing it to a practical stage.

Undoubtedly the circuit affords unlimited possibilities of still further development along this line and it is quite apparent that more will be heard from it from time to time.

FLIVVER SUPER SET

(Continued from page 15)

Use about No. 22 wire of double covering, either cotton or silk. Do not use single covered wire or enameled wire. Begin and wind 130 turns of wire on the tube, taking taps off from the 50th, 85th, 100th, 115th and 130th turn. This gives us six taps that may be chosen on the winding. These will be found to be plenty. No attempt should be made to pick out single taps.

Do not shellac the winding. Depend upon tightness of the winding to hold it in place, and if necessary to use a binder, use nothing but collodion. The rotor ball should have from 100 to 125 turns upon it.

This constitutes the heart of the Flewelling receiver and inasmuch as space is limited, more details of construction will be given in the second article of this series, to appear next week.

Which Side Is Positive

The positive side of a battery is that from which current flows to the external circuit. Negative is the return circuit to the battery. This applies only in direct current.

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My Highly Improved Reinartz brings in all important stations on both coasts and Mexican border, loud, clear and without distortion. We dance to music from Atlanta received on one loud Baldwin unit. Build one of these wonderful sets from my blueprints and specifications, price 50c, or with a perfect and complete double wound spiderweb coil, \$3.00 by mail. No other windings used. Photo of my set on a glass panel with every order.

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Reviews of Books

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

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

The Armstrong Super-Regenerative Circuit. By George J. Eltz, Jr., E. E. This is a De Luxe edition of this famous circuit. Profusely illustrated and fully explained. Fifty-two pages. Price, \$1.00.

How to Retail Radio. A new book telling of tested plans and methods and policies for the dealer in Radio. Financing, location, store equipment and arrangement. Price, \$2.00.

Radio Experimenter's Hand Book. By M. B. Sleeper. This book will help in the selection and the construction of simple

apparatus for transmission and reception of Radio telegraph and telephone signals. Price, \$1.00.

Lefax Radio Handbook. A loose-leaf handbook. This book never grows old or out of date. All of the latest apparatus and hook-ups are added as time goes on. Anything that grows old is taken out and new leaves substituted. Price, \$3.50.

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

The book department of the Radio Digest is prepared to send you any of the books on Radio published, whether listed in our Book Review or not. Let us know and we will see that the book is mailed to you. Postage stamps in payments for books not accepted. Send money order or check. Radio Book Department, Radio Digest, 123 W. Madison St., Chicago, Ill.

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- \$5.00 Ames Audio Transformers, 4-1 \$2.95
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Bakelite Panel..1½ per sq. inch
Every Item Guaranteed Perfect and Original

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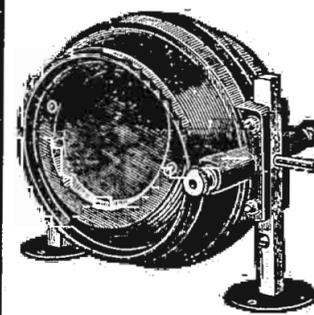
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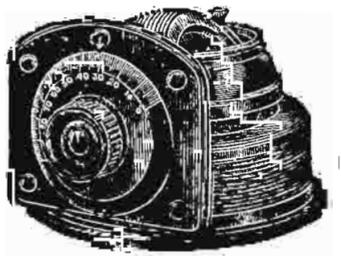
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- 11-Plate Variable Condensers..... 1.25
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- 60c Signal WD 1145
- 50c Corona Porcelain25
- 50c Star, fibre and nickel..... .30
- 75c Red Moulded Bakelite..... .49
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- 1.00 Hipco for Amplifiers..... .65
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- ANTENNA EQUIPMENT**
- \$0.50 100 ft. No. 14 Bare Copper.....\$0.39
- .85 Lead-in Tubes, 12 inch..... .50
- .50 Porcelain Lightning Switch..... .30
- 3.00 Brach Outdoor Lightning Arrester 2.10
- 2.50 No. 14 Weatherproof Lead-in Wire, Per C 1.75
- 1.00 U. S. Signal Corps Antenna Cable (4 Strand Tinned Copper, 3 Strand Tinned Steel)65
- .10 Porcelain Strain Insulators..... .07
- .15 Large Type Insulator..... .10
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- \$6.00 Frost 3000 Ohm.....\$4.95
- 5.00 Frost 2000 Ohm 3.95
- 8.00 Brandes Superior 5.95
- 5.00 Red Star 2400 Ohm..... 3.50
- 8.00 Dictograph 5.95
- MISCELLANEOUS**
- \$8.50 Remler Detector Panel.....\$5.95
- 9.00 Remler Detector Panel..... 6.50
- 6.00 Remler Detector Panel..... 4.50
- 1.25 Remler Potentiometer (with switch) .90
- .06 Nickel Binding Posts—2 for..... .05
- .55 Remler Grid Leak and Condenser.. .30
- .40 Tin Foil for Shielding25
- .05 Square Tinned Busbar Wire, foot .02
- .75 Dayton Bakelite Dials, 3 inch..... .49
- 12.00 Atwater-Kent Circuit Tuner (mtd.) 8.90

EXTRA SPECIAL—With each \$15.00 order for above goods, we will sell one genuine WD 11—1½ Volt Tube—for \$5.00. ONLY ONE TO A CUSTOMER.

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- Malone-Lemmon 23 pl. Vernier..... 8.00
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- Regal (High quality 6 ohm)..... .85
- Klosner Vernier75
- Paragon Standard 1.05
- Framingham70
- Bradleystays 1.85
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- Radio Corp. Special Pr.
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- General Radio (400 ohm)..... Special Pr.
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- Framingham (200 ohm)..... 1.10
- Paragon (200 ohm)..... 1.60
- Amso (150 ohm)..... 1.10
- Bradleyometer, 400 ohms..... 3.00
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- Rameco (Fine quality)..... .40
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- General Radio Special Pr.
- Radio Corp. (UR 542)..... Special Pr.
- Double (Fada) Special Pr.
- Triple (Fada) Special Pr.
- WD II (Rameco)..... .40
- WD II (Bell Panel or Base Mtg.)..... .90
- TRANSFORMERS (Audio Freq.):**
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- Solderette (Soldering iron to attach to standard plug)..... 1.50
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- Telephone plugs (for two phones)..... .70
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- Brach Indoor Lightning Arrester..... 1.25
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We also carry in stock at all times all parts for Flewelling, Reinartz, Reflex and Hazeltine Neutrodyne Circuits. Write for prices.
Also plans and instruction for completion and successful operation of Armstrong Super-Regenerative Receiver. Parts for this also ready for immediate shipment.
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Questions and Answers

Phone Connections

(3298) MMS, Baltimore, Md.
I would appreciate to be enlightened as to the following:

Is it necessary to put a lightning arrester on an insulated lead-in that is soldered to a tin roof and used as an antenna?

Does it harm a 120-ampere A battery to charge it at the rate of 10 amperes?

Is it necessary to turn your tubes off when finished, or is it better to disconnect your batteries leaving your rheostats at their last tuning point?

What is meant by connecting phones in parallel or series? I could never differentiate these two terms in my mind.

When using an Ever Ready dry cell B battery with a 45 volt tap when it runs low can I increase the current by using a 4 1/2 volt unit in series?

I get best results from my detector tube when the point on the side of the tube is not pushed all of the way in the slot. The contacts seem to be O. K.; why is this?

If you do not disconnect your A and B batteries when your rheostats are off, does it consume any current?

I have a detector and a 2-step amplifier with a tuner of the Reinartz type using a spider web coil, and two 23-plate condensers with one rheostat, controlling the two amplifying tubes. How can I tell if this set is regenerative; if not, how can I make it so?

I can only receive local stuff in the day time, but at night I get a thousand miles and more consistently. How can I receive out of town stations in the day time?

What is the function of a transformer? Can Radio frequency in a separate unit be attached to a Reinartz circuit? How?

I am using two 45-volt B batteries in my Magnavox, but it seems like 90 volts paralyze the tube; 45 volts seems to work better, but I can only get local stations with any volume.

Will a 201 A tube function properly with the present type of transformer?

Is a 6,000-ohm phone louder than a 2,400-ohm?

A.—Theoretically there would be no necessity of using a lightning arrester on an insulated lead-in as described; however, it is a requirement of fire underwriters and must be complied with.

No detriment will result from charging a battery at the rate suggested.

Would advise turning rheostat down just after charging battery before connecting battery to set.

We are illustrating by diagram method of connecting phones in series and parallel for your information.

Battery current may be increased in the manner suggested, but when it runs low it will begin to make noises in tube; thus it would be rather advisable to use a new battery.

Would advise clearing contacts points with emery cloth to permit of fitting closely tube into socket.

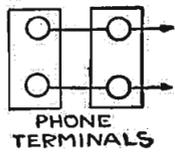
No current is consumed when filament of tubes are not lit.

The circuit you are using is already employing regenerative principle.

Reception by night is both theoretically and demonstrable better by night than by day, due to the ionization of the air by the sun's rays. The receiving range is about one-tenth as great in day time as at night.

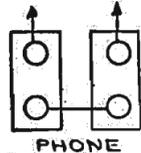
A transformer's function is to step up the voltage, generally speaking. How-

PARALLEL CONNECTION



PHONE TERMINALS

SERIES CONNECTIONS



PHONE TERMINALS

ever, in a Radio receiving circuit it has many purposes.

Method of using Radio frequency with Reinartz circuit is shown on page thirteen of December 16 issue of Radio Digest. However, we are not advising that it is generally effective with this circuit.

If a tap is used so that detector tube does not get to exceed twenty-two and one-half volts, plate potential amplifying tube should easily stand ninety volts without detriment.

A 201 A tube will function effectively and afford more volume than a 201.

A 6,000-ohm phone is not necessarily louder but more sensitive than a 2,400-ohm.

Flewelling Battery Voltage

(2392) W.N.A., Minneapolis, Minn.

Will you please inform me by return mail the voltage of the A and B batteries that are to be used with Flewelling Set? In the description batteries are not mentioned.

A.—Answering your inquiry with reference to Flewelling circuit will advise

that the voltage of A battery depends upon the type of tube used. A WD 11, volt on the filament. A Myers tube requires four volts and a standard tube such as Cunningham or Radiotron requires six volts. B battery voltage for a WD 11 tube should be sixty-five while for other tubes as high as one hundred and fifty volts may be used.

Reinartz with WD-11

(2396) LOS, Canton, S. D.

In your issue of January 13th, in article by H. J. Marx on "How to Make and Operate a Reinartz Receiver," it states that "this circuit will function well with any tube." Does this mean that I can use a 1 1/2 volt tube in hook up shown in same article?

If not, why? Have not been able to get a Nov. 25th issue to see the hookup for WD-11 tube.

A.—Answering your inquiry, will advise that a one and one-half volt tube may be used in the Reinartz circuit. As a matter of fact in any standard circuit. No change is required in circuit other than substitution of a one and one-half volt dry cell for the usual six-volt battery.

We note your failure to secure November 25th issue of Radio Digest. May we

suggest the advantage and convenience of having your name upon our regular mailing list rather than depending upon newsstand service, which is apt to be disappointing as in this instance

Receiver Polarity

(2372) LO, Chicago, Ill.

Please tell me an easy way to find the polarity of receivers?

A.—Answering your inquiry as to method of determining polarity of phones, would advise that this may be accomplished by means of an ordinary compass. The south pole of the magnet (in receiver) will attract the north seeking pole of the compass and the north pole of the magnet (in receiver) will attract the south seeking pole of compass.

DEALERS!

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Please reserve me Bound Volume Number Two or Three or Four and one year's subscription to the Radio Digest, for which I am enclosing check—M. O. for Five Dollars.

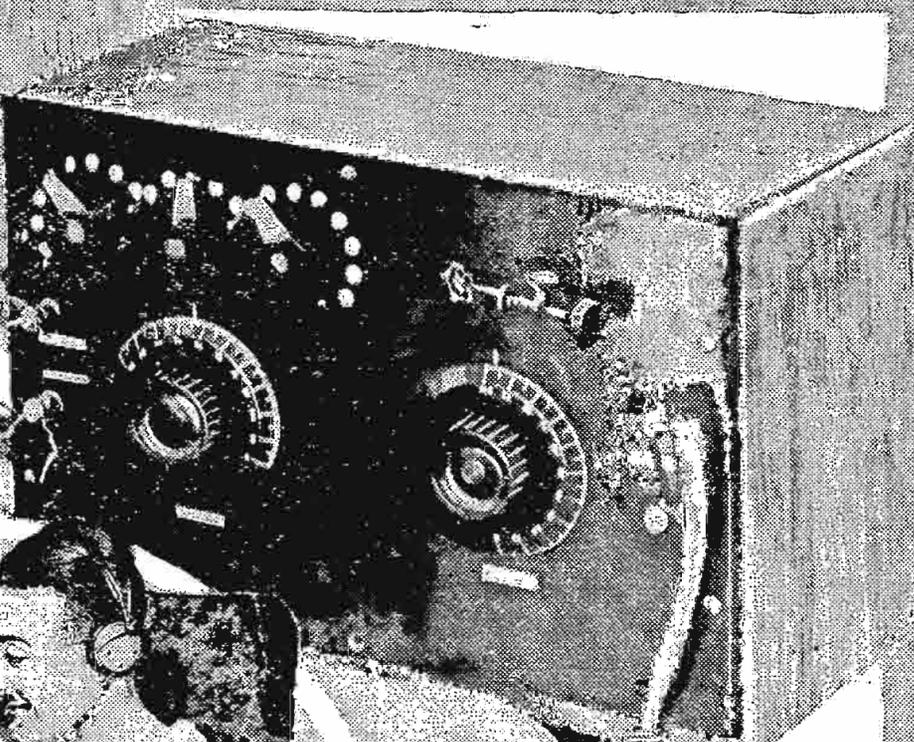
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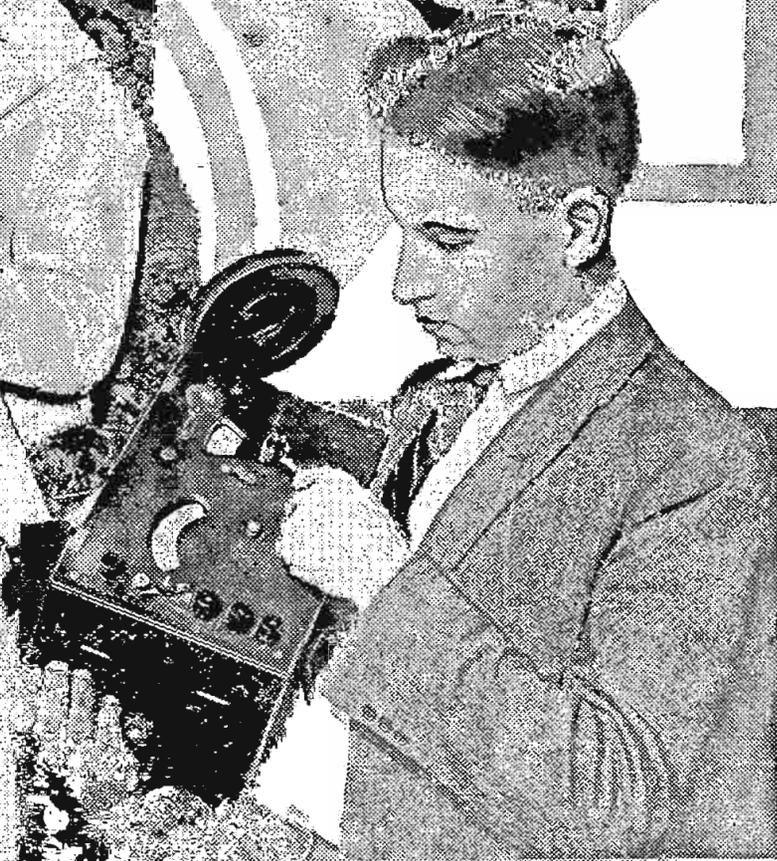
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Radio Illustrated

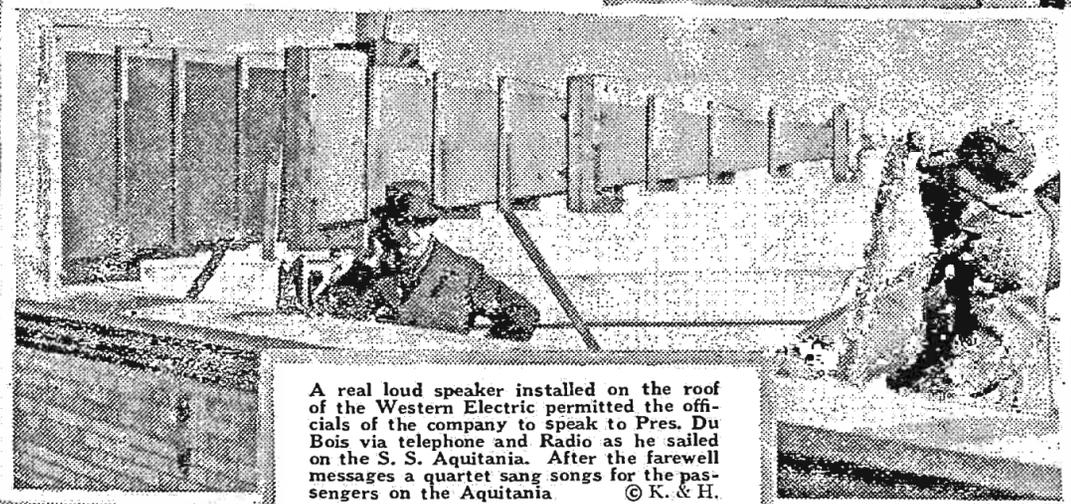
What is Billie Dove, Metro screen actress, listening to with such eagerness? Whatever the Radio waves were waving, they kept Miss Dove occupied during the five weeks she and the other members of the cast of "All the Brothers Were Valiant" spent aboard the whaling schooner, the "Carolyn Frances." It was on this schooner that many of the important scenes in this Irvin V. Willat production of Ben Ames William's story were filmed. "All the Brothers Were Valiant" is a Metro picture



It would be disappointing indeed to find out that two of the star performers of a Radio musical comedy were not Radiophans. However, we need not worry on account of George Clark and Tiny Mite, principals of "Radios" at the London Palladium, for the above picture proves how they stand on the question



The photo shows Operator Raymond F. Guy adjusting wave length with a wave-meter at WJZ. This station has some of the finest Radio apparatus in the country. From the look on Raymond's face you can judge that adjusting this delicate apparatus is not play © K. & H.



A real loud speaker installed on the roof of the Western Electric permitted the officials of the company to speak to Pres. Du Bois via telephone and Radio as he sailed on the S. S. Aquitania. After the farewell messages a quartet sang songs for the passengers on the Aquitania © K. & H.