Reinartz Coil Winding; The Single Tube Reflex

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

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WINS FLEWELLING PRIZE

CRYSTAL FAN WILL BE FUTURE EXPERT

LOGWOOD SAYS HE WILL STAND BY AMATEURS

Radical Action Against Trusts Urged—Unless Science Is to Be Thrown in Discard

By A. H. Munday

TORONTO, ONT.—"The harm being done to the advancement of Radio by the big trusts, and the small trusts for that matter, can almost be put down as irrevievable, and unless some radical action is fostered by enthusiasts all over the world the science will soon be on the way to the discard," declared Mr. Charles V. Logwood, in giving his opinion on the big trusts, and their handling of the circuits.

"The healthy development of any new movement is of course subject to certain restrictions and regulations, but the everyday fan with his crystal set is an important person to consider, and his requirements should be considered equally as much as the most powerful stations all over the world. It is from these young

(Continued on page 2)

TEST CASE ON AIR LAW TO BE MADE

Secretary of Commerce Will File Appeal in Case Against Interstate Company

WASHINGTON.—The Secretary of Commerce will file an appeal in the Supreme Court of the United States in his case against the Intercity Radio Company of New York City. The District of Columbia Court of Appeals recently handed down a decision in which it upheld the Supreme Court of the District of Columbia requiring the Secretary of Commerce to issue a Radio license to the Intercity company. The case will go to the United States Supreme Court as the first test case under the Radio law.

PLANTS ENTITLED TO ACKNOWLEDGE WIRES

F. R. Stark, Western Union Attorney, Tells How

CHICAGO.—The regulation of the department of commerce which apparently prevents broadcasting stations from acknowledging telegrams and telephone calls does not prevent Radio operators from announcing the fact that messages have been received, but it does prevent broadcasters from talking directly to the sender of the telegram. This is the view taken by Francis R. Stark, general attorney for the Western Union Telegraph Company.

"It seems to me quite evident that a station may broadcast the information that a telegram has been received and received at a certain time, without any personal communication to the individual, which would violate the regulations," said Mr. Stark. "It is not the broadcasting of the information that a telegram has been received, but only "the transmission of acknowledgments to individuals relating to the receipt of such a telegram."

FLIVVER SET RACE TAKEN BY STUDENT

To Describe Prize Sets

F. P. Hall and A. J. Barclay Second and Third Winners—Seventeen Win Mention

CHICAGO.—Lawrence M. Blakey, student at the Georgia Institute of Technology, Atlanta, Ga., has been awarded first prize of $40.00 by the judges of the $100.00 Flewelling Prize Contest, conducted by Radio Digest. F. P. Hall, Owego, N. Y., won second award of $25.00, and A. J. Barclay, Tampa, Fla., won the $10.00 given as third prize.

Fourth to eighth prizes, respectively, of

(Continued on page 2)

'La Femme Charmante' above is Nedelka Simeonova, violinist virtuoso, a pupil of Leopold Auer. She is one of the most popular artists who broadcast at WOR, the Bamberger Store station, Newark, N. J.

Miss Lucile Wiseman (left), soprano, and Miss Mildred Wiseman, violinist, artists on the entertaining staff of WOAI, at San Antonio, Texas, are favorites with Radiophans

Mme. Freda St. Jerna, the Swedish Nightingale, has the distinction of being the first singer heard over WOAI, the Radiophone station of the Southern Equipment-Evening News-Express, at San Antonio, Texas

ENGLAND HEARS WCX BROADCAST MARKETS

DETROIT,—The Detroit Free Press Radio Station, WCX, has received information from New Castle, England, that broadcasts of its market reports had been picked up in that place. The reports are said to have come in strong and clear. This is the first time WCX has received information that its broadcasting has been heard in England, although they have been reported heard far.

WEAF Has Mexican Night

NEW YORK.—Mexican Night was a special feature of Station WEAF's program March 5. A distinguished group of musicians and speakers under the auspices of the Consul General of Mexico in New York City furnished the Radio audience an entertaining and instructive evening. F. P. deHoyos, General Agent of the National Railways of Mexico, delivered a talk on the culture of Mexico.

New Club for Davenport

DAVENPORT, IA.—A new club was recently organized here known as the Davenport Radio Club. At the first meeting officers were elected as follows: W. R. Yancy, president; H. A. Wright, vice president; Clarence E. Alford, secretary and treasurer.

Wittenberg Heard in England

SPRINGFIELD, OHIO.—According to word received here, messages and concerts sent out recently by the Wittenberg college Radio station here, have been picked up in England. The college station was established only a short time ago and sent out its first program less than two months ago.

BOSTON, MASS.—A recent Radio club is one formed in Holyoke, Massachusetts. A drive is now being made for increased membership.

CHICAGO NOW ADMITS OUTSIDERS MONDAYS

CHICAGO.—Three Chicago broadcasting stations now remain silent every Monday night from 7 o'clock until midnight, to give Radiophans a chance to hear out-of-town stations. This agreement was made recently by representatives before the Radio subcommittee of the council committee on gas, oil and electric light. The new Zenith Edgewater Beach station will also adhere to this plan.

FLEWELLING AWARDS

(Continued from page 1.)

$5.00 each were awarded to A. R. Miller, Jr., Spring Valley, Minn; Charles Priesmeyer, Chicago, Ill.; E. C. Hebert, Detroit, Mich.; J. A. Harris, W. Lynn, Mass., and Thomas Dunply, Kansas City, Mo.

Marked Ingenuity Shown

Marked ingenuity and careful workmanship were found in practically every entry. Distance reception was one of the deciding factors which cost several excellent entries their places in the prize.

High lights on the prize winners are interesting. Mr. Blakey, first prize winner, fulfilled every rule of the contest and submitted a very neat and complete manuscript. His care in treating the subject and building the prize set were considered important factors by the judges in making the award.

Mr. Hall, second prize winner, showed some unique ideas in construction, and even extended his paper to include the making of a two-step Radio frequency amplifier.

Mr. Barclay, winner of third prize, took great care in preparing his description of his set, submitting excellent diagrams and photographs.

Third Prize Set Next Week

The third prize set, Mr. Miller's, will be described in the next issue of Radio Digest, that of March 24. The following week (April 7) the second prize set will be described, and in the April 14 issue, the complete description of the first prize set will appear.

The descriptions will be very detailed so as to aid Flewelling fans in their experimental work.

From the many excellent papers submitted in the contest, the judges selected seventeen for honorable mention. The contestants whose papers were worthy of honorable mention follows:

E. C. Galbreath, Denver, Colo.; W. J. Pusey, Haskell, N. J.; H. C. Borgfeldt, Wilmette, Ill.; L. C. Fairfield, Winnipeg, Manitoba, Can.; E. E. Holmes, Los Angeles, Calif.; Harry Shiples, Salt Lake City, Utah; H. J. Perkins, Lake Worth, Fla.; E. E. Cook, Chicago, Ill.; Dr. B. F. Morrow, New York, N. Y.; E. Schmidling, Milwaukee, Wis.; M. L. Healy, Boston, Mass.; J. B. Rathbun, Chicago, Ill.; H. E. Dudrey, Ashland, Ky.; Henry Burr, Kansas City, Mo.; Theodore Madige, New York, N. Y.; J. F. Callahan, Brooklyn, N. Y.; Geo. A. Remling, North Tarrytown, N. Y.

LOGWOOD SPEAKS

(Continued from page 1.)

Radiophans that we will have to gather our future experts, and unless we gain their confidence, and help them to help themselves, the science will suffer in the next generation," emphasized Mr. Logwood.

Raps Certain Firms

He pointed out that as soon as any Radiophan has worked out a new circuit that showed promise of an improvement on the one in popular use, he was immediately requested to submit the plans to certain firms throughout the United States, with the promise of large returns if his circuit proved meritorious. As soon as one of the companies had secured the sole rights they immediately place it out of reach of all except the largest stations, and then at a great expense to the companies licensed to use it.

Mr. Logwood, who is at present figured in an action against Major Armstrong regarding the priority of patenting the Armstrong circuit, is at the present time working on several new circuits with the interests of the small Radiophan at heart solely.

Thinks Logwood Will Win

"In my opinion it will not be very long before some action will be taken; perhaps it will be by the small fans themselves," declared Professor J. M. Buckley, of Manchester, England, who is on a tour of Canada and the United States to secure first-hand information on Radio and its application in North America. "I have studied the Armstrong circuit and am also fully acquainted with the claim of Mr. Logwood. In my opinion, Mr. Logwood will win his case, because the United States patent office has already allowed his claim of priority of application, as I understand it. I think that it will be one of the finest moves ever made for the science if Mr. Logwood succeeds, because he is a man, and associated with men, who are far from being purely mercenary. They have the true interests of the Radiophans at heart and with their guidance, that is of Mr. Logwood and his associates, the Radio world will make great advancement."

Health Board Uses Broadcast

March 15 to March 22 was Diphtheria Week in Philadelphia. Then Philadelphians heard all the Board of Health knows about diphtheria "vaccination" cure and treatment. They had the news broadcast to them over the Radio as well as delivered to them by regular pre-Radio day channels.

Reports show that there are about six hundred incorporated manufacturers of Radio apparatus in the United States.

NAA, Old Time Naval Plant, Responsible for Naming Town in Virginia "Radio"

When NAA First Began Operation All Transmission Was Conducted from Hut Near By—Now Is Operated By Remote Control On Seven Separate Circuits

By Carl H. Butman

WASHINGTON—There is a town named Radio. It is in Virginia just across the Potomac from Washington. It is there that the gigantic towers of the Naval Radio station, from which the name came, is situated.

Usually it is known as Arlington, being near the great National Cemetery, but the call letters of the station, NAA, are known almost around the world. In the Postal Guide, the tiny village at the foot of the three great towers, one of which is 600 feet high, is listed as Radio.

This Naval Radio station was put in operation in 1912 and was the first of the Navy's chain of high-powered Radio stations to be established. It has only become well-known to American fans since the government broadcasting was transferred there in January, but today many thousands of Radio owners listen in on 710 meters when NAA speaks.

Seven Sets Now in Use

When the station was first put in operation only code signals were sent and received. Ten years ago, all operations were conducted on a single set from a little hut nearby under the direction of a superintendent of communications. Today it is different; seven separate transmitting circuits are operated by remote control from the naval and munitions buildings in Washington, from which wire lines link up with the Radio circuits for both army and naval use.

All receiving is done in Washington by special antennae and loops. Simultaneous operation is permitted with six sending sets without interference, thanks to "duplex operation."

Back in the early days, Chief J. W. Scanlin was listening in one night, on December 29, 1912, to be exact. He heard a curious series of numerals and letters forming words unintelligible to him. He had heard similar characters in code for several nights, but on the night mentioned he copied the message and told his superior officers in Washington that he had heard and copied "FL." He was laughed at. FL was the call of the Eiffel Tower in Paris, and no one believed he could pick up a message from that distant station. He insisted, however, and a report containing the copied message was transmitted to Paris through the Department of State. The reply proved that he was correct. He had copied Eiffel Tower, and correctly except for a few characters. For the first time, an American naval station had caught a European Radio station.

Soon thereafter experiments were undertaken between NAA and the Eiffel Tower and direct two-way communication was established in 1913.

Old Set Reaches Far

With the old 100 kilowatt Fessenden spark set, put in operation in 1913, some remarkably long distance results were achieved. Naval vessels in the Mediterranean have copied the time signals, which are still sent out from NAA on this set, after 19 years of service. An amateur in Brazil heard NAA as long ago as 1914, but this is not uncommon today.

Some of the first Radiophone experiments were conducted from Arlington in 1915 when the announcements were received in Pearl Harbor, Honolulu.

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Radio Digest, Illustrated, Volume 4, Number 10, published Chicago, Illinois, March 17, 1923. Published weekly by Radio Digest Publishing Company, 123 West Madison Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign, Six Dollars; single copies, Ten Cents. Entered as second-class matter April 27, 1922, at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

Looking Ahead

Reflex, Reinartz, and Flewelling, featured every issue. Watch for the new developments in these circuits through the columns of Radio Digest.

Third Prize Flewelling Set, designed by A. J. Barclay of Tampa, Florida, will be described in full by the winner himself in the next issue of thte Radio Digest. The second and first prize sets will be described in the April 7 and 14 issues respectively.

A New Development in Reinartz Sets, will be the next subject discussed by H. J. Marx. It's good. Don't miss it!

A-B-C Lessons for Biginners, Chapter Twelve next week will take up a two-stage audio frequency amplifier, as well as a detector employing regenerative amplification. Read A. G. Mohaupt's Chapter Eleven on page 11, this issue and fall in line with the other beginners.

The Only Sure-Fire Radiophonists' Telephone Book, Part III with State, City-Station index. Watch for the new feature which will give daily schedules of the high power broadcasting plants.

Last But Not Least, E. T. Flewelling, will tell some more interesting details regarding the experimental work he is doing. Read this too in the March 17 Radio Digest.

TORONTO COPS PLAN BROADCAST STATION

TO BE ONE OF THE MOST POWERFUL IN WORLD

Other Canadian Forces Intend to Follow In Footsteps of Chief Dickson

TORONTO, ONT.—One of the most powerful Radio broadcasting plants and long-distance receiving stations in the world is to be installed at the police headquarters in Toronto, Canada, within the next few months if present plans of the police commissioners materialize. In a special interview to a representative of the Digest, Chief Dickson said that before long the department will enter into negotiations, and it is expected that the plant will be in operation before the fall of the present year.

To Keep abreast of Times

"We must keep abreast of the times," declared Chief Dickson, "and I have had my ear to the ground regarding Radio for many months. I fully realize that Radio is the coming science that is going to revolutionize police methods, and the world generally, but it should be remembered that there will have to be the necessary government restrictions so that the work of the police and other departments for the protection of the public cannot in any way be interfered with. Yes, the possibilities of the new science are great, especially in the prevention of crime and the detection of criminals. Canada is especially suitable for high powered stations for police work, chiefly because it is a country of long distances and few large police centers. Then again there are many outlying districts that have not yet been equipped with telephones. These centers can now be equipped with high powered Radio stations at small expense, and in this way help in watching for the safety of the public.

Awaits Improvements

Chief Dickson is opposed to the immediate installation of a broadcasting station because he felt that there might be some radical improvements in apparatus very shortly, which might make necessary the scrapping of any equipment bought now. For this reason a "watchful waiting" policy will be adopted for a few weeks.

Chief Dickson pointed out that the head of the United States secret service, W. J. Burns, has his own broadcasting station, as have also the chiefs of police of New York, Detroit and other large centers throughout the United States. Almost every Radiophan is acquainted with the Detroit police's appropriate Radio call letters, "KOP."

Three Centers with Plants

Communication has been going on with Chief Dickson and the chiefs at Montreal and Ottawa with regard to the opening of a station by the chief in each of these three centers, and it is now reported that all three have definitely decided on the same policy as that of Chief Dickson's. So, when some definite decision is reached, all three centers will have high powered stations, but it is understood that the one to be installed at Toronto will be one of the most powerful in the world in order to be of the greatest service for points throughout Western Canada and also, at the same time, be in touch with all stations in Europe.

The chief stated that he had gone into the matter of cost and other details in connection with the installation and the operation. He has, we understand, full knowledge of the whole situation, and is in a position to take prompt action when it is considered opportune to act.

NOVEL FAMILY UNION FOLLOWS KYW SONG

Telegraph Operator Sings for Broadcast—Finds New Cousin

CHICAGO.—On January 8, Frank D. Greif, 2713 Florence avenue, who is a telegraph operator and sings as an avocation, sung over the Radio in the Westinghouse KYW program. Siting at his Radio set in Binghamton, N. Y., George F. Greif, an electrical engineer, heard the song, and the name of the singer.

George F. Greif, reversing the idea that "you may forget the singer but you can't forget the song," wondered if the singer were a relative, as the name is not a common one. He wrote the Chicago singer and a checkup of their relatives disclosed that they were first cousins, having the same grandfather, Frederick Joseph Greif, born in Germany.

Frank D. Greif, having lost his father when a child, did not know a great deal about his grandparents, but the mother of George, living in Lakeland, Fla., furnished the information that disclosed the young men their consanguinity.

'WORLD-WIDE' PHONE COMING—STEINMETZ

WIZARD OF SCHENECTADY MAKES PROPHECY

Static Elimination, Selectivity, Two Goals Sought—Believes Radio Will Not Supplant Wire Lines

By P. N. Hollingsworth

BOSTON, MASS.—Radiophone talks and concerts will be sent completely around the world from some central broadcasting station in the very near future, says Dr. Charles P. Steinmetz, the electrical wizard of Schenectady, in a recent interview here. "Engineers are working day and night on many things which will revolutionize Radio," he said. "They have been working for years on a scheme to entirely overcome static electricity, and they have nearly reached their goal. There has been a constant improvement in eliminating static, and in the near future I expect to see static interference completely wiped out.

"Selectivity, that is the ability to tune out stations and tune in others to make the use of the Radiophone more secret—is another improvement on which experts all over the world are working. These men have made remarkable strides in the past year, but in the coming few months I expect to see much more accomplished.

See Future of Utility

"I see no reason why, in the near future, Radio communication cannot be made almost as fool-proof as the land line telephone of today. It will be possible, I believe, to carry on a Radiophone conversation with a far distant station on a prearranged scale of wave lengths without the fear of others listening in.

"I do not believe that the Radio will ever supersede the land line telephone system, however. There is too much need for both for either to crowd out the other. They are both here and here they will stay. We cannot get along without the telephone for certain uses and we cannot now get along without the Radiophone. They both have separate missions in our business and social life."

SONG LOCATES MAN'S BROTHER OVER ETHER

BERLIN, WIS.—While listening to a quartet giving a program recently from station WLAG of Minneapolis, Dr. B. E. Scott of this city heard the announcer say: 'I hope Dr. Scott of Berlin, Wis., is listening in." The doctor then realized that he was listening to a quartet one of whose members was his brother. He called the station by long distance telephone and five minutes later heard his brother's voice bidding him a "good-night."

NEW ZEALAND HEARS WHAZ—NEW RECORD

TROY, N. Y.—Words and music broadcast by Radio telephone from the Rensselaer Polytechnic Institute station here have been heard distinctly in New Zealand, according to a cablegram from Invercargill, N. Z., reaching the station today. This is regarded here as a new record for distance, the airline mileage to Invercargill being nearly 10,000 miles. New Zealand fans heard WHAZ on three separate days.

GANNA WALSKA SINGS FROM WJZ

Above is the first exclusive photo of Mrs. Harold McCormick, nee Ganna Walska, lyric soprano, singing over the Radiophone. The picture was taken on the occasion that Mme. Walska sang over Station WJZ direct from the Waldorf Astoria following her arrival in America. © K. & H.

WHITE BILL DEAD AS CONGRESS ADJOURNS

NINE MONTHS BEFORE NEW BILL CAN BE MADE

Department of Commerce Must Continue under Ancient Law Enacted 10 Years Ago

BULLETIN

WASHINGTON.—During the closing hours of Congress the White resolution, providing for an investigation by the Federal Trade Commission of the alleged monopoly in the Radio industry, was passed by the House of Representatives. No time is set for the completion of the report and therefore the results will probably not be made public until the next session of Congress.

The White Radio bill which passed the House some weeks ago died a natural death in the Senate, owing to the continued opposition of some of the Democratic members to increasing the power of the secretary of commerce.

Secretary of Commerce Hoover announced that he will call a Radio conference to consider the temporary assignment of new wave lengths. Invitations for the conference have not gone out yet but the secretary stated it would probably be held March 20.

The secretary will reassemble the committee that acted during the last Radio conference which was held at the department of commerce, about a year ago. The conference will be held largely because of the failure of the White bill to pass Congress. Hoover stated that he could hardly believe that there was anything in the rumor, which has been current for some time, that the Radio Corporation of America succeeded in killing the White Radio bill in the Senate.

WASHINGTON.—The White Radio Bill died in committee along with a number of other important legislative documents when the 67th Congress adjourned on March 4. The House and Senate do not convene until December 4, when a new bill will probably be introduced—but that is nine months away.

Whether Secretary Hoover can manage to keep the ether from getting more jammed with broadcasts and other Radio communications without legislation, remains to be seen. Lack of a new law makes it necessary for the Department of Commerce to continue under legislation enacted ten years ago when broadcasting was unknown and there were few commercial and amateur stations.

Will Try to Use Old Law

It is probable that the Secretary will undertake the partial reallocation of wave lengths within the limits of the existing Radio law in an effort to reduce interference and make for peace in the ether.

Just what plans the department has for improving conditions in the present Radio pandemonium, are not known, but a plan for execution within a few months is being worked out, it is understood.

To Appeal Inter-City Case

The decision of the District Court of Appeals requiring the Secretary of Commerce to reissue a license to the Inter-City Radio Company of New York, although that station has been severely complained of due to interference, will be appealed, it was announced recently.

Secretary Hoover and his solicitor have taken the matter up with the attorney general's office requesting that the case be appealed to the Supreme Court of the United States. It was the action of the Court of Appeals that caused Secretary Hoover to state recently that: "This removes the last shred of the Department's authority over Radio."

Radio played an important part in the ceremonies conducted in connection with the two-hundredth anniversary of Benjamin Franklin's entrance into Printing House Square, New York.

Dedicate KOG as Sub-Station of KFI

Los Angeles Evening Herald Has No Transmitter but Works as Remote Control

LOS ANGELES, CALIF.—On Monday, January 29, at 5 o'clock, Radiophans who were listening-in heard, "This is the Evening Herald broadcasting through the central Radio station at Anthony's, Los Angeles." This was the re-dedication of KOG. This station is now only a remote control for KFI, the 500-watt plant of Anthony's, Los Angeles.

Since that time and henceforth Radio Station KOG, it stills retains its old call letters, goes on the air every afternoon and every alternate evening at the hours named above. The afternoon programs includes Radio news bulletins, and closing market reports.

The code lessons which became a part of the Herald's Radio program with the old station will be suspended until plans are worked out at a later date to continue the same, as there are many boys who desire to learn code receiving and many others with a knowledge of telegraphy get entertainment from listening in on Radio signals.

The opening concert which was Radiophoned from the new input station of The Evening Herald was heard and enjoyed by thousands of Radiophans throughout the Western States. The program was made up in equal proportions of both vocal and instrumental music.

Instrumental numbers for the program were furnished by the famous Fuhrer string quartet who have delighted music lovers with their interpretation of classical scores. The vocal numbers were presented by the well-known Carl Bronson Artists who have appeared from time to time on the Radio programs of KOG. The Bronson artists are known throughout Southern California and their appearance at KOG is always looked forward to with interest. Prof. Carl Bronson presided at the piano for the concert.

WHA Broadcasts Religious Services by John R. Mott

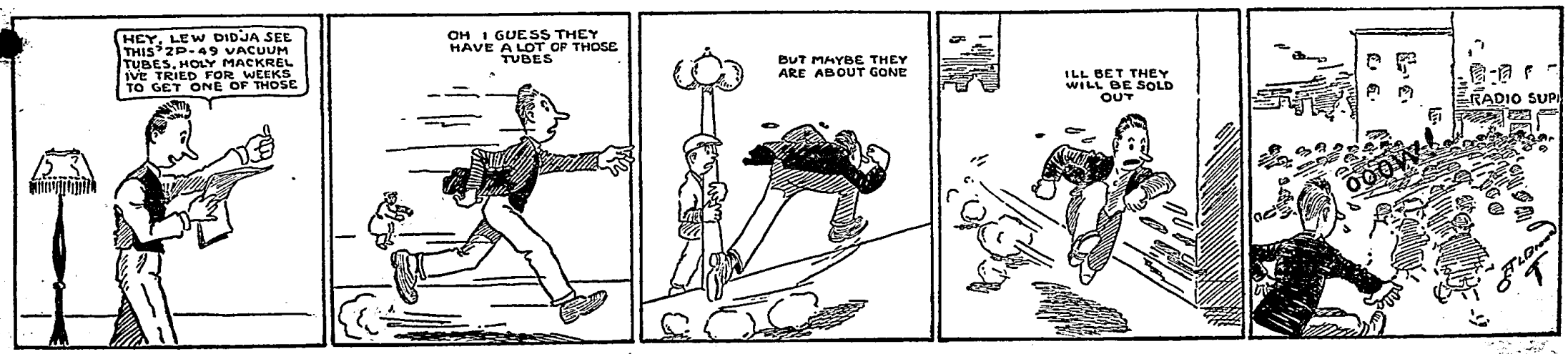
MADISON, WIS.—Radio Station WHA, University of Wisconsin, recently broadcast the addresses given Sunday afternoon and evening, March 4, by Dr. John R. Mott, principal speaker at the religious conference held at the university, March 2 to 4. An additional feature of the program broadcast was songs by the Fiske University quartet of Nashville, Tenn.

Amateurs within 200 miles listened to Dr. Mott's speech Sunday afternoon, and it is estimated that the evening address was heard within a radius of 1,000 miles.

New Plant for Ann Arbor

DETROIT.—The Times-News of Ann Arbor is the newest broadcasting station in Michigan. It is known officially as WQAJ and operated on 360 meters. This station is broadcasting concerts in connection with the musical interests of the University of Michigan and Ann Arbor.

THE ANTENNA BROTHERS — Spir L. and Lew P. — But Wait Till We Bust the Trust



THREE RAILROADS IN SOUTH HAVE PLANT

TRAVELERS LISTEN IN TO CONCERTS ON TRAIN

Ex-College Boys Organize Novelty Orchestra to Furnish Music for New York Limited

By Vera Brady Shipman

There are there railroads in the middle south, privately owned, which can boast of the only railroad ownership Radio broadcasting station in the world. These roads, the Atlanta and West Point, the Western Alabama, and the Georgia railroad, are all under the presidency of C. A. Wickersham with his son Frank Wickersham as signal engineer for the three, and director of Radio.

The College Park Radio station was originally put in to broadcast train dispatches with the experimental call letters 4XO. The idea of broadcasting programs was developed and the companies' own orchestra was gathered together and placed at College Park in 1921 when the programs were installed for reception on trains running on these roads between Montgomery and Atlanta, on the through New Orleans to New York lines. The receiving set is placed on the diner of the train and the whole train assembles after the evening meal to hear the programs of jazz orchestra tunes.

Try Various Stunts

Interesting combinations have been used by degrees of amplification. In one instance a violin solo was played on the train to the piano accompaniment in the College Park studio broadcasted to the train. Other combinations of orchestral instruments have been effected by train and studio, with exact rhythm and time.

The station is in charge of I. Miller and B. W. Benning, whom I met at the Constitution office in Atlanta preparatory to my trip to College Park. The announcer is Gene Curtis, a local College Park lad, son of a local physician. There are five musicians on the orchestra staff programs: Fred Graf, director, playing violin, saxophone and trombone; "Nick" Nickolas, an overseas veteran who combines piano, voice and a rare buzz on a comb; Frank Caldwell, voice and banjo; F. B. Myers, saxophone, and Frank Corts, a genuine Hawaiian steel guitar soloist.

Broadcast for Passengers

Their programs are broadcasted at 7:30 and 8:30 p. m., and 10:30 and 11:30 p. m., expressly for entertainment of passengers on board the New York limited while running from West Point, Georgia, to Atlanta.

WDAJ, as the College Park station calls, is a 500-watt station operating on 360 meters in Class A. They have been heard at Buenos Ayres, at sea and in every state and Canadian provinces, according to their map which they proudly display.

NAVAL BAND MUSIC WINS RECORD PACT

Concert Broadcast from Station KHJ Results in Compositions Being "Canned"

LOS ANGELES, CALIF.—Through the advancement made possible by Radio, the music of the naval band of the battleship U.S.S. Oklahoma has been preserved for posterity. A short time ago this band was received at Radio station KHJ, the Los Angeles Times, in their studio to be monitored in preparation for the naval-Radio concert which was presented a few evenings later by the officers and enlisted men of the U.S.S. Oklahoma from Radio station KHJ. The harmonious result of this monitor test was so satisfactory that the band was put "on the air."

Among those who were listening in to the concert was Theophilus Fitz, president of the Golden Record Company of this city, who immediately completed arrangements with the band to make two records prior to the special naval-Radio concert through KHJ.

The records have proven a distinct success and arrangements have been made through the reproducing company to place these records free of charge on every American vessel in naval service. Permission has also been given to place a reproduction in colors of the battleship Oklahoma on the records.

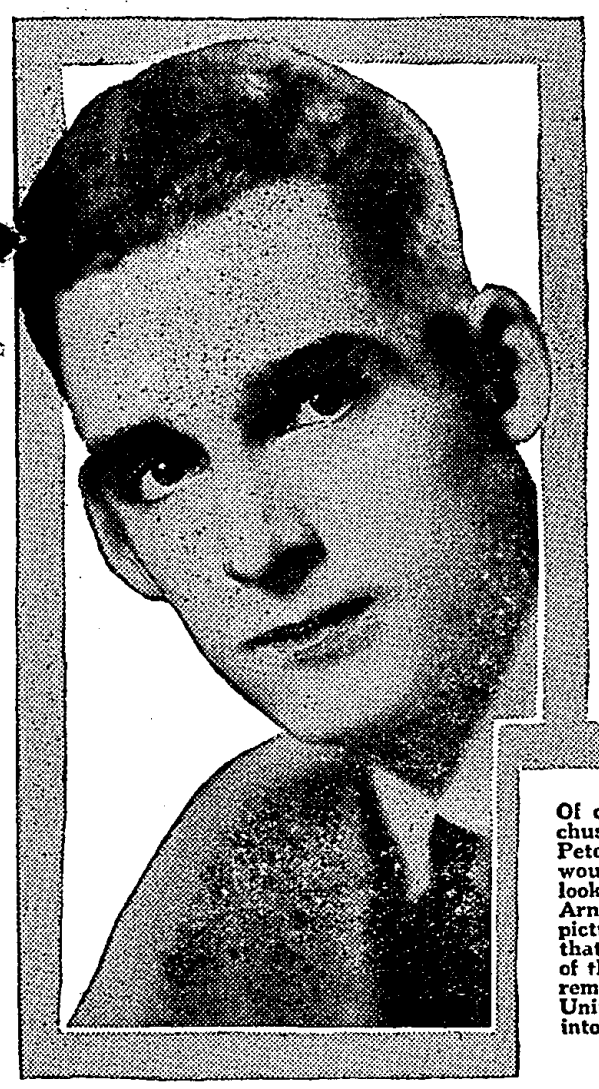
Efforts to afford relief to the deaf and dumb by means of Radio are producing encouraging results. One child of twelve had his hearing developed to a point where he pronounced the word "Dog" when a picture was shown—the first word he had ever spoken in his lifetime.

GERMANS HEAR WOR'S TRANS-OCEANIC TEST

Teutons Listen In on American Concert for First Time

NEWARK, N. J.—A cable from Lichterfelde, Germany, a suburb of Berlin, states that Miss Edith Bennett, the young American soprano who sung for an overseas Radio concert recently from Station WOR, was heard by the Seehof experimental station at six o'clock in the morning, which, allowing for the five hours' difference in time, would be midnight Eastern Standard time. This is the first time Germany has listened in on an American Radio concert, so far as has been reported. Eight high vacuum amplifiers were used in receiving, but only ordinary antenna, eight meters high.

YOU'VE HEARD 'EM? HERE THEY ARE!



Of course you know who "Uncle Billy" is—if you have ever listened in on WGI, Medford, Massachusetts. Here is a picture of "the bedtime story man" (center above). We are sorry to say that Peter Rabbit and Johnnie Chipmunk were not at the station when the photographer called or we would have made it a group. While a lot of the kiddies have the impression that "Uncle Billy" looks something like Billie Possum, there are some grown-ups who still think "G. C. A." (G. C. Arnoux), program director of WBAP, Fort Worth, Texas, is "fat and forty." We are forced to run a picture of "G. C. A." (left), in order to cut down on some of our correspondence correcting this rumor that is riot among the fair sex. At the right is Harry Sadenwater, who has been placed in charge of the technical direction of the General Electric Company's broadcasting plants. Sadenwater will be remembered as the Radio officer aboard the ill fated NC-1, one of the three flying boats of the United States Navy that attempted to cross the Atlantic in May, 1919. Mr. Sadenwater's craft ran into a heavy fog and was forced to seek safety in the ocean. The plane was badly damaged by waves but the crew was finally rescued by a Greek freighter

BRITON'S STATIONS PURPOSELY LIMITED

LICENSED RECEIVING SETS DEFRAY EXPENSE

Four Broadcasting Plants Supply News and Time for All of the British Isles

By F. N. Hollingsworth

LONDON, ENGLAND.—Britons have only four broadcasting stations to entertain them and to provide the news of the day via the air, but, considering the size of the British Isles, this seems to be amply sufficient. The number has been purposely limited, however, to lessen interference. Receiving stations are licensed, and a portion of the license fees turned over to the broadcasting stations through the British Broadcasting Association to help defray expenses of the work. The largest station is at Marconi House, with call letters 2LO, and wave lengths of 400 and 800 meters, using 1500 watts power. The station at Manchester, 3ZY, has 800 watts power and a wave length of 385 meters, while the other two are 5NO at Newcastle on 400 meters and 5IT at Birmingham, on 420 meters. In tuning in to attempt to pick up England, fans should remember that London is five hours earlier than Eastern Standard time.

Fans Wire and Phone in on WQAM's Clearness

Hotel Guests Dance by Music of Miami Plant

MIAMI, FLA.—Telegrams, letters and telephone calls coming in to The Metropolis tell of the clearness with which the programs put on by the new Radio station WQAM are heard. Among the cities reporting by wire or letter are Glen Cove, N. Y.; Somerville, N. J.; Needham, Mass.; Arcadia, Orlando and Hialeah.

Telegrams, local and long distance telephone calls, received during the broadcast of WQAM attested to the popularity of Tasillo's Le Bal Tabarin Orchestra of Hartford, Conn., which furnished a recent program.

This orchestra is now filling a season's engagement at Luna Park dancing pavilion. In several of the leading hotels of Miami and Miami Beach guests often dance to its music which was received over Radio and The Metropolis has received many expressions of thanks by telephone and telegram.

DE FOREST AWARDED MEDAL BY INSTITUTE

Special Committee Appointed to Investigate the Audion

PHILADELPHIA.—Presentation of the Elliott Cresson medal to Dr. Lee de Forest for his invention of the Audion or three-electrode vacuum tube took place here at the Franklin Institute of the State of Pennsylvania in connection with a joint meeting of the Institute of the Philadelphia Section of the American Society of Civil Engineers.

The special committee appointed by the Institute to investigate and report upon the Audion consisted of Mr. Charles E. Bonine, chairman, and Dr. George A. Hoadley, with the following consulting members: General J. J. Carty, Dr. A. E. Kennelly, Major General George Owen Squier, Mr. John Stone. The presentation address was delivered by Dr. Walton Clark.

The report upon which the award was made says in part:

"This invention of the three-electrode vacuum tube for the purpose of amplifying minute electrical currents and pressures, called by the inventor the Audion and variously known as the electron amplifier, thermionic amplifier, three-electrode bulb, et cetera, the specific invention considered in this report, is one of the most important ever made in the field of the electrical transmission of intelligence and through its development has worked a profound revolution in the art of Radio communication."

Glee Club Contest Is New Novelty of Station WEAF

NEW YORK.—Picking the winner of the Intercollegiate Glee Club Contest was the Radio audience's unusual privilege on the evening of Saturday, March 3, when WEAF broadcast the college men's voices through a special direct wire installation at Carnegie Hall. Entered in the contest were glee clubs from Yale, Harvard, Princeton, Columbia, Dartmouth, Cornell, University of Pennsylvania, New York University, Pennsylvania State, Amherst, Wesleyan and the University of Wisconsin. The latter is winner of the Intercollegiate Prize Contest held in the Middle West.

Each glee club sang one "light" song and one "college" song of their own selection, followed by a rendition of "The Hunter's Farewell" by Mendelssohn. The complete vocal merits of each club may thus be fairly judged. The Radio audience not only enjoyed a program of unusual merit, but had the opportunity to test its discriminative powers in selecting the winner, whose name is yet to be announced through WEAF as soon as the judges' decision is reached.

ETHER WAVES BRING SON BY FLYING BOAT

Huge Seaplane Delivers Man to Mother's Side

MIAMI, FLA.—The eleven-passenger flying boat Buckeye of the Aeromarine Airways, Inc., performed an unusual service recently aided by a new Radio apparatus carried aboard the huge seaplane, according to advices received by C. F. Redden, president of the company, at the executive office, Times building, New York.

Shortly before the Buckeye sailed on its first trip to Nassau from Miami, a Radio message was received from Carter De Gregory at Settlement Point at the west end of Grand Bahama island, stating that his mother was seriously ill in Nassau and requesting that the Buckeye stop for him and carry him to the British island.

F. Kuback, Radio operator aboard the Buckeye, sent a message from the flying boat to a ship in harbor at Settlement Point giving directions to have Mr. De Gregory aboard a small boat ready to be transferred to the aircraft.

The descent was made promptly for Mr. De Gregory and the voyage was resumed without delay; the Buckeye arriving in Nassau that evening.

Pullman Conductor Gives Passengers Air Concert

Receiving Set Furnishes Music for 400-Mile Trip

TEXARKANA, TEX.—People here who were passengers on Kansas City Southern passenger train No. 1, southbound, March 1, are discussing what they profess to be the first Radio entertainment for railway passengers in this territory.

The Radio set is the property of Pullman conductor, Tom Chapman. It was installed in the Pullman with aerials running along the top of the coach. The set furnished the passengers with concerts all along the 400-mile journey between here and Kansas City.

Hear WHB in New York Tube

NEW YORK, N. Y.—Officials of the Interborough Rapid Transit company of New York recently used the subway and East river tunnel to test Radio reception. Kansas City, WHB, was picked up in the concrete tube sixty feet under ground, and also midway to Brooklyn in the tube under the river.

Every state in the Union reported having heard WGY on Christmas eve. At the same time WGY was heard in London, Liverpool, Mexico, Porto Rico, Cuba and Canada.

CREATION OF NEW DEPARTMENT ASKED

NEW POST OFFICE DEPT. WILL INCLUDE RADIO

Adoption of New Department of Communication Is Not Urged By President

By Carl H. Butman

The creation of a Department of Communications, including Radio, is suggested in the report on the reorganization of the executive departments submitted to the joint committee of Congress by the President a few days ago.

The committee, headed by Walter F. Brown, suggests that the Post Office Department be renamed the Department of Communications, and that it include an Assistant Secretary for Telephone and Telegraph, including Radio.

To Add Development Bureau

In the report Mr. Brown says in part: "The only important change contemplated is the addition of a bureau (to the Post Office) to develop and extend telephone and telegraph communications, including Radio, for the general public benefit."

Apparently the Navy would retain its communication system as would the Signal Corps, but it is evident that Radio regulation would be transferred from the Commerce Department to the Department of Communication, although the Bureau of Navigation, under which the Radio section operates today, is left in the Commerce Department.

President Does Not Urge Adoption

Although the report is labelled as recommended by the President, his letter of transmittal states that with few exceptions, the changes have the sanction of the cabinet, and adds that it is his hope that the suggestions will be of assistance to the committee. Further than that, the President does not appear to urge its adoption.

Signal Corps Establishes Two New Army Net Stations

WASHINGTON.—The War Department has announced that Radio stations are to be established by the signal corps at Fort Sill, Okla., and Fort Leavenworth, Kans., as a part of the army Radio net. The station at Fort Leavenworth will be a relay point for transcontinental business. The signal corps land line in Alaska extending from Fort Gibbons to Koyukuk, a distance of about 200 miles, is to be abandoned, and a Radio station will be established at Ruby to take care of the locality previously served by that line.

PLANTS INCREASE ELEVEN IN MONTH

U. S. BROADCASTERS NUMBER 581 NOW

Losses 13, New Stations 24, Net Gain 11, During February—28 Class B's on Air

By Carl H. Butman

WASHINGTON.—An increase of eleven broadcasting stations is shown on the records of the Department of Commerce during the month of February. On the first of February there were 570 stations licensed to broadcast entertainment data and news, while on March 3 there were 581 broadcasters operating.

During the past month 24 new licenses were issued to broadcast, but 13 old stations ceased to function. Of the total stations transmitting entertainment today, 28 are Class B stations operating on 400 meters, the balance being on 360.

New Stations' Calls

New stations licensed during the past three weesk follow:

WSAC, Clemson Agricultural College, Clemson College, S. C.; KFDV, Gilbrech & Stinson, Fayetteville, Ark.; WWAY, Marigold Gardens, Chicago, Ill.; WRAB, Savannah Board of Public Education, Savannah, Ga.; KFER, Auto Electric Service Co., Inc., Fort Dodge, Ia.; WQAW, Catholic University of America, Washington, D. C.; KFEV, Radio Electric Shop, Douglas, Wyo.; WTAS, George D. Carpenter, Elgin, Ill.; WDAD, Central Kansas Radio Supply, Lindsborg, Kan.; KFDO, Everett H. Cutting, Bozeman, Mont.; WQAV, Huntington & Guerry, Inc., Greenville, S. C.; KFDP, Hawkeye Radio & Supply Co., Des Moines, Ia.; KFDU, Nebraska Radio Elect. Co., Lincoln, Neb.; KFCZ, Omaha Central High School, Omaha, Neb.; WBAB, Andrew J. Potter, Syracuse, N. Y.; WQAT, Radio Equipment Corp., Westhampton, Va.; KFEQ, J. L. Scroggin, Oak, Neb.

Thirteen Stations Dropped

The thirteen stations which were dropped during February follow:

KFED, Billings Polytechnic Inst., Polytechnic, Mont.; WKAG, Edwin T. Bruce, M. D., Louisville, Ky.; WTAX, Capital Radio Co., Lincoln, Neb.; WNAF, Enid Radio Distributing Co., Enid, Okla.; WOH, Hatfield Electric Co., Indianapolis, Ind.; WLAF, Johnson Radio Co., Lincoln, Neb.; WDAR, Lit Brothers, Philadelphia, Pa.; WLAR, Mickel Music Co., Marshalltown, Ia.; WDY, Radio Corporation of America, Roselle Park, N. J.; WHAF, Radio Electric Co., Pittsburgh, Pa.; WJK, Service Radio Equipment Co., Toledo, O.; WJAE, Texas Radio Syndicate, San Antonio, Tex.; WDV, John O. Yeiser, Jr., Omaha, Neb.

Ohio vs. Michigan

COLUMBUS, O.—Ohio may have lost to Michigan in football and basketball, but "by hickory," when it comes to Radio that's different, according to members of the Ohio Amateur Radio club. "Beat Michigan" is the slogan adopted by the club for their convention which will be held at Hotel Columbus, April 6, 7 and 8. The Michigan Amateur Radio convention was held at Flint, Michigan, two weeks ago.

WKAA Uses Fifteen Watts

CEDAR RAPIDS, IA.—Station WKAA of this city is now broadcasting with fifteen watts in-put, using three five-watt tubes. This plant uses the Colpitt-De Forest circuit with grid modulation. DX fans have reported hearing WKAA over a thousand miles away.

RECEIVING RECORDS? SEND 'EM IN—

By the Contest Editor

ADDING to the 312 records published in the complete list last week, 45 new distance reaches were made last week. Of the past week's newcomers, 26 of these beat old records and 19 were records for stations not represented hitherto.

H. S. Olding, New Glasgow, Nova Scotia, Canada, deserves special mention for having acquired 24 of the "DX Crowns" during the week. The new records appear below, followed by the rules of the contest which are repeated for the benefit of the new Radiophans who may have become interested:

Station	Miles Away	Who Heard It
CHCF	1250	B. U. Livingston, Morristown, N. J.
CKCK	1650	L. C. Burwell, Jr., Charlotte, N. C.
KDYW	2175	Edmund Howard, Waterbury, Conn.
KFV	1950	J. W. Mayfield, Cincinnati, O.
KHJ	3000	H. S. Olding, New Glasgow, N. S., Can.
KJR	2800	H. S. Olding, New Glasgow, N. S., Can.
NAA	2250	R. J. Gall, Blythe, Calif.
WBL	1900	H. S. Olding, New Glasgow, N. S., Can.
WBU	1250	H. S. Olding, New Glasgow, N. S., Can.
WCAE	2250	R. Taylor, Livermore, Calif.
WCAH	1950	A. B. Butlers, Los Angeles, Calif.
WCAT	1975	H. S. Olding, New Glasgow, N. S., Can.
WCAQ	1150	H. S. Olding, New Glasgow, N. S., Can.
WDAE	1625	H. S. Olding, New Glasgow, N. S., Can.
WEAB	1550	H. S. Olding, New Glasgow, N. S., Can.
WEAE	2000	R. J. Gall, Blythe, Calif.
WEAI	2075	R. J. Gall, Blythe, Calif.
WEAP	1700	R. J. Gall, Blythe, Calif.
WEAZ	1475	H. S. Olding, New Glasgow, N. S., Can.
WEY	1125	R. J. Gall, Blythe, Calif.
WFAC	1375	H. S. Olding, New Glasgow, N. S., Can.
WFAF	2200	R. J. Gall, Blythe, Calif.
WFI	2200	R. J. Gall, Blythe, Calif.
WGAK	1400	H. S. Olding, New Glasgow, N. S., Can.
WGAN	1700	H. S. Olding, New Glasgow, N. S., Can.
WGF	1425	Perkins Benneyan, Fresno, Calif.
WGV	1800	H. S. Olding, New Glasgow, N. S., Can.
WHA	1650	Perkins Benneyan, Fresno, Calif.
WHAA	1450	H. S. Olding, New Glasgow, N. S., Can.
WHAL	1100	H. S. Olding, New Glasgow, N. S., Can.
WHB	1650	H. S. Olding, New Glasgow, N. S., Can.
WIAO	1250	H. S. Olding, New Glasgow, N. S., Can.
WIZ	1175	H. S. Olding, New Glasgow, N. S., Can.
WLW	2000	R. Taylor, Livermore, Calif.
WMAG	1150	L. C. Burwell, Jr., Charlotte, N. C.
WNAB	1350	H. S. Olding, New Glasgow, N. S., Can.
WNAM	1375	H. S. Olding, New Glasgow, N. S., Can.
WOAI	2250	H. S. Olding, New Glasgow, N. S., Can.
WOAZ	1525	E. S. Macartney, Ottawa, Ont., Can.
WOK	1725	H. S. Olding, New Glasgow, N. S., Can.
WPAC	1250	Perkins Benneyan, Fresno, Calif.
WQAQ	2150	H. S. Olding, New Glasgow, N. S., Can.
WRP	1375	Guy V. Carrolo, Houston, Tex.
WRR	2000	H. S. Olding, New Glasgow, N. S., Can.
WWB	2150	R. Taylor, Livermore, Calif.

Rules to Remember

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

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

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

3. Call signals of station heard, its location and the mileage, as defined in Rule 2, must be given in reporting record. Otherwise record will not be considered.

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

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

Christen College Station

ITHACA, N. Y.—Members of the staff of the College of Electrical Engineering at Cornell University made their first broadcast February 28. A series of talks by President Livingston Farrand and members of the faculty were broadcast from Station WEAI, the university Radio station. This station is expected to develop into a high-powered transmitting station, keeping the outside world in touch with university affairs and athletics.

Department of Agriculture Quizzes Farmers on Reports

WASHINGTON.—That farmers throughout the country are receiving the Radio market news reports broadcast by the Department of Agriculture is shown by the replies to an inquiry sent out by Radio recently. About half of the replies received were from farmers, the rest being from grain dealers, banks, telephone companies, and other agencies which serve the farmer. Radio has developed more rapidly in the Middle West than in other farm sections of the country, and this probably accounts for the fact that the inquiry shows the greatest interest to be in grain reports. Next in interest are livestock reports and weather reports.

Error in Advertisement

The World Battery Company's advertisements appearing in the Radio Digest, issues March 3 and March 10, were in error as to price, as at the prices quoted it would be impossible for this company to supply batteries in solid rubber cases. The correct advertisement appears immediately below.

The "How" of the Simplified Super Circuit

Part VII—Listening in to DX Stations Without an Aerial

By E. T. Flewelling

BECAUSE the writer started a new set and had photos taken of it to give the fans an idea as to how the material can be assembled, it seemed only fair to continue with the set and see what may be done with it. Considering that the Flivver is used by many who are not able, or do not have the privilege of putting up an outdoor antenna, it is best to build the outfit without thought of using an outdoor antenna at all.

The writer most of the time uses his Flivver without an outdoor antenna, but because there was a chance of its presence influencing the results, he checked up by disconnecting the aerial from the entrance to the house and took it down temporarily. After every chance of aid from the aerial was eliminated he prepared the Flivver for its test. The set had been wired and so a two-foot loop and variable condenser were simply placed across the tuning inductance. Then a wire was run to the ground from the grid side of the inductance.

Found Minimum Wave Length 380

The Flivver certainly was full of "pep," and although it was after 4:00 p. m., and the Shepard Stores (WNAC) was on the air or "the ground," the writer was unable to get them. The tuning condenser and the loop condenser were set at their minimum and the set was then checked by use of a wavemeter. It was found that the lowest point which could be reached was 380 meters.

A Giblin Remler 50-turn coil was being used and it was decided to make some changes in the coil. It was removed, five turns were taken off, and then the coil was replaced. A smaller variable condenser, .00025 mfd., was placed in the loop circuit and before the writer had a chance to put on the phones we heard the announcer say, "WNAC, the Shepard Stores, Boston."

Coils Have Too High Wave Length

The wavemeter now showed that the set had a range of from 335 meters to 425 meters. Most of the 50-turn coils have proved all right for broadcast use, yet more than once it has been found necessary to set the tuning condenser at the zero point on the dial before even the slightest sound of broadcasting on 360 meters could be heard, and it was necessary to remove a few turns of wire from the 50-turn coil.

As a rule the coils run very good and no trouble has been experienced from this source with the 400-meter stations. It is therefore an easy matter to check up, that is, if one hears 400-meter stations but none in 360-meters he may be sure that it is because his set cannot tune low enough.

The first station was very loud but not so clear. The grid lead R1 was changed so that the squeal was raised in pitch to a point where it was less prominent. The condenser leak R2 as a rule can be kept more or less constant after it is set correctly.

When the grid leak was adjusted so that the squeal was hardly audible the station was lost. The leak was increased in resistance to a point where a slight click was heard in the phones and then the "lost" station came in perfect. So loud was it in fact that the phones were put on a horn. The broadcast could be heard by sitting from 5 to 10 feet away from the horn.

The set was left then for more than an hour and returned to at about 7:00 p. m. for the evening's work.

Working for Distance

It was not long before stations outside of Boston were heard. They came in rather poorly and were hard to get because the Boston stations were too close to us and blanketed the weaker and more distant stations.

A total of 15 different stations were received during the evening. It must not be taken that they all came in "like a brass band;" because this was not the case. Some of them were pretty weak by the time that they arrived. WGM, Atlanta, Ga., came in with so much outside noise that the writer was unable to make out who it was until the phones were on the horn. In the next room the smaller, or rather weaker noises and the the announcer's voice could be heard better. Reception in many cases was not at all good from a musical standpoint because the set had to be pushed too hard.

Distance Versus Musical Quality

Distance work carries with it little of value as far as music is concerned, but the greater the distance your set is capable of covering, the easier and better will it get the nearby stations. Quality and distance very seldom combine one with the other.

During the evening several different tubes were used in the set, and all gave results. Some tubes gave louder reception than others, but all were able to handle the DX work. Most of the work was done with a UV-201 using 125 volts on the plate.

Typical Flivver Evening

The above is simply given as a typical evening with the Flivver. Results are sometimes better one evening than another, of course, but the question has been asked so many times whether the Flivver can get the distant stations that it seems but fair to show what can be expected of it.

Here is a little hint. The Super Flivver set is not working at its maximum unless sooner or later, you are able to bring in on the ground alone a station that is 1,000 miles away from you.

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.)

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

WAH, Eldorado, Kans. 485 only. The Midland Refining Co. Daily ex Sat, 10:30 am, 1:30 pm, markets, weather. Sat, 1 pm, same. Central.

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

WAJU, Yankton, S. D. Yankton College.

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

WBAB, Syracuse, N. Y. 300 mi. Andrew J. Potter. Daily, 7-8 pm irregular. Eastern.

WBAD, Minneapolis, Minn. Sterling Elec. Co.

WBAF, Moorestown, 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. Sat, 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, 1-1:15 pm, 2:15-2:30, 4:30-5:30, music. Sat. morn. only. Eastern.

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

WBAP, Fort Worth, Texas. 400 and 485 only. 1,500 mi. Fort Worth Star Telegram. Daily ex Sun, 9:45-10 am, 11-11:30 am, 3-3:30 pm, 3:45-4. Daily ex Sat and Sun, 7:15-8 pm, 9:30-10:30, news, reports, concerts. Sat, 6:30-6:45 pm, bible lesson. Central.

WBAU, Hamilton, O. Republican Pub. Co.

WBAV, Columbus, O. 500 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. 1200 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.

WCAB, Newburgh, N. Y. Temporarily discontinued.

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

WCAD, Canton, N. Y. 200, 480 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. Thur, 8:30-10 pm, concert. Sun, 2-4 pm music. Central.

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

WCAI, San Antonio, Tex. Southern Equipment Co.

WCAJ, Univ. Place, Neb. 150 mi. Neb. 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. Central.

WCAL, 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.

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

WCAP, Decatur, Ill. Central Radio Service.

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, Tues, Wed, Thurs, Fri, 5:30-6 pm, code instruction. Central.

WCAT, Rapid City, S. D. 485 only. 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 & Company, Inc. Daily ex Sun, 11:30 am, 2:30 pm, 6:30, reports, music. Tues, Fri, 10-12 pm, concert. Sun, 2-4 pm, music. 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, Thur, 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. 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, Lindsborg, Kans. 485 also. 200 mi. Wm. Louis Harrison. Tues, Thurs, Fri, 9:30 pm, entertainment, weather. 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.

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. R. Co. Daily, 7:30-8:30 pm, 10:30-11:30 pm, concert. Central.

WDAK, Hartford, Conn. 150 mi. Hartford Courant. Daily ex Sun, 2:30 pm, 3:30, 4:30, 5:30, music; 7:40, bedtime story; 8:15, concert. Eastern.

WDAL, Jacksonville, Fla. 485 also. 250 mi. Florida Times Union. Daily, 11 am, time, weather; 4-4:30 pm, 8-9, music; 10:05, reports. Eastern.

WDAO, 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.

WDAS, 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 am-12, 5-6 pm, church services. Eastern.

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

WDAY, Fargo, N. D. 485 also. 300 mi. Kenneth M. Hance. Daily ex Sun, 12:15-12:30 pm. Tues, Thurs, Sat, 7:30-8:15, reports, news, music. Central.

WDM, Washington, D. C. 50 mi. Church of the Covenant. Sun, 10:30 am, church service; 3 pm, lecture; 7:30, 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; 8:15, bedtime story; 9:45, weather. Wed, Sat, 10-11:15 pm, dance music. Sun, 10:30 am, 4:30 pm, 7:30, church services. Central.

WEAC, Terre Haute, Ind. 485 also. 75 mi. Baines Electric Service Co. Daily ex Sun, 10:15 am, weather; 12-1 pm, 5-6, music. Central.

WEAD, Atwood, Kan. 485 also. 150 mi. N. W. Kansas Radio Supply Co. Daily ex Sun, 11-11:30 am, markets, music; 12, markets; 1:45 pm, markets; on half hour 3:15 to 5:45, news sports. Tues, Wed, Thurs, Sat, 7:30-9, concert. Sun, 11 am, church service; 3 pm, sacred music; 7:30, church service. Central.

WEAE, Blacksburg, Va. Polytechnic Inst.

WEAF, New York City, N. Y. 400 only. 1,500 mi. Western Elec. Co. Daily ex Sun, 4:30-5:30 pm. Mon, Wed, Thur, 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. Thur, 8-9:45 pm, concert. Central.

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

WEAN, Providence, R. I. 485 also. 50 mi. The Shepard 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. Central.

WEAP, Mobile, Ala. 485 also. 50 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, 2-2:30 pm, 6:30-7, weather, music, news. Tues, Thur, 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 eve, church service. Central.

WEAV, Rushville, Nebr. 200 mi. Sheridan Elec. Service Co. Wed, Fri, Sun, 8-9 pm, concert, news, etc. Mountain.

WEAW, Anderson, Ind. 25 mi. Arrow Radio Lab. Mon, Wed, Fri, 7:30-8:30 pm, concert, news, etc. Central.

WEAX, Little Rock, Ark. T. J. M. Daly.

WEAY, Houston, Tex. 1,500 mi. Will Horwitz (Iris Theater). Daily ex Sun, 11 am, dinner hints, news; 12 m, music; 12:57-1 pm, time; 2:30 pm, music; 6 pm, news. Wed, Fri, 8-10 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. Hurlburt-Still Elec. Co. Daily ex Sun, 10 am, 5:30 pm, weather, roads. Tues, Thur, 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.

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

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

WFAD, Salina, Kan. 250 mi. Watson Weldon Motor Supply Co. Daily ex Sun, 8:45 am, 9:45, 10:45, 11:45, 1:30 pm, reports. Tues, Thur, Fri, 8 pm, concert. Sun, 11 am, church service; 8 pm, concert. Central.

WFAF, Poughkeepsie, N. Y. 200 mi. H. C. Spratley Radio Co. Daily ex Sun, 10-10:30 am, 11:30-11:45, 1:30-2 pm, 4-4:15. Tues, Thurs, Sat, feature program, 8:15-9:15 pm. Eastern.

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

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

WFAJ, 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.

WFAS, Fort Wayne, Ind. United Radio Corp.

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, Nebr. 485 also. 300 mi. Univ. of Nebr. Daily ex Sun, 12:40 pm, weather. Mon, Thurs, 7 pm, lectures. Thurs, 8 pm, concert. Central.

WFAY, Independence, Kan. 500 mi. Daniels Radio Supply Co. Daily ex Sun, 12 m, 4 pm, news. Mon, Tues, Wed, 7:30-8 pm, entertainment. Thur, Fri, 7-8:30 pm. Sat, 7-9 pm, music. Sun, 11 am, church services. Central.

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

WFI, Philadelphia, Pa. 400 and 485 only. 1,000 mi. Strawbridge and Clothier. Daily ex Sun, 10 am, reports; 1:16 pm, news; 2, reports; 3:30-4:30, concert; 6:30-7, children's hour. Wed, Sat, evenings, concert. Wed, Fri, 10:10 pm; Sun, 3:30 pm, organ recital. Sun, 4 pm, chapel. Eastern.

WGAB, 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, Thur, 7:30-8 pm. Central.

WGAK, Macon, Ga. Macon Elec. Co.

WGAL, Lancaster, Pa. 35 mi. Lancaster Elec. Supply & Construction 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.

WGAT, Lincoln, Nebr. 500 mi. Am. Legion, Dept. of Nebr. Mon, Wed, 9 pm, announcements. Fri, 9-10 pm, patriotic program, concert. Sun, 3-5 pm, sermon. Central.

WGAU, Wooster, O. Marcus G. Limb.

WGAW, Altoona, Pa. Ernest C. Albright.

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, 9-10 am, financial news; 11:30, news, opening markets; 4 pm, news, closing markets. Mon, Wed, Thurs, Sat, 7:30-8:30 pm, concert. 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, 9, church services. 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.

WGR, Buffalo, N. Y. 485 also. 1,000 mi. Federal Tel. & Telg. Co. Daily ex Sat, 12:15 pm, weather; (Mon, Thurs, agriograms); 2, 3, 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. 370 and 485 only. 1,000 mi. General Elec. Co. Daily ex Sun, 12 m, 12:30 pm, 6, 10, reports, time, sports. Mon, Tues, Thur, Fri, 2-2:30 pm, 7:45, concert. Fri, 10:30 pm, special. Sun, 10:30 am, 4:30 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; 7 pm, lectures, news. Mon, Thurs, 7:20 pm, agriograms, concerts, sports. 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, 3:30 pm, 5, reports, music, news. Tues, Thurs, Sat, 8 pm, entertainment. Sun, 10 am, church service. Central.

WHAC, Waterloo, Ia. 150 mi. Cole Bros. Elec. Co. Daily ex Sun, 6 pm, news, sports. Mon, Wed, Fri, 9:30 pm, concert. 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. Thur, 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, 2:45, 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. 160 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. Spec. Co. Daily ex Sun, 12-1 pm, music. Mon, Wed, Fri, 6-8 pm, concert. Tues, Thur, 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, concert. 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. 100 mi. W. Va. University. Daily, 4-6, 7-7:30, news etc. Eastern.

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.

WHX, Des Moines, Ia. 50 mi. Iowa Radio Corp. Daily, 5:30-6:15 pm. Wed, 8-9:30 pm. Central.

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

WIAC, 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, band concert. Sun, 2:30 pm, music. Central.

WIAF, New Orleans, La. 300 mi. G. A. DeCortin. Tues, 9-10:30 pm, Fri, 12-1 am, music. Sun, 10-11:30 am, music. 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. 100 mi. Heer Stores Co. Daily ex Sun, 10:30-11, reports, news. Tues, Thur, Sat, 7:30-8:30 pm, music. 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, Thur, Fri, 10:15-10:30 am; 11:30-11:45, news; 11:45-12:10 pm, lecture; 5-6 pm, news; 7-7:15, music; 7:15-7:30, lecture. Central.

WIAQ, Marion, Ind. Chronicle Pub. Co.

WIAR, Paducah, Ky. 150 mi. Paducah Evening Sun. Daily ex Sun, 3:30-4 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, Binghampton, 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, 2:30-3:30 pm. Daily, 1:30-2 pm, 7-7:30 pm. Tues, 7-12 pm. Fri, 7-9:55 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, Nebr. 200 mi. American Radio Co. Mon, Wed, 8:30-9 pm. Central.

WJAD, Waco, Tex. 485 also. 500 mi. Jackson's Radio Engrng. Lab. Daily ex Sun, 12:30-1 pm, markets, news, music; 3:30-4, news, music; 6-6:15, sports; 8:45-9:45, concert, news. Sun, 11-12 am, church service; 3:30-4 pm, music; 6-6:15, sports; 8:45-9:45, 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, 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, 3, 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.

WJAQ, Topeka, Kan. 200 mi. Capper Publications. Thurs, health talks. Sun, 8 pm, church services. Schedule not regular. Central.

WJAR, Providence, R. I. 485 also. 600 mi. The Outlet Co. Daily ex Sun, 10-11 am, 2-3 pm, 5-6. Fri, 8-10 pm, concert. Eastern.

WJAS, Pittsburgh, Pa. 150 mi. Pittsburgh Radio Supply House (Pittsburgh Leader). Daily ex Sun, 11:30-12 m, 2:30-3 pm. Mon, Tues, Fri, 7-8 pm. Eastern.

WJAT, Marshall, Mo. 100 mi. Kelley-Vawter Jewelry Co. Daily ex Sun, 5:30-6 pm, concert. Central.

WJAX, Cleveland, O. 485 also. 1,000 mi. Union Trust Co. Daily ex Sat pm; Sun, 9-9:45 am, 10-10:45, 2-2:45 pm, 3-3:45, music, financial reports, news. Tues, 7-8:30 pm; Thurs, 8:15-10:30 pm, entertainment. Eastern.

WJAZ, Chicago, Ill. Chicago Radio Lab.

WJD, Granville, O. 100 mi. Denison Univ. Fri, Sat, 5-6 pm, music, educational lectures. Sun, 5-6 pm, religious stories. Central.

WJH, Washington, D. C. 100 mi. White & Boyer Co. Daily ex Sun, 1-2 pm, music. Tues, 7:45-10 pm, music. Eastern.

WJX, New York, N. Y. De Forest Radio Telephone & Telegraph Co.

WJZ, Newark, N. J. 1,500 mi. Radio Corp. and Westinghouse Elec. Co. Daily ex Sun, 9-9:15 am; 12-1:15 pm, 4-4:15, 7-7:30, 8-10:30. Sun, 10:30 am-1 pm, church services; 3-4:30, music. Eastern.

WKAA, Cedar Rapids, Ia. 200, 485 also. 200 mi. H. F. Paar. Daily ex Sun, 12:45 pm, reports; 5:30, reports, agriograms; 6-7, music. Thur, 11-12 pm, music. Sun, 4-5 pm, church service. Central.

WKAC, Lincoln, Neb. 400 mi. The Lincoln Star. Tues, Fri, 8-9:30 pm, concert, entertainment. Central.

WKAD, East Providence, R. I. Charles Looff.

WKAF, Wichita Falls, Tex. W. S. Radio Supply Co.

WKAH, West Palm Beach, Fla. Planet Radio Co.

WKAK, Okemah, Okla. Okfuskee County News.

WKAL, Orange, Tex. Gray & Gray.

WKAN, Montgomery, Ala. 200 mi. Alabama Radio Mfg. Co. Mon, Wed, Fri, 6:30-7 pm, music, news. Central.

WKAP, Granston, R. I. Wilcox Flint.

WKAQ, San Juan, Porto Rico. Radio Corp. of Porto Rico.

WKAR, East Lansing, Mich. Mich. Agrl. College.

WKAS, Springfield, Mo. 100 mi. L. E. Lines Music Co. Daily ex Sun, 6:30-7 pm, sports. Mon, Fri, Sat, 8-9:15 pm, music. Central.

WKAV, Laconia, N. H. Laconia Radio Club.

WKAW, Beloit, Wis. 100 mi. L. M. Turner. Daily 12-12:15 pm, 7-7:30, concert. Central.

WKAX, Bridgeport, Conn. 75 mi. Wm. A. Macfarlane.

WKAY, Gainesville, Ga. 100 mi. Brenau College. No definite schedule. College activities. Thurs, 8:30 pm, concert. Eastern.

WKC, Baltimore, Md. 500 mi. Jos. M. Zamoiski Co. Tues, Thurs, Sat, 7:30-9:30 pm. Eastern, daylight saving.

WKN, Memphis, Tenn. Riechman-Crosby Co.

WKY, Oklahoma City, Okla. 485 also. 500 mi. WKY Radio Shop (Daily Oklahoman). Daily ex Sun, 12 m, weather; 7:30 pm, sports, specials; 9 pm, weather, news. Tues, Wed, Fri, 8:30 pm, concerts. Central.

WL2, Fairfield, O. U. S. Army.

WLAC, Raleigh, N. C. N. C. State College.

WLAG, Minneapolis, Minn. 400 and 485 only. 1,000 mi. Cutting & Wash. Radio Corp. Daily ex Sun, 9:30 am, 10:10, 10:30, 11:30, 1:30 pm, 2:20, 4:30, reports; 6-6:30 pm, children's hour; 6:30-7:30, lecture. Tues, Wed, Fri, music. Mon, 10:10 pm, concert. Thurs, 9:15 pm, concert. Sat, 8:30, 10:30 pm, concert. Central.

WLAH, Syracuse, N. Y. Samuel Woodworth.

WLAJ, Waco, Tex. 485 also. 1,000 mi. Waco Elec. Supply Co. Daily ex Sun, 9:30 am, 10:30, 2:30 pm, music, reports. Tues, Thur, 7:45-8:45 pm, music. Sun, 3 pm, church service.

WLAK, Bellows Falls, Vt. Vermont Farm Machine Co.

WLAL, Tulsa Radio Co. Tulsa, Okla.

WLAM, Springfield, O. 100 mi. Morrow Radio Co. Mon, Wed, Fri, 8-9:30 pm, dance music. Central.

WLAN, Houlton, Me. Putnam Hdwe. Co.

WLAP, Louisville, Ky. W. V. Jordan.

WLAQ, Kalamazoo, Mich. 100 mi. A. E. Schilling. Daily, 10-12 pm, music. Central.

WLAS, Hutchinson, Kan. 485 also. 200 mi. E. V. Plush. Daily ex Sun, 9:30 am, 10:20, 11:30, 12:30 pm, 1:30, 5:15, markets, weather; 12:30-1:15 pm, 5-6, music. Wed, 8-9 pm, concert. Sun, 3 pm, music. Central.

WLAT, Burlington, Ia. Radio and Specialty Co.

WLAV, Pensacola, Fla. 200 mi. Elec. Shop, Inc. Daily ex Sun, 8-9 pm, music, entertainment. Central.

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

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

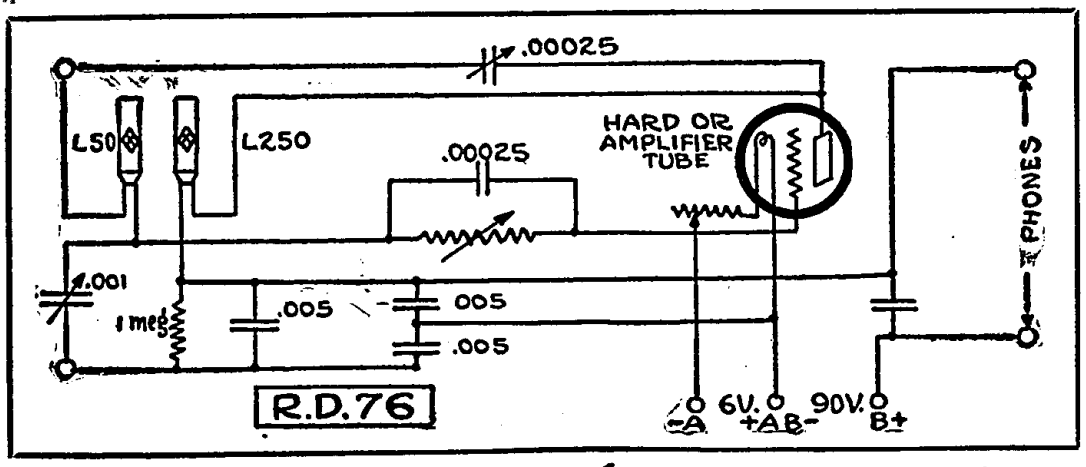
WLAY, Fairbanks, Alaska. Northern Commercial Co.

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

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

(The third and last part of the station schedules will appear next week. With this will appear the city-station index.)

FLEWELLING BASIS OF R.D. 76



MANY attempts have been made to adapt the Flewelling condenser bank to other circuits, some of which have given very good reception while others show but doubtful performance. One of the new developments of this circuit is given here as Hook-Up R.D. 76.

For some time .006 mfd. condensers were rather scarce on the market so the more standard capacity of .005 mfd. was substituted.

A 50-turn honeycomb coil is used in the antenna circuit with a .001-mfd. vernier variable condenser in series on the ground side. Regeneration has been increased by the use of a 250-turn honeycomb coil in the plate circuit. In addition a .00025 mfd. variable condenser is placed in series between the antenna and plate. A variable grid leak with a .00025 mfd. grid condenser is used as in the original Flewelling. A fixed condenser of .001 mfd. capacity is shunted across the telephone receivers. A hard tube is used in combination with about 90 volts of B battery in the plate circuit.

The resistance of the variable grid leak should be kept high and the filament rheostat, which should be of the vernier type, is turned on about three-quarters of full current. The plate condenser is kept low while the condenser in the ground circuit is adjusted for wave length. The coupling between the two coils is adjusted for best results in conjunction with variations of the plate condenser. Often the grid leak and the rheostat can be readjusted for improvements in reception.

The controls for tuning are numerous and require a little practice and some skill in operation, but the circuit is very selective and will amply repay the experimenter in results.

Book Reviews

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

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

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.

Revolutionary Theories in Wireless. By Frank E. Summers. A treatise in the how and why of Radio and science. A practical result of years of careful study and research by the author. Non-technical, written so you can understand it. Price, $2.50.

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.

Radio Reception. By Harry J. Marx, Technical Editor Radio Digest Illustrated, and Adrian Van Muffling. A simple treatise on Radio reception. Beginning with the elementary principles of electricity it carries the reader on into the essentials of Radio telephony. The most successful methods of Radio reception are explained and special reference given to practical tuning. 230 pages, with 130 illustrations. Price, $2.00.

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

Never operate a receiving set in the cellar or other damp place.

Gold Plated Aerials

Gold-plated wire for the antenna is the latest for the utmost efficiency. R. H. G. Mathews, of Chicago, central division manager of the American Radio Relay League and one of the best known amateurs in America, uses gold-plated wire to avoid corrosion, which increases skin resistance and so lowers efficiency.

Never use oilcloth as a cover for the table on which a Radio is placed. It acts as a conductor.

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Radio Controlled Airplanes

Tremendous Possibilities for Quick Action of Planes

RADIO controls an airplane in a six-hour flight. Not a soul on board but yet the ether waves from the ground turned the trick. Does this seemingly unimportant news dispatch from France have any meaning to you?

Major General Patrick, chief of the U. S. air forces, recently stated that Radio controlled planes would be common in this country before long. That being the case, the lives of many U. S. military pilots will be lengthened considerably. Nowadays, eight years is about the maximum life of our military fliers. They are often maimed for life long before the eight years are up. Radio will prolong the lives of the pilots and make military aviation a more attractive career for youths looking forward to imitating Methuselah.

Snowbound Farmers

Shut in by Large Drifts, Radio Relieves Monotony

MANY persons living in the country who looked upon Radio as a plaything are now well convinced that broadcasting is a real utility. Recently an eastern state was almost buried under snow. The cities were able to cope with the snow after a fashion, but the country was practically isolated, especially after the wind churned up the snow and drifted roads as rapidly as shovelers and tractors opened them. The farmer was snowed in. Rural mail carriers found it impossible to get through for days. In some cases the telephone lines were temporarily out of commission. Notwithstanding his isolation the farmer with a Radio receiving set was able to get the news of the day.

Ether Etiquette

The Right of One's Neighbor Should Be Considered

THERE is a certain code of action in every sport, one that is intended to permit the greatest number to enjoy that sport. In the theater, hats are removed. The person who stands in his seat at a ball game is soon requested with "down in front," and if he does not "down" he is apt to be downed. Persons who are noisy during a symphony concert are asked to leave. If you think the matter over for a moment you will appreciate that corresponding features exist in Radio broadcast reception and that "listening in" must be played as a gentlemen's game.

Every Radio receiving station consists of an antenna of some description connected to some type of receiving apparatus. The antenna intercepts and absorbs from the passing magnetic waves a certain amount of energy. This amount will vary with the type of receiver used, the operation of receiver, the size of the antenna and overall the efficiency of the receiving set.

Listeners employing crystal sets can do a great deal of good for other listeners by detuning their sets when they are in use. It is not necessary to disturb the adjustment of the crystal to do this. Merely turn your tune dial or knob, or place your tuning coil sliders to either end of their scales and your set will not absorb the energy that other listeners in wish to pick up.

Most regenerative receivers become miniature transmitters when the regeneration control is placed at a point where the receiver will oscillate. Waves radiated from a station using a receiver in this way can be picked up several blocks away by other regenerative sets.

Every Radiophan has heard the faint whistles and squeals moving over the scales of their sets, spoiling the reception of distant concerts. These whistles are caused by thoughtless fans receiving signals while their sets oscillate. These listeners find the station with their detector tube oscillating and then, by careful adjustment, lower the "beat note" to zero. By keeping the receiver at this central adjustment it is possible to receive signals with the detector tube oscillating. Since the slightest change in either the transmitting station's wave length or the receiving station's antenna or adjustments will cause a growl or squeal, this method is to be discouraged as most impolite and unsportsmanlike.

Condensed

By DIELECTRIC

Is there any special significance in the fact of thirty-four broadcasting stations failing to renew their licenses to broadcast during the month of January? Are there already enough stations operating to fulfill the needs of the Radio audiences of the country? Everyone of you knows that there are too many using the ether now, on the present allotment of wave lengths. Even with the benefits to come with the ultimate passage of the White bill, it would seem desirable to eliminate some of the less efficient broadcasting stations. We have passed the stage of quantity requirements and entered the quality era. Very few fans are content merely to hear "something." The letter printed in Radio Digest from Rochester, N. Y., is an indication of the modern trend of listeners in away from the cut-and-dried character of program. Something of the 400-meter station requirements must be made to apply to all stations in the very near future.

Homesickness, at least, may be reduced to a minimum by copying the plan of Station WWJ, which proposes to install a receiving set on the S. S. Pastores of the United Fruit Company, so that the passengers (from Detroit) may have the home news daily on their cruise to the tropics. This plan would no doubt work well aboard other vessels within a broadcasting radius of the home station. But what about that other dread malady often accompanying sea travel? If Radio can be used to prevent seasickness as well, then it will be a boon to a large number of voyagers. A reflex circuit might tend to stabilize the undue amount of oscillation set up in the feed-back system of a passenger in a rough sea. The details of this Radio specific I shall leave to some medical fan.

Radiophans in Chicago are going at the silent period program with a vengeance. They first proposed an ordinance compelling one night a week of silence on the part of local broadcasters, so that DX work might pursue its course undisturbed. It looked a little dubious to me, however, since the measure was referred to the committee on "gas." That is the subject in hand, but most such committees favor the gas-er rather than the gas-ee. However, the local plants have agreed on a silent Monday night without recourse to an ordinance. It only goes to show how determined we fans can be to gain our end. "Silence, and mighty little of that," has been the slogan of the vast majority of broadcasting stations, though I'm glad to say that quite a few have lately acceded to the popular demand without being coerced in such forceful manner. It will come to all of us eventually. In the meantime Radio Golf suffers in some quarters.

What becomes of the Radiowl in the light of this warning from the Department of Commerce? Surely the reading of letters and telegrams from Screech and Hoot owls is in contravention to the rule against acknowledging such messages by broadcasting. It is not alone the clan to which I have referred as violating this rule to whom all censure is due. There are many stations in the habit of reading communications from listeners in. This is uninteresting to most of us, as a matter of fact, and probably pleases only those whose names are being read. The revocation of licenses is a stern measure—but enforceable.

I believe much good is to come as the result of the activity of the National Radio Chamber of Commerce. This body is concerned with improving the character of broadcasting programs by eliminating much that is trivial and without real value to the main Radio public. Whether or not it should come within the scope of this organization to use its influence to debar questionable matter from the air, I do not know. That such matter is being broadcast I do know, having heard it. It may be assumed that children should be in bed while these vaudeville skits are being sent out. Quite likely. There are some adults to whom alleged witticisms carry considerable nauseating effects. Of course with the audience in the hall we are not concerned, but the larger audience wishing to hear something worthwhile and clean can hardly be expected to tune in culpable stations as frequently as would otherwise be the case. Before a number of invited guests expectantly awaiting what should come from the loudspeaker, such incidents are not helpful to the game.

Another distance record has been established by Station WHAZ, the Rennselaer Polytechnic Institute, at Troy, N. Y., and one by an amateur, A. G. Leonard, Jr., of this city. In the first instance, concert programs were received in New Zealand over a distance of 10,000 miles, both speech and music being clearly received. Mr. Leonard's record is quite noteworthy for a 200-meter station. His voice was heard by the operator of the Awaru station, at Invercargill, New Zealand, a distance of 8,000 miles. The voice was said to be very plain though weak, while the CW messages were clear and strong. These records are multiplying rapidly and you can look for a new one most any day.

Two large audiences heard speeches simultaneously, the one in Chicago and the other in New York, by means of telephonic communication, while at the same time a much larger audience was listening in to the proceedings through their receiving sets. Honor was paid to the memory and contributions of Dr. Alexander Graham Bell to telephonic development. Radio development has not yet reached the point where a two-way conversation may be carried on between two stations privately. Scientists are working out the principles involved but have not succeeded so far in attaining the desired end. Much that has seemed impossible is now a reality, so that this difficult problem may be solved and become a practical phase of Radiophony.

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.)

But What's in a Name?

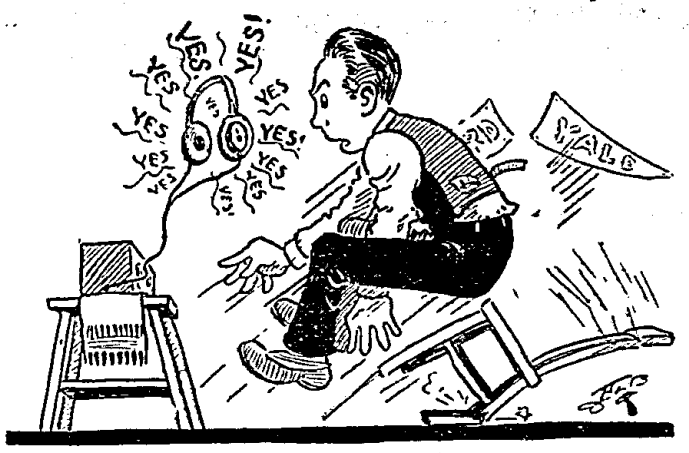
Dear Indi—

Glancing over some of the programs of the multitudinous broadcast plants, I fain would report that Mrs. Pipes plays (the violin, not the organ) for KGW, Arthur Bean is served Seattle fans a la ether, and Mr. Head and Mr. Stern are now featured at one of the Atlantic Seaboard stations. Oh, yes, Mr. Story recently told a fairy tale for the children listeners of WGI.

—INDIPHAN.

Oh Ladio!

I called my love by Radio,
In hopes that she would hear;
I asked her if she'd marry me,
And closed it, "Billy Dear."



Oh! sad is my predicament—
Indeed a sorry mess;
When I tuned in my receiving set
I heard forty answer, "Yes!"

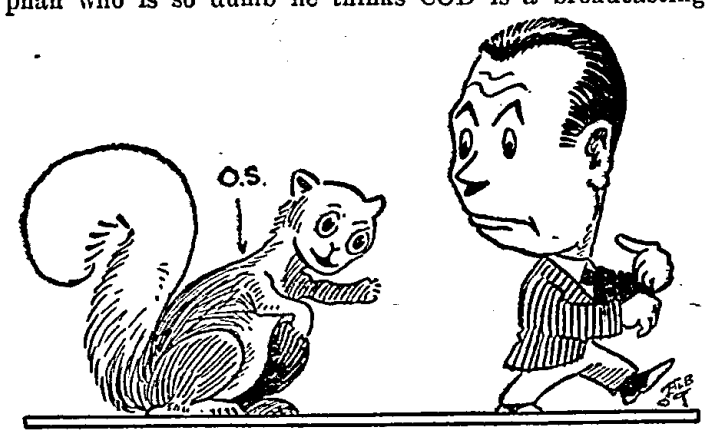
—LORD JEFF.

Here's an Old One in a New Setting

A director of a broadcasting station was asked by a prospective user of the service what the charge was. "One hundred dollars for the first ten minutes" was the answer. "All right," said the prospect, "we'll skip the first ten minutes."

His Type Cornered All the Gold Bricks

The Office Squirrell sez he heard of a so-called Radiophan who is so dumb he thinks COD is a broadcasting



station. Said dumbbell also thinks all noises other than music are created by the died-in-the-wool DX worker next door who has only been "in Radio" for ten years or more.

O. O. McIntyre, the famous New York writer, recently said, "Talking by Radio is just like talking into a knot hole."

—G. C. C. JR.

A. B. C. Lessons for Radio Beginners

Chapter XI—The Vacuum Tube as an Amplifier

By Arthur G. Mohaupt

AMPLIFICATION in Radio refers to strengthening or increasing the intensity of the signals received and detected. Prior to the perfection of the three-electrode vacuum tube, numerous attempts had been made to produce or develop some amplifier device, but all attempts were without real success. With the advent of the vacuum tube, however, the problem was solved quickly, for not only can the vacuum tube be used as a detector of Radio signals, but under the proper conditions can also be used as an amplifier of the rectified oscillations existing in the output or plate circuit of the detector tube. Exactly how this can be accomplished will now be explained.

The Vacuum Tube as an Amplifier

Although the average detector tube can also be used as an amplifier with some degree of success, better results can be obtained if a specially prepared tube, known as an amplifier tube, is employed. Although an amplifier tube greatly resembles a detector tube in its mechanical construction, it differs, however, in that a much higher vacuum exists within the amplifier tube. In fact, the degree of vacuum is practically as high as can be obtained with modern exhausting apparatus.

On account of this higher vacuum the amplifier tube is often referred to as a "hard tube" to distinguish it from the soft detector tube in which there are still small quantities of gas left. The higher vacuum makes it possible to employ a much higher plate pressure, and hence the oscillations impressed on the grid can be greatly amplified without in any way distorting or altering the nature of the signals.

General Operation of Tube

In order to understand fully how a three-electrode vacuum tube adds as an amplifier, let us review briefly the general operation. We will remember that as the filament of a tube is heated, negatively charged electrons are emitted which fill the interior of the tube. If then a positive potential is applied to the plate from some source of electrical energy, such as a group of dry cells, the electrons are attracted toward the plate and render the intervening space a good conductor of electricity.

A current can then flow in the plate circuit, the energy being supplied by the dry cells. Between the filament and the plate is the grid in the form of a screw or woven network of fine wires. The electrical condition of this intervening grid has the ability to control the electronic emission and hence also the flow of current in the plate circuit.

If the grid is negatively charged, it repels some of the electrons back upon the filament and thus weakens the plate current. On the other hand, if the grid is charged positively, it attracts the electrons on their way to the filament, increases the number that are emitted from the filament, and in this manner strengthens the current flowing in the plate circuit.

Detector and Amplifier Action

That the tube may function as a detector or rectifier of electrical oscillations, the relative electrical conditions of the three elements or electrodes has to be such that a positive charge on the grid produces a greater increase in plate current flow than the decrease in plate current flow caused by an equal negative charge.

In this manner a unidirectional pulsating current is set up in the plate circuit, and the envelope of these direct current oscillations correspond in all details to the electrical oscillations that are initially sent out at the transmitting station.

That the tube may act as an amplifier of electrical oscillations, the relative electrical conditions of the three electrodes must be slightly different. The conditions must be such that equal positive and negative variations of the grid potential will cause correspondingly equal increases and decreases in the plate circuit current. This state of affairs is effected by applying a higher positive pressure to the plate of the tube. If the increases in plate current were greater or less than the decreases, the signals would be distorted and the sounds heard would not be very pleasant.

Increase and Decrease in Plate Current

If then, an alternating electromotive force is impressed upon the input circuit of the amplifier, that is, across its filament and grid, the positive and negative voltage alternations will cause corresponding increases and decreases in the plate circuit current—with the difference, however, that the intensity of the electrical oscillations in the plate circuit is much greater than that of the oscillations initially impressed upon the plate and grid. The necessary additional energy is supplied by the battery supplying the high plate pressure.

The alternating electromotive for operating the input circuit of the amplifier tube is generally obtained by means of a transformer connected into the output circuit of the detector tube. This transformer is of the step-up type, so that the change of voltage impressed on the grid will be as high as is practically possible. Very slight, practically no current is required to affect the grid, and hence large voltage variations can be created in the plate circuit by supplying only minute quantities of energy to the grid circuit. It is for this reason that the three-electrode vacuum tube can be used so effectively as an amplifier of electrical oscillations.

Connections for Amplifying Tube

In Figure 40 is shown a wiring diagram illustrating the scheme of connections used when an amplifying tube is used in connection with a transformer for amplifying the electrical oscillations in the output circuit of a detector tube. D is the detector tube with the connections M and N leading to the turner. In the plate or output circuit, instead of having the telephone receiver, we have the primary winding of an iron-core step-up transformer. The secondary of this transformer, in turn, is connected across the filament and grid of the amplifier tube T. Into the plate circuit of this tube the telephone receivers are then connected in series with the high-voltage battery B-2.

The circuit arrangement operates in the following manner:

When the receiving apparatus is tuned to the frequency of the incoming electrical oscillations, these are impressed upon the filament and grid where they undergo rectification and are reduced to oscillations at an audio frequency. These audio frequency oscillations are then sent into the primary of the transformer and induce current oscillations of a much greater potential in the secondary circuit.

These oscillations are then impressed upon the filament and grid of the amplifier tube T. Here they cause corresponding fluctuations in the plate circuit current, but since the battery B-2 is capable of supplying additional energy, the electrical oscillations are of much greater intensity and hence are capable of affecting the telephone receivers so that louder sounds are produced in them.

In case one amplifier tube does not produce sufficient amplification, a second one can be used, but it is seldom advisable to employ more than two, for otherwise undesirable distortion of the signals is likely to result.

Kinds of Amplification

Amplification in Radio circuits can be effected in several ways. The first method was explained in the previous paragraphs, and consists of sending the electrical oscillations in the output circuit of the detector tube into one or more amplifier tubes until the desired strength of signals is obtained. This method of amplification is known as "cascade amplification," for the amplifier tubes are said to be connected in cascade—the word cascade meaning one on top or above the other. It is seldom advisable, however, to employ more than two stages of such cascade amplification, for as was stated, undersirable distortion of the signals is otherwise likely to result.

This method of amplifying the audio frequency oscillations of the output circuit of the detector tube is also commonly referred to as audio frequency amplification since it affects or amplifies the audio frequency oscillations.

Connecting Amplifying Tube in Cascade

In Figure 41 is illustrated the method of connecting two amplifier tubes in cascade. Such an arrangement is known as a two-step or two-stage amplifier. As is shown, the output circuit of the detector tube is connected through an audio-frequency transformer to the input circuit of the first amplifier tube. Into the plate circuit of this amplifier tube is connected the primary of a second audio frequency transformer, and the secondary of this transformer is in turn connected into the input circuit of the second am-

(Continued on page 12)

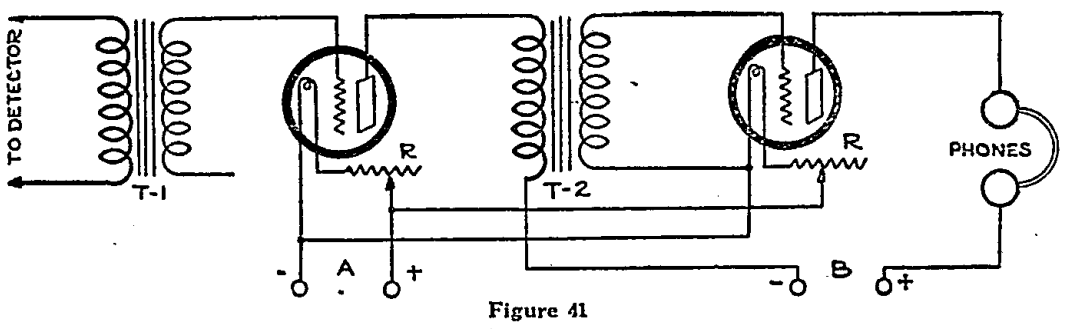


Figure 41

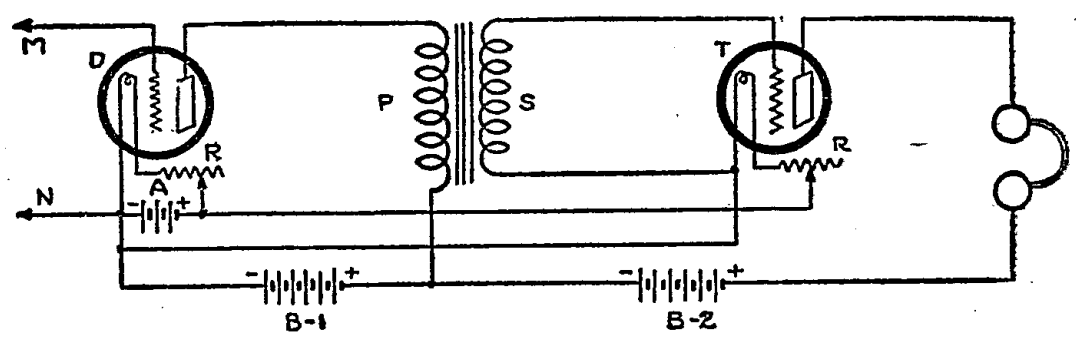


Figure 40

Tapped Coil and Variocoupler Circuit

Feed Back Produced by Two Coils on One Tube

The materials necessary to make the hook-up shown in the accompanying illustration consist of one variocoupler, one 43-plate condenser, one tapped coil on a tube three inches in diameter and 12 inches long, one detector unit and other accessories such as B battery, headset, etc.

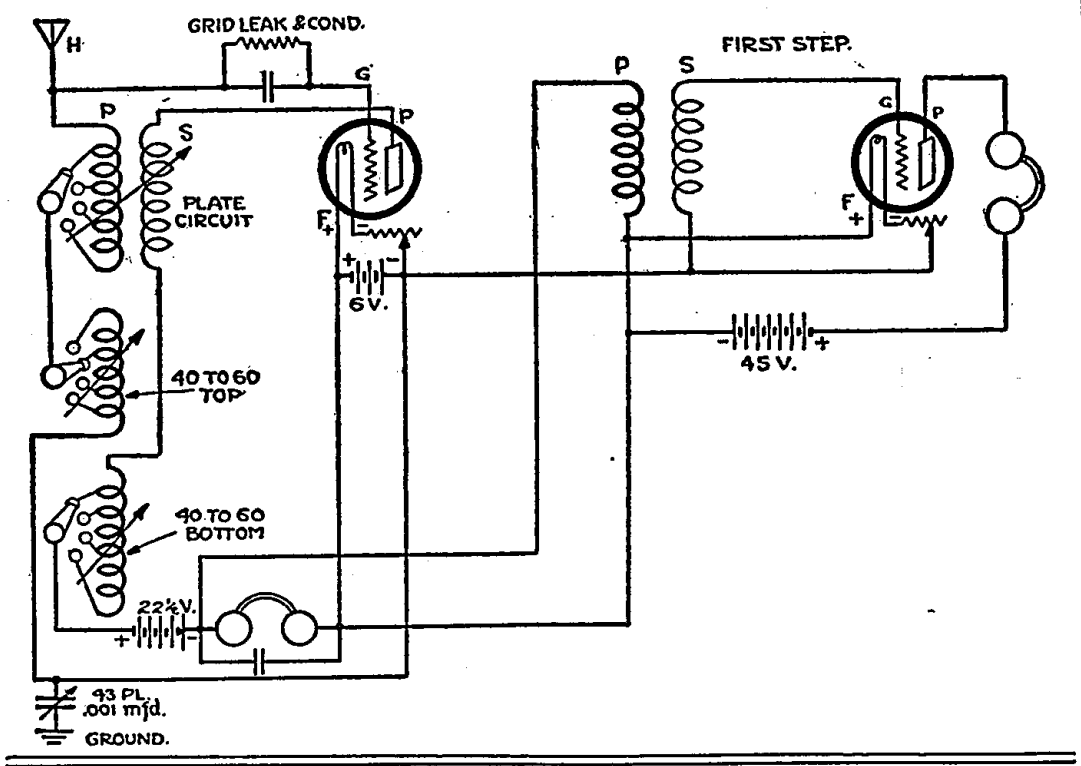
In a way the circuit is critical. The secondary of the coupler must be turned until regeneration is obtained. When once at this point, the set can be left alone, but still it will tune out the little fellow. The tapped coil consists of two separate coils, wound in the same direction but not connected. They are each tapped. About 40 turns of No. 16 or 18 wire is used for the aerial inductance. The upper portion should be the aerial inductance, and the lower the plate feed back.—Willard Tolhis, Bethesda, O.

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 Illustrated,
123 West Madison St., Chicago, Ill.

HOOK-UP FOR SELECTIVE TUNING



A. B. C. LESSONS

(Continued from page 11)

plifier tube. Into the output circuit of this tube the telephone receivers are connected in series with the battery B-2.

As was stated before, a higher plate pressure is needed for amplifier tubes than is required for detector tubes. The B batteries used in amplifier circuits generally have a pressure of 45 volts, although pressures even as high as 67 and 90 volts are sometimes used. Often a single 45-volt B battery is used with a 22½-volt tap, the plate circuit of the detector tube being connected to this tap while the plate circuit of the amplifier tubes is connected to the 45-volt terminal.

Audio Frequency Transformers

The transformers used for linking the output circuit with the input circuit of the next amplifier tube are known as audio frequency transformers, for they are used to step-up the voltage of the audio frequency electrical oscillations impressed across the primary winding.

The number of times that a transformer steps up the voltage depends upon the relative number of turns in the secondary and primary windings. Transformers are consequently rated according to the number of times they step up the voltage, this factor being termed the transformation Radio. A 10 to 1 transformer steps up the voltage ten times. It also has ten times as many turns on the secondary winding as on the primary winding.

Whenever two stages of audio frequency amplification are employed, it is better to use two transformers having a different votage ratio, especially if the ratio of the first is high. If the first transformer has a 10 to 1 ratio, it is better to use for the second transformer one having a ratio of 5 or 3 to 1. However, equally good results can be obtained, and some claim even better, if two transformers of the same ratio are used, providing the transformation ratio is not too high. Thus, very good results can be obtained by using two transformers each having a 5 to 1 ratio.

Radio Frequency Amplification

Often when the receiving apparatus is not very sensitive, or when the transmitting station is so far away that the incoming waves are too weak to properly affect the detector, it is possible to strengthen or amplify these signals before they reach the detector tube. Such amplification is known as Radio-frequency amplification, for the oscillations that are being strengthened or amplified are still at a Radio frequency.

The same amplifier tubes as were used for audio-frequency amplification can also be used for Radio frequency amplification. However, any number of steps of Radio-frequency amplification can be used without in any way affecting the quality of the signals. The successive steps of Radio-frequency amplifiers can be linked to each other in several ways, although Radio-frequency transformers are most commonly used. These transformers differ from the audio-frequency transformers mentioned above in that they do not contain an iron core.

Regenerative Amplification

Another form of amplification used very extensively is that known as regeneration or regenerative amplification.

In regenerative amplification the plate circuit of the detector tube is tuned by means of some form of inductance, such as a variometer, until it has exactly the same oscillation frequency as that of the incoming waves. Under these conditions some of the energy of the plate circuit is actually fed-back upon the grid circuit, with the result that it is again sent through the detector tube and amplified to a large extent.

Each of these methods of amplification will be taken up in detail in later chapters, where practical instructions will also be given for constructing the various types of amplifiers.

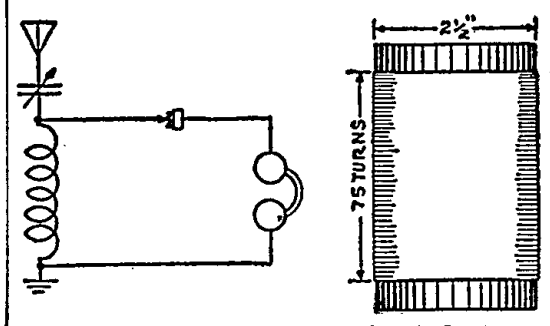
Chapter Twelve

The practical construction of a two-stage audio frequency amplifier, as well as a detector employing regenerative amplification will be taken up in Chapter Twelve. Everyone interested in the constructure of either of these circuits should not miss this most important chapter.

One Knob Control for Tuning a Crystal Set

The set described is tuned completely by means of a variable condenser, the inductance being fixed. The detector may be of any make, but I would suggest the use of a Grewol. The variable condenser is of the Crosley make, which is in the form of a book. The antenna is 300 feet long and 50 feet high, and the inductance consists of a 2½-inch cardboard tube wound with 75 turns of magnet wire.

Of course, if the antenna is shortened,



the number of turns on the inductance must be increased. With this set the writer has heard all of the local stations as well as WBAP, Fort Worth, Texas, which is 250 miles distant. Two other stations were easily heard, WDAF, a powerful station in Kansas City, Mo., 650 miles away, and WFAA of Dallas, Texas.—Milton Hobbs, Houston, Texas.

How to Wind Your Own Reinartz Coils

-By H. J. Marx

SUCCESSFUL operation of the Reinartz circuit is based upon the efficiency of the tuning unit which consists in its most popular form of a spider web coil. The term "spider web," however, includes so many different kinds of winding that the amateur is apt to be hopelessly bewildered by the assortment, and wonders which of the many varieties he should use. For this reason, it has been felt advisable to consider again the subject of spider web coils and to describe the various methods of winding as would be practical for use with the Reinartz circuit.

Types of Coils

There are two popular types of coils. The one has the wire wound on a framework of some sort, while the other is of the self-supporting type where the framework is taken out after the coils have been wound and specially treated with "dope."

The three forms of coil frames are shown in Figures 1, 2 and 3, of which the last two are most popular. The frames

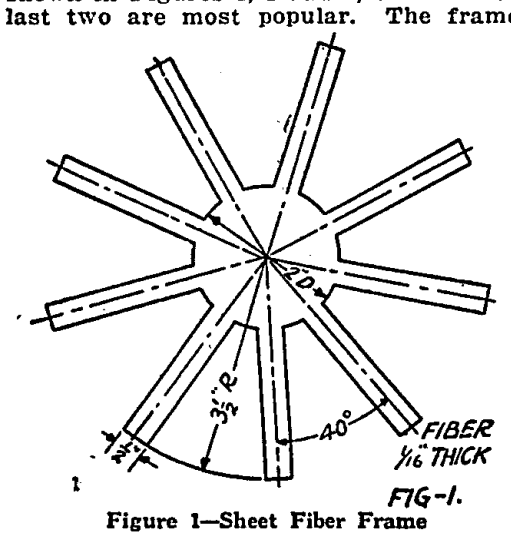


Figure 1—Sheet Fiber Frame

of Figures 1 and 2 are made from 1/16-inch stock of either fiber, panel material, or even tough cardboard. The wire being laced back and forth around the projecting pegs or through the slots of the type shown in Figure 2. The number of projecting arms or slots is always kept odd so that each succeeding layer is on the opposite side of the peg from the preceding one. In this way each layer acts as a support for the layer immediately following it and thus builds up a substantial and good form of inductive coil unit.

Methods of Winding

This method of lacing the wires back and forth around the pegs is illustrated in A of Figure 5, which would represent a view with the pegs straightened out. Another method that is often used is shown in B of Figure 5. In this type of

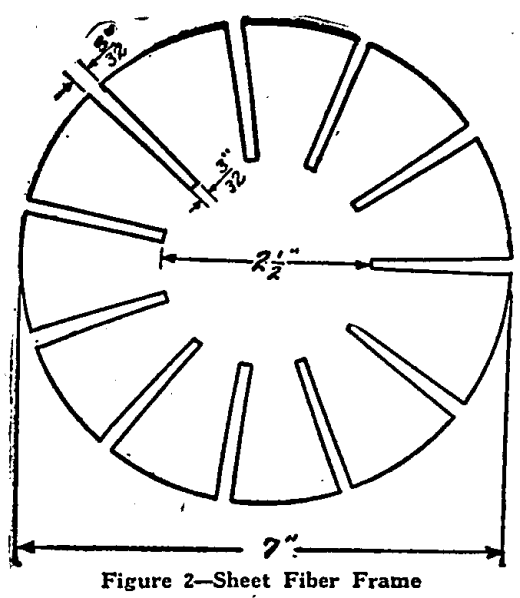


Figure 2—Sheet Fiber Frame

winding, the wire jumps two pegs each time and in this way gives more of a flat or pancake effect to the coil.

Still another variation is shown in C of Figure 5 in which the wire always jumps two pegs on the one side, but only more or less around one peg when on the other side. This gives a perfectly flat surface on the one side of the coil which is usually used as a base while the other side is used for taking off taps as laid out.

Self-Supporting Coils

In the self-supporting form of spider web coils, the wires are as a rule wound on a wooden framework of the type shown in Figures 3 and 4, the pegs of which can be removed and the core taken out after the winding has been completed and been treated with a special "dope" or coating solution. These special forms of windings vary somewhat, and the appearance of the coil can be changed considerably by slight alterations in either the weaving back and forth of the wire or the arrangement of the pegs around the core.

With the type of frame shown in Figure 3, the self-supporting coil usually uses some form of winding similar to either B or C. The frame No. 4, however, has a peculiar type of winding shown in D of Figure 5. In this form one turn of wire is taken around the core between the two rows of pegs. At the next layer, the wire zigzags back and forth around the pegs as illustrated. The following turn is again laced around in a straight line between the two rows of pegs. This method of alternation is kept up throughout the winding.

It should be noticed that the primary and secondary are all one length of winding spaced with fifteen extra turns connecting the two sets of taps.

The primary consists of ten turns. With a tap for every turn counting the starting lead, there will be eleven connection

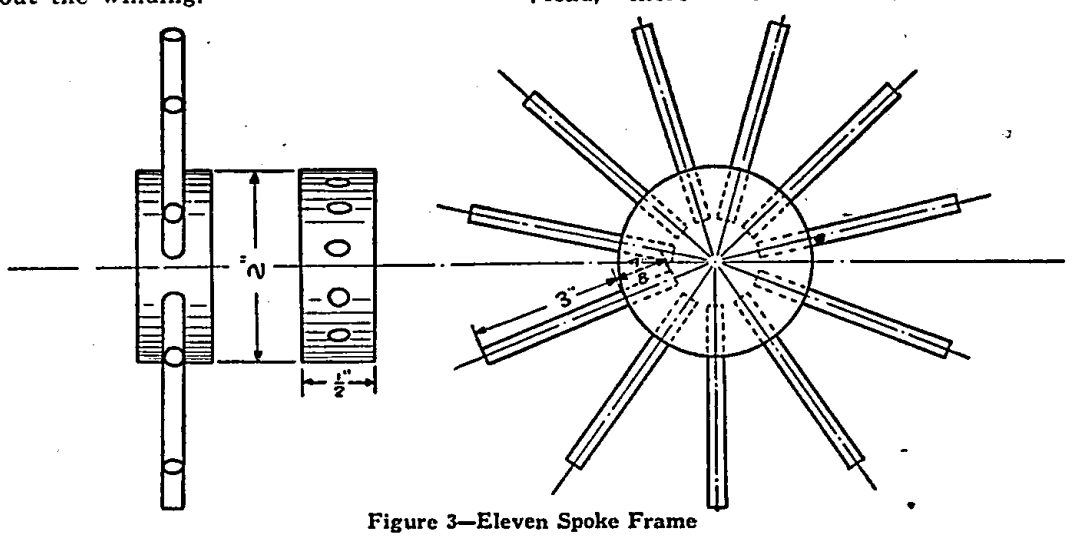


Figure 3—Eleven Spoke Frame

Treating the Coils

Naturally if the wire was just wound as indicated and the pegs were then pulled out, the winding would collapse. To avoid this, the coils are given a coat of some solution which will cement the successive layers to one another, making the whole a more or less solid structure. These solutions vary considerably and have different values.

points. After the last tap, fifteen extra turns are wound on before the next tap is made. This tap is the first connection point for the secondary tap switch.

The secondary winding consists of twenty-eight turns, tapped after every seven turns. Counting the first tap, this will give five connection points.

Soldering Tap Leads

In soldering the connections to the con-

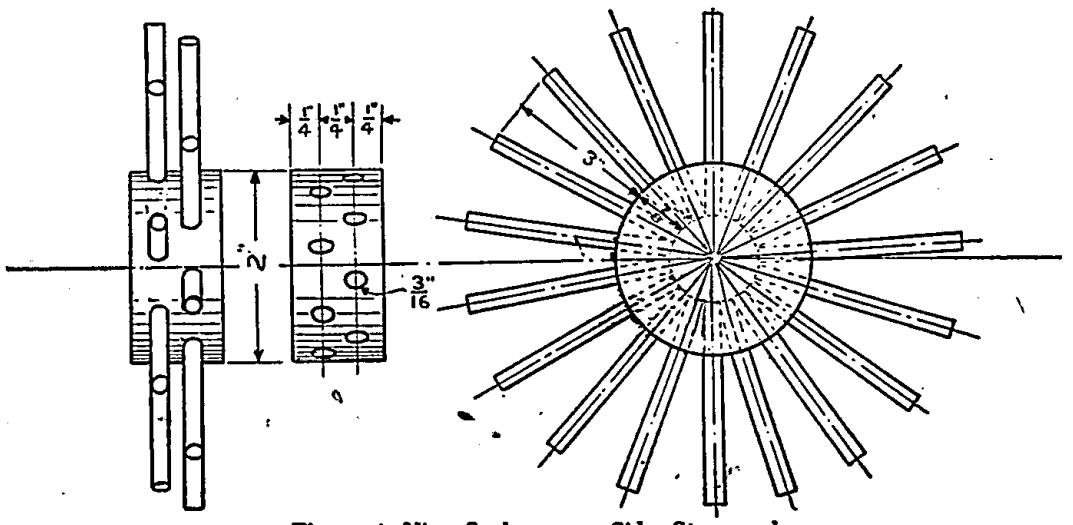


Figure 4—Nine Spokes on a Side, Staggered

One solution often used is made by dissolving celluloid in alcohol. This is then brushed on the coil. After the alcohol is evaporated and the celluloid is set, the pegs can be removed. Depending upon the thickness of the solution, two, three, or even four coats may be necessary. Another cheaper form of solution is the use of ordinary water-glass which is nothing more or less than sodium silicate. This can be purchased at any drug store. Still another solution is made by dissolving celluloid in acetone. It is not good practice to put on too much of the solution, since the capacity effect is increased, thus overcoming the biggest advantage of this form of winding.

Details of the Taps

Either No. 24 or 26 copper wire can be used for winding. Single cotton or single silk covering is all that is necessary. Regardless of the type of winding each turn around the core is mounted.

The wire should be laced in and out of the tongues of the frame with an even tension throughout. The taps should not be taken all at the same point, but should be taken in steps—each one on the tongue following the one where the preceding tap was taken off. The turns are counted from each tap point. In this way about two complete extra turns are accumulated. In taking off a tap a one-inch loop is twisted in the wire and the turns are continued, afterwards the covering can be removed from the taps to prepare for soldering on leads.

Number of Turns in Each Coil

The first and tickler winding consists of sixty turns, with a tap every fifteen turns. Counting the start and finish taps, this will give five connection points.

tact points it is advisable first to tin the tapped connections. This will make it easier to get a good soldered joint and perfect electrical connection. Poor and careless workmanship will do more towards destroying the efficiency of a receiving set than any other factor. After the winding has been completed the projecting tongues can be trimmed off, leaving a ⅛-inch projection above the last turn.

The mounting of the spider web in the cabinet is left to the ingenuity of the amateur. It can be mounted either vertical or laid at the bottom of the cabinet. If

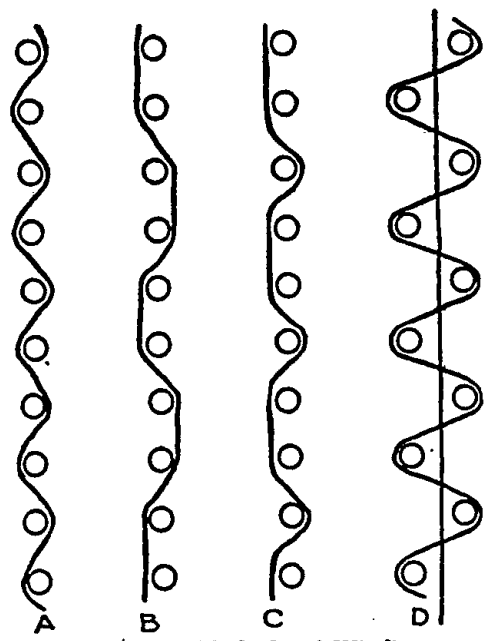
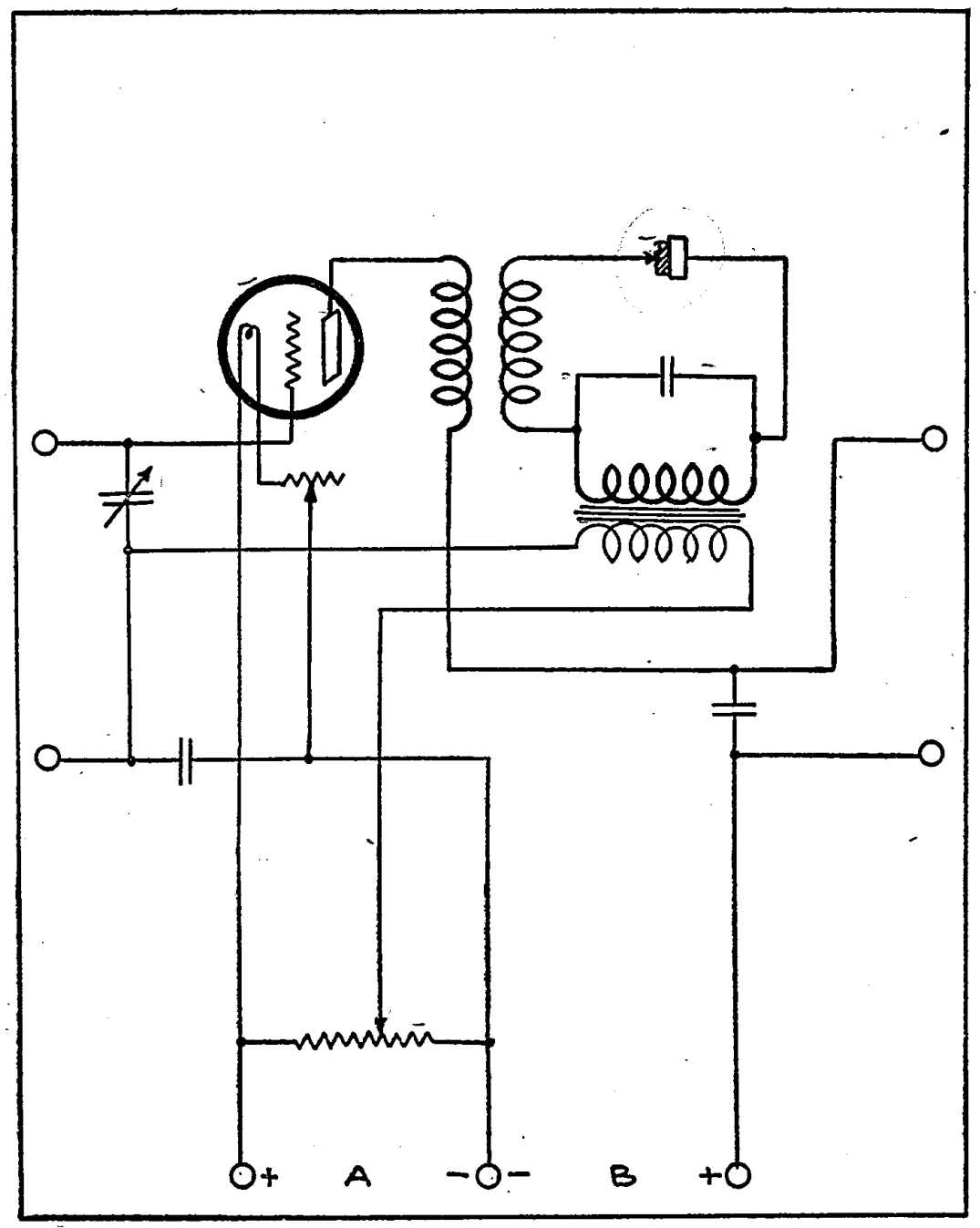


Figure 5—Methods of Winding

a horizontal mounting on the base is used, the taps should all be taken off on one side. If the vertical mounting is decided on, the taps should be located in each case on the side where the tap switch is mounted on the panel.

The self-supporting type of coils are usually laid flat on a circular base. The leads to the taps are kept rigid enough to hold the coil in position. Sometimes the coil is entirely supported by the tap leads.

THE SINGLE TUBE REFLEX



IN RESPONSE to numerous requests, the hook-up diagram of the single tube reflex receiving circuit given by H. J. Marx in his article in the December 30 issue of Radio Digest is illustrated again herewith. Many readers have sent in comments on the good results they are getting with this circuit. It is particularly well adapted for loop aerial work, and appeals to the fan who lacks an outdoor aerial. With an outdoor aerial a coupler or tuning unit of some sort is required.

The main tuning control is the .001 mfd. variable condenser across the grid circuit, which should have a vernier attachment. The vacuum tube should be an amplifier. No detector tube is used, but a crystal detector is required. There is nothing to be gained by substituting a tube detector, as many fans seem to think. One radio and one audio frequency transformer are required.

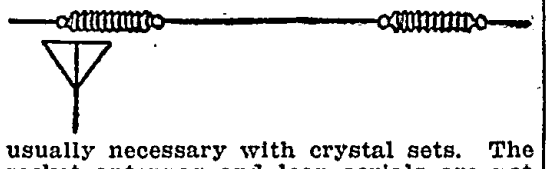
The condensers across the phones and the primary of the audio frequency transformer are both fixed, .001 mfd. The potentiometer should have a resistance of from 200 to 400 ohms. The condenser between the negative A battery terminal and the return lead of the grid circuit has a fixed capacity of .002 mfd. The filament rheostat should be of the 10-ohm type. The plate battery voltage should be from 45 to 67½ volts.

The WD-11 or peanut tube did not give satisfactory results in this circuit, however. One thousand-mile reception with this circuit, using a loop aerial, was exceptionally clear and audible. It is advisable, however, to select tubes that will give good plate flow, as results are often dependent on the quality of the tube used.

About Radio Parts

Outdoor Antenna

The illustration shows the outdoor antenna and the symbol used for its designation in receiving circuits and hook-up diagrams. This type of antenna is



usually necessary with crystal sets. The socket antennas and loop aerials are not primarily intended for crystal sets. As indicated, insulators should be used at both ends of the wire in order to avoid loss of the received currents through leakage to the ground.

Senatore Guglielmo Marconi now prophesies that commercial telephoning across the Atlantic will not be feasible for two or three years.

Questions and Answers

Patent Situation

(1799) GLR, Newport News, Va.

The Flewelling circuit, featured in your paper, presents some interesting aspects for marketing in this city. We must cover distance here, the nearest broadcasting station being over one hundred miles, and the price of the instrument must be within reach of the average pocketbook. The Flewelling tuner meets these requirements.

We are anxious to manufacture and market such a tuner and would like some information regarding the legal side of this circuit. What would be necessary in order to build and market this instrument complete? Could this instrument be sold completely assembled with the exception of the wiring (directions for wiring and operating to be furnished with set) without infringing on any patents? We would also like to know if instruments such as the single circuit with tickler coil regeneration could be sold assembled but not wired, or with everything except the plate circuit wired?

A.—Armstrong undoubtedly may, in time, get his patent on the super-regenerative principle. This patent may take two years to be adjudicated. Whether the circuit is super-regenerative has been questioned. Regardless, Flewelling has applied for patent rights.

Therefore, direct and complete manufacture of the set for sale would render you liable for infringement.

However, sale of the parts, or the parts assembled except for the wiring, should not constitute an infringement. Directions for completing the wiring may also be sold legally.

This same treatment is, I am sure, applicable to any other patented circuit.

If you will read the main front page story in the December 23rd issue, you will learn some few points of interest to you and regarding some Radio patents.

Plate Voltage of Flewelling

(2209) VH, Geneseo, Ill.

In the description of the Flewelling circuit which was given in the Radio Digest for October 21, 1922, the statement was made that the plate voltage could vary from 18 to 250 volts, but that 110 volts was very good. Beginners in the construction of Radio receiving sets, who had decided that they would make a "flivver," might think this meant that the 110 volt lighting current would work, if it was direct current; in fact, the wording of the sentence suggests that very thing. However, such a connection would prove disastrous because the high amperage of the lighting circuit would scatter the bulb over the landscape. In this same connection, do not use ignition or telephone dry cells in the construction of a B battery, because their amperage is also too high.

A.—Noting your criticism of grammatical construction in description of plate voltage employed in Flewelling circuit as described in October 21st issue of Radio Digest, we do not detect any ambiguity and even though it were misinterpreted as suggested no greater damage than the possible blowing of a fuse would result. However, you are correct in statement that it wouldn't work.

Indoor Antenna

(2223) JLP, Wamego, Kan.

I have assembled a receiving set consisting of detector and two stages audio amplification and have had very satisfactory results with it. My antenna is about 130 feet long and 40 feet high and built of stranded wire. I have received practically every large station in the United States, including KHJ at Los Angeles, KDKA at Pittsburgh, WGY at Schenectady, WJZ at Newark, etc., and have also received Havana PWX. I have been able to run these stations through my loud speaker very satisfactorily.

In experimenting with an indoor antenna I put up one of stranded wire on the ceiling, the wire being about 12 feet above the ground level. By altering a few connections I received the following: WLW at Cincinnati, WBAP at Fort Worth, WFAA at Dallas, WOC at Davenport, DN4 at Denver, KHJ at Los Angeles, WSB at Atlanta, and WLAG at Minneapolis. All these were received the same evening on the detector and one stage audio frequency. They came in just as strong and clearer than with the outside antenna hooked up as before.

I would like to know if these are unusual results with an indoor antenna such as I have described. If it is unusual it is on account of the different hookup I discovered experimenting with the new antenna. Being a reader of several Radio magazines I thought you would be the most responsible authority on this subject. I will certainly appreciate any information you can give me and will advise of any further developments I might find to advance the science of Radio.

A.—In our opinion the reception you have accomplished under experimentation with an indoor antenna is much beyond the usual and worthy of congratulation. Many of the most valuable contributions to the science of Radio have come from amateur operators and Radio is indebted to a great extent to such for its present benefits.

Dry Batteries on Crystal Set

(2322) LB, Bonner Springs, Kan.

Will a few dry batteries improve the wave lengths of my crystal detector set? If so, please tell me how to connect them to it.

A.—The employment of dry cell batteries, or any other kind of battery, has absolutely no effect upon wave length range.

Loop Aerial

(2117) RPJ, Clinton, Ill.

Will you please answer through your column of the Radio Digest, what size wire, and how large should a loop aerial be made.

A.—A three foot square frame having six or eight turns of number fourteen wire, spaced one-half inch apart makes an effective loop aerial.

Plate Voltage on WD-11

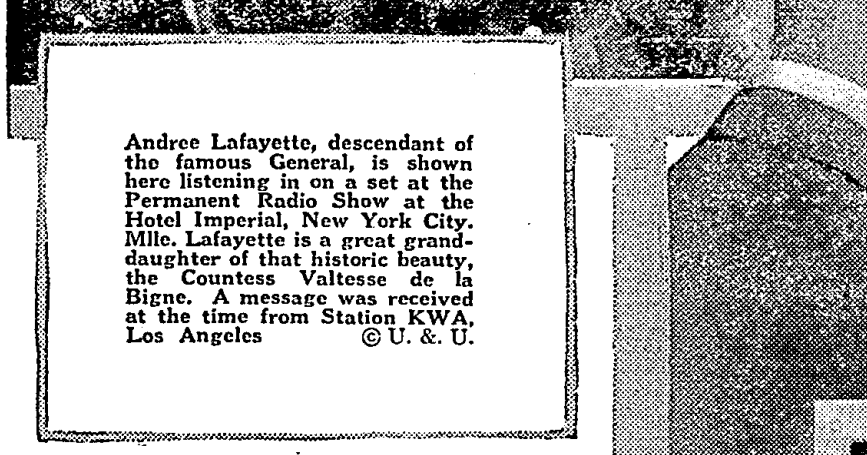
(2053) AVH, Oelwein, Ia.

Please advise how much Plate or B battery to use on the WD-11—dry cell tube in the Flewelling circuit?

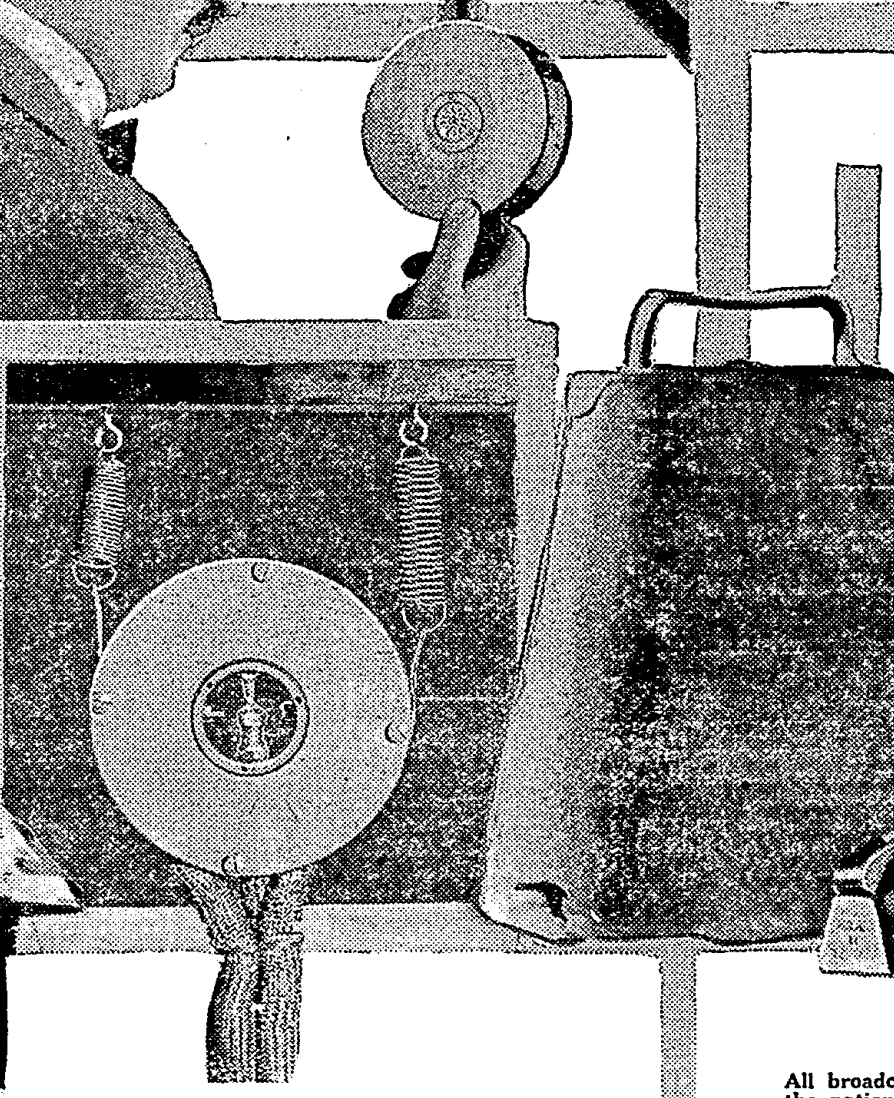
A.—Answering your inquiry would advise that about forty-five volts are sufficient plate voltage for WD-11 tubes.

Radio Illustrated

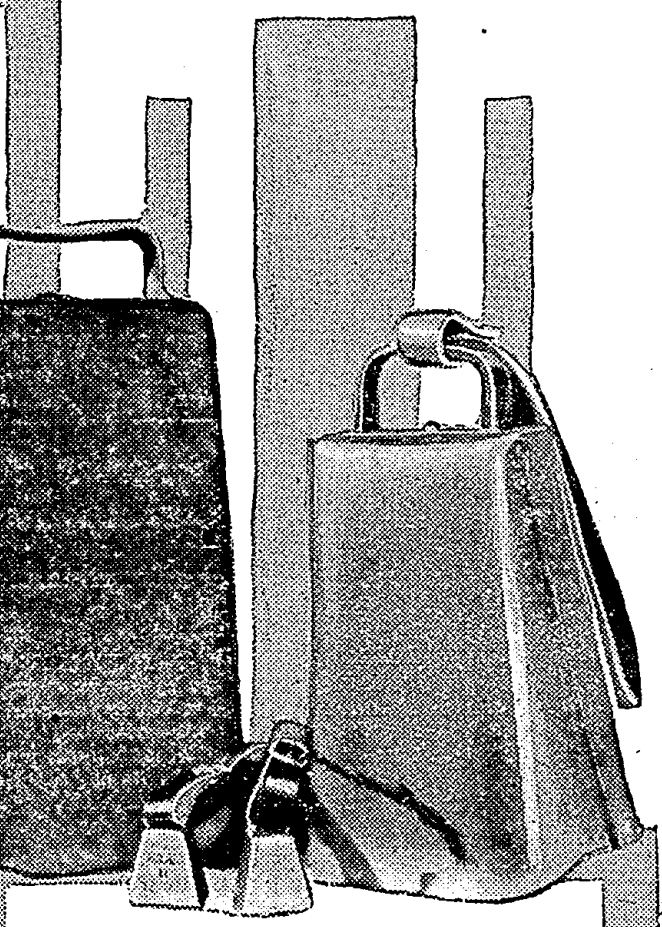
Andree Lafayette, descendant of the famous General, is shown here listening in on a set at the Permanent Radio Show at the Hotel Imperial, New York City. Mlle. Lafayette is a great granddaughter of that historic beauty, the Countess Valtesse de la Bigne. A message was received at the time from Station KWA, Los Angeles © U. & U.



An informal ten-minute talk by Bernays Johnson from the Wanamaker Station WOO on Radio minerals and how to operate a loud speaker on a crystal set brought forth the world's record of 5,600 letters. This is by far the largest number of letters received by any station in response to a short talk of any nature



A new transmitter invented by Dr. Phillips Thomas. With this transmitter it is said that music and other sounds are broadcast exactly as produced. In this transmitter the new diaphragm takes the place of the usual form. A minute electrical discharge takes the place of the mechanical disk. It is affected by the sound waves just like the diaphragm and responds well to all vibrations



All broadcasting stations throughout the nation are adopting some means of designating their stations by means of a slogan, chime bells or a whistle. From the great Southwest where the cattle roam the prairies comes the jingle of cow bells. The illustration shows these bells that sound out their tones from Station WBAP at Fort Worth, Texas