

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

REG. U. S. PAT. OFF. & DOM. OF CANADA

Vol. VI

Copyright, 1923
R. D. F. Co. Inc.

SATURDAY, SEPTEMBER 15, 1923

No. 10

RADIO AIDS DOPE FIGHT

MRS. WALLACE REID TAKES AIRPHONE INTO DRUG BATTLE

Proclaims Broadcast Stations Arch Enemies of Narcotic Peddlers—Can Warn of Dread Ravages and Help Cure Hopeless Addicts

CHICAGO.—Heralded as the arch enemy of traffickers in crazing, deadly drugs, acclaimed as the savior of hundreds of thousands addicted to the use of narcotics, Mrs. Wallace Reid, widow of the noted

motion picture actor who recently was a victim of the needle of nepenthe, emphasized here a few days ago the inestimable value of Radio as a weapon in the war against "dope," and urged broadcasting's wide use. Steps were taken to enlist broadcasting stations throughout the country.

The little woman whose face, saddened by the death of her husband and by the

(Continued on page 2)



Jane Cowl, famous Shakespearian actress, now playing "Juliet" in Oakland, Calif., was wooed via Station WOR, Newark, N. J., by a "Radio Romeo" in the person of W. Wallace Hermann, the concert tenor. He sang to her "You Are the Juliet of My Dreams"

GIANT SET SUPPLANTS BAND IN FALL FROLIC

CINCINNATI.—What was said to have been the largest Radio set ever built was the giant which featured the float of the Crosley Company of this city in the recent night pageant of the fall festival here. The horn of the set which was set on a motor fire engine chassis, was twelve feet long. The set supplanted a brass band.



Wallace Reid (from a photo taken just prior to his death) and his wife, formerly Dorothy Davenport, who is waging a Radio warfare against dope peddlers combined with an educational broadcasting campaign to aid the 2,000,000 addicts in this country to discard their death-dealing drug habit

CANADA OPERATOR'S WEDDING IS HEARD

Station CFCN Transmits Nuptials by Means of Microphone at Church Altar

CALGARY, ALTA.—Radiophans recently listened to the broadcast over CFCN, W. W. Grant broadcasting station here, of the first Radio wedding in Canada. And it seemed exceptionally fitting on this occasion that a Radio operator himself should be wed over the ether.

Dale M. Snelley, daughter of Mrs. Fred (Continued on page 2)

Juliet in Oakland Hears WOR Romeo Carol Love

Actress on Pacific Coast Wires Appreciation to Newark

NEWARK.—Not beneath a bowered balcony, not under the mystic skies of Italy but on etheric waves the love song of a modern Romeo W. Wallace Hermann, noted tenor, was broadcast here a few days ago by Station WOR to Juliet, Jane Cowl, famed actress, who was in a theater in Oakland, Calif., acting as hostess of a Radio party.



WORLD NEWS AIDS INTEREST IN OFFER

HISTORY MAKING SHOWS REFLECTION BY FANS

Coal Quarrel, Ball Pennants, Ruhr Question, Italy and Greece Row Stimulate Radiophony

SPECIAL REWARD OFFER

Coupon Number 16

This Special Reward Coupon appears each issue in Radio Digest until further notice. When sent in, accompanied by necessary remittance, according to the rules governing same, apparatus can be secured. See apparatus list and rules of offer below.

Save Me—I Am Valuable

That Radio has served as one of the greatest educative elements in the history especially of the United States, that it is now applied in a manner that will insure a higher mentality for posterity and that the events of the future will tend to develop even more the passion of peoples to learn, are the linked conclusions of publicists all over the earth, according to the recent reports of observers.

The outcome of the coal quarrel in this country, the winning of the baseball pennants, the Ruhr problem, the serious situation involving Italy and Greece—all these tend to spur the interest of Radiophans and, of course, increase the demand for the parts offered by Radio Digest at low cost. During the last few days especially the various political, religious and military conditions throughout the world have excited the interest of fans so much as to show an appreciable reflection in their demand for Radio Digest parts, in the special reward offer for regular subscribers.

Rules to Remember

One point must be emphasized to those contemplating taking advantage of the special offer, that is, that the coupons turned in for any item must be numbered consecutively, as for example, 1, 2, 3, and 4 or 3, 4, 5 and 6. The number of coupons necessary and the cash remittance, of course, depend on the item sought by the reader. There is no limit to the number of sets turned in by any one reader. Another point to remember is that cash checks and money orders but no postage stamps must be secured. To make selection more simple the items have been divided into eight classes, each class depending on the number of consecutive coupons and amount of cash remittance necessary. Watch this page next issue for the list of parts you can secure.

AIRPHONE FIGHTS DOPE

(Continued from page 1)

agony of others, is known to millions, pleaded that steps be taken immediately to apprise, by means of Radio, the people of the United States and Canada especially of the ravages of morphine, heroin, opium and the like.

"There are three great media to warn humanity against the drug habit," she said. "These are Radio broadcasting stations, motion pictures and newspapers. When millions hear the voices of those who fight, when they receive the personal touch that Radio conveys, they will realize the peril that besets the nation."

Has Used Five Stations

In her campaign against the purveyors of subtle, soul-destroying poison, Mrs. Reid has utilized broadcasting stations in five cities of the United States. In Chicago she delivered her message over Station KYW. So great was the interest aroused by her combat in this city that great crowds followed the automobile which conveyed her to and from KYW and a motion picture theater. At the theater she appeared prior to the presentation of the picture "Human Wreckage," an anti-narcotic picture in which she was featured as the heroine.

"Radio Digest could do much good," continued Mrs. Reid (formerly known as Dorothy Davenport), "by making known to its readers that the crusade against the drug habit is not against those affected by it but against those who sell drugs, against the ring which waxes fat over the misery of hundreds of thousands of men and women."

Radio Diverts Addict's Mind

The use of airphones to quiet those addicted to drugs, to divert their minds from the maddening longing which besets them, was advocated by the fair crusader. "When it becomes generally known," Mrs. Reid said, "that addiction to drugs is a disease, a terrible malady, the apathy and the scorn of most of the people will turn to pity."

Then will ensue, she declared, a demand for sanitarium in which the drug-bewildered multitude may be housed and treated, calmed in great part by the soothing strains afforded by Radio. "The sooner

Radio is included in the treatment for these unfortunates," said Mrs. Reid, "the sooner will this country's burden be lightened. Radio is the best form of audible education."

Life Threats Sent

So persistent, so implacable has been Mrs. Reid's fight against the drug evil that many of those responsible for its spread—the "dope peddlers"—have threatened her life. Several letters bearing threats of death were sent to Mrs. Reid by peddlers while she was in Chicago. "They do not frighten me," she said. "They make me more determined."

Many of the men in this country and Canada who are addicted to drugs are veterans of the world war. "It is they particularly who would appreciate the application of Radio," said Mrs. Reid.

So effective was her Radio appeal in this city that the mayor announced plans for a conference with the commissioner of health to consider the possibility of establishing hospitals for the victims of drugs. Similar encouragement was given Mrs. Reid by the mayor of Kansas City, Mo.

Believes Radio Chief Drug Weapon

"If the 2,000,000 or more drug victims in the United States could be taught and treated by means of Radio," Mrs. Reid continued, "if they could be advised and diverted by speech and music great benefit would result." And if Radio could be utilized as a crusader, if the air would bear the tales of terror that the legion of unfortunates could unfold, if the various broadcasting stations would carry on the fight against peddlers and unscrupulous importers, the curse of drugs soon would be driven away.

As a result of Mrs. Reid's advocacy it is probable that the influence of many United States senators and other publicists will be enlisted to organize a campaign against the drug habit in which Radio will be the chief weapon.

WJZ Sends Music Ovation to Whiteman, Jazz King

Novel Tribute to Composer Includes Air and Sea Strains

NEW YORK—When the great liner Leviathan of the United States' marine docked here recently the most novel ovation ever accorded a musical composer was given to Paul Whiteman. The famous leader, returning from abroad, was crowned "King of Jazz" as eight orchestras, a submarine band, players on a circling airplane and musicians in diving suits saluted without intermission symphonic strains created by Whiteman. The entire program was broadcast by Station WJZ, Radio Corporation of America.

CFCN "OP" MARRIES

(Continued from page 1)

W. Beggs of Calgary was united in marriage to Morris V. Chesnut, secretary treasurer of W. W. Grant Radio Ltd., the Rev. Robert Johnston, D.D., minister of Grace Presbyterian church here officiating, and the proceedings were broadcast. Immediately after the ceremony was completed letters and telegrams of congratulations were received from all over the country, from people of whom the bride and bridegroom had never heard, while the church from which the ceremony was broadcast was crowded with spectators and guests.

A microphone was placed at the altar and the ceremony broadcast by remote control, two cables having been especially installed from Station CFcn on Crescent Heights.

Microphones with amplifiers are being installed in hotels in Paris for paging.

CONTENTS

Radio Digest, Illustrated, Volume VI, Number 16, published Chicago, Illinois, September 15, 1933. Published weekly by Radio Digest Publishing Company, 123 West Madison Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign Postage One Dollar additional; single copies, Ten Cents. Entered as second-class matter at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

"All the Live News of Radio".....	1 to 9
WJAZ—"This End of the North Pole"; An Evening at Home with the Listener In; Receiving Record Hook-Ups.....	5
The Week's Advance Broadcast Programs.....	7
The Antenna Brothers, Comic Strip.....	7
Editorial; Indigest; Condensed by DiElectric.....	10
First Steps for Beginners in Radio, Chapter XVI—Plate Batteries, by Thomas W. Benson.....	11
R.D.-97, Single Tube Reflex Circuit; Reviews of Books.....	12
How Your Voice Looks "Taken" on a Movie Film, a Description of the Famous Pallophotophone, by Peter J. M. Clute.....	13
Flawless Answers to Queries.....	14
Five Tube Netrodyne Receiving Circuit, Part IV—Neutralizing and Tuning, by H. J. Marx.....	15
Simplex Picture Diagram—Single Tube Regenerative Circuit.....	16
Inductance Coil Used on Reinartz Set; Other Kinks.....	17
Questions and Answers.....	18
Directory of Radiophone Broadcasting Stations, Part I—Station Schedules.....	19
Radio Illustrated, a Page of Pictures.....	20

Looking Ahead

A Loop Aerial You Can Put in Your Parlor—and not get the wife angry. Designed for present range of broadcast wave lengths. H. J. Marx will describe the De Luxe Loop Aerial next issue.

The Miloplex Single Tube Set Knocks 'Em All Dead—with its simplicity of operation, low cost, few parts. Buy next week's Digest and make a Miloplex. Worth everybody's while.

Three Tube Tuned Impedance Coupled Radio Frequency Circuit—a good hook-up for R. F. hounds—will be R.D.-96 next week.

Pictures Tell the Story Better—for some of us. The easily followed simplex diagram next issue will be an English crystal detector Radio frequency amplified set.

Alternating or House Lighting Current Will Light Your Tubes—Thomas Benson will devote his next chapter for beginners to telling how this can be done.

A Match Box Receiving Set That Works—One of many interesting, practical kinks the Radiophan will read about next week.

Photo Diagram Page of Melco Supreme Acmedyne Circuit Set—Next number. Don't miss this simple exposition of a receiver worth knowing.

Newsstands Don't Always Have One Left

WHEN YOU WANT

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Publisher Radio Digest, 123 West Madison St., Chicago, Illinois.

Please send enclosed check M. O. for Five Dollars (\$5.00 foreign) for One Year's Subscription to Radio Digest, Illustrated.

Name

Address

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

WD-11 TUBES

UV-201A, UV-199 and WD-12..... \$5.30
This is a wonderful saving on tubes as they are all guaranteed items and in their original packages. Buy several apiece at this attractive figure.
\$12.00 Nath. Baldwin Phones, Type CC..... \$8.55
6.00 Brander Superior Phones..... 4.45
5.00 Beta Reflex Transformer..... 4.15
4.50 Theridion Audio Transformer..... 2.85
2.00 Filostat..... 1.90
1.00 Reflexor..... .75
27.00 Michigan Midget..... A wonderful One-tube Set..... \$18.95
Everything guaranteed as firsts. Don't delay getting price list No. 9. Wonderful bargains. We pay postage.

RADIO SUPPLY STORES
254 West Stiegl Street, Monheim, Pa.

Reinartz Coil \$1.85

The Improved Basket Weave, Covering All Broadcasting Wave Lengths
With each coil we send FREE two large blueprints giving hookup and panel layout, list of materials, and fully illustrated instructions for construction and operation.

Buy before the fall rush sets in. We sell all parts required for this wonderfully efficient receiver—panel, coil, condensers, socket, variable capacitor, variable inductor, dials, switches, fuses, contact points, wire, solder, etc. (no tubes or phones) for only \$8.85. Postage additional on all shipments.

Send no money PAY THE POSTMAN. All Goods Shipped Parcel Post C. O. D.

RADIO SURPLUS STORES, Helena, Montana

Learn Radio at Home



Earn \$50 to \$250 per week for fascinating, easy work; wonderful future in Radio. Thousands of new, big paying positions.

EASY TO LEARN AT HOME
You can easily and quickly become a "certified" Radio expert through startling new method of National Radio Institute, one of the largest and oldest schools of radio work. All instruction Radio instruments loaned free. Employment service free to graduates.

Send for FREE BOOK
"Your Opportunities in Radio"
Get full details of wonderful opportunities in Radio, of thousands of our successful graduates, and of remarkable, easy method of learning Radio at home to qualify for high paid positions in this field. Mail requesting new field. Mail enclosed now for 44-page Free Book and Special List of Opportunities to those who enroll now.
National Radio Institute
Dept. 55-J Est. 1914
Washington, D.C.

Bunch Your Orders Don't Scatter Them

Dealers who form the good habit of "putting all their eggs in the H-R basket" WIN OUT—save a lot of time, worry, mistakes, delays and money.

We are distributors of the largest and most responsible manufacturers of nationally advertised radio equipment in the U. S. and carry complete stocks, for immediate shipment in any quantity. We have abolished mistakes and delays by our double-check, time-stamp system of handling orders. We represent:

- | | |
|---------------------|------------------|
| Atwater-Kent | Rad-Tu Loops |
| Zeigler | Baldwin |
| United Mfg. Co. | Coto Coil |
| Murdock | Funkar Changers |
| General Radio Corp. | Brantingers |
| Carrier | University |
| Dubilier | Frequency Es and |
| All American | A's |
| Howard | Cameron Panels |
| Federal Tel. & Tel. | C. R. L. |
| | Arma |
| | Hisco |

Send for literature and discounts, stating lines on which you wish immediate quotations.

We are the largest exclusive Radio Jobbers in the middle west.

Note: ERLA Bulletin 14 on one, two and three tube REFLEX, FREE for the asking.

HUDSON-ROSS

123 W. Madison St. Chicago

STATION CFCN NOW BOASTS 1800 WATTS

CANADIAN PLANT AT CALGARY REMODELS SET

Twelve Special 500-Watt Tubes Require Input of Eight and One-Half Kilowatts

By Jeffrey J. Dingman
CALGARY, ALTA.—CFCN, broadcasting station of the W. W. Grant Radio, Ltd., here, has been completely remodeled and recently went on the air as the most powerful station on the Western half of the American continent and as one of the two or three super-stations in the United States or Canada. On the initial test the set was operated on only one-third of the maximum power. Since then it has been put up to the maximum power and it is expected that long distance broadcasting records which CFCN in the past has set, will be shattered when mail from far distant points begins to arrive.

CFCN is now equipped with twelve giant tubes of 500 watts each, especially manufactured in Montreal. It is estimated that the regular modulating output power of the station is 1,800 watts, which is the power delivered into the antenna system. The initial input power is eight and one-half kilowatts. In addition an amplification system carrying two fifty-watt tubes has been devised. This amplifier is expected to aid the clarity of the broadcast.

Has Four Times Old Power
As a comparison to show the increased power of the set, before this was constructed only three 500-watt tubes were employed. Radiophans all over America are familiar with the long distance broadcasting records CFCN established on the old set. Its signals were heard off the coast of Yokohama, in Alaska and Mexico, and 700 miles at sea in the Atlantic ocean. It is anticipated that new records will be established in the near future.

"During the time we were necessarily off all over the continent regarding the new station," Mr. Grant said in an interview with a Radio Digest Illustrated representative. "It has created even more interest than we anticipated."

The studio has also been remodeled, so that there is now much more space for the artists who entertain nightly. The artists' and reception rooms are richly appointed and delicately decorated. The mural decorations and the color scheme are exceptionally pleasing to the eye.

BIGGEST RADIO ONE OF FIVE FOR CHINA

American Firm Establishes First Communication with U. S. Despite Jap Opposition

PEKING.—The American legation here has confirmed the announcement in San Francisco recently that R. P. Schwerin, president of the Federal Telegraph Company, had signed, in conjunction with the Radio Corporation of America, a new agreement with the Chinese government permitting the immediate construction of five powerful stations in China, including for the first time direct communication between the United States and China.

Schwerin made the announcement on his return to San Francisco from China. Two of the five stations will be erected at Shanghai; one of them is to be the most powerful in the world. The others will be at Peking, Harbin and Canton. Their aggregate cost will be about \$13,500,000.

The Federal company's executive is credited here with having been of great assistance to the American interests in their eight months' struggle to sign the contract. The Japanese government, claiming exclusive Radio rights in China, had objected to the project.

First Air Lines from U. S. to Holland and Italy Open

NEW YORK.—For the first time in the history of international communication, direct Radiotelegraphic service between the United States and The Hague (Holland) and between the United States and Calcutta (India) was established recently, according to an announcement by the Radio Corporation of America. The opening of these services raises the total number of direct Radio circuits radiating to European countries from New York city from six to eight, and affects not only Holland and Italy, but provides more direct routes between the adjoining countries and the United States.

Citizens of San Diego, Cal., are making an effort to raise funds for a municipal Radio plant. Fancy dress balls and many other money-making schemes are being resorted to and it is expected that the necessary amount will soon be in hand.

RADIO IN EACH ROOM, NEW HOSPITAL PLAN

CHICAGO.—"How d'ya feel?" is not likely to be the usual greeting of patients in the \$1,000,000 hospital proposed by a surgeons' syndicate for the north side here. It'll probably be "How'dja like the Radio last night," for reception outlets for every room feature the design, according to the recent announcement of Dr. Benjamin Breakstone, promoter.

LESS READING SINCE ADVENT OF AIRPHONE

NAGARA FALLS, N. Y.—The Librarian at the Carnegie Public Library here, reports that fewer people came to the library to read in the evenings during the past year. Professional men who formerly came to the reading room have discontinued their hours among the books. An inquiry revealed that Radio sets are keeping the people at home.

MAKING TONGUE FOR LEVIATHAN



A girl's deft fingers formed the tongue with which S. S. Leviathan "speaks" at will by Radiotelegraph to either side the ocean. Miss Marie Frowick is seen assembling the "tongue" of a 10,000-watt vacuum tube. Two of these furnish the power to the Leviathan's big Radiotelegraph transmitter which has power enough to span the Atlantic. Western Electric Photo

WCBD Is Zion's Answer to Founder's Prophecy

Illinois City, Seat of Sect, Fulfills Dowie's Forecast

ZION, ILL.—Way back in 1897 Dowie, founder of the city of Zion, saw Radio. In an address delivered in Chicago, September 5, 1897, he said:

"Do you know that one day in the big Zion temple we will have, we are going to have a great big thing to catch the sound, and I am going to have them turn on Zion to Zion's friends in New York. See? And by the beds of the sick and the sorrowing some day I am going to have them hear the testimonies that they cannot hear excepting from their dying beds. Going to get it some day."

Dowie did not call the instrument "Radio"; he called it "a great big thing to catch the sound," but he saw the Radiophone just the same. And his prophecy has come true. Station WCBD, Zion, Ill., the fulfillment of Dowie's prophecy, has been heard in many states and in Canada, and far out on the Atlantic ocean.

Cape May Plant Abandoned
WASHINGTON.—The Naval Radio traffic station at Cape May, N. J., has been closed and abandoned. The transmitter at that station was removed to the compass station at Henlopen, the latter station becoming the compass control station for the group composed of Cape May, Cape Henlopen and Bethany Beach. Traffic formerly handled by the Cape May station will be handled by the station at Philadelphia.

AURIST USES AIRPHONE TO AID DEAF PERSONS

WOR Broadcasts Prescriptions for Hard of Hearing

NEWARK, N. J.—Dr. Paul V. Winslow, consulting ear surgeon of the New York state hospital, recently delivered a lecture entitled, "Radio for the Deaf," at Station WOR, L. Bamberger and company, here.

Dr. Winslow, who is president of the National Round Table for Speech Improvement, advocated new theories pertaining to cures for deafness. Among other things during his broadcast he said that humming and singing will cure head noises and make it possible for persons partially deaf to renew their hearing.

After many experiments, Dr. Winslow prescribed a series of singing and humming exercises. He urged as a form of practice the humming of M in a way that would vibrate the lips, or the singing of the vowel F in two-minute periods three times a day, placing the tone high up in the nasal chambers with a decided twang.

Dr. Winslow has also made a series of experiments with Radio and is of the opinion it can be employed to fine advantage in helping to cure deafness.

WNAC on New Schedule
BOSTON, MASS.—Station WNAC, the Shepard stores, is now operating on a new broadcasting period from 1:00 to 2:00 p. m., excepting Sunday. The programs will consist of selections by the Shepard Colonial orchestra, organ selections from the Modern theater and renditions by phonograph.

ALASKA AIRPHONES AID IN GOVERNMENT

COMMUNICATE WITH MAIL STEAMERS FAR OUT

First Troubles Remedied by Training Light Keepers in Radio—Tell Ships Where to Land

By J. M. Lamm
WASHINGTON, D. C.—The use of Radio in Alaska is expediting government business and is of great use in case of emergencies. Complete Radio telephone transmitting and receiving stations were installed at Cape Scharchef and Scotch Cap Light Stations, Alaska, by the navy department in 1921. Some minor difficulties were experienced, it is said, during the first year of operation, due to burnouts of the motor generators and the wrecking of one of the steel antenna masts by a storm.

Repairs were made immediately, however, and since that time but little trouble has been experienced. The keepers at both stations have mastered the mechanical and electrical details of the installations sufficiently to keep them in operating order, and Radiophone communication between the two stations, which are about seventeen miles apart, is maintained without difficulty.

Communicate with Mail Steamer
Owing to the lack of other Radiophones in that part of Alaska, one keeper at each station has taken up the study of the code, and the keepers are now able to communicate with the mail steamer at distances up to 125 miles, and also to keep in touch with each other and to exchange messages by key.

At sixty-five miles the voice of either station can be picked up, it is said, by the steamer, even on the opposite side of high mountains.

This means communication has been of great service both to the stations and to the mail steamer. As the boat is approaching Unimak Pass, information is obtained direct from both stations as to landing conditions, and no time is lost if a landing cannot be effected. When a landing is impossible at Cape Scharchef, the mail boat is instructed to land the mail at Scotch Cap. It is then sent overland by one of the keepers.

Both stations exchange code messages with the naval Radio station at Dutch Harbor and are thus in touch with the outside world, a matter of vital importance in emergencies.

MARCONI SEES ONE WAY AIR MESSAGE

Radio Pioneer Reports Tests Show Direct Transmission Is Possible

LONDON.—In a statement issued to the press on his arrival at Southampton on board his yacht *Electra* recently, Senator Marconi said that during the two months he had been away on his research cruise he has been working all the time on the system of directive Radio telegraphy, by which a message could be sent in one direction only, and he was delighted to say that experiments had proved highly satisfactory.

The apparatus with which he had been working was the only installation of its type, but it was likely to come into universal use in the future. The results he obtained proved that communication could be maintained over long distances.

The new system, said Senator Marconi, effectively eliminated atmospheric disturbances, and he might say that he had experienced no trouble of that sort during the whole of his two months' research. The course of the trip was roughly 2,200 miles or the distance from England to Canada.

Kansas City Mayor Hears Peace Plan by Airphone

KANSAS CITY, Mo.—Frank H. Cromwell, mayor of this city, the first mayor to broadcast weekly talks about municipal affairs as a means of civic education, recently listened in aboard the famous Radio car which, with a trio of New Yorkers, is on a world tour, a venture in international friendship, having presented a parchment letter from Mayor Hylan, of New York, to the mayor of Kansas City. The set on the car had traveled 3,000 miles without breaking a tube; all were mounted in sponge rubber.

U. S. Compares Amplifiers
WASHINGTON.—Measurements of voltage amplification of audio-frequency amplifiers are discussed in Letter Circular 28, recently issued by the United States bureau of standards for free distribution. The circular gives the results of voltage amplification measurements made on sixteen audio-frequency amplifiers which were on the market during 1921-22.

Life Worth Living Even in Prison When Radio Outfit Brings in World

News and Music from the Outside Cheer Condemned Slayers and Other Criminals in Cook County Jail—Prisoners Become Quieted as They Listen In

By J. L. Newman

Bars do not a prison make as long as Radio carries through them the news of the world, its sweet tones and sad. Stone walls, grim and grimy, the hoarse cries of men and of women, the chilling clang of cell doors, dark dank shadows, even the odor that does not depart—these do not make a prison while Radio conquers space and encompasses the earth.

All this and more was shown recently by means of a set operated in the Cook county Jail, Chicago. It was the first time that a Radio set had been placed in a prison. The theory of penologists, sociologists and of poets, that music will soften the hardest hearts was proved when the strains of the classics were wafted by Radio through the tiers of the prison into the breasts of murderers and thugs of men old in crime.

Digest Installs Set

The set, a Zenith IR, two-circuit type, with power amplifier and loud speaker, was installed by an expert of the Chicago Radio Laboratories under the auspices of Radio Digest. Permission had been obtained from Captain Wesley Westbrook, chief jailer. "The boys surely will like this," he said enthusiastically. "It will serve to maintain discipline."

Deep down in the prison a strapping paced the stone floor. He was accused of trying to obtain "easy money." The day was dark and so were his thoughts. But when he, a Radio expert, was asked to assist in the installation of the set, he smiled gladly. And when he was appointed operator of the apparatus he became proud.

The set was placed in the library and hospital of the prison, far above the noisy traffic of the streets. The antenna was shoved through the bars and steel mesh of a window, to dangle in the air. A spreader was adjusted to keep the antenna away from the outer wall.

Prisoners Join in Work

A handsome youth, the son of the Mediterranean in his glowing eyes, helped to string wires through grated doors, down iron stairways and forbidding galleries, to a loud speaker hundreds of feet away. A burly negro laughed, jiggered and caged as he unwound a coil of wire. A collegian, precise of speech, haughty in manner, talked glibly of Radio as he watched with the glare of a beast at prey, a uniformed jailer.

The bell at the end of the corridor sounded. The heavy door was opened and the wire writhed and tossed on its way to another loud speaker. Through devious iron and stone bound lanes, past gratings through which peered brutal, eager, gloomy eyes, up and down and around, the wire made its way to still another loud speaker. Near the cells of men and a woman con-

demned to bang, the wire went: near the cells of lads who had sought gain at the points of pistols, near weaklings who cowered under the sickly glare of arcs, near black and white and yellow, near the singing and the suspected.

Shout with Delight

Long before the hundreds of feet of wire had been attached to the loud speakers most of the prisoners knew that the Radio set was to be installed. It was to have been a secret, but the prison "underground" was too wary. And when the volume of sound carrying "jazz" reached the lowermost cells, six or seven stories below, the prisoners shouted in delight.

Beside his cell door facing the "bullpen" a condemned slayer squatted. He had killed a woman. Murder was still in his eyes. In a few days he would face eternity at the end of a rope. The loud speaker, a few feet away, skirled and snarled and then brought the dulcet drone of a saxophone. The killer, startled, sprang to his feet. He shook the bars. As they rattled a woman prattled of snuggles and petting. The loud speaker was alive. The moment was tense, tragic. A jailer hummed.

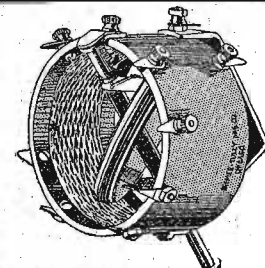
"Say, bo," bellowed the murderer, "is that a Radio?" Then, the noose impending, he shuddered his feet. The loud speaker enticed him. "Keep it up, kid," the slayer yelled, "keep it up." And high above the clamor from other homicides, the murderer's broaty whine accepted the snuggling and the petting of the women of the loud speaker.

Woman Asks for Classical Music

Down, down, down—from the depths of a cell at whose door lay a crumpled loaf and a pan of water, came the demand for baseball scores.

"Do we get any real music?" a woman, wide of eye, full of bosom, a slayer, inquired, as she swayed with the strains from a Chicago station. The woman, who had killed her husband so as to live with a younger man, wanted real music. She was answered by "Misses."

"Way up, on the topmost floor, the Radio expert prisoner continued to tinker with the



The B-T. Universal Tuning Unit

There is nothing on the market you can compare with the Bremer-Tully Universal Tuning Unit. It is an entirely new instrument, that gives unequalled selectivity and control on practically all modern circuits. It replaces coils in Heintz, Ultra, Audion and other regenerative and non-regenerative circuits. In most circuits taps are not required. Also gives reasonable results in Radio Frequency and all Reflex Circuits.

Simple to connect, no soldering; connections made to binding posts, easily changed to any circuit. Photo diagrams of above, also special Bremer-Tully circuits, in addition to key of windings, furnished. Write today.

BREMER-TULLY MFG. CO.
532 South Canal Street, CHICAGO, ILL.

COME TO CANADA

For your Radio-Frequency circuit. Our circuit developed for the Royal Air Force, gives amazing results on only two tubes. It is easy to build, and easy to operate. Regenerative sets can be converted to the wonder circuit in a few minutes. Here in the Canadian Northwest we hear Kaledich, N. C., Havana and Porto Rico. Atlanta heard on the loud speaker. Now look at the map and see where we are located. Circuit and full constructional details sent prepaid on receipt of a dollar bill. No further charge.

We want a number of radiophones with reliable sets to collect data on static and fading signals. Write today.

INDEPENDENT RADIO ENGINEERS
1732 14th Ave. W., CALGARY, CANADA

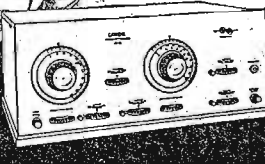
A 20-ft. Silk-Covered Wire is the only antenna required with

The New GREBE Broadcast Receiver

THIS wire, supplied with the Receiver, may be set up anywhere in a moment, or permanently concealed behind the picture moulding, or run along the baseboard of a room. Ask Your Dealer Today.

Licensed under Armstrong U.S. Pat. No. 1,113,149

Write for "Grebe Radio in the Well-Appointed Home."
A. H. GREBE & CO., Inc.
RICHMOND HILL, N.Y.



CHAMPAGNE BUCKETS FIND USE ONCE MORE

Liquor Pails Serve as Amplifier Bases Aboard Leviathan

NEW YORK.—Silver champagne buckets were put to a use recently which was a commentary on the times during a "good-will luncheon" given by the United States Lines aboard the Leviathan at her dock at Southampton, England. These receptacles, once a necessary part of a ship's dining service, were inverted on a table and on them were placed the loud speakers of an amplifying system installed to make the speeches audible to all of the 600 guests. As the great dining room of the Leviathan was designed for dining rather than public speaking, it was feared that the speakers would be unable to make themselves heard by everyone. So when the ship was docked a public address system such as is in use in many American hotels was installed.

knobs of the set. In the farthest cell house a colored boy danced gleefully. In the offices of the jail clerks and turnkeys grinned and stepped in sprightly fashion.

Want Set Permanently

"There is no question that music induces quiet," said Captain Westbrook. "The Radio set will be operated day and night by one of our inmates." Steps were to be taken, he said, to purchase a set for permanent installation. "The county hasn't the money for a Radio machine," Captain Westbrook said, "but perhaps some kindly person will donate enough to buy one."



Army Airphone's 'Paper' Saving \$52,535 in Year

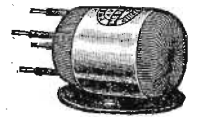
U. S. Spends Only \$13,840 for Military Messages, Data Show

WASHINGTON.—The army Radio net, valued at approximately \$500,000, made a return to the government of more than ten percent during the last fiscal year—on paper. From June 30, 1932, to July 1, 1933, the traffic handled by the signal corps Radio net would have cost the government \$66,375 at government rates via commercial wires. The actual cost of these operations was \$13,840, which shows a "paper" saving of \$52,535.

Actually, official messages are handled without cost; the few private and commercial messages which are handled, where other Radio service is not available, are sent at rates slightly higher than the commercial. The money is turned over to the federal treasury.

During the fiscal year ended in July, 129,953 official messages were handled by the army's messager center, Munitions Building, Washington.

PREMIER "HEGEGOG" TRADE MARK AUDIO FREQUENCY TRANSFORMER



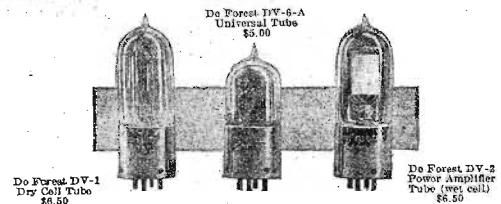
MAXIMUM VOLUME MINIMUM DISTORTION
100 PER CENT SHIELDED MOUNTS ANYWHERE

PRICE \$3.50

RATIOS—1 to 3, 1 to 4, or 1 to 5
The Most Efficient, Compact Transformer ever designed. Ask Your Dealer for the Premier "Hegehog."

Full Specifications on Request

Premier Electric Company
Est. 1905
3810 Ravenswood Avenue, CHICAGO, ILL.



The More You Know About Radio The More You Rely on De Forest

Without Lee De Forest's discovery of the vacuum tube there would be no radio today. All radio broadcasting, all radio receiving by means of tube sets, rests on De Forest patents.

De Forest has been a pioneer in radio since 1900 and De Forest is a pioneer today. That is the reason for the great success of the De Forest Reflex Radiophone. That is the reason for the success of the new De Forest tubes—DV-1 Dry Cell Tube, DV-6-A Universal Tube, DV-2 Wet Cell Power Amplifier Tube.

If you want a radio receiving set with a range on indoor loop of from 1,500 to 3,000 miles, depending on atmospheric conditions; if you want simplicity of control, clear reception without distortion and without extraneous noise; if you want operation on either wet or dry cells—see the De Forest Reflex Radiophones at the De Forest agent's today.

The D-7A Reflex Radiophone is a three-tube set at \$125.00; the D-10 Portable Reflex has a drawer in its cabinet for dry batteries and is a four-tube set at \$150.00. No matter what you pay, you can't get greater radio satisfaction. Whether you buy your set complete, or build your own from the laboratory tested De Forest parts, you can rely on De Forest, the greatest name in Radio.

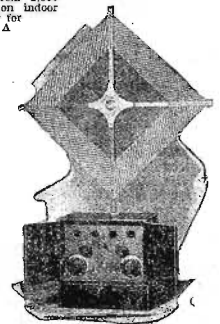
De Forest Radio Tel. & Tel. Co.
Dept. R. D. Jersey City, N. J.
If located west of Pennsylvania address
De Forest Radio Tel. & Tel. Co.
WESTERN SALES DIVISION
5680 12th Street Detroit, Mich.

De Forest Portable Reflex Radiophone type D-10, which operates on wet or dry cells, has a reception range of from 1,500 to 3,000 miles on indoor loop; has drawer for all necessary A and B dry cells. Price \$150.00, plus approximately 8% for transportation in territories west of Rocky Mountains.

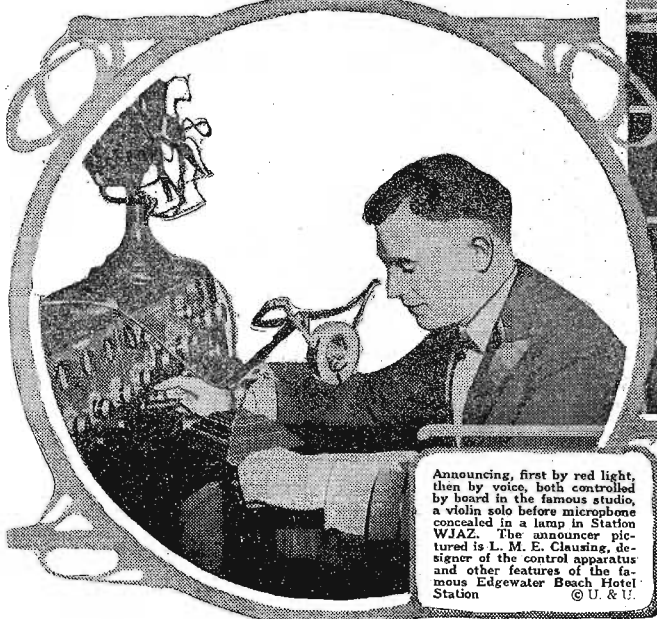


Radio Catalogs Free
Send a postcard for De Forest's Free Radio Catalog with full details and prices on sets, tubes, and parts.

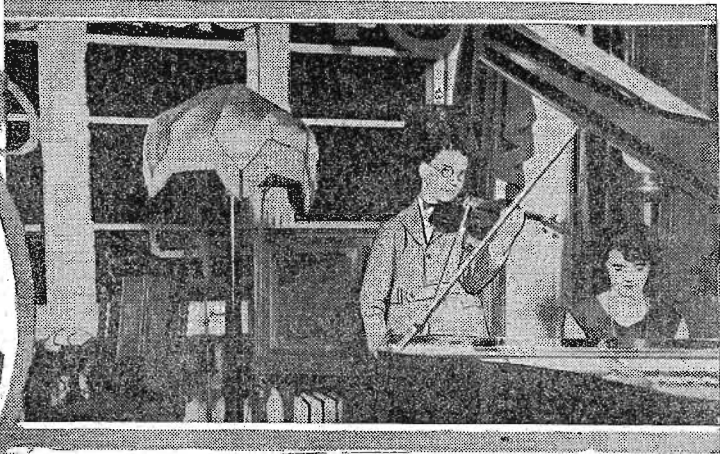
De Forest products are sold only through exclusive agents, direct to the public for your protection. The De Forest Company will be glad to loan from representative dealers in various communities who wish to become exclusive De Forest agents.



WJAZ—"THIS END OF NORTH POLE"



Announcing, first by red light, then by voice, both controlled by board in the famous studio, a violin solo before microphone concealed in a lamp in Station WJAZ. The announcer pictured is L. M. E. Clausing, designer of the control apparatus and other features of the famous Edgewater Beach Hotel Station © U. & U.



The transmitting station (in a house especially built, about 300 feet away) and two to be used in emergency.

The board controls too the lights which signal the various numbers of the programs. When a plug is inserted a red light, mounted attractively, flashes to those in the studio and to the audience without that next number is about to be broadcast. This too is a signal for silence. The same method is applied to the beach dining floor and to the orchestra in the dining salon.

Sensitive Modulator Control
What is said to be one of the most remarkable and efficient devices ever used in relation to Radio is that which modulates or gages the volume of sound in the crystal studio's control room. On a dial mounted on a large wooden cabinet is a needle which swings almost instantly in a response even to a breath. When Mr. Clausing, designer of the device, whistles sharply in the direction of the microphone from a point about four feet away the needle swung violently to the right. As Clausing lowered the whistling sound the needle retreated accordingly. The modulator control is used to judge the amount of voice frequency power being sent into the transmitter. It is constructed so as to enable the announcer to hear his own orders, instructions or directions; thus enabling him to judge the volume of his own voice. The mod-

ulator amplifies sound about 8,000 times which sound then is amplified several million times in the transmitter.

Design Oversize Throughout
Another interesting phase of the plant is a device which enables the announcer in the studio to talk to the operator in the station regardless of the latter's position. This is done by means of an electrical connection of the control board with a loud speaker in the station. By this contrivance the operator in the station is freed from the annoyance and loss of time usually caused by hurrying to and answering a telephone.
As many as sixteen tubes have been fitted to the transmitter. The tubes are arranged in a circle to enable equidistant connections. A low resistance aerial, fan-like as to construction, its lead-in caged, distinguishes Station WJAZ. The natural period of the antenna is about 230 meters; it works on an assigned wavelength of 447 meters. The generator capacity is ten kilowatts at 4,000 volts. The entire set was purposely built oversized so as to enable the carrying of more than twice the usual load.
It is this unusual capacity; it is the scientific manner in which WJAZ is operated that has given it the name of "This End of the North Pole" and has enabled it to apprise an eager, anxious world of the movements of the MacMillan expedition to the top of the earth.

Crystal Studio and Immense Power Help Make Chicago Station Leader

By J. L. Newman

CHICAGO.—On a gleaming strand of a great lake hard by a mighty city there rises like a fan a tall slender mast. From its top, on waves of air, go and come rare words and music. It is the point of a wonder spot that has drawn hundreds. Its voice is known to myriads of all colors, climes and castes as Station WJAZ—"This End of the North Pole."

Opened about four months ago by the Chicago Radio Laboratory, the achievements of the plant, its operation and equipment, have attracted the attention of many prominent Radio engineers. Its location, too, has set it apart; in fact, it is the studio of WJAZ which has brought distinction.

At the far end of a magnificent dining salon in the Edgewater Beach hotel, looking upon the steely blue expanse of Lake Michigan, is what men and women have described as a bower of beauty—the crystal studio. There are no walls. Instead there are clear, bright sheets of heavy double or triple plate glass in white frames. These enclose the studio. The glass admits the light, and the wondering gaze of guests. But the transparent sheets exclude sound. The silence thus afforded aids those in charge of the studio to control in part the volume and variance of transmission, to temper its tone, and to make smooth the way of temperamental artists.

Studio Artistically Decorated

Red, white and blue form the color scheme. Above are billows of rich red velvet which shield a system of lights whose hues may be varied to accord with the verbal and musical themes that compose the programs. The glass partitions too are draped in red velvet. Here too are two grand pianos, a console phonograph, a number of bizarre lamps, bits of artistry and antique pieces. Under foot is a blue carpet of yielding texture.

One of the lamps lightens in two ways. It sheds a mellow radiance over the singers or speakers and at the same time conceals in its fringe a microphone. A violinist, as an instance, stands by the lamp, sees his audience through the glass and thus is inspired. There is nothing to show that he is playing too to hundreds of thousands of others within a radius of 3,000 or more miles, depending on broadcasting conditions.

From the microphone under the lamp shade a wire leads to the control board in the adjoining room which is part of the crystal studio. From the board another wire (telephone) leads to the transmitting plant. In various parts of the studio proper, at the base of the glass frames, are devices for the insertion of jacks by means of which the microphone is connected with control board. Microphones are located too near the "Jazz" orchestra which WJAZ broadcasts nightly and near the orchestra on the marble dance floor on the beach.

Control Board Important Phase
Perhaps the most important phase of the crystal studio is the control board and modulating device beside it. These contrivances and others of the studio and plant were designed in large part by Leroy M. E. Clausing, formerly in the Radio service of the United States Bureau of Standards in Washington, D. C., and of the Radio service in the navy yard at Charleston, S. C.

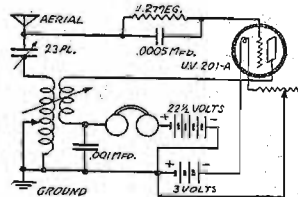
There are ten microphone lines controlled by the board. There are jacks for placing on the air the strains of the orchestra in the dining salon, one for the first studio desk (reserved for oratory), two for piano and song, one for the announcer, one for the marble dance floor on the beach (about 200 feet away), one for

RECEIVING RECORDS? SEND 'EM IN—

(The following items are based on letters from Radiophans, who have been doing good distance work. Readers submitting letters for publication must diagram their sets.—D.X. Record Editor.)

Week-Old Set Gets Distance

J. F. Hooper, 204 Kindersley Road, Montreal, Canada, reports regularly receiving over two dozen distant broadcasters using the regenerative single tube circuit shown herewith. In his letter he states that the set as yet is less than a week old and that "static is something awful, but I find good results may be had by listening in between 11:00 p. m. and



1:00 a. m., Eastern daylight saving time." Mr. Hooper uses a UV-201-A tube with 3 volts on the filament and 22½ volts on the plate. The diagram illustrates the arrangement. It should be noted that Radio Digest uses the variable condenser symbol shown to indicate that the side with the arrow through the black dot is the connection to the rotary plates.

Vessels at sea may now obtain free medical advice through the Radio station at Gothenburg, Sweden. The Radiogram telling the symptoms of the person afflicted is forwarded to the Almanns and Sahlgrenska Hospital, from where free advice is sent to the ship through the Gothenburg transmitter.

AN EVENING AT HOME WITH THE LISTENER IN

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCA, Toronto, Ont.	400	6:00-7:00	6:00-7:00	6:00-7:00	6:00-7:00	6:00-7:00	6:00-7:00	6:45-7:45
CFCA, Calgary, Alta.	440	10:00-11:00	.....	.....	11:30-1:30	11:00-1:00	.....	.....
CKAC, Montreal, Que.	430	.....	6:00-7:00	.....	.....	.....	.....	.....
KDKA, E. Pittsburgh, Pa.	328	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-9:00	5:00-7:30
KEAF, Denver, Colo.	360	9:00-10:00	9:00-10:00	.....	9:00-10:00	9:00-10:00	9:00-10:00	.....
KEL, Los Angeles, Calif.	480	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00
KGW, Portland, Ore.	492	9:30-2:00	12:00-1:00	10:00-11:00	12:00-1:00	9:30-2:00	12:00-1:00	9:00-10:00
KHJ, Los Angeles, Calif.	395	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	10:00-12:00
KFO, San Francisco, Calif.	423	10:00-12:00	10:00-12:00	.....	10:00-12:00	.....	10:00-12:00	.....
KSD, St. Louis, Mo.	540	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00
KTV, Chicago, Ill.	345	.....	7:00-9:00	7:00-9:00	7:00-9:00	7:00-9:00	8:00-10:00	.....
NAA, Radio, Va.	435	6:45-7:20	6:05-7:20	6:25-8:40	5:45-7:40	7:00-7:40	.....	.....
PWJ, Havana, Cuba.	400	.....	.....	8:00-10:30	.....	.....	8:00-10:30	.....
WBAF, Fort Worth, Texas.	400	9:30-10:30	.....	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	7:00-7:30
WBZ, Springfield, Mass.	337	5:00-8:00	6:30-8:00	5:00-8:00	6:30-8:00	5:00-8:00	6:30-8:00	7:00-8:00
WCX, Detroit, Mich.	517	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	4:00-5:00
WDAF, Kansas City, Mo.	411	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	11:45-1:00
WDAJ, College Park, Ga.	258	7:30-11:30	7:30-11:30	10:30-1:30	7:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30
WDAP, Chicago, Ill.	360	.....	9:00-1:00	.....	9:00-1:00	.....	9:00-1:00	8:00-11:00
WDR, Philadelphia, Pa.	395	5:30-6:00	5:30-8:00	5:30-8:00	5:30-6:00	6:00-1:00	5:30-6:00	.....
WDF, New York, N. Y.	405	.....	.....	5:00-5:50	.....	.....	.....	.....
WEAF, New York, N. Y.	492	.....	6:30-6:00	5:30-8:00	.....	.....	9:00-10:00	.....
WEAA, Dallas, Tex.	476	8:30-9:30	8:30-12:00	.....	8:30-9:30	8:30-9:30	8:30-12:00	9:30-11:00
WFAA, Dallas, Tex.	395	5:00-5:30	5:00-7:00	5:00-6:30	5:00-7:00	5:00-6:30	5:00-6:30	5:30-6:30
WGL, Medford, Mass.	380	.....	.....	6:00-1:00	6:00-1:00	6:00-1:00	6:00-1:00	8:30-10:00
WGM, Atlanta, Ga.	429	9:30-10:30	9:30-10:30	12:00-1:00	9:30-10:30	9:30-10:30	9:30-10:30	.....
WGR, Buffalo, N. Y.	319	6:00-8:00	.....	0:00-8:00	.....	6:00-8:00	.....	.....
WGY, Schenectady, N. Y.	360	6:45-9:00	6:45-9:00	.....	6:45-9:00	6:45-11:00	.....	6:30-8:30
WHA, Madison, Wis.	360	7:30-8:30	.....	7:30-8:30	.....	7:30-8:30	.....	.....
WHAS, Louisville, Ky.	400	.....	7:30-9:00	7:30-9:00	7:30-9:00	7:30-9:00	7:30-9:00	.....
WHZ, Troy, N. Y.	380	8:00-9:30	.....	.....	8:00-10:00	.....	.....	8:00-10:00
WIC, Cincinnati, O.	411	.....	9:25-10:55	.....	.....	.....	.....	8:00-8:55
WHK, Cleveland, O.	360	5:00-5:30	5:00-5:30	7:00-8:55	6:00-8:55	5:00-5:30	5:00-5:30	6:00-6:30
WIP, Philadelphia, Pa.	609	4:00-5:30	5:00-10:00	5:00-5:30	5:00-8:00	5:00-5:30	5:00-5:30	8:00-10:00
WJZ, New York, N. Y.	350	.....	6:30-8:30	.....	6:30-8:30	.....	6:30-8:30	.....
WJAZ, Chicago, Ill.	448	.....	.....	9:00-1:00	5:00-1:00	9:00-1:00	9:00-1:00	6:00-5:50
WJY, New York, N. Y.	405	.....	.....	.....	5:30-9:30	5:30-9:30	.....	.....
WJZ, New York, N. Y.	465	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	6:00-5:50
WJZ, New York, N. Y.	465	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	5:30-9:30	6:00-5:50
WLAG, Minneapolis, Minn.	417	6:30-10:30	6:30-10:30	.....	6:30-10:30	6:30-10:30	6:30-10:30	7:30-8:30
WLW, Cincinnati, O.	309	7:00-9:00	9:00-11:00	7:00-9:00	9:00-11:00	.....	.....	.....
WMAQ, Chicago, Ill.	448	.....	9:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	.....
WMAZ, Memphis, Tenn.	409	8:00-9:30	8:30-12:00	.....	8:00-9:30	8:00-9:30	8:00-9:30	.....
WOL, San Antonio, Texas.	385	.....	9:30-10:30	.....	9:30-10:30	.....	.....	.....
WOAW, Omaha, Neb.	528	9:00-10:00	9:00-10:00	.....	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00
WOC, Davenport, Ia.	484	7:30-8:30	.....	10:00-11:00	7:00-8:30	7:00-8:30	9:30-10:30	7:00-9:00
WOP, Philadelphia, Pa.	509	6:45-9:00	.....	.....	6:45-9:00	6:45-9:00	.....	.....
WOR, Newark, N. J.	405	6:00-10:00	5:15-6:30	6:00-9:00	5:15-6:30	5:15-6:30	6:00-9:00	.....
WOS, Jefferson City, Mo.	441	8:00-9:30	.....	8:00-9:30	.....	8:00-9:30	.....	.....
WSA, Cincinnati, O.	409	.....	7:00-9:00	.....	7:00-9:00	.....	9:00-11:00	.....
WSB, Atlanta, Ga.	459	8:00-12:00	8:00-12:00	.....	8:00-12:00	8:00-12:00	8:00-12:00	7:30-8:30
WSY, Birmingham, Ala.	380	8:00-8:45	.....	8:00-8:45	.....	8:00-8:45	.....	.....
WJZ, Detroit, Mich.	517	6:00-7:30	6:00-7:30	6:00-7:30	6:00-7:30	6:00-7:30	6:00-7:30	4:30-5:30

Instructions for Use.—All the hours above are given in Central Standard Time. If your city uses Eastern Time, add one hour to each of the periods stated; if your city uses Mountain Time, subtract one hour; if your city uses Pacific Time, subtract two hours. If in addition your city is using Daylight Saving Time, add one hour to this result.

RELAY CONVENTION STIRS ALL CHICAGO

PUBLIC INTEREST CENTERS IN TECHNICAL PHASES

More Than 1500 Delegates to Second Annual Meeting—Many Notables on Program

CHICAGO.—One physical law at least was broken here September 11 when instead of radiating from all roads Radioed to Chicago where, beginning September 12 and ending on the 15th, more than 1,500 delegates, representing all phases of Radio, were to attend the second annual convention of the American Radio Relay League. The meeting, under the auspices of the Chicago Radio Traffic association, was preceded by unusual enthusiasm not only on the part of delegates but of the public. The latter evinced great interest especially in the technical sessions scheduled for September 13 and 14 in a high school.

Those Who Are to Speak

Among the many Radio notable speakers on the program were such experts as W. D. Terrell, chief supervisor of Radio, United States Department of Commerce; R. Y. Cadmus, supervision of Radio, third district, the oldest inspector in the service; Arthur Batcheller, supervisor of Radio second district, Charles C. Kolster, supervisor first district, S. E. Edwards, supervisor seventh district, and E. A. Beane, supervisor ninth district.

Many Notables Taking Part

Other notables to take part in the program were C. D. Tuska of Hartford, Conn., who was to talk of the New Miner Circuit; J. H. Miller of the Jewell Electrical Instrument company, "Vacuum Tube Characteristics," demonstrated on the platform; M. E. West, laboratory superintendent Chicago Radio Laboratory, "Underlying Characteristics of Receiver Design"; Leroy M. E. Clausen of Station WJAZ (Chicago), formerly of the United States bureau of standards, "Tube Transmitter Design," and William Dublier, "The Condenser, Its Application to Radio." These are the names of experts who have been invited to deliver addresses: Edwin H. Armstrong, inventor of the circuit bearing his name; Dr. Lee DeForest, of the DeForest Radio Telegraph and Telephone company; Dr. Ernest E. W. Alexanderson of the General Electric company; Dr. H. C. Hazeltine of Neutrodyne fame, and Dr. Bowden Washington of the Cutting and Washington Company.

Station WJAZ was ready to broadcast resumés of the convention and especial addresses by H. P. Maxim, president of the American Radio Relay league, and W. D. Terrell. Other phases of the program were athletics, tours to stations in Chicago, banquet, "stunts" and a "Night of Mystery" by the royal order of Wouff-Hong.

LEARN RADIO

Here's your opportunity. Radio needs you. Win success in this fascinating field. Trained men in demand at highest salaries. Learn at home, in your spare time.

Be a Radio Expert

I will train you, quickly and easily, to design, construct, install, operate, repair, maintain, and sell all forms of Radio apparatus. You will be the most successful in existence. Learn to earn \$1,800 to \$10,000 a Year

FREE Wonderful, home-construction, tube receiving set, of latest design. Write for "Radio Facts" free. Engineer Mohaupt, American Electrical Association, Dept. 3, 4513 Ravenswood Ave., Chicago

Elks' Parade Described by WSB on Fire Escape

Cable Connects Microphone to Distant Transmitter

ATLANTA.—Perched on a fire escape, WSB's microphone recently registered a unique description of the eight-mile parade of Elks, which ended the national convention of the B. P. O. E. in Atlanta. The city blocks separating the station from the line of march were bridged by stringing several hundred yards of cable across a stretch of tin roofs, thus hooking the microphone with the transmitter. This apparently primitive method required no inconsiderable technical skill; it functioned perfectly.

As the great procession passed beneath WSB's aerial point of vantage, the hooting of many bands, the shouts of the patrol leaders, the cheers and applause of the great crowd and a description of the maneuvering of the gaily caparisoned marchers was broadcast by "the Voice of the South."

Station WHA Will Resume Broadcasting October 1

MADISON, WIS.—The closing program for the summer was given recently by Station WHA, of the University of Wisconsin. The station will be closed until October 1, when services will be resumed under the direction of Prof. E. M. Terry, and Robert Ray, chief operator for the coming school year.

During the regular school year, daily programs, with the exception of Sunday, have been given, and during the summer session tri-weekly evening programs were broadcast.

Plan Pullman Airphones

LONDON.—Pullman cars equipped with Radio receiving sets will be running shortly on the various railway services in England.

Experiments carried out by Radio engineers on express trains, using both inside and outside aeriels, have been successful. It has been possible to pick up concerts from broadcasting stations while traveling at sixty miles an hour. Passing trains do not interfere, nor do tunnels make any difference to the clearness of the music and messages.

FORMICA

Laminated Phenolic Condenser Product SHEETS TUBES RODS

RADIO PANELS

POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

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

SEND FOR COMPLETE PRICE LIST PROMPT ATTENTION TO MAIL ORDERS DEALERS PRICES ON APPLICATION

STARRETT MFG. CO. 519 SOUTH GREEN ST. CHICAGO

WHAZ, BREAKER OF RECORDS, YEAR OLD

OPENING GROUP PRESENTS ANNIVERSARY PROGRAM

Among First Plants Heard Abroad, Rensselaer College Celebrates Its Achievements

TROY, N. Y.—Station WHAZ, the Rensselaer Polytechnic Institute here, the oldest engineering college in America, celebrated its first anniversary September 19, with a program by the same group which presented the first program when this station was opened a year ago. Dr. Palmer C. Ricketts, president of the institute, delivered a brief address.

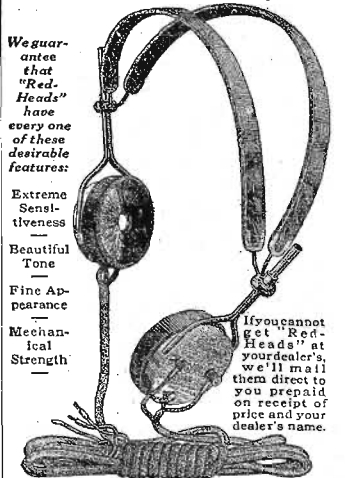
Station WHAZ has already performed many unique feats. Installed through a gift of \$30,000 by the Rockefellers, graduates of the Institute, famous as the builders of the Brooklyn Bridge, this station was primarily intended for use in connection with the electrical engineering course at the Rensselaer Polytechnic Institute and for Radio experimental purposes, which are regularly carried out with many interesting scientific developments. It was decided to devote it one evening each week to the entertainment of the Radio audience, and during the cooler season its programs, which run the whole gamut of entertainment and instruction, are heard regularly from coast to coast, from Alaska to Panama, in Hawaii, Cuba and at sea.

Known for Distance Records WHAZ was one of the first stations in America heard in continental Europe last November. It was the first eastern station heard in Hawaii last December. This station established the long distance record of the world in February, when early morning test programs were picked up on four days at Invercargill, New Zealand, a distance of 10,000 miles from Troy, farther than the human voice had ever been carried before without wires. It accomplished the first transcontinental two-way Radiophone transmissions in January and February with station CFCN at Calgary, Alberta, Canada, with programs and messages interchanged simultaneously.

A new summer distance record was made in June when a midnight concert by Doring's Band and soprano solos by Mrs. William T. Lawrence were clearly heard in complete form at Hollywood, California. Even during the periods of greatest static interferences reports show that its programs are heard with remarkable clearness as far West as the Rockies. WHAZ was also heard clearly during the summer months in eastern Canada and the Carolinas.

"RED-HEAD"

—a triumph in radio receiver design



We guarantee that "Red-Heads" have every one of these desirable features:

- Extreme Sensitiveness
- Beautiful Tone
- Fine Appearance
- Mechanical Strength

HERE'S what we say about "Red-Heads"—they're extraordinary radio receivers. We believe they're the best receivers on the market today. Superlatives are easy to say and hard to back up. Here's how we back up ours. We guarantee that you'll like "Red-Heads." You take no risk in buying them. We'll refund your money plus postage if you don't agree with us after trial. "Red-Heads" are the lowest priced, high-grade, aluminum-cased receivers on the market. Nine years of receiver experience are behind their quality.

What One User Says

The Newman-Stern Co., Waupun, Wis., July 25, 1923. Gentlemen: In 1915 I purchased a pair of your "Red-Head" phones. This pair of phones was one of the first you put out. They are still in good condition and, I believe, best treatment of the other phones on the market. Very truly yours, D. J. SAXTON

And "Red-Heads" are better today than they ever were.

READY NOW!

The New 1924 Model F—3000 Ohms

The new standard "Red-Heads" have ELEVEN improved features—new this year. Beautiful and graceful in appearance; light in weight; aluminum case; the famous brown-red ear caps; military headband; high-grade cord; exquisitely sensitive and fine toned. 3000 OHMS PER PAIR.

At your dealer's or prepaid on receipt of price. \$6.50 PAIR Complete

THE NEW "RED-HEAD" JR. 2000 Ohms

Makes its way to the public this year in response to a demand for an extra fine 2000 Ohm phone. A remarkable production with workmanship guaranteed as on our standard Model F. Complete with headband and cord.

At your dealer's or prepaid on receipt of price. \$5.00 PAIR Complete

Since 1915 Pioneers in Radio—year after year our "Red-Heads" are striving to achieve one purpose—better radio receivers. THE GUARANTEE Money back if after 7 days trial you're not satisfied that "Red-Heads" are the BEST receivers on the market at the price. THE NEWMAN-STERN CO. Dept. RD, E. 12th St., Cleveland, O.

ERLA REFLEX
Bulletin 14 Now Ready
Dealers: Attractive Discounts.
Note: We are the largest exclusive Radio Jobbers in the Middle West.

HUDSON-ROSS
123 W. Madison St. Chicago

FRESHMAN RESISTANCE LEAKS

The largest and most Complete line in the World

Our new construction of all types Variable Resistance Leaks produces a product which we can now guarantee indefinitely as being scientifically correct, mechanically perfect and built for unusual durability.

BASE MOUNTING TYPE VARIABLE RESISTANCE LEAKS

Freshman Leaks give an absolute unbroken range of 180 degrees from zero to 5 Megohms. With either .00025 or .0005 Freshman Condenser \$1.00

Without Condenser .75

PANEL MOUNTING TYPE VARIABLE RESISTANCE LEAKS

will bring in stations never heard before. Can be mounted on any panel in a few seconds. When mounted, only the knob shows on the panel. The latest and most essential part of an efficient tube set. With either .00025 or .0005 Freshman Condenser \$1.00

Without Condenser .75

FRESHMAN FIX-O

Fixed Resistance Leak Combination—4 in One

Freshman Condenser .00025 Price Complete
Leak Mounting Freshman Resistance Leak Sale-T Handle 65c

Separate Leak & Sale-T Handle.....50c
Separate Condenser & Mounting.....40c
All Freshman Products at your dealer's price. We send purchase price and you will be supplied without further charge.
Also ask your dealer for our free diagrams of the Neutrodyne, Flowelling and Kaufman Circuits.

Chas. Freshman Co. Inc.
Radio Condenser Products
106 SEVENTH AVENUE NEW YORK

The New Grebe Broadcast Receiver

Point No. 3 The two chief factors of modern radio—Regeneration and Tuned Radio Frequency Amplification—find their first successful combination in this Receiver.

Just One of its Seven Points of Satisfaction

Licensed under Armstrong U. S. Pat. No. 1,113,119

Ask Your Dealer
A. H. GREBE & CO., Inc.
Richmond Hill, N. Y.

The Week's Advance Broadcast Programs

Tuesday, September 11

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Musical program. Selections Star Concert Orchestra; Albert Downing, tenor; Harry Adaska, violinist.

KDKA (Eastern, 326), 9:00 A. M., Music; 11:30, Victoria and Victor records; S. Hamilton Co.; Piano and piano rolls; C. C. Mellor Co.; 5:15 P. M., Dinner concert, KDKA Little Symphony Orchestra; 6:30, Literary program, Marie Stewart; 8:45, Children's period; 7:20, Concert, KDKA Little Symphony Orchestra; Mrs. F. W. Meyer, contralto.

KGW (Pacific, 492), 10:00-11:00 P. M., Dance music. George Olsen and orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert program featuring Baldwin's Don Ton Ballroom Orchestra, of Ocean Park, Calif.; 2:30-3:30, "Uncle John"; 8:00-10:00, Program arranged by Louis Nebelitt.

KSD (Central, 345), 8:30 P. M., Musical program.

KYW (Central, 345), 8:30 P. M., Children's bedtime story; 7:00-7:58, Musical program; Herbie Mintz, pianist; Sallie Jones, accompanist; Isham Jones and his orchestra; 8:31-8:53, Program, American Farm Bureau Federation.

PWX (Eastern, 400), 9:00-11:30 P. M., Concert by the Cuban Navy Band Orchestra.

WBZ (Eastern, Daylight Saving, 337), 6:30 P. M., Bedtime story for children; 7:00, Concert, Ruth Ray, violinist; Irene Adams, soprano; 7:00, Bedtime story for Giovanni, Orson S. Marden.

WDAP (Central, Daylight Saving, 380), 7:00 P. M., M., Drake Concert Ensemble; Blackstone String Quartet; 10:30, Frederick W. Brown, tenor; Bob Condie, pianist; Frances Stodola, soprano; Jack Chapman and His Dance Orchestra.

WDAE (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:30-3:00, Talk on "Care of Children"; 4:30-5:55, Song recital; 7:45, "Affairs of the Heart," Rose Logan.

WDT (Eastern, Daylight Saving, 405), 12:00-12:54 P. M., Musical program, "Clipping Choppy Chips from Chateau Catalogue; Overture, Original St. Louis Five; Jimmie Clark, conductor; 2:30-3:00, "Clipping Choppy Chips from Chateau Catalogue; Overture, Original St. Louis Five; Jimmie Clark, conductor; 4:30-5:55, Short talks and musical program; 7:30-8:00 P. M., Bedtime stories; 8:00 P. M., Recital, dance music, Meyer Davis Belvedere Stratford Concert Orchestra.

WFAA (Central, 476), 8:30-9:30 P. M., Musical and dramatic entertainment by the Tell Me This Club, Dallas Journal; 11:30-12:00, Paul E. Amies's orchestra.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music; 3:00, Concert; 6:30, Dinner music; Meyer Davis Belvedere Stratford Concert Orchestra; 7:30-7:58, Children's Own Hour, stories by Gladys Hill; 8:00, Boy Scout Radio Corps; 9:00, Short talks; 9:15, Musical program; 10:30, Dance music, Meyer Davis Belvedere Stratford Dance Orchestra.

WGR (Eastern, Daylight Saving, 360), 12:00-12:30 P. M., George Albert Bonchard, organist; 1:35-7:00, Digest of the day's news, topic of scientific interest; "The American Boy," 7:45, Organ music, convention of National Association of Cost Accountants.

WGY (Eastern, 380), 9:00 A. M., Morning Service from program, Margaret Waterman, pianist; William Shaw, bass.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Orchestra; 8:00, Musical program, Selections on the Rialto Theater Organ; 7:30-9:00, Concert, Al Gorman's Novelty Orchestra; Al Gorman, pianist and director; Henry Miller, saxophonist; Cliff Gorman, banjoist; Homer Smith, trombonist; Robert Cohen, drummer; Hubert Ekins, drummer; Reading, "An Interesting Historical Episode."

WHK (Eastern, 380), 8:00 P. M., Dance program, "WBK Trio," Dawson's Radio Release, Automobile Road Report.

WIP (Eastern, Daylight Saving, 509), 7:00 P. M., Artistic recital; 8:42, Dinner music; 9:00, Bedtime story, Uncle Wip; 8:15, Recital.

WJAX (Eastern, 390), 7:50 P. M., Cleveland News Concert, Dance, Joe Thomas, soprano; J. L. Schroder, lecturer; Mrs. Edith Jones, soprano; 10:00, P. M., WJAX (Central, Daylight Saving, 443), 10:00 P. M., 2 A. M., Musical program, R. Warren K. Howe, director; Orlova Orchestra; Dan, soprano; Frederick W. Asard, tenor; James Elske, baritone; Hazel Goodman, violinist.

WLW (Eastern, 309), 10:00 P. M., Selections by the Circle Dance Orchestra; "Absent," "Roll On, Beautiful World, Roll On, Beautiful World," Chester Matthews, baritone; Mrs. C. Taylor, accompanist; One act play, "Shirley of England," Fontana, Larry Day; Goodie, Marie Pearce; Director, Francis Bellino.

WMAQ (Central, Daylight Saving, 447), 4:30 P. M., Program, Glenn Dillard Gunn School of Music; 9:00, LaSalle Roof Garden Orchestra; E. E. Suetter, Jr., director; 9:15, Elsa Fleming, Kaubark-Mulgrew, Polish pianist.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30 P. M., A. G. Hunkeler, lecturer, music; 5:45, Chimes concert.

WOD (Eastern, Daylight Saving, 509), 11:00 A. M., Organ recital, Mary E. Vogt; 12:00, P. M., Lunch music, Wamsucker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt.

WVJ (Eastern, 517), 9:45 A. M., "Trouting Day," Fred Shaw, pianist; Margie Johnson, soprano; 12:05 P. M., Detroit News Orchestra; 8:30, Detroit News Orchestra; Town Clerk, Albert H. Schindler, soprano; Antonio DiGilio, tenor; Dix, Mildred L. Williams, contralto.

Wednesday, September 12

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Program, Selections Star Concert Orchestra; Arthur Semple, flutist; Marnie Roth, violinist.

KDKA (Eastern, 326), 9:00 A. M., Music; 11:30, Victoria and Victor records; S. Hamilton Co.; Piano and piano rolls; C. C. Mellor Co.; 5:15 P. M., Dinner concert, KDKA Little Symphony Orchestra; 6:30, Literary program, Marie Stewart; 8:45, Children's period; 7:20, Concert, KDKA Little Symphony Orchestra; Mrs. F. W. Meyer, contralto.

KGW (Pacific, 492), 10:00-11:00 P. M., Children's program; 10:11, Dance music, George Olsen and Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert program, "Uncle John"; 8:00-10:00, Program, Willet M. Brown Motors Company.

KSD (Central, 345), 8:30 P. M., Program by Steve Cady, Joseph Gallagher, William Tasselle, Elmer McDaniel, John Alckinson, Charles Voerge, vocalists; Kathryn Fuller, ukulele soloist.

KYW (Central, 345), 8:30 P. M., Children's bedtime story; 7:00-7:58, Harry Geiss, pianist; Herbie Mintz, pianist; Mary Lee, soprano; Isham Jones and his Orchestra; 8:05-8:28, Reviews of the latest books, Llewellyn Jones.

WBZ (Eastern, Daylight Saving, 337), 6:30 P. M., Dinner concert, WBZ Trio; 6:30, Bedtime story for children; 7:00, Mrs. William J. Warren, contralto; WBZ Trio; 8:00, Bedtime story for Giovanni, Orson S. Marden.

WDAP (Central, Daylight Saving, 380), 7:00 P. M., Drake Concert Ensemble; Blackstone String Quartet; 10:30, Cerydon Trio, Xylophone and Piano; J. E. Stevens, bass; Jack Chapman and His Dance Orchestra.

WDAE (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:30-3:00, Talk on "Care of Children"; 4:30-5:55, Song recital; 7:45, "Affairs of the Heart," Rose Logan.

WDT (Eastern, Daylight Saving, 405), 12:00-12:54 P. M., Musical program, "Clipping Choppy Chips from Chateau Catalogue; Overture, Original St. Louis Five; Jimmie Clark, conductor; 2:30-3:00, "Clipping Choppy Chips from Chateau Catalogue; Overture, Original St. Louis Five; Jimmie Clark, conductor; 4:30-5:55, Short talks and musical program; 7:30-8:00 P. M., Bedtime stories; 8:00 P. M., Recital, dance music, Meyer Davis Belvedere Stratford Concert Orchestra.

WFAA (Central, 476), 8:30-9:30 P. M., Musical and dramatic entertainment by the Tell Me This Club, Dallas Journal; 11:30-12:00, Paul E. Amies's orchestra.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music; 3:00, Concert; 6:30, Dinner music; Meyer Davis Belvedere Stratford Concert Orchestra; 7:30-7:58, Children's Own Hour, stories by Gladys Hill; 8:00, Boy Scout Radio Corps; 9:00, Short talks; 9:15, Musical program; 10:30, Dance music, Meyer Davis Belvedere Stratford Dance Orchestra.

WGR (Eastern, Daylight Saving, 360), 12:00-12:30 P. M., George Albert Bonchard, organist; 1:35-7:00, Digest of the day's news; 8:00, Concert, Vera Groves, pianist.

WGY (Eastern, 380), 9:00 A. M., Morning Service from program, Margaret Waterman, pianist; William Shaw, bass.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Orchestra; 8:00, Musical program, Selections on the Rialto Theater Organ; 7:30-9:00, Concert, Al Gorman's Novelty Orchestra; Al Gorman, pianist and director; Henry Miller, saxophonist; Cliff Gorman, banjoist; Homer Smith, trombonist; Robert Cohen, drummer; Hubert Ekins, drummer; Reading, "An Interesting Historical Episode."

WHK (Eastern, 380), 8:00 P. M., Dance program, "WBK Trio," Dawson's Radio Release, Automobile Road Report.

WIP (Eastern, Daylight Saving, 509), 7:00 P. M., Artistic recital; 8:42, Dinner music; 9:00, Bedtime story, Uncle Wip; 8:15, Recital.

WJAX (Eastern, 390), 7:50 P. M., Cleveland News Concert, Dance, Joe Thomas, soprano; J. L. Schroder, lecturer; Mrs. Edith Jones, soprano; 10:00, P. M., WJAX (Central, Daylight Saving, 443), 10:00 P. M., 2 A. M., Musical program, R. Warren K. Howe, director; Orlova Orchestra; Dan, soprano; Frederick W. Asard, tenor; James Elske, baritone; Hazel Goodman, violinist.

WLW (Eastern, 309), 10:00 P. M., Selections by the Circle Dance Orchestra; "Absent," "Roll On, Beautiful World, Roll On, Beautiful World," Chester Matthews, baritone; Mrs. C. Taylor, accompanist; One act play, "Shirley of England," Fontana, Larry Day; Goodie, Marie Pearce; Director, Francis Bellino.

WMAQ (Central, Daylight Saving, 447), 4:30 P. M., Program, Glenn Dillard Gunn School of Music; 9:00, LaSalle Roof Garden Orchestra; E. E. Suetter, Jr., director; 9:15, Elsa Fleming, Kaubark-Mulgrew, Polish pianist.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30 P. M., A. G. Hunkeler, lecturer, music; 5:45, Chimes concert.

WOD (Eastern, Daylight Saving, 509), 11:00 A. M., Organ recital, Mary E. Vogt; 12:00, P. M., Lunch music, Wamsucker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt.

WVJ (Eastern, 517), 9:45 A. M., "Trouting Day," Fred Shaw, pianist; Margie Johnson, soprano; 12:05 P. M., Detroit News Orchestra; 8:30, Detroit News Orchestra; Town Clerk, Albert H. Schindler, soprano; Antonio DiGilio, tenor; Dix, Mildred L. Williams, contralto.

Thursday, September 13

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Program, Selections Star Concert Orchestra; Arthur Semple, flutist; Marnie Roth, violinist.

KDKA (Eastern, 326), 9:00 A. M., Music; 11:30, Victoria and Victor records; S. Hamilton Co.; Piano and piano rolls; C. C. Mellor Co.; 5:15 P. M., Dinner concert, KDKA Little Symphony Orchestra; 6:30, Literary program, Marie Stewart; 8:45, Children's period; 7:20, Concert, KDKA Little Symphony Orchestra; Mrs. F. W. Meyer, contralto.

KGW (Pacific, 492), 10:00-11:00 P. M., Children's program; 10:11, Dance music, George Olsen and Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert program, "Uncle John"; 8:00-10:00, Program, Willet M. Brown Motors Company.

KSD (Central, 345), 8:30 P. M., Program by Steve Cady, Joseph Gallagher, William Tasselle, Elmer McDaniel, John Alckinson, Charles Voerge, vocalists; Kathryn Fuller, ukulele soloist.

KYW (Central, 345), 8:30 P. M., Children's bedtime story; 7:00-7:58, Harry Geiss, pianist; Herbie Mintz, pianist; Mary Lee, soprano; Isham Jones and his Orchestra; 8:05-8:28, Reviews of the latest books, Llewellyn Jones.

WBZ (Eastern, Daylight Saving, 337), 6:30 P. M., Dinner concert, WBZ Trio; 6:30, Bedtime story for children; 7:00, Mrs. William J. Warren, contralto; WBZ Trio; 8:00, Bedtime story for Giovanni, Orson S. Marden.

WDAP (Central, Daylight Saving, 380), 7:00 P. M., Drake Concert Ensemble; Blackstone String Quartet; 10:30, Cerydon Trio, Xylophone and Piano; J. E. Stevens, bass; Jack Chapman and His Dance Orchestra.

WDAE (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:30-3:00, Talk on "Care of Children"; 4:30-5:55, Song recital; 7:45, "Affairs of the Heart," Rose Logan.

WDT (Eastern, Daylight Saving, 405), 12:00-12:54 P. M., Musical program, "Clipping Choppy Chips from Chateau Catalogue; Overture, Original St. Louis Five; Jimmie Clark, conductor; 2:30-3:00, "Clipping Choppy Chips from Chateau Catalogue; Overture, Original St. Louis Five; Jimmie Clark, conductor; 4:30-5:55, Short talks and musical program; 7:30-8:00 P. M., Bedtime stories; 8:00 P. M., Recital, dance music, Meyer Davis Belvedere Stratford Concert Orchestra.

WFAA (Central, 476), 8:30-9:30 P. M., Musical and dramatic entertainment by the Tell Me This Club, Dallas Journal; 11:30-12:00, Paul E. Amies's orchestra.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music; 3:00, Concert; 6:30, Dinner music; Meyer Davis Belvedere Stratford Concert Orchestra; 7:30-7:58, Children's Own Hour, stories by Gladys Hill; 8:00, Boy Scout Radio Corps; 9:00, Short talks; 9:15, Musical program; 10:30, Dance music, Meyer Davis Belvedere Stratford Dance Orchestra.

WGR (Eastern, Daylight Saving, 360), 12:00-12:30 P. M., George Albert Bonchard, organist; 1:35-7:00, Digest of the day's news; 8:00, Concert, Vera Groves, pianist.

WGY (Eastern, 380), 9:00 A. M., Morning Service from program, Margaret Waterman, pianist; William Shaw, bass.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Orchestra; 8:00, Musical program, Selections on the Rialto Theater Organ; 7:30-9:00, Concert, Al Gorman's Novelty Orchestra; Al Gorman, pianist and director; Henry Miller, saxophonist; Cliff Gorman, banjoist; Homer Smith, trombonist; Robert Cohen, drummer; Hubert Ekins, drummer; Reading, "An Interesting Historical Episode."

WHK (Eastern, 380), 8:00 P. M., Dance program, "WBK Trio," Dawson's Radio Release, Automobile Road Report.

WIP (Eastern, Daylight Saving, 509), 7:00 P. M., Artistic recital; 8:42, Dinner music; 9:00, Bedtime story, Uncle Wip; 8:15, Recital.

WJAX (Eastern, 390), 7:50 P. M., Cleveland News Concert, Dance, Joe Thomas, soprano; J. L. Schroder, lecturer; Mrs. Edith Jones, soprano; 10:00, P. M., WJAX (Central, Daylight Saving, 443), 10:00 P. M., 2 A. M., Musical program, R. Warren K. Howe, director; Orlova Orchestra; Dan, soprano; Frederick W. Asard, tenor; James Elske, baritone; Hazel Goodman, violinist.

WLW (Eastern, 309), 10:00 P. M., Selections by the Circle Dance Orchestra; "Absent," "Roll On, Beautiful World, Roll On, Beautiful World," Chester Matthews, baritone; Mrs. C. Taylor, accompanist; One act play, "Shirley of England," Fontana, Larry Day; Goodie, Marie Pearce; Director, Francis Bellino.

WMAQ (Central, Daylight Saving, 447), 4:30 P. M., Program, Glenn Dillard Gunn School of Music; 9:00, LaSalle Roof Garden Orchestra; E. E. Suetter, Jr., director; 9:15, Elsa Fleming, Kaubark-Mulgrew, Polish pianist.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30 P. M., A. G. Hunkeler, lecturer, music; 5:45, Chimes concert.

WOD (Eastern, Daylight Saving, 509), 11:00 A. M., Organ recital, Mary E. Vogt; 12:00, P. M., Lunch music, Wamsucker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt.

WVJ (Eastern, 517), 9:45 A. M., "Trouting Day," Fred Shaw, pianist; Margie Johnson, soprano; 12:05 P. M., Detroit News Orchestra; 8:30, Detroit News Orchestra; Town Clerk, Albert H. Schindler, soprano; Antonio DiGilio, tenor; Dix, Mildred L. Williams, contralto.

low; W. H. Ward; Scene, A Little Wood at a summer resort in Maine; "The Traitor," drama; Mack Charles Bauman, W. H. Ward; J. A. Berg, A. E. McCarter, John Loftus; Harry Evans, Jerome Levensheim; Orchestra, selection; "The Traitor in the Piece," comedy-drama; Cast, Ross Cohn, John Loftus, E. H. Smith; Scene, A living room; Orchestra selection.

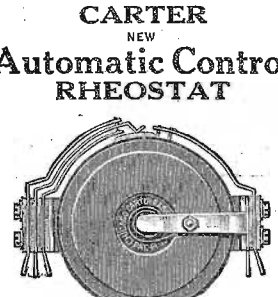
WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; Ollie Jones, conductor; Selection on the Rialto Theater Organ; 7:30-9:00, Concert, Memphis Syncopators; J. Clark Martin, director; Elmer Weisrock, conductor; Eugene Mullin, saxophonist; Louis Abel, saxophonist; William Miller, banjoist; John Klein, drummer; Roy Lawrence, trombo player.

WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Artistic recital; 7:30-7:58, Bedtime stories, Uncle Wip; 8:00, "Where to Go and How to Get There," Eugene F. Hoop of the Automobile Club of Philadelphia; 8:15, Dance music, see Bedtime and high Ten Virgilians, Hotel Watson Roof Garden; 10:00, Dance music.

WJAX (Eastern, 390), 8:00-9:30 P. M., Special anti-racism all-sole program by favorite entertainers; 10:00, Special musical program by the Winston Hotel Orchestra.

WMAQ (Central, Daylight Saving, 447), 10:00 P. M., 2:30 A. M., Musical program, R. Warren K. Howe, director; Orlova Orchestra; Dan Russo, director; Ted Pietto, coach; Charles Gray, leader; Phyllis Peltier, violinist; Jerome Peterson, violinist; Elizabeth Dransick, pianist; Nathaniel Parker, oboist.

(Continued on page 8)



CARTER
NEW
Automatic Control
RHEOSTAT

Eliminates first and second stage jacks, change-over switches and filament control jacks. Clock spring pilot control insures positive and reliable operation. Very simple. Wonderfully effective.

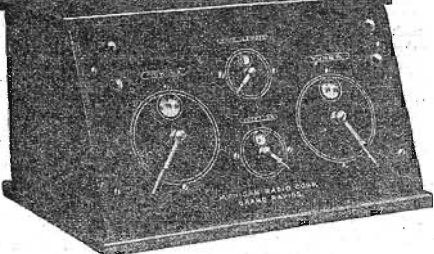
Code No. 3, 6 ohm..... Price \$2.25
Code No. 3-C, 20 ohm..... Price \$2.50
Code No. 3-D, 30 ohm..... Price 2.50

Ask your dealer. Rheostat hook-ups upon request.

CARTER RADIO CO., 205 South State Street
CHICAGO

List of Free
Fans Bargains

RADIO BARGAINS
17 North LaSalle St., Chicago



Michigan Midget Receiver
\$27.00

A Radio Engineering Triumph

Without parallel at the price.

For use with either a standard 6-volt or any of the new dry-cell tubes.

Brings in long distance signals clearly through headphones or, by adding two-stage amplifier, through loudspeaker.

Sloping panel and lever controls make accurate tuning so easy that any member of the household can operate it.

In a handsome mahogany-finish cabinet, only 14 1/2 inches long, yet providing storage space for three No. 6 dry cells and a B battery. Weighs only 6 pounds (without batteries) yet surpasses many of the big expensive receivers in power and scope.

Price, without tube or batteries, \$27.00.

Also ask about the "Michigan" Two-Stage Amplifier and our exclusive line of Condensers, Variocouplers, Variometers, Rheostats, etc. Every instrument fully guaranteed. When you send for circular, give the name of your favorite radio dealer. If your dealer cannot supply remit direct and give us his name and address.

SUPER-VALUES

PHONES	CONDENSERS
Brands Superior.....\$5.25	3 Plate Verolter.....\$0.90
N & K German.....\$5.50	25 Plate Vernier.....\$2.80
Federal.....\$5.25	33 Plate Vernier.....\$1.50
Standard.....\$3.50	13 Plate Plain.....\$1.90

FADA NEUTRODYNE PARTS
For the amateur Radio set builder. Special Neutrodyne parts for use in the patented Neutrodyne Circuit. **OUR PRICE \$18.75**

AUDIO TRANSFORMERS	OUR PRICE
List Price	Our Price
\$4.50 All American.....5 to 1 Ratio \$3.85	\$3.85
\$4.75 All American.....5 to 1 Ratio \$4.10	\$4.10
\$4.75 All American.....10 to 1 Ratio \$4.10	\$4.10
\$4.25 Jefferson.....4 to 1 Ratio \$3.75	\$3.75
\$7.00 Jefferson.....10 to 1 Ratio \$5.65	\$5.65

All Mail Orders Shipped Promptly. Send Money Order, Including Postage

WRITE FOR OUR CATALOG
HANES-ZENER CO. The RADIO Mail Order House
Known for Low Prices
3 WEST 29th STREET, NEW YORK CITY

ADVANCE PROGRAMS

(Continued from page 7)

WLW (Eastern, 309), 4:00 P. M., Classical piano selections, Adelaide Apple, Reading, "The Clair Mender," Fred Smith, 4:40, Wurlitzer concert, Gordon Stuart, harp, baritone; Miss Voelger, pianist; Vocal duet, Louis Vercimino and Mrs. William Margaret Decker, contralto; Henry Busch, violinist; Mrs. Henry Kisch, soprano; Short story for children, Flora Shank; Piano duet, Mrs. Alan Bolander and Mrs. William Dunning; Olive Kaiser, soprano; Rudolph Kafka, violinist; Bruce Wright, tenor; Eastern Hills Dance Orchestra; Louis Steman, pianist; Margaret Decker, pianist; Alexander Decker, bassist; Woodie Beall, drummer.

Friday, September 14

OFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Musical program, Selections, Star Concert Orchestra; Alex Elder, baritone; Harry Adaskin, violinist. KDKA (Eastern, 325, 9:00 A. M., Music; 11:30, Victoria music, 8:00-9:00, Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:40-5:00, Organ recital, Mary E. Vogt. WWJ (Eastern, 517), 12:05 P. M., Detroit News Orchestra; 3:30, Detroit News Orchestra; Tompkins Moore, tenor; Lillian Nehman, soprano; Alf D. Fleming, baritone; 11:00, Detroit News Orchestra.

WDAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00 P. M., Musical program, short talk by Peter Levan, 4:30-5:00 P. M., Concert; Special WDAR feature; Dance music, Howard Lantz's Arcadia Cafe Dance Orchestra; Play by the Greenoughs, selection, Ollie G. Yetton, pianist.

WGR (Eastern, Daylight Saving, 360), 12:30-12:30 P. M., Gospel music, broadcast, organist, direction of H. B. Menale. WGJ (Eastern, 300), 1:00 P. M., Music and address, Dr. William Burgess Cornell; 7:45, Musical program, Orchestra selection; Peter Schmidt, clarinet solo; Theodore Berthelme, contralto; Edwy Arnold, pianist; Ernest Burielgh, cellist; Edward Rice, violinist; 10:30, Musical program, Orchestra selection, WGJ orchestra; Mrs. Sumner Farshurst, soprano; Ollie G. Yetton, pianist.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; Ollie Jones, conductor; Selections on the Radio Theater organ; 7:30-9:00, Concert, Beethoven Trio; Mrs. J. Harry Trent, soprano; Mrs. Blanche Thorn, mezzo soprano; Hedwig Beerman, contralto; Mrs. Hazel Willinger, accompanist; Reading, "An Interesting Historical Story," by Peter Levan.

WMAD (Central, Daylight Saving, 447), 4:30 P. M., Chimes concert, 5:00, Children's program, 5:30, Mrs. Frances Paul, "Wide Awake," editor; 7:30, Weekly musical lecture; Mrs. Marx E. Oberlander, 9:00, La Salle Roof Garden Orchestra; 9:15, Mrs. Herbert T. Giesler, soprano.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30

P. M., C. E. Wilent, lecturer; Music; 5:45, Chimes concert; 6:30, Sandman's visit. WOP (Eastern, Daylight Saving, 509), 11:00 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:40-5:00, Organ recital, Mary E. Vogt; 7:40, Dinner music, Hotel Adelphi Roof Garden; 8:45, Dance music, Hotel Adelphi Roof Garden; 9:00, Concert, 11:10 P. M., Continuation of dance music from Hotel Adelphi Roof Garden.

Saturday, September 15

OFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Musical program, Selections, Star Concert Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:40, Dinner music, Hotel Adelphi Roof Garden; 8:45, Children's program; 9:00, P. M., Grand Symphony Orchestra; 5:15, Children's concert, Washington Band; 6:45, Children's program; 7:05, Honor from "Judge"; 7:20, Concert, Washington Band; Charles Wilbur Foden, baritone.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert program; 2:30-3:30, Matinee Musical; Miss Brinson, pianist; 6:45-7:30, Children's program, "Uncle John"; 8:00-10:00, Dance music, George Olsen and orchestra. KSD (Central, 546), 8:00 P. M., Missouri Theater Program, orchestra, organ recital, vocal and instrumental specialties.

KYW (Central, 345), 5:30 P. M., Children's bedtime story for children; 7:00, Concert, Kathryn Grubb, pianist; Mary Lee, soprano; Grace King Cranston, soprano; George Cranston, tenor; Sigurd H. Sjöberg, pianist; Aerial Potter, violinist; Ruth Fenderson, dramatic reader; Isham Jones Orchestra; 8:05, Under the Spreading Lamin, Youth's Companion.

WDAP (Central, Daylight Saving, 360), 7:00 P. M., Dance Concert Ensemble; Blackstone String Quintet; 10:00, Concert, Ensemble; Blackstone String Quintet; 10:30, George E. Hill, baritone; Monthly program, organ-leader club; Jack Chapman's Dance Orchestra.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music, 2:00, Concert, Caroline Hoffman, piano accompanist; 6:30, Dinner music, Meyer Davis Holten; 7:00, Concert, 8:30, Dance music; 9:00, Concert. WGR (Eastern, 300), 1:00 P. M., Music and address, Dr. William Burgess Cornell; 7:45, Musical program, Orchestra selection; Peter Schmidt, clarinet solo; Theodore Berthelme, contralto; Edwy Arnold, pianist; Ernest Burielgh, cellist; Edward Rice, violinist; 10:30, Musical program, Orchestra selection, WGJ orchestra; Mrs. Sumner Farshurst, soprano; Ollie G. Yetton, pianist.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; Ollie Jones, conductor; Selections on the Radio Theater organ; 7:30-9:00, Concert, Beethoven Trio; Mrs. J. Harry Trent, soprano; Mrs. Blanche Thorn, mezzo soprano; Hedwig Beerman, contralto; Mrs. Hazel Willinger, accompanist; Reading, "An Interesting Historical Story," by Peter Levan.

WMAD (Central, Daylight Saving, 447), 4:30 P. M., Chimes concert, 5:00, Children's program, 5:30, Mrs. Frances Paul, "Wide Awake," editor; 7:30, Weekly musical lecture; Mrs. Marx E. Oberlander, 9:00, La Salle Roof Garden Orchestra; 9:15, Mrs. Herbert T. Giesler, soprano.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30

Husk, soprano; Levana Gosnell, contralto; George Hamon, tenor; Arthur Flindley, baritone. WIP (Eastern, Daylight Saving, 509), 1:00 P. M., Song recital; 6:02, Dinner music; 7:00-7:30, Bedtime stories, Phelo Wip; 8:00, Song recital and dance music.

Sunday, September 16

KHJ (Pacific, 395), 10:00 A. M., Sacred Service; 10:30-11:00, Organ recital, First Methodist Episcopal Church; Arthur Hakeley, organist; 7:00-7:30 P. M., Organ recital, First Methodist Episcopal Church; Arthur Hakeley, organist.

KYW (Central, 345), 10:00 A. M., Church service, St. Christophers Episcopal Church; Rev. Norman J. Huston, rector; 5:00-8:00; Sisson Trio; A. L. Sherman, pianist; Theodoro Ratzler, cellist; George Bass, violinist.

WFAA (Central, 476), 2:30-3:30 P. M., Radio Chapel Bible Class, Dr. Wm. M. Anderson, Jr., Pastor, First Presbyterian Church, Dallas, Tex.; 10:00-11:00, Music, Britling's Dallas Cafeteria Orchestra; Lou Goldstein, director.

WFI (Eastern, Daylight Saving, 395), 7:30 P. M., Church service and sermon, Arch Street Presbyterian Church; organ recital. WGR (Eastern, 300), 1:00 P. M., Music and address, Dr. William Burgess Cornell; 7:45, Musical program, Orchestra selection; Peter Schmidt, clarinet solo; Theodore Berthelme, contralto; Edwy Arnold, pianist; Ernest Burielgh, cellist; Edward Rice, violinist; 10:30, Musical program, Orchestra selection, WGJ orchestra; Mrs. Sumner Farshurst, soprano; Ollie G. Yetton, pianist.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; Ollie Jones, conductor; Selections on the Radio Theater organ; 7:30-9:00, Concert, Beethoven Trio; Mrs. J. Harry Trent, soprano; Mrs. Blanche Thorn, mezzo soprano; Hedwig Beerman, contralto; Mrs. Hazel Willinger, accompanist; Reading, "An Interesting Historical Story," by Peter Levan.

WMAD (Central, Daylight Saving, 447), 4:30 P. M., Chimes concert, 5:00, Children's program, 5:30, Mrs. Frances Paul, "Wide Awake," editor; 7:30, Weekly musical lecture; Mrs. Marx E. Oberlander, 9:00, La Salle Roof Garden Orchestra; 9:15, Mrs. Herbert T. Giesler, soprano.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30

WHAS (Central, 400), 9:57 A. M., Organ music; 10:00, Chimes concert; Edouard Christian, Contralto, Rev. Dr. George Swan, Pastor; 4:00-5:00 P. M., Concert, Mrs. Jane Webster Alurell. WK (Eastern, 360), 3:00 P. M., Selections from repertoire operas, WJIX Orchestra; Vocal and instrumental solos.

Monday, September 17

WDAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Short talks and musical selections; 4:30-5:00, Song recital. WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music, Meyer Davis Holten-Stairford Concert Orchestra; 3:30, Song recital and reading; 6:30, Dinner music, Meyer Davis Holten-Stairford Concert Orchestra.

WGR (Eastern, Daylight Saving, 360), 12:00-12:30 P. M., Gospel music, broadcast, organist; 6:30-7:00, George E. Hill, baritone; 7:00, Digest of the day's news; 9:00, Ball room music, Amhurst's orchestra.

WGJ (Eastern, 300), 1:00 P. M., Music and address, Dr. William Burgess Cornell; 7:45, Musical program, Orchestra selection; Peter Schmidt, clarinet solo; Theodore Berthelme, contralto; Edwy Arnold, pianist; Ernest Burielgh, cellist; Edward Rice, violinist; 10:30, Musical program, Orchestra selection, WGJ orchestra; Mrs. Sumner Farshurst, soprano; Ollie G. Yetton, pianist.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; Ollie Jones, conductor; Selections on the Radio Theater organ; 7:30-9:00, Concert, Beethoven Trio; Mrs. J. Harry Trent, soprano; Mrs. Blanche Thorn, mezzo soprano; Hedwig Beerman, contralto; Mrs. Hazel Willinger, accompanist; Reading, "An Interesting Historical Story," by Peter Levan.

WMAD (Central, Daylight Saving, 447), 4:30 P. M., Chimes concert, 5:00, Children's program, 5:30, Mrs. Frances Paul, "Wide Awake," editor; 7:30, Weekly musical lecture; Mrs. Marx E. Oberlander, 9:00, La Salle Roof Garden Orchestra; 9:15, Mrs. Herbert T. Giesler, soprano.

WOC (Central, 484), 12:00 M., Chimes concert; 3:30

WD-11 and WD-12 Tubes Repaired. WD-11 or WD-12.....\$3.50. C-301 or UV-200..... 2.75. C-301 or UV-201..... 3.00. C-302 or UV-202..... 3.50. C-301A or UV-201A..... 3.50. Moorehead Detectors..... 2.75. Moorehead Amplifiers..... 3.00. DV-6 or DV-6A..... 3.00. Also the new UV-199..... 3.50. NEW DX 1 1/2 VOLT TUBES. 4.00. All tubes guaranteed to work like new. Mail Orders Given Prompt Attention "24 Hour Service". RADIO TUBE CORP. 55 HALSEY STREET NEWARK, N. J. Tubes Sent Parcel Post, C. O. D.

WE REPAIR THE FOLLOWING RADIO TUBES. Dealers and Agents write for Special Discount Mail Orders Solicited and Promptly Attended to. UV-199.....\$3.50. UV-200..... 2.50. UV-201..... 3.00. UV-201A..... 3.75. WD-11..... 3.50. DV-5..... 3.00. DV-6..... 4.00. H. & H. RADIO COMPANY P. O. Box 22-A Clinton Hill Station NEWARK, N. J.

THE AUDIOPHONE. Quality of reproduction such as only the original itself can equal. Speech that is so distinct that the voice heard is the actual voice of the speaker. Music that requires no tolerant imagination to be recognized as music of the finest type.

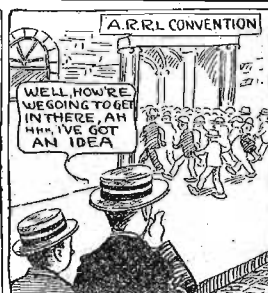
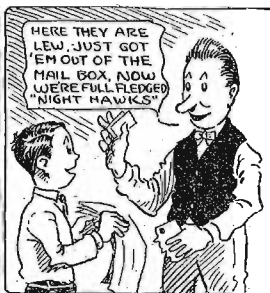
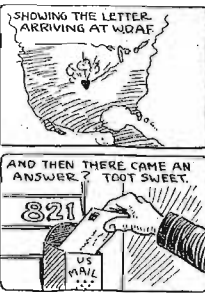
Bristol's Single Stage Power Amplifier. gives additional VOLUME with any two stage amplifier. No separate batteries required. It provides the additional volume necessary to bring in very distant stations on the loud speaker. Write for bulletin and address of the nearest dealer handling our instruments. THE BRISTOL COMPANY WATERBURY, CONN. Boston New York Philadelphia Pittsburgh Detroit Chicago St. Louis San Francisco

"MAKE PERFECTION YOUR SELECTION" ACE, Model V Regenerative Receiver Set. \$20. NEUTRODYNE 5 Tube Circuit. Complete parts for this wonderful circuit. Mostly Fada parts used. We give only the best guaranteed material. \$39.00. Perfection Radio Corporation Six New York Retail Stores. Add Parcel Post. Do Not Send Stamps. 208 page complete Radio catalogue free with orders of \$5.00 or request. Otherwise prepaid for 25 cents.

THE ANTENNA BROTHERS

Spir L. and Lew P.

A Tip for CQ Hounds



WCAP REQUIRED TO SHOO BIRDIES AWAY

SWALLOWS ON STATION'S ANTENNA STOP TALK

Bodies of Feathered Migrants Increase Plant's Wave Length and Interrupt Broadcast Program

By Carl H. Butman
WASHINGTON. Even the birds in Washington are Radiophans; their insistence on attending broadcasting events is causing some of the stations here considerable embarrassment. Engineers of the Chesapeake and Potomac Telephone company, Station WCAP, found themselves in trouble during the recent broadcasting of the dinner given to Paul Whitman in New York, which was received here by land wire from WFAF, because of the antics of a flock of swallows which had settled on the station's antenna.

Shortly after the program began the wave length of the station suddenly was increased from 415 to 475 meters; the vacuum tubes in the transmitter became heated and the plate current units raised greatly. To save the tubes it was necessary to reduce the plate voltage from 1,600 to 1,450, but even then the plate current required was 350 milliamperes instead of the normal 700 milliamperes.

Emergency apparatus was placed in readiness as the engineers scurried to seek the cause of the trouble. One of them went out to look at the antenna; he almost collapsed when he saw the swallows on the wires. The lead-in wire was shaken sufficiently to cause the unwelcome Radiophans to seek another resting place for the night and conditions in the operating room again became normal.

Engineers of Station WCAP said that the effective size of the antenna was increased by the size of the birds' bodies.

ADVANCE PROGRAMS

(Continued from page 8)
WGY (Eastern, 380), 1:00 P. M. Music and Reading. Mrs. Minn; 7:45, Concert program; Louis Skoff, pianist; Ruth Olive Halford, soprano; Joseph Kreisler, violinist; Earl Rice, accompanist; Louis Skoff, Walter Hoff, piano duet.
WHAS (Central, 400), 4:50-5:00 P. M. Concert, Mary Anderson Theater Orchestra; Ollie Jones, conductor. Selection played on the Biato Theater organ.
WHZZ (Eastern, 380), 9:00-10:30 P. M., Concert, Art Vinyet and His Dance Orchestra. Address, "Advantages to the Consumer of Co-operative Advertising," Byron G. Dixon.
WIP (Eastern, Daylight Saving, 509), 3:30 P. M., Artist recital; 6:45, "Radio Baseball Dope," by Monte Cross, club time player; 7:30-7:30 P. M., Boditho stories, Uncle Wip.
WLW (Eastern, 309), 4:00 P. M., Special music, Jeanie Kent; 8:00-10:30, Roger Hill Dance Orchestra; Special Odd Fellows' program.
WOO (Eastern, Daylight Saving, 509), 11:00 A. M., Organ recital, Mary Vonck; 12:30-12:35 P. M., Luncheon musical, Wamasser Tea Room; 4:45-5:00, Organ recital; 7:45 P. M., Dinner music, Hotel Adolphus Hotel Gaiety Orchestra; Candelari, director; 8:30, Song recital; 9:30 P. M., Grand organ recital, Mary E. Vogt.

Music is supplied at a Presbyterian church in New York city by use of an amplifier attached to a receiving set. By timing the services just right, an organ prelude broadcast from another church is picked up.

MORE MONEY NEEDED FOR RADIO SCRUTINY

Congress to Be Asked for \$100,000 Extra for Inspection

WASHINGTON.—When the next session of congress considers the appropriations for the conduct of the federal government during the coming fiscal year a greatly increased appropriation will be asked for the operation of the Radio division of the department of commerce, which now is struggling with funds but little greater than those available three or four years ago, when broadcasting as it is known today was nonexistent.

If the Radio division is to perform its functions efficiently, at least \$100,000 more than is now appropriated will be necessary, it is believed. A greatly increased force of inspectors is needed if broadcasting stations and amateur plants are to be checked properly.

At present practically all of the time of inspectors on the coast is required for the examination of ship stations and similar governmental work.

Build Your Own HAZELTINE NEUTRODYNE with FREED - EISEMANN Licensed Essential Parts

Complete wiring diagram, instructions, etc. sent in special container with patented essential parts. Three NEUTROFORMER COILS mounted on variable condenser, and DOUBLE NEUTRODON (as illustrated), sent for \$24.00. Ask your dealer to show you these parts, as well as complete assembled five-tube Neutrodyne Set in mahogany cabinet, Model NR-5, \$150. Or send 25c for Neutrodyne Constructor which shows "How to Make the Neutrodyne." FREED-EISEMANN RADIO CORPORATION, 255 Fourth Avenue, New York. Licensed by I. R. M. Inc. Under Hazeltine Patents

VERILOUD SYNTHETIC RADIO CRYSTAL. ON APPROVAL FOR 30¢ ZOBEL-STEIN LABORATORIES 322 9th ST. BROOKLYN, N. Y. South 2650



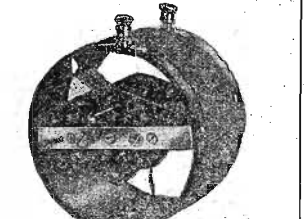
After everything has been said, there's just one thing you want and should demand from a transformer, and that is Volume, but it must be volume without distortion.

"All-American" AMPLIFYING TRANSFORMERS

Every other claim is camouflage and beside the point. You want volume without distortion. Are you getting it? These Manufacturers have standardized on "All-American" Transformers after all other known makes have been thoroughly tested in comparison. All-American give greater volume over the entire range of tone without distortion. Go to your dealer and get "All-American" Amplifying Transformers for your set. Send us 25¢ for postage and we'll send you book of book-ups of successful circuits.

RAULAND MFG. CO. 200 No. Jefferson St., Chicago, Ill.

SOMETHING NEW—Necessary for Your Set



Horne VERNI-TUNER (Trade Mark) Primary, Secondary and Condenser—All within a short 3" tube.

A Great Space-Saver Sharper tuning than possible with any other coupling and at one-half the cost. \$4 Used for the following circuits: Regenerative, all types, Tuning, Radio-Phonograph, Radio-Immune, Ultra Audion. At your dealer or postpaid on receipt of purchase price. Also write for free booklet showing all circuits. HORNE ELECTRIC & MFG. CO. Mercer & Colgate Sts., Jersey City, N. J.

ELECTRIC SOLDERING IRON 228. EVERY RADIO FAN has been looking for this iron for both home and shop use. Operates on A.C. or D.C. current. GUARANTEED one year. Best anywhere in U.S. or Canada. Price not subject to change. Money order for \$2.25. FANS. Send stamp for our list of RADIO BARGAINS. 17 N. LA SALLE ST. - CHICAGO.

WORKSMAN RADIO SERVICE 14 Vesey St., New York, N. Y. Our appreciation of your orders is expressed in the quality of our merchandise and prompt service. VARIOMETERS: \$3.50 Wavrite 150" \$2.95; \$2.40 Dignon 150" 1.95; \$3.50 Fisher, Large, 180" 2.25; \$3.50 Fisher, Large, 90" 2.25; \$2.75 Fisher, Small, 180" 1.75; \$2.75 Fislet, Small, 90" 1.75. CONDENSERS: \$2.00 R. C. 11 plate \$1.05; \$2.35 R. C. 22 plate 1.35; \$2.70 R. C. 33 plate 1.65. VERNIER CONDENSERS: \$4.00 Precision 22 pl. \$2.25; \$6.00 K. C. 45 pl. 2.95. SOLENOIDS: \$1.00 Magna, Aluminum \$0.45; \$1.75 Radiotele \$0.45; \$1.50 Compulsion, All 50. RHEOSTATS: Patent, 6, 16, 25 or 30 ohms \$0.95; \$0.50 5 ohm; \$0.45 2 ohm; \$0.45 1 ohm; \$0.60 1/2 ohm; \$0.60 Ajax Combination and Rheostat, 1.55. PHONES: \$6.00 Branley Superior \$3.25; \$2.00 N. & K., Improved \$1.50; \$5.00 Nemo \$2.50. All orders promptly filled. All orders amounting to \$5.00 or more will be shipped prepaid. Will ship C. O. D. unless remittance accompanies order.

The Largest Radio Store in America OFFERS FOR 30 DAYS ONLY! \$67.50 FOR THIS SALE EVERY SET IS GUARANTEED BRAND NEW \$142.50 Model RC Radiola Made by WESTINGHOUSE for the Radio Corp. of America. Every one of you Radio Fans know that the RC Radiola Set is one of the best on the market—that it sells all over the country for \$142.50. Here's your opportunity to get that set at a REAL SAVING—IF YOU ACT AT ONCE. We have a very limited number of brand new sets that we are offering at \$67.50. Think of that! \$75.00 less than the regular selling price! No C. O. D.'s can be shipped. This Price is Actually Less Than the Cost of the Parts! The RC Radiola has been sold everywhere for \$150 with the aerial equipment included. During this sale you get everything complete at the remarkable price of \$67.50. Get your order in at once! COMPLETE, WITH BATTERIES AND ALL EQUIPMENT: 3 WD-12 Tubes; 3 Insulators; 50 ft. Lead-in Wire; Ground Clamp; Phone Plug; Pr. Sensitive Head Phones; 3 Red Seal Radiola Batteries; 1 3-Volt Radio "B" Battery; 100 ft. Antenna Wire. ACT NOW! While they last—Save \$75.00 SEND YOUR ORDER IN TODAY! CHICAGO SALVAGE STOCK STORE 509 So. State St. CHICAGO, ILL. MAIL ORDERS ADDRESS DEPT. R-3

Radio Digest Illustrated

REG. U. S. PAT. OFF. AND DDM. OF CANADA

Published by the Radio Digest Publishing Company, Inc.
123 West Madison Street
Telephone: State 4843, 4844, 4845
Chicago, Illinois

E. C. RAYNER, Publisher
Chas. F. Smisor, Editor
Evans E. Plummer, Managing Editor
Harry J. Marx, Technical Editor

Eastern Representative, Jacob Miller, Times Bldg., Times Square,
New York; Telephone Bryant 4909

Pacific Coast Representatives
E. J. Wood, 251 Kearney St., San Francisco
Telephone Kearney 1472
H. M. Morris, 417 Western Mutual Life Building, Los Angeles
Telephone L2011

Member of the Audit Bureau of Circulations

58
PUBLISHED WEEKLY

SUBSCRIPTION RATES
Yearly in U. S. and Possessions and Canada, \$5.00.
Foreign postage, \$1.00 additional. Single copies, 10 cents.

Vol. VI Chicago, Saturday, September 15, 1923 No. 10

Public Discontent

Interference from Ship Stations Causes Trouble

PUBLIC discontent, we read, continues to grow regarding the range of wave lengths allotted to broadcasting stations. In defense it is urged that manufacturers should provide more selective apparatus but in reply to this attitude it is urged that selective apparatus requires expert handling. Listening in on many coastal towns is impossible, owing to interference from poorly tuned ship stations. This reads like a chapter out of our own experience.

Rural Districts to Have the Best

Education by Radio, Not by Mail

PERHAPS not so very many years from now one of the really great accomplishments of Radio will have been recorded. The old school house will be cast aside and in its place will arise a new mode of education, much more broad for the rural dweller. Radio broadcasting is bound to make inroads to the children of the country. Radio education will be the thing of the future, how near is to be determined.

Colleges will establish and conduct Radio courses especially designed for students of the country districts. The enrollment of such students and their final graduation will be developed, beyond a doubt, on a logical, workable basis. Nearly all the functions of a high school or college can be accomplished, and will be accomplished, by Radio.

Some of the more progressive universities are planning lectures. The far-seeing and deep-thinking among educators, sociologists and statesmen are beginning to understand what this will signify. Thousands of America's best youth will be trained as their fathers and forefathers never were. Young folks, who live far away from centers of learning, who could never go to high school, nor to college, will have high schools and colleges brought to them.

The limitations of the country school will be swept away. The earnest but often inexperienced and ill-paid country school teacher will be reinforced, perhaps supplanted, by the best type of college professor through Radio. The shortcomings of the district school, some usually open only two or three months, will vanish.

Behind the Scenes in Broadcasting

The Public is Not Pleased with a Junket Program

DID YOU even picture in your mind's eye just the sort of person playing a part in a movie act? Many of us have figured the good little girl or young man as saintly. There have been many instances in which you have talked to a person, over the telephone, for years perhaps, yet have never seen him nor her. A correspondence may have sprung up between persons which may have brought great friendship; yet the picture in the mind's eye remains, a picture for good or bad; it cannot be brushed away.

Some day you are awakened; the saintly girl or good young man has met some tragedy that has bared her or his home life. You are brought face to face with the underworld act in real life where these two have played the important parts. The man at the other end of the telephone may be a "dub" when you first see him. The correspondent may be uncouth, far from the person with whom you want to associate.

Radio broadcasting is very similar to the persons in real life. However, some of the bad features come out in the Radio broadcasts and the unseen audience has a better chance to determine who is who at the sending station. It is very regretful to say that we have the broadcaster or station manager who is very indiscreet in his management, who will permit a hoodlum party which slips low street talk into the concerts. This is not only harmful to the station but to the broadcasting situation as a whole.

The cheap way of giving prizes and a lot of uncalculated talk turns many listeners away with disgust. Remember, such a station will tickle the fancy of the low class but the best will not be reached. Are we to pass in the low class or will we advance to higher levels?

RADIO INDI-GEST

The Lay of the Last Repair Job

A crystal set that worked was built by Jonnie Bone
So he opened up a store, all his very own,
Hung up signs all over, just to advertise,
"Come in here and get expert advice."
"He built all hook-ups, never skipped a one,
Sure all would work as long as he had done;
Sold all the sets, took in the set.
But knew not why they started coming back;
Took in repair jobs, just on a guess,
Started charging with 'em, what a mess!
Left his customers raving, closed up the store
When he blew all the tubes in a set of four."
Frank Tessler

Show Him This: He'll Laugh to Death

Dear Indi: There is an amercber round our way who wasn't brought up right. I have tried hitting him Indi Chest, but he keeps on hogging the air. Suggestions for a remedy are in order.
MIKE ROFRANS.

Contest Entry No. 3: Fairly Bum

Dear Indi: In response to Gess Hoo's noble petition for a limerick contest in which Mike and Izzy are to be featured and the worst limerick wins, allow me to present the following:

Mike and Izzy of aerial raising fame,
Sat in on a little poker game,
Raising a full to the limit,
They called but were not in it.
Since then they're not been the same.

In conclusion I wish to claim that this is bad enough; it really ought to win.
SPIDER WEBB.

STATION BLAH IS SCANDALIZED BY MISS HULA, OSCILLATORY DANCER

WALLA WALLA.—Staggering evidence (not liquid) that the entire if not all the personnel of Station BLAH, Indi-Gest's broadcasting station here, has been on an awful orgy and not paying attention to the super bum equipment, has been turned up and a picture of the reason on the beach at Walla Walla secured. The reason, depicted herewith for proof, is named Dua Hula. She has managed to live up to that name so well that the condensers of Brambdin Bray, dumb announcer, Wattle Knees, program director on silent nights, and Mike and Izzy, chief antenna raisers, have become charged with magnetism and radiant energy and the ground upon which they tread is counterpoised in thin air.

Dua started shaking a wicked antenna just when the summer static season began and has kept the entire force of BLAH in the air and off of it ever since. But the tables have been tabulated and Dua is outluck for the time being, all on account of the clever staff snaphooter. This thinking member of the Indi-Gest scandal gathering organization, told Dua to pose for her picture and led her to believe that it is still being snaphot. Holding the pose, of course, she can't oscillate at any appreciable frequency.

Having satisfactorily sleuthed the mystery of the unheard from Station BLAH and stopped Dua's free and sustained oscillations, the oscillation expert and snaphooter report to Indi-Gest's flock of readers that they believe the plant can now be kept on the sharp and narrow wave length. As a conclusion to the interview with Indi-Gest's station employees, Brambdin Bray, dumb announcer, announced, "I will announce a lot next time I don't have anything to announce," and Wattle Knees, programless director, curly remarked that although his remarks were not for publication, he hoped we'd tell the world that he, "will give a very beautiful noiseless program on the very next silent night."



A-B-C Lessons for Indigest Beginners

Chapter XIII—It's Senatore Guglielmo Marconi
BY GOSH

MIS for Marconi,
Who started all the holler,
That fills the ether everywhere
And makes the world grow smaller.

Sure, But We Don't Know What

Dear Editor of Indigest: I have hooked a spark plug in blunt across the primary of the teakettle in my Stebbins De-generating-set, and have changed the carburetor lead to the positive side of the rear tire and ever since have listened to every program from Walla Walla without hearing anything. Does this prove anything?
GUD LEAK.

Muffle the regimental drums
And toll loud the bell;
J. Brown added water to acid
In a Battery Cell.

Looking Ahead

In Response to Many Calls from Indi-Gest's Corps of Enthusiastic Readers, next week will be given the first half of a poem entitled, "Radio in Cactus Center," written by Arthur Chapman, the well-known poet and author. Don't miss this rough and ready epic of the growth of Radio popularity on the plains where ranch bunk shacks are the largest buildings for miles around.

POO! POO! FOR YOUR MUSIC



Condensed

By DIELECTRIC

The season for using portable sets may be considered by some as about over since vacation time is drawing to a close. I believe the portable set will continue to be used through the winter months, certainly by those seeking the location of coal piles. If it is popular this winter, tubes requiring only dry cell batteries to operate them will be steadily in demand.

Birthday resolutions are not like some brands of New Year's resolves—made to be broken. No one who has listened to the programs broadcast by Station WSY in "sweet Alabama" can recall a single instance of an objectionable feature during the first year of broadcasting. On entering the second year the announcement was made that WSY would continue to maintain a standard in music, religion and education second to none. In all three realms Radio broadcasting is providing a great service.

As an announcer remarked recently, the experience of entertaining from a studio is at best rather trying—no applause, no noise. A great deal has been done to make the interior of modern broadcasting studios really attractive and beneficial psychologically to the artist. WSB, the well known "voice of the south," was never behind in these particulars. At present the station is one of the finest and most attractive of any in the United States, having undergone extensive changes. Its acoustics, always good, are even better.

A tentative plan for maintaining broadcasting in Sweden has been presented to the Swedish government for its approval. In the event of acceptance a joint monopoly on Radiophone broadcasting between the government and a corporation just formed would result, giving to the government the erection of all sending stations and to the company their use for five hours daily. Programs like those known to us will be broadcast. It is further proposed that each owner of a receiving set shall pay a fee; the make of the set is not to be stipulated. This evidences progress.

Although Station WOR suffered an adverse decision in the United States district court relative to the broadcasting of music controlled by the "interests," that fact has not dimmed the optimistic vision of the National Association of Broadcasters—and it should not. In response to the association's invitation to musical composers to submit new songs and popular airs the listeners in are now assured entertainment subject to no tax or fee to the stations. Radio audiences have never been taxed for the pleasure of listening to music but the stations have had to procure their own compositions to "escape" taxes.

To the majority of listeners in Radio is resorted to as a diversion, a purely entertaining feature. Such it is; yet over the ether lanes may come without warning news that will turn joy to sadness and make one fearful for some time to listen. While sitting with the headphones comfortably adjusted during an excellent program from WHAS, the announcer broke in to tell of the sudden death in an auto accident of a man in Virginia. To me it was an incident; to the brother, who may have been listening, for whom the news was broadcast, it would bring distress. Yet who would be without a set?

Recently Dr. Steinmetz was credited with the assertion that all of the smaller broadcasting stations should seek favor with the big ones in the near future, for the reason (as he sees it), that only a few of the latter will be broadcasting; they will utilize some of the lower powered stations for relaying concerts. The number of Radio stations has increased by 1,128 since June 30 of last year, according to the department of commerce; of these, 191 are broadcasting stations. So long as good programs carefully transmitted are given listeners in, their source will be of little moment.

First Steps for Beginners in Radio

Chapter XVI—Plate Batteries

By Thomas W. Benson, A. M. I. R. E.

BEGINNERS will find the accompanying series by Mr. Benson very helpful in learning the rudiments of the popular science of Radiotelephony. The articles yet to appear are:

- Chapter XVII—Using Alternating Current on Tubes.
- Chapter XVIII—Testing Radio Instruments.
- Chapter XIX—Locating Trouble in the Set.
- Chapter XX—Useful Information and Formulas.

THE plate, or as it is usually termed, the B battery, builds up the energy that operates the loud speaker or other reproducing device. And no set can operate at its best unless the batteries are in good condition. The question is sometimes raised as to why they are termed B batteries—the answers are oftentimes amusing. The truth is that in the early days of the audion or triode tube the filament battery was usually lettered A in the circuit, and the battery for the plate, B. In speaking of the battery it was referred to as the B battery; the name has stuck to the present day.

Use of Dry Batteries

Small flashlight batteries connected in the series were used in the early days but special batteries of the dry cell type are now being manufactured for the purpose. The wide application of multi-stage amplifiers made this a necessity; the old type batteries had too high an internal resistance. A good B battery has a very low internal resistance for the following reason: we learned in a previous chapter that it was possible to couple tubes in cascade with resistances, the principle being to locate a high resistance in both the plate and grid circuits of adjacent tubes. Now, were the B battery to have a high resistance it will be clear that when two tubes are fed from such a battery there is a resistance coupling between them.

The action taking place is as follows: as additional current is drawn from the battery by changes in the resistance of the tube due to changes in grid potential the voltage of the battery will vary. Thus when the plate current in the last tube of a two stage audio frequency amplifier increases it pulls down the voltage of the battery which affects the current in the plate circuit of the first tube and by induction through the transformers acts upon the grid of the last tube, giving a feedback effect.

Noises Produced by B Battery

And for the same reason an old B battery makes a set noisy. As the battery becomes run down its resistance increases the coupling between circuits so formed and gives rise to noises that are annoying, to say the least. When the voltage of the plate battery has dropped 20 per cent it is advisable to replace them; thus a 2 1/2-volt battery becomes useless when it has dropped to about 17 volts. Larger batteries can be figured in the same proportion.

In testing B batteries do not use an ammeter. A high resistance voltmeter should be used for the purpose while the battery is under load, that is, while operating the set. When a battery is old it is said to polarize quickly. When current is being drawn from a battery the chem-

ical action taking place liberates hydrogen gas at the carbon rod. Certain chemicals in the battery absorb this hydrogen and prevent its collecting. After a time these chemicals become exhausted and are unable to absorb the hydrogen as rapidly as it is formed and the bubbles collecting on the carbon offer a high resistance to the flow of the current.

Reliability of Voltage Reading

After standing unused awhile the battery will recuperate, that is, the hydrogen will either escape through the sealing compound on the battery or will be slowly absorbed by the weak chemicals remaining. Therefore a battery that has not been used for a time will show a good reading on the voltmeter but when put into service the voltage will drop off rapidly. For that reason a voltage reading is reliable only when the battery is actually working.

Many fans have discovered that heating the B battery gives it a short lease of life after it is seemingly exhausted. The reason is apparent—the application of heat always assists chemical reactions—the hydrogen absorbing chemicals are made to work more energetically when nearly exhausted while no doubt the heat assists in the escape of the hydrogen around the seal. This revival of action is at best very short and serves only in an emergency.

As mentioned under filament batteries, a dry cell contains much moisture; this is necessary for the chemical reaction to take place. It is the gradual loss of this moisture around the sealing compound which accounts for a dry cell's going bad even when not in use. Therefore any method of preventing loss of moisture would prolong the active life of the battery. To that end it is advisable to keep the B battery in a cool place.

Fuse for B Battery

A short circuit on a B battery will destroy it in a very short time because the cells are small and the chemicals are rapidly exhausted under heavy currents.

Too often the first warning of this condition is when the warmth of the battery is noted. The only preventive is to connect a fuse in the circuit that will blow when too much current is drawn. This is a protection that few sets have; it is standard practice in all other fields of electrical application. A fuse can be easily made by mounting two brass bolts on a small piece of slate or formica and connecting the device in series with the B battery, locating it close to where the positive lead enters the set or better still, right at the B battery itself. A short length of 1/2-ampere fuse wire should be clamped under the nuts on the bolts to serve as a protection to the circuit. Should the wires become shorted this fuse will blow and open the circuit.

Many of us have had the unpleasant experience of accidentally connecting the B battery to the filament circuit and thereby burning out the filament. It is extremely difficult to protect the filament of the dry battery tubes with fuses, the current consumption of the filament being so low. Accidents of this nature can be eliminated only by removing the tubes from the sockets while making changes in the wiring. It takes only a minute; if it saves a tube it's a well paid bit of work.

Where only one tube is in use it is possible to prevent the B battery burning out the filament accidentally by connecting a limiting resistance close to the B battery. This resistance may take the form of a 25-watt incandescent lamp.

The high resistance of the lamp will prevent enough current flowing to damage the filament. One lamp should be used for every 22 1/2 volts in the plate circuit. These lamps cannot be used when more than one tube is employed because the feedback phenomena will enter as mentioned in the first paragraph of this chapter. The best way is to take the tubes out of the set.

Storage B Battery

From the above discussion it is apparent that a storage battery is the ideal form of B battery, not only because of its rechargeable feature but because of its low resistance. For broadcast receiving they are not usually desired; this is due to their bulkiness. Their use is advised where possible and where compactness is not essential. When of the lead and acid type the same instructions for maintenance

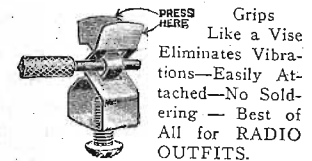
apply to the B as the storage A battery; the only special care being not to charge the former at too high a rate. The charging rate advised by the manufacturers should not be exceeded; otherwise they will heat badly; the plates may buckle and the paste fall out. Cells of the nickel-iron, caustic soda type are more rugged and stand more abuse but the voltage is lower per cell and the efficiency is very low, rarely exceeding 60 per cent; lead batteries run as high as 80 per cent. By following these suggestions the Radiophon may be able to reduce the frequency of his B battery renewals and prevent noises that are now puzzling him.

(TO BE CONTINUED)

Perfect Connections

Are Always Sure With

FAHNESTOCK PATENT WIRE TERMINAL



Clip No. 45 (Illustrated) Especially Adapted for Bus Wire

Made in all Sizes and Shapes At your Dealer's

FAHNESTOCK ELEC. CO.

East Avenue and Eighth Street
LONG ISLAND CITY, N. Y.

LANDLORDS?
Don't worry the landlord.
RITTER PORTABLE LOOP
and no questions are asked. \$1
Price \$1.
By mail 10c extra.
RITTER RADIO CO.
230 Canal Street New York

Federal Standard Radio Parts

offer to the man who wants to "build his own" a selection from 130 different units, each of which is guaranteed.

Each part is made of the best material and given searching tests by our radio engineers.

If you want the best results use Federal parts throughout the set. They were designed and built to work together. One inferior part will impair the efficiency of the entire set.

Insist on the name Federal on every part you buy. If your dealer does not stock them, a card will bring a complete catalog of the 130 Federal units and the name of the nearest Federal dealer.

Federal Telephone and Telegraph Company

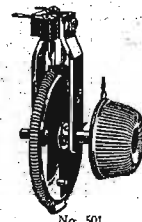
Factory: BUFFALO, NEW YORK

Boston New York Philadelphia Chicago San Francisco
Bridgeburg, Canada London, England

YOU DON'T NEED

Tubes to get out of town. Even in the summer I hear Omaha, Kansas City, Fort Worth and Davenport on my crystal set without amplification. Works over 1,000 miles in winter. Send self-addressed envelope for further information or \$1.00 for complete copyrighted drawings and instructions. Everything clear and simple. **W. L. LAMBERT,** Leon Lambert, 50 South Delaware, Wichita, Kan.

Kellogg Radio Equipment for Better Results



Rheostats

The Kellogg rheostats are simple in design, having but one movable part. The resistance wire is carried on a rotor of high grade insulating material and the contact arms are so placed that a slight movement brings in the one-half turn of the wire, giving a vernier effect. The knob is shaped and corrugated to fit the fingers, making possible the slightest movement.

No. 501 Rheostat, 6 ohms.....\$1.50
No. 502 Rheostat, 25 ohms..... 1.50
No. 46945 Rheostat Rotor, 25 ohms90

KELLOGG SWITCHBOARD SUPPLY COMPANY
1666 W. Adams Street
Chicago, Illinois

Positive Radio Helps

For Storage Battery Tubes Use **Eveready Storage "A" Batteries.**

For Dry Cell Tubes Use **Eveready Dry Cell Radio "A" Batteries.**

For all Vacuum Tubes Use **Eveready "B" Batteries.**

EVEREADY
Radio Batteries
they last longer

How Your Voice Looks "Taken" on a Movie Film

A Description of the Famous Pallophotophone

By Peter J. M. Clute

TO TRANSLATE sound in terms of light and then through light to reproduce the sound seems to be almost impossible of accomplishment by science.

The photographing of sound waves themselves is nothing new. Figure 1 shows three separate lines, representing various sounds photographed on a single strip of film. The wavy lines, however, that represent the voice convey through the eye no sound impression. The next logical step, then, is to make these wavy lines do something that will make a telephone receiver diaphragm move in synchronism with it.

An extraordinary device or machine which accomplishes this purpose is the pallophotophone, which has recently been brought to a state of perfection by Charles A. Hoxie, an engineer engaged in special development work at the laboratories of the General Electric Company. The outfit derives its name from the Greek words that signify "shaking light."

Movement of the Diaphragm

Let us first consider what makes the diaphragm vibrate in a telephone receiver. It is actuated by an electromagnet, the pulling power of which is being affected by an electric current, whose variations are in accordance with the vibrations of another diaphragm moving under the influence of a speaker's voice. Although, perhaps, separated by miles, both diaphragms vibrate in unison, and speech is thus transmitted.

The telephone transmitter is in reality a valve, regulating the amount of current flow. If there was a valve wherein light and shadow would affect the current, a positive connecting link between light and sound would be established. Such a device has been known to scientists for years and is called a "photo-electric cell." It is a device which in the dark does not permit ordinary current to pass through it, but if a ray of light falls upon its sensitive structure, current flow is started. Successive light and shadow cause current variations, following instantly and in strict accordance with every change in the light that impinges upon it. If a film carrying a sound record is passed before the light-controlled current valve, there is immediately produced a fluctuating current through the cell, which, if passed in turn through a telephone receiver, will actuate the diaphragm.

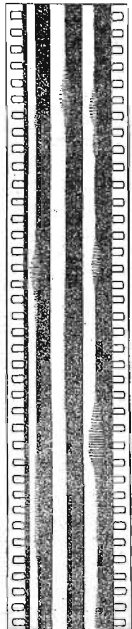


Figure 1

There are two distinct devices in the pallophotophone, one for recording sound and one for reproducing the sound, either of which may be used independently.

Recording Sound

The recording device consists essentially of a tiny mirror, scarcely larger than a pin head, on which is reflected a beam of light. This mirror is attached to a most delicately adjusted vibrating diaphragm. When sound waves, originating from any source, reach the diaphragm, causing it to vibrate, the mirror oscillates and the reflected beam of light moves with it. This moving ray of light falls upon a strip of photographic film, which passes in front of the mirror in a continuous motion. The film when developed in the usual way shows a succession of delicate, dark up-and-down markings on a clear background. These markings constitute the sound record and represent the oscillations of the reflected beam of light. The record produced on the film is a marvelously faithful reproduction of the sound because of the extremely small size of the mirror and diaphragm and their low inertia. These characteristics enable the "shaking light" to produce a sound record on the film that enriches all the fine overtones, the delicate shadings of speech, in fact, every feature that distinguishes different voices. In this particular, the sound record is more nearly exact than any record thus far obtained with devices of this nature.

The recording device operates on mechanical principles, inasmuch as there is no essentially electrical process involved in the procedure.

Reproducing the Voice

The reproducing device, as previously mentioned, is an entirely different contrivance, and the two devices are so independent of one another that either can be removed from the apparatus while the other is in use. This procedure has been followed repeatedly by the inventor in his demonstrations of the pallophotophone.

The reproducing system is electrical in its nature of operation in contrast to the mechanical features involved in the recording device. The film carrying the sound record is wound on a reel, so that it passes in front of an extremely sensitive electrical apparatus. The essential part of this equipment is a photo-electric

cell, which is connected with two batteries in the grid circuit of a vacuum tube. One of the electrodes of the photo-electric cell may be either potassium or sodium, either of these metallic substances possessing the property of giving off electrons when illuminated. If the other electrode is made positive, with respect to the potassium, and

that circuit in amounts directly proportional to the intensities of the light passing to the cell through the film, and at frequencies corresponding to the frequency of the sound vibrations recorded on the film. The remainder of the circuit and its action are quite similar to those of the standard Radio equipment. Amplification

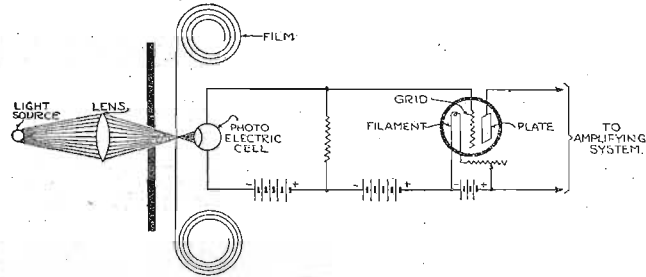


Figure 2

a beam of light allowed to shine on the potassium, there will be a passage of electrons from the potassium to the positive electrode, the flow of electrons being proportional to the intensity of the light.

Referring to the simple schematic circuit diagram in Figure 2, any change in the resistance of the photo-electric cell will produce a corresponding change in the electromotive force impressed on the grid of the vacuum tube. When the film carrying the sound record passes between the cell and the light source, the varying degrees of illumination which it allows to pass to the cell cause a corresponding amount of electronic emission within the cell, thereby creating a potential difference in the grid circuit. Current then flows in

is obtained in the ordinary way by means of tubes.

Sensitive Reproducing Apparatus

The particularly notable characteristic of the sensitive reproducing apparatus is that it responds to variations in the light falling upon it with such instantaneous speed that it is only comparable to the speed of light itself, or to the speed with which Radio waves traverse space. Hence when the film is passed continuously in

(Continued on page 14)

USE VAN'S LIQUID COPPER

for shilding back of panels, etc. Eliminates body capacity. Van's Liquid Copper takes the place of sheet copper or aluminum. Easily applied with a brush—no cutting, drilling, soldering or waste. One bottle covers 100 square inches; mailed to you for \$1. Send a Dollar bill today.

THE VAN LABORATORY

4045 North Lowell Avenue Chicago

VENTRILQUISM, taught almost anyone at home. Small cost. Send 2c stamp today for particulars and proof. George W. Smith, Room M-810, 125 N. Jefferson Ave., Peoria, Illinois.

RUSONITE

CRYSTAL RECTIFIER

(Patent Pending)
THE PERFECT SYNTHETIC CRYSTAL DETECTOR, SENSITIVE OVER ENTIRE SURFACE. No Hunting for "Spots." Loud and Clear. Endorsed by thousands of satisfied users. Sensitiveness Guaranteed. Price, Mounted..... \$5.00
14 K. GOLD SUPERSENSITIVE RUSONITE CATHODES. Permanent. Will Stand Up Under Heavy Field Voltage. Guaranteed. Price, Mounted..... \$1.00

Order from your dealer or direct from
RUSONITE PRODUCTS CORP.
 15 Park Row New York, N. Y.



Radiotron UV-200
The long distance detector. \$5.00



Radiotron WD-11
The ideal dry battery detector and amplifier. \$6.50



Radiotron WD-12
The standard base dry cell tube, \$6.50

3,600,000 Radiotrons/ already made and sold!

Radiotron UV-201-A
The super-amplifier tube, \$6.50

Radiotron UV-199
The little tube of big performance, \$6.50

This one fact reveals at a glance the growth of radio! 3,600,000 RADIOTRONS already sold! It was the perfection of the RADIOTRON that made popularization of radio possible—and every vacuum tube set needs RADIOTRONS for clear reception and amplification—for sensitivity—and long distance reception.



This symbol of quality is your protection

Radio Corporation of America

Sales Dept., Suite 3002; 233 Broadway, New York

10 South LaSalle Street, Chicago, Ill. 433 California Street, San Francisco, Cal.

Radiotrons

REG. U. S. PAT. OFF.

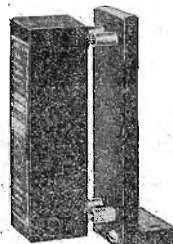
The New VirBren DX

The last word in Radio Engineering as applied to Radio Frequency Transformers is found in the NEW DX-12 and DX-1A R F Transformers.

Conclusive laboratory measurements show that these transformers give the highest amplification, over a broad wavelength range, of any R F Transformer on the market.

The original design which makes this possible is fully covered by patents.

The DX-1A is especially designed for the UV201-A tube. The DX-12 is our new Standard broad range R F Transformer for use with all other tubes which are suitable for R F Amplification, including the UV199.



Patented Dec. 19, 1922

Write for literature.

Type	Wavelength range	Price	Send 30c for large pictorial diagram sheet and instruction leaflet No. 3 showing latest popular R F circuits, including REFLEX circuits.
DX-1	170-550	\$6.40	
DX-12	170-550	6.40	
DX-1A	250-550	6.40	

Dealers and Jobbers; write for proposition

Radio Instrument Company, Inc.
 WASHINGTON, D. C.

RECORDING THE VOICE

(Continued from page 13)

front of the device, an electric current is created, which corresponds with great accuracy to the original sound waves, as recorded by the markings on the films. This current is then used to actuate a telephone receiver, a loud-speaking device, or to operate directly Radio broadcasting apparatus without the use of pick-up devices ordinarily employed.

The pallophotophone has introduced into Radio broadcasting an entirely new element—the possibility of making a master record of a speech or lecture at a convenient place and time, and broadcasting it days or weeks later from scores of Radio sending stations throughout the country. The same holds true of reproducing musical selections. In using the reproducer in broadcasting, the electrical impulses are not again converted into sound, but are impressed directly on the amplifying system, thus eliminating the distortion that would otherwise prevail. Those who have listened in to speeches and lectures transmitted from WGY by this new device have reported that it was a noticeable improvement, in fact, it could talk by Radio even better than persons who spoke directly into the regular microphone transmitter. It also has a big advantage over the phonograph in this particular, inasmuch as it is possible to record and reproduce lengthy speeches or a whole concert program.

Radiohans within the range of WGY have been given an opportunity of hearing short talks by a number of this country's most prominent business and professional men. The pallophotophone was instrumental in this performance, inasmuch as the recording device was used to photograph the voices of these celebrities without inconveniencing them by coming to the broadcasting studio.

Speaking Moving Pictures

The perfect talking moving picture has been sought for years, but until the pallophotophone was developed there did not seem to be any very great prospect of early success. Now, however, a film can be made, the pallophotophone working with the camera, and this film thrown on the screen, the pallophotophone being used with the movie projector to reproduce the sound of the actors' voices. The reproducing device of the pallophotophone being mounted on the projector itself, the film, with both the picture and the sound record upon it, will then be projected in synchronism.

While the speaking movies and broadcasting possibilities are the applications of the most immediately popular appeal, there are other potential uses of the pallophotophone. It has the possibility of being developed into a film-phonograph for use in the home, just as disc-phonographs are now used. It is an excellent telephone transmitter for use in voice communication. It can be used to advantage in Radio telegraphy in producing signals. It can also be used in the electrical laboratory to do the work of the ordinary oscillator without the local interference commonly encountered in using the oscillator. And it can be used for audio-amplification in Radio.

The interconnection of sound and light has thus been accomplished and the future only can reveal the extent of its application to our every-day life.

As to Ground Potential

In tube transmitters the sets should be connected to the center tap of the filament coil and also the negative lead of the direct current source of high potential are at ground potential with respect to the rest of the system.

FLEWELLING ANSWERS TO QUERIES

By E. T. Flewelling

Resistance of Grid Leak

(Submitted by H. J. R., Hampton, Va.)

Question. I have been very much interested in the Flewelling circuit, using the three condenser type. Have been able to obtain little or no reception on the loop alone, but with a ground or ground and loop, signals come in strong. Which do you prefer for use with your circuit, a variometer in the plate or a tickler coil? Can you also advise me as to the resistance of the grid leak in the circuit?

Answer. I believe one of our recent answers took up the question of which was preferable, a variometer or a tickler coil, but I will repeat here because so many letters are still coming in asking about this point. A previous issue of the Digest, if I am correct, gives the reasons why and I will simply confine myself to stating that for general use the tickler type of circuit is preferable and refer you to previous Digest article for more specific answer.

With regard to the resistance of a grid leak in a single condenser set. We have often been asked this question and as often have been unable to give a definite answer. The resistance of the grid leak will run from 200,000 to 5,000,000 ohms, depending entirely upon the adjustment of the set, the characteristics of the individual parts being used and

as to how hard it is to bring in a station. By this last, I mean that it is no work at all to bring in a local station, a little work to bring in a 500-mile station and sometimes quite hard to bring in a 1,000-mile station. Now, amplification with any super circuit depends, other factors being disregarded, upon the frequency rate of what we will call the whistle. The lower the frequency within limits, the higher the amplification.

On your 1,000-mile station, it might be necessary to introduce to play the greater amplification secured by lowering the frequency of the whistle. This is done in several ways, the one which we have preferred to use being by changing the value of the grid leak resistance.

If you have worked with the Flewelling circuit much, you have no doubt found that this same thing can be done by changing the value of the grid leak condenser. It is often the preferable way of doing it. Use a fixed grid leak in the circuit of about one to two megohms and use instead of the regular fixed grid condenser a regular variable condenser, such as is used for tuning, having a capacity up to .001 mfd. If this is done, you need not worry any further as to what the value of the grid leak is, securing all necessary changes by manipulation of the variable grid condenser.

Roll of Gummed Paper Tape for Speaker Horn

BOSTON, MASS.—E. W. Whittier of this city tells how to make a loud speaker horn that is indestructible, easy to make, which gives clear tones with a good volume of sound at a cost of thirty cents, in thirty minutes.

The only material needed is a roll of gummed paper tape, the diameter of the roll representing the diameter of the mouth of the horn. From three-quarters of an inch to an inch is the width to use. After removing about ten yards of the tape from the outside of the roll, the center of the roll should be pressed gradually outward, one hand being used to shape the horn as desired. As the roll slowly grows outward from the center, the left hand should be used to pull from the outside with a slightly twisting motion.

Care should be exercised to keep the spacing of the turns, as the horn or cone shape forms, at equal distances all round, to prevent collapse. A novice should start first with a straight cone shaped horn,

rather than try to make one with a curved mouth. After the shape has been obtained and the cone is complete, the paper should be fastened inside and outside under a faucet, no longer than necessary to wet it all over. Then put it in the sun to dry. These horns should be made when the sun is shining.

PATENT ATTORNEYS

PATENTS. Booklet free. Highest references. Best results. WATSON E. COLEMAN, Patent Lawyer, 624 F Street, Washington, D. C.

RADIO SPECIALS—WHY PAY MORE?

- UV-201A, UV-199, WD-11, WD-12 Radiotrons \$ 5.40
- SIMPLEX 3000-Ohm Guaranteed Phones... 3.45
- BRANDES "SUPERIOR" Phones... 4.50
- ERLA REFLEX TRANSFORMERS... 3.98
- Large size 225-Volt Variable "B" Battery... 1.85
- Large size 45-Volt Variable "B" Battery... 3.75
- 50-Ohm Rheostats, 51c; 200-Ohm Potentiometer .65
- Crosley Model Y with 1 1/2-V. Tube, Batteries and Phones... 28.95
- Crosley Model 3B with 1 1/2-V. Tube, Batteries and Phones... 51.86
- Crosley Model X with 1 1/2-V. Tube, Batteries and Phones... 78.34
- Simplicx Radio Sales, 1806 Lafayette, St. Louis, Mo.

As the tape has been wound on a wooden block, this leaves a hole at the small end, of the same size, to which the phone piece can be attached with the adhesive paper tape. If a smaller hole is desired, to fit a unit adapter, the ten yards removed at the beginning can be wound around the snout of the adapter just enough to fill the small end of the horn; then set and let dry.

The paper horn thus made may be varnished or painted.

Aerial Construction

Do not use a kite aerial. The aerial should have one or more insulators at each end. It is better to have too many than not enough. Always attach aerials to substantial supports, so located that if either the support or aerial breaks it cannot come in contact with other wires.

Never string aerials over or under any other wires. Should the antennae wires come into contact with the power lines, the antennae might become dangerously charged.

From time to time the aerial should be lowered, and the insulators should be cleaned to avoid leakage.

WE REPAIR YOUR VACUUM TUBES

WD-11-12, UV-199, UV-201-A	
C-201-A	\$3.50 each
UV-200, 300, AP	2.75 each
UV-201, C-201, AP Amplifiers	3.00 each
UV-6, UV-6-A	3.50 each
UV-207	4.00 each

And Guarantee Them Equal to New

ATTENTION

OUR NEW 6V. 1/2 AMP. DETECTOR AND AMPLIFIER **\$4.10**

THIS TUBE IS A REVELATION

QUICK SERVICE—Includes with your order resistance to cover repair plus parcel postage for one pound per tube. If preferred, tubes will be returned C. O. D. repair charges.

SPECIAL

LOUD SPEAKER, nickel-plated—21" high. Undistorted reproduction.

Regular Price \$ 15.00

Our Price **9.50**

Shipped prepaid.

ABALENE RADIO, 14 Vesey St., New York, N. Y.

MESTRO Vernier Adjuster

Finest adjustment for all dials. Nickel-plated with screws. Postpaid 50c. Dealers Wanted.



MESTRO RADIO PRODUCTS COMPANY
514 West Fifth Street
Davenport, Iowa

"Since the Dawn

of intelligence the advancement of civilization has been hand in hand with the improvements in methods of communication, until today the world may be considered to be one vast family. This is especially true in relation to the United States and Canada where the art of conveying the human voice from point to point has been developed to a very high degree."

From "The Story of Service"

Your home life and the unity of the family demand that "touch" with the outer world which Radio alone can supply. Satisfaction should be your demand in the purchase of Radio equipment. "Service" Type 212 Radio Receiver will give satisfaction.

When you operate the set you instinctively "feel" the great distances over which you may bring desired programmes to your home.

ASK YOUR DEALER OR WRITE US



THIS IS A TELEFORCE PRODUCT

Service Radio Company

DEPARTMENT A

4727 Montgomery Avenue
CINCINNATI, OHIO

Every Radio Fan Should Have This Book

Compiled by HARRY F. DART, B.S.E.E., Formerly with the Western Electric Co., and U. S. Army Instructor of Radio Technically edited by F. H. DOANE

562 PAGES—The most complete book of its kind ever published. Written, compiled and edited by practical Radio experts of national reputation. Packed with concise, sound information useful to every Radio fan—from beginner to veteran hard-boiled owl. Hundreds of illustrations and diagrams to make every point clear. Note this partial list of contents:

Different types of receiving and sending hook-ups, electrical terms, condensers, oscillating circuits, coupled circuits, induction coils, antenna systems, electric batteries, generators and motors, protective devices, crystal detectors, arc generators, transmitters, filters, wavemeters, radio experiments, International and Morse codes, commercial receiving sets, tables and data, radio transmitting and broadcasting stations (with call letters), and hundreds of suggestions for helping you to get more pleasure out of Radio.

Send \$1 to-day and get this 562-page I. C. S. Radio Handbook before you spend another cent on parts. Money back if not satisfied.

INTERNATIONAL CORRESPONDENCE SCHOOLS, Box 8279, Scranton, Penna.

I enclose One Dollar. Please send me—postpaid—the 562-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

Name.....

Address.....

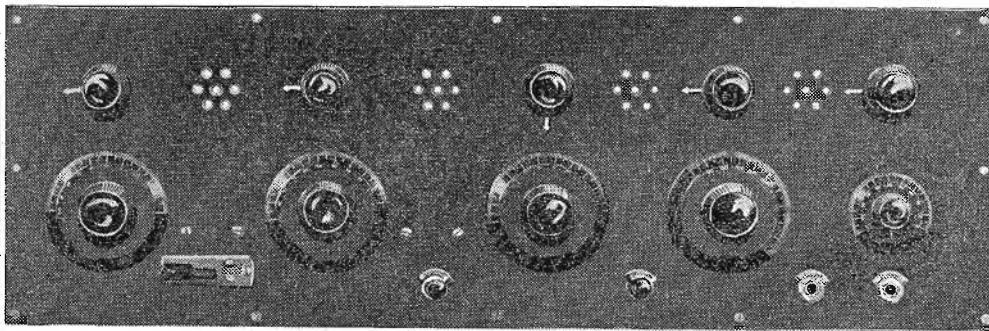
Five Tube Neutrodyne Receiving Circuit

Part IV—Neutralizing and Tuning

By H. J. Marx

WITH the completion of the wiring the fan begins to sit back and heave a sigh of relief, probably thinking "Well, that job's done!" Far be it from such; the worst is yet to come! The belittlement of the balancing operation has been the direct cause of more disparagement of neutrodyne circuit reception than any other reason. Balancing or neutralizing the coupling capacities, as the writer said some time ago, is not to be classed as a "cinch." It is not unusual to hear someone say: "The directions are—adjust the neutrodons until the signal is not heard or until minimum point is reached; but in my set reception is loud all the time; it doesn't seem to vary." In other instances, the moment the filament doesn't light, even though the tube is in the socket, no reception is heard.

The result is the sets are usually left as they are and the neutralizing is not finished. If a strong nearby or local broadcasting station is tuned in for the balancing operation, the chances are that the secondaries of the neutroformers are sufficient energy collectors on local broadcasting to give good, loud reception, and since Radio frequency amplification is only partially effective on short distance work, there is no apparent difference



Front View of Assembled Neutrodyne Set Showing Various Controls

tus. The other type consisted of a metal sleeve over a composition tube which is threaded on the inside. Two metal machine screws with round heads and lock nuts close to the heads are turned into the two threaded holes in the composi-

dials are slightly readjusted, the volume can usually be increased a trifle. This step is now ready for balancing.

The adjustment is made on the second neutrodon. The screws are turned in and out until the reception is entirely eliminated or reduced to minimum volume. If the volume of the reception is too great it will be very difficult to judge this point. The dial adjustment should then be gone over to see if readjustment doesn't bring back the reception. If so, the balancing operation will have to be repeated. After the adjustment is complete on this neutrodon the screws should be locked by means of the lock nuts.

Take out the tube, remove the paper, then replace the tube and again retune the set. The procedure is then repeated with the first tube and the first neutrodon.

Battery Connections

In reference to the filament batteries, whether storage or dry cells are used, care should be taken that the terminals

are not reversed. A discharged or run down condition of the batteries materially affects the quality of the reception.

As far as the plate batteries are concerned, sufficient 22½ volt or 45 volt dry batteries should be connected in series to total 90 volts. The plate circuit of the detector tube is tapped in on the first 22½ volt unit.

It is advisable to try the detector voltage from 16½-volt tap and then increase it until best adjustment is obtained. The same procedure is recommended for the amplifier plate voltages.

Best results are not necessarily obtained with tubes at maximum brilliancy. Find the filament voltage recommended for the tubes used and by connecting a

(Continued on page 16)

STATION LOG

Station	Location	Wave Length	First Dial	Second Dial	Third Dial
WMAQ	Chicago, Ill.	448	79	30	78
WJAZ	Chicago, Ill.	448	78	79	77
WHAZ	Troy, N. Y.	380	61	62	60
WDAP	Chicago, Ill.	360	58	59	48
WCBD	Zion, Ill.	345	54	55	46
WTAS	Elgin, Ill.	275	36	38	22

when balancing is attempted. Likewise if a very weak signal is tuned in, it is so easily detuned that correct balancing is almost impossible. For this reason, a station between the two extremes should be tuned in, and the adjustments should be checked for any slight readjustment on another station. In this way, correct neutralization is possible.

Preliminary Tuning

Before attempting the balancing operation, it is suggested that the tuning operation instructions be first studied and tried. First, become acquainted with the tuning operations and approximate dial settings peculiar to your set. The best way is to find when your strongest station is in operation, then try to tune it in; if you happen to hit something else, well and good. Once having tuned in and determined the station, make a note of the station, its exact wave length and the dial settings of the first three neutroformers. These may vary slightly after balancing, but will serve as guides for going after others.

It must be remembered that in a neutrodyne circuit each of the three neutroformer circuits must be tuned to the same wave length; otherwise reception will not be heard. This gives it unusual selectivity but makes it difficult at the start. After this preliminary tuning is complete the balancing operation can be started.

The Neutrodons

There are two or three types of neutrodons or grid balancing condensers on the market. The first or best known type consists of a metal sleeve over a composition tube (as dielectric) which slides back and forth over two wires separated about ¼ inch. This type did not impress the writer as a very accurate piece of apparatus.

tion tube. Sufficient clearance is allowed at the center to permit another machine screw to pass through the metal sleeve and composition tubes, which screw is used for mounting as shown in the illustrations in last week's article. The machine screws at each end can then be turned in and out until the proper balancing capacity is obtained. The lock nuts can then be turned tightly against the composition tubing for permanent adjustment.

Since these screws turn easily a stiff piece of fiber can be used as a screw driver; a metal screw driver adds body capacity and makes close adjustment difficult.

Balancing Operation

Light first four tubes and plug receivers in on first audio jack. Tune in for reception but avoid any nearby local station where the volume is very great.

The reception should be clearly heard but not so loudly as to make it uncomfortable to the ears. Remove the second tube from the socket and insert a piece of paper under one of the filament contacts, then replace the tube in the socket. Although the rheostat is turned on, the filament naturally will not light. Don't turn off the rheostat; the real balancing should neutralize all capacity effects, even the filament battery leads, hence the method used.

With this tube inoperative, reception will still be heard faintly in the receivers, due to the capacity coupling that exists and which is to be neutralized. If the

—Of special interest to Radio Dealers!

One of Chicago's oldest and largest exclusive radio stores sold more Mu-Rad Receiving Sets in 1922-23 than all other types of Receivers combined!

Mu-Rad sells—and sells!

That fact has been repeatedly verified by our many other Mu-Rad dealers in the middle-west. Why not join them? Why not enjoy as they do the ASSURED PROFITS of good radio merchandise well advertised?

Write for a Mu-Rad Franchise

To get complete details of our special Mu-Rad proposition will not obligate you. Write also for a copy of our handbook catalog of other profitable Radio merchandise. Write today before someone else in your neighborhood gets exclusive Mu-Rad privileges.

Chicago Radio Apparatus Company

Jobbers of Good Radio Merchandise
General Offices: 407 South Dearborn
CHICAGO

WATCH!

for the

METALECTRIC SOLDERING IRON

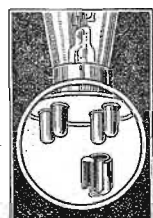
"DESIGNED
TO MEET
THE REQUIREMENTS
OF THE RADIO
ASSEMBLER"

POST ELECTRIC CO.

(Department 509)
30 E. 42nd St., NEW YORK

PROTECT

The Heart of Your Radio Set



Vacuum Tubes are costly and extremely delicate. A battery or any other excessive current applied for only a fraction of a second to the filament leads will burn out your tubes.

You have probably already had this experience and it is apt to happen again at any time. A burnt out tube means money lost—the set out of commission—inconvenience to you.

WHY TAKE THESE CHANCES WHEN RADECO SAFETY FUSES

will absolutely protect your tubes. Applied in an instant to the filament terminals. Will fit any standard tube or go in any standard socket. Full guarantee. 50 cents each. Sent Postpaid. Delay may be costly. Write now. Specify type of tube used.

DEPT. 3
RADIO EQUIPMENT COMPANY
630 Washington Street Boston, Mass.
New England's Oldest Exclusive Radio House
Distributors of many other successful Radio Specialties. Write for our proposition and full details.

MISSING WHAT YOU GET

YOUR set is probably bringing in DX stations you never hear because your rheostat cannot control your filament action. The Fil-Ko-Stat gives infinite adjustment and enables you to magnify the weak stations and bring them in strong and clear.

Full resistance 30 Ohms, adjusted to ALL TUBES. \$2

At All Dealers in High Grade RADIO SUPPLIES

FIL-KO-STAT

Made and Guaranteed by
Dix Instrument Co., Harrisburg, Pa.
Sole International Distributors
Radio Stores Corp., 218 W. 34, N. Y. City

2 VOLT 4 VOLT 6 VOLT

World Storage Batteries Save You 50% And You Get a Written 2-Yr. Guarantee

We maintain the same high quality material and workmanship found on the most expensive batteries and still are able to allow our remarkably low sale price by greatly reducing our overhead and sale costs.

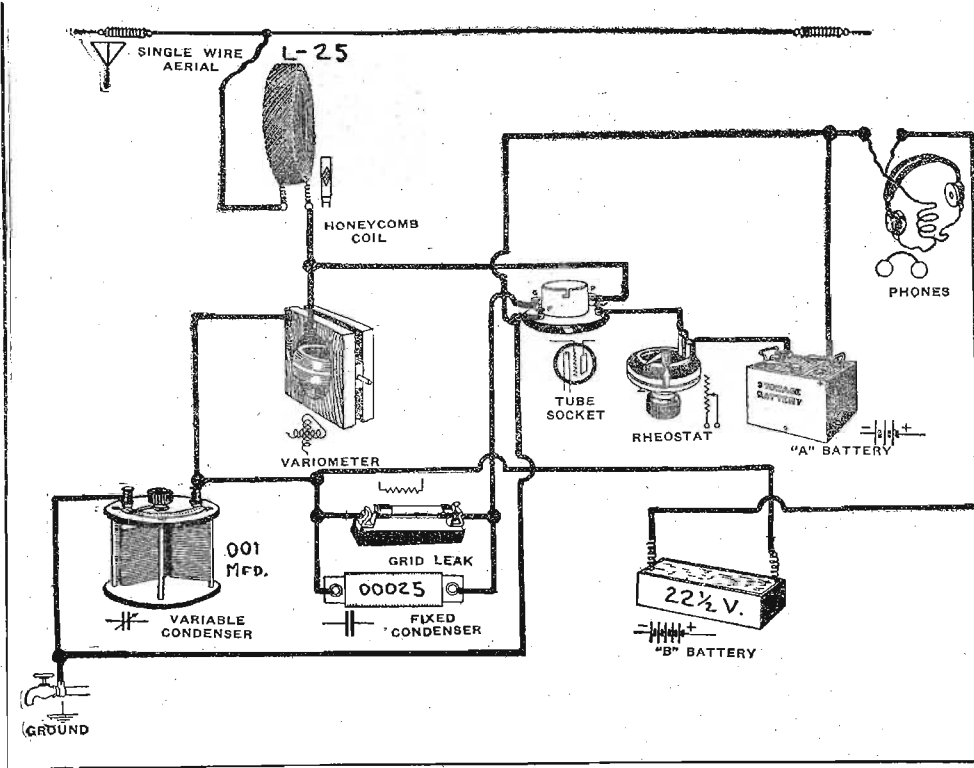
Special 2 Volt Storage Battery for WD-11 and WD-12 Tubes..... \$5.00 6 Volt..... \$ 8.50 6 Volt 100 Amp..... \$12.50
Special 4 Volt Storage Battery for UV-199 Tubes..... \$8.00 6 Volt 80 Amp..... 10.00 6 Volt 120 Amp..... 14.50
200 Hours' service in one charge. Returnable.

SEND NO MONEY. We ship C. O. D., subject to inspection, or will allow 5% discount for cash with order. Shipment made same day order is received. Save 50% on your next battery and get better service and longer life. Our written guarantee is your proof of satisfaction. The Big Fall Radio Season is on now. To get the full benefit of it order your new WORLD battery today!

WORLD BATTERY CO.

60 EAST ROOSEVELT ROAD, CHICAGO, ILLINOIS

SIMPLEX SINGLE TUBE REGENERATIVE CIRCUIT



THE circuit shown in the Simplex diagram will be found highly efficient and reasonable in price. As the average variometer may not have a sufficient number of turns for proper wave length when connected in series with a variable condenser, a 25 turn honeycomb can be added as shown. For lower wave lengths this would be omitted.

Any good .001 mfd. variable can be used for the primary. This need not be vernier since closer adjustments can be controlled through the variometer. Any make or type of detector or tube should function properly in this circuit, since only 22 1/2 volts are used in the plate battery. If necessary a .002 phone condenser can be connected across the receiver terminals.

No grid leak resistance is given because it was found advisable to use the variable type. The adjustment varies considerably with different tubes and for different stations. A good out-door antenna and ground connection are necessary, especially for distant reception. Audio frequency amplification can be added in the usual manner.

OPERATING NEUTRODYNE

(Continued from page 15)
voltmeter across the filament terminal on each tube socket, find the position of each rheostat at which the recommended voltage is obtained. After the tuning is completed, the rheostats can be readjusted for any improvements.
Functions of Controls
Before taking up the tuning, a proper understanding of the functioning of each dial is necessary.
The first dial on the left tunes the grid circuit of the first tube. For the same aerial each wave length will have an approximate dial setting which may vary slightly under different atmospheric conditions affecting the antenna circuit characteristics and coupling in the neutrodyne coils.
The second and third dials tune the secondary circuits of the corresponding tubes. Their setting for each wave length may be considered as fixed; it has practically no changes affecting them. These three dials must operate in synchronism;

that is, each of the three circuits must be tuned to the same wave length or frequency; otherwise reception will not be heard. This increases the difficulty of the original tuning operations but it is the real reason for the high degree of selectivity inherent in neutrodyne circuits. Once the dial settings of a station have been determined, the dial settings will tune them in at any time.
The variometer or fourth dial is not used except for distance reception, where the volume can be increased and clarity of reception improved. It is not used in initial tuning.
The potentiometer dial, in spite of reports to the contrary, has been found very effective in controlling the grid modulation of the detector tube. Its range of effectivity is considerable; although its adjustment is not critical, the improvement is very noticeable.
Tuning Operation
Begin by setting the second and third dials, say to 60, then rotate the first dial

slowly to determine whether there is any broadcasting on that wave length. Naturally, the second and third dials may not work on the same dial setting; the one may be slightly ahead of the other. But this is determined only after the first station has been tuned in. This then acts as a guide for approximate settings for other wave lengths. If no broadcasting is heard advance the second and third dials to 65 and repeat. Continue this procedure up the scale at 5 degree or even smaller intervals until a station is heard.
When a station is heard, determine the call letters, location and the dial settings and look up the wave length. By logging the dial settings every time a new station is heard, tuning becomes simpler and easier.

(THE END)

Wave Trap
There is much talk about wave traps. I experimented with one to improve its action. Talk about Radio freaks! I connected a variometer in series with my small indoor aerial and then to the aerial outside, which was being used as a receiving aerial. By varying the inductance of the variometer I perceived that the action was the same, if not better, than the usual type of wave trap. It has considerably with the DX tuning, even when you do not want to shut anybody out. It acts as a vernier to the primary condenser.—Arthur J. B. Ball, Jr., Bloomfield, N. J.

POSITIVE RESULTS
are being obtained by thousands of satisfied users of the
EASTERN COIL SETS
for the
COCKADAY CIRCUIT
The remarkable features which are making this circuit (4 circuit tuner) more popular each day are its simplicity of construction and control—wonderful selectivity—distance records—clearness and loudness of reception, and the fact that all capacity squelching, interference, etc., are eliminated.
Made as per specifications of Mr. Cockaday, using No. 18 wire with D coil bank-wound.
COMPLETE ASSEMBLED SET OF B, C AND D COILS. \$275
PRICE
Hook-up, directions and material list furnished free with each set of coils.
Mail Orders Filled. Dealers Communicate
EASTERN RADIO MFG. CO.
22 Warren Street, Dept. R. D., NEW YORK, N. Y.

Rametra Corporation
Ready for Immediate Delivery—**ALL PARTS FOR THE**
Acmedyne Circuit
as described by Mr. Lawrence Cockaday in the August issue of "Popular Radio," employed in the wonderful Meco-Supreme Receiver.
Tuned Radio-Frequency at Its Best
Telos Vario-Transformer.....\$8.50
Telos Variometer.....\$6.00
AMSCO Compensating Condenser.....\$3.00
Complete knock-down parts for Meco-Supreme, including drilled aluminum Bakelite panel, solid mahogany cabinet, and three No. 201-A Radiotrons.....**\$80**
All goods absolutely guaranteed by manufacturer and ourselves. Shipped immediately prepaid, on receipt of purchase price. Write for price list on our complete line of quality apparatus.
RADIO & MECHANICAL TRADING CORP.
23 Warren Street NEW YORK CITY

Another Columbia Scoop

A Gearing Coil Mounting for Inside Panel Mounting, made of moulded Bakelite and mirror nickered brass—for those who prefer their bulky coils on the inside of the cabinet hidden from view.
Ask your dealer for it. All good dealers stock it.
Price \$7.00
COLUMBIA RADIO CORP.
157 NO. UNION ST. CHICAGO

Grewol
THE PERMANENT DETECTOR
Fixed Adjustment
The Grewol is adjusted on the most sensitive spot on the crystal and fixed—proof against vibration and jar. Protected from dust and moisture by glass enclosure. Grewol adds to the efficiency of reception.
Packed in individual carton with instructions.....**\$2.00**
Write for Booklet
RANDEL WIRELESS COMPANY
8 Central Avenue Newark, N. J.

DIETZEN VACUUM
11 VOLTS Operates on single dry cell "A" battery. Features: 1. No. 18 wire with D coil bank-wound. 2. No. 201-A Radiotrons. 3. No. 201-A Radiotrons. 4. No. 201-A Radiotrons.
RADIO VIA PARCEL POST AT N. Y. PRICES
Standard Parts Only, in Original Packing
NO SALVAGED GOODS SOLD
Where "Money Back Policy Prevails!"
PHONES For Parcel Post
Dietzen 3,000 Ohm.....\$3.75
Dietzen 6,000 Ohm.....\$4.12
Dietzen 12,000 Ohm.....\$4.50
Dietzen 24,000 Ohm.....\$4.87
Dietzen 48,000 Ohm.....\$5.25
Dietzen 96,000 Ohm.....\$5.62
VARIABLE CONDENSERS
Dietzen 14-Plate Vernier.....2.65
Dietzen 24-Plate Vernier.....2.95
Dietzen 48-Plate Vernier.....3.45
TRANSFORMERS (Audio Frequency)
Dietzen.....3.45
Ames 4% to 1.....2.95
TRANSFORMERS (Radio Frequency)
Coca.....2.45
Owl......95
MISCELLANEOUS
Rahartz Coils.....1.25
S.A. Put Plug......40
Freshman Grid Leak & Cond. combined......35
Dietzen Single Circuit Jack......40
Aerial Insulators......10
Ritor Portable Loop......95
Arius Lightning Arrester......16
Walsh Patent Tube.....2.00
Pearl Tube Socket......50
Switch Lever, Fada Type......19
Ammeter Testing B Battery......49
Elymeters......49
Double Photograph Attachment......95
Cockaday Coil.....2.05
2 Coil Honeycomb Mounting.....2.95
Wave Trap.....4.05
Electric Sounding Horn.....3.65
100 Foot Copper Antenna Wire......39
RHEOSTATS
Dietzen, 6 ohm......39
Dietzen, 30 ohm......49
SOCKETS
Bell V. T. & W. D. H......89
V. T. DeLillo......50
DIALS
2-inch......25
3-inch......35
4-inch......49

Modell's
ESTABLISHED 1891
191 Fulton St., Dept. F-28, New York City
9 New York Stores
America's Greatest Radio Mail Order House

Inductance Coil Used in Reinartz Set

Many Turns of Wire on Tube Increases Range

Recently Reinartz advised using a spider-web inductance in conjunction with an extra coil, consisting of several turns of wire on a tube for the reception of 600-meter commercial stations. I put this coil

WORKSHOP KINKS? EARN A DOLLAR—

THERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. Send them in with full details, including stamped envelope, so rejected copy may be returned. The work must be entirely original, not copied.
RADIO KINKS DEPARTMENT,
Radio Digest,
123 W. Madison St., Chicago

on my set and was surprised to find it very efficient for broadcast reception. I wound a coil, as shown, and it certainly exceeded my fondest hopes. The coil used is wound as follows: the coil L_1 has 70 turns on a tube of 3-inch diameter, the coil being tapped at 0, 5, 10, 15, 20 turns, and at point X the 50th turn. The coil L_2 is wound on the end of the same tube, leaving $\frac{1}{4}$ -inch space between coils. This coil consists of 45 turns with taps at 15, 30 and 45 turns. The coils were wound with Number 22 cc wire. The diagram is self-explanatory. It gets the stuff a great deal louder than the other hook-up and there are less switches and switch points to bother the operator.—Donald M. Hood, Fall River, Mass.

How to Make Tube Socket

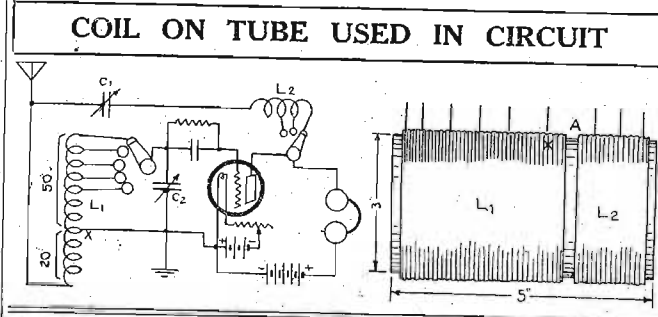
The following instructions for making a tube socket will produce a very serviceable and economical socket if followed closely.

The main advantage of this socket lies in the fact that it may be made in the sub panel upon which the ordinary socket is often mounted. This feature conserves space and being combined with the sub panel and extending beneath it is very convenient to clean and adjust contact springs.

More than one socket can be made on one base.

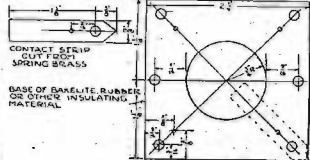
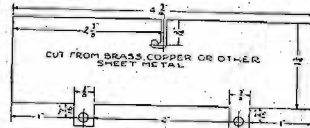
The walls of the socket are bent around any round object of suitable size and the ends soldered—very little solder should be used. A piece of wire may be wrapped around the walls to hold them in place while soldering. The projecting legs are then bent out at right angles to the sides of the socket.

The base is cut from the rubber of an old battery jar. This rubber should be



thoroughly washed and cleaned with steel wool to get out the acid which may be in the pores of the rubber. Warm the rubber and the center hole may readily be cut out with a large drill or knife. The base is drilled as shown. The four large holes at the corners are to hold the contact springs in place, and the four small holes are to take the pins on the contact springs to prevent the contact springs from moving sideways with the movement of the tube.

The contact springs are also cut as shown, the large hole being large enough



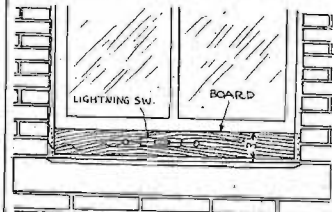
to pass through a 6-32 bolt. The small hole may be punched in if a drill small enough is not available. This hole should be large enough to just take a small brass brad. The brad is put through the hole, up to the head, then the head soldered to the contact.

The contact spring is bolted underneath the base by means of a 6-32 bolt. The bolt should be long enough to have an extra nut on it under the base by which means connection is made to the springs. It is better to solder the leads directly to the contact spring if the wiring of the set is to be permanent. The brad on the contact spring should extend slightly through the base when no tube is in the socket.—E. A. Johnstone, Pocatello, Idaho.

For each step of amplification you require an amplifying tube, transformer, rheostat and socket.

Board in Window Makes Place for Lead-In Wire

Very often it is impossible to drill a hole in a window or anywhere near it for the lead in wire. To overcome this difficulty procure a board about 3 inches wide and long enough to fit securely under the window sash. All the holes are drilled through this board; the lightning switch



may be mounted on the outside of it. No damage is done to the window sash or casing when using such a board.—Arthur F. Plimmer, Wichita, Kansas.

Batteries for Tube Filaments

It is not advisable to use wet batteries as a source of current supply for heating the filaments of the ordinary types of six volt vacuum tubes inasmuch as constant use of the tubes will cause the batteries to become exhausted in a comparatively short time. This would necessitate frequent renewal of the elements of the battery and the electrolyte.

For a circuit employing one or more stages of amplification, a storage battery should be used unless it is desired to heat the filaments of the amplifier tubes by stepping-down the 110 volt house-lighting circuit to a potential of six volts by means of a special transformer. Alternating current should not be used to heat the filaments of detector tubes as the hum due to the rapid reversal of current drowns out the Radio signals.—Peter J. M. Clute, Schenectady, N. Y.

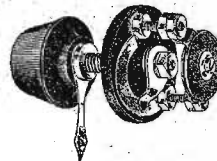
Protection Against Lightning

It is not necessary to dismantle a Radio set during the summer weather because of the danger of lightning striking the aerial. The aerial is actually a protection against lightning, and the chances of a real bolt hitting such a small target are very remote. The aerial, if properly grounded, either through a switch or arrester, will serve to drain the electricity from any really heavy discharges. Do not be afraid of lightning; its actual danger in the city is very small indeed, on account of the grounded steel frames of the buildings absorbing all the energy. The Radio set may be used successfully all summer with the exception of the time when a storm is in the immediate neighborhood.

Use for Bits of Old Panels

Odds and ends of old panels, even if they are full of holes, make good battery terminal panels for the interior of the set. Put small bolts through with binding posts on each side or with the wires from the set soldered to the bolts. Then bring your battery wires in through small holes in the back of the cabinet. It makes a neat job, keeps the tangle of battery wires from the front panel, allows more direct connection and utilizes junk. Pieces of the rubber cells of old storage batteries are also good for this use.—Guy M. Chase, Elizabeth, N. J.

Walwart Variable Grid Resistance



No instrument is more important than the grid resistance in a circuit and yet not until the Walwart Variable Grid Resistance was announced was it possible to obtain a satisfactory instrument.

The variation of the capacity is from zero to six megohms, and is varied by moving the knob only one-half turn.

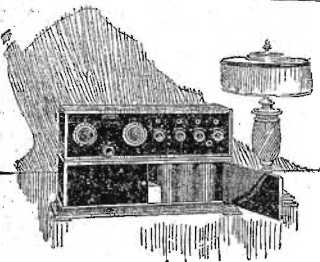
The variable grid resistance will last indefinitely, without deterioration or loss in efficiency. It is not a make-shift like the lead pencil type, but a scientific instrument which our radio engineers have successfully produced.

Price \$1.00

With "Walwart" .0025 Mfd. fixed condenser, 25c extra.

Ask your dealer first. If he cannot supply them, remit direct, sending dealer's name and address.

WALWART ELECTRIC MFG. CO.
DEPT. 400—1250 WEST VAN BUREN STREET
CHICAGO, ILL.



Abroad at Home with a Crosley Model X-J Price \$65

Wonderful opera from New York, dance music from Chicago, stock quotations, current speeches, amusing stories from where you will—all these are brought to your home and fireside if you own a Crosley Model X-J.

This beautiful new Model, similar in construction to the famous Crosley Model X but with greater refinement of detail, is the last word in perfection among radio sets. Its low price—\$65—the battery cabinet pictured above costs \$16 extra—makes it doubly attractive and it more than lives up to the Crosley slogan—Better—Cost Less.

FOR SALE BY GOOD DEALERS EVERYWHERE

Write today for free Catalog which shows the complete Crosley Line

Crosley Manufacturing Co.
9492 Alfred Street Cincinnati, O.

SEVERAL GOOD REASONS

for the

Widespread Popularity

OF THE VARIABLE-VERNIER

ELGIN BOOK CONDENSERS

Can be used in any circuit specifying rotary plate condensers with the following advantages:

- 1st. Vernier All the Way. Three turns required from maximum to minimum capacity, instead of the customary half turn.
- 2nd. No Hand Capacity, if the plate nearest the hand is connected to the grounded, or dead side as we direct.
- 3rd. Cannot Become Shorted by metallic dust or by warping due to temperature changes.
- 4th. No Sliding Contacts to cause noise or trouble.
- 5th. Saves Space. Lies flat and requires but a fraction of an inch back of the panel.
- 6th. Rugged and Substantial. Heavy phosphor bronze bending leaf. Nothing to break or wear out.
- 7th. Reasonable Price. About one-third the cost of a vernier rotary plate.
- 8th. Straight Capacity Line. This is accomplished by giving a convex shape to the inside leaf, causing the outer one to separate from it gradually with a sort of unrolling motion.

Send for Free Circular

Giving Hookup of the New Super-Reinartz Set

ELGIN RADIO SUPPLY COMPANY
207 E. Chicago Street ELGIN, ILL.



FOUR SIZES:
No. 4, .001 mf. \$1.75
No. 3, .0025 mf. 1.50
No. 2, .005 mf. 1.25
No. 1, .0093 mf. 1.00

Questions and Answers

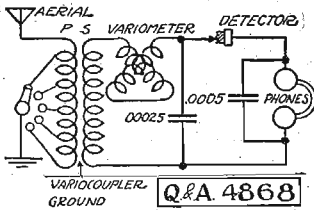
Phantom Circuit

(4522) RZZ, Laredo, Texas.
 Can a Freshman variable grid leak 0 to 5 megohms be used on the phantom? Can the set be used on a regular antenna and ground; what results does it give? When used with a 4-foot antenna, where are the antenna and ground connected?
 A.—A Freshman grid leak 0 to 5 megohms will serve.
 The circuit in question is designed primarily as a portable receiver, and can be used with the usual antenna and ground connections. If a smaller antenna is used, no change is necessitated as to the method of connecting.

Long Distance Crystal Set

(4868) J.W.J., Terre Haute, Ind.
 I should like a hook-up that will receive two hundred miles or more with a crystal detector. I have never received music except from WEAC, one mile away.
 A.—I have a hook-up of a detector, two slide tuner, 3000 ohm. phones and 90-foot aerial.

A.—We present a diagram of a crystal



detector circuit. The apparatus used in this circuit makes it possible to obtain much finer tuning properties, which naturally increases its receiving range. In ordinary crystal detector circuits the signals in most instances reach the crystal for detection but are not audible because the tuning mechanism is not sufficiently sensitive.
 The diagram shows a circuit capable of a receiving range of three hundred miles where an adequate antenna system, 150 feet of wire in a single strand including lead in, is employed.

Good Reception

(4545) EBA, Fort Gibson, Miss.
 If you can spare the time, I want you to tell me if I have really hit upon anything better than is common. I am situated way down south in the "land of static," and have few opportunities to visit other bugs to compare results, but I am advised by a Radio salesman in New Orleans that my results are way ahead of those he has heard in the south.

Pardon a long description, but I feel it necessary that you may know all the facts. I am situated in a small country town, 200 miles from New Orleans, 250 from Memphis, 250 from Birmingham, and 400 from Dallas and Fort Worth, about 550 from St. Louis, Kansas City and Louisville, and more than 700 from Chicago and Omaha. I bought my present set one year ago. It is a 6-tube set, 3-step Radio detector and 2 audio. I got fair results last fall and winter, but very poor during last summer. During January and February I was able to get stations in the above cities with sufficient volume, using 2-step audio amplifier to operate a Magnavox loud speaker, enough to fill two rooms, and on rare occasions on first step audio to operate Magnavox loud enough to hear directly in front.
 Early in April I failed to get anything but static, very rarely getting any part of

a program. I decided to use a loop. I bought two and made one with Springfield braided antenna wire. I got poor results, or none at all. I added a third step audio, then changed the hook-up inside, and accidentally connected both loop and outdoor aerial at the same time without the ground being connected, and found I got wonderful results, frequently getting signals too loud to use phones on the detector jack, and getting plenty of volume to operate a Magnavox on first stage audio.

My antenna is 75 to 85 feet high, has two strands 150 feet long, lead in 7 feet more. Also have a lower antenna running north and south, one wire 70 feet, with 35 feet lead-in. But I do not get nearly the volume with this antenna.

The set is very critical and delicate to tune, and I have to keep detector (C-300) turned well down. I use C-301 A in Radio frequency, and Western Electric power tubes in the audio circuit.

WMC at Memphis is the nearest station; it often comes in with terrific loudness. The loop is of the pancake type with 120 feet of number 18 fixture wire, even with the antenna on the loop is fairly directional, but the connecting of the ground wire immediately stops all signals.

If I tune in a station on the loop only, with the loud speaker on second stage, the aerial signals will immediately increase at least ten times as loud.

Now, as you see it I am getting signals with the same set and tubes louder than I did in winter. There is a difference between first and second stage amplification. I feel sure that this winter I will not need any amplifiers in the audio circuit, as I will be able to get signals loud enough directly off the detector. In fact I have operated a loud speaker directly off the detector and have been able to hear across the room, but very faintly.

I would like to have your honest opinion as to whether I have run across anything that is above the average. If I have, would you advise me what to do with it? During the winter, I used a 4-strand cage type antenna 120 feet long and a present height 80 feet. This has blown down; I tried two wires, hoping to escape some static.

I find that I can get stations even when static is so bad that I can hear nothing but static on my friend's Westinghouse. I assure you that I will appreciate any advice or comment that you have to make as to my results or experiments.

A few nights ago I heard WVJ for the first time since March, and I am also getting Edgewater Beach loud and clear, also W.D.A.T. but never K.C.W. During the winter before making changes I had no trouble in reaching both New York and Los Angeles.

A.—Although your apparatus is exceptionally good, it is not without precedent. You are to be congratulated upon the good fortune of being very favorably lo-

calated and doubtless in having a high-grade equipment and skillful construction, which are essential to the excellent results you have received.

Commercial Production

(4628) DWS, Dushore, Pa.
 I have, in a homemade set, what I call a 3-coil variocoupler which I find highly efficient. As there is no similar instrument now on the market, I would like to ask your opinion as to whether or not I would be able to manufacture and sell them without getting tangled in red tape.

There is no need of a lengthy description of it on which to base your answer. It is nothing more than a 180-degree coupler with somewhat less than the usual clearance between the primary and the secondary, and a second rotary coil, used as a tapper, revolving inside the secondary rotor. It gives a high degree of selectivity and powerful regeneration. Regeneration is very easily controlled; one can tune closer to the "spilling over point" and still obtain undistorted signals with this tuner than with any other I have ever used. At a distance of 125 miles I receive WGY with sufficient volume to operate a loud speaker; this on a single WD-12 used as a detector, and with no amplification. Of course, the results are far from deafening, but are loud enough to be heard clearly all over the room. With one stage of audio frequency added, using the same type of tube, results compare favorably with my Westinghouse RC with its detector and two stages.

What I would like to do is manufacture the tuners, unmounted, and also put up complete sets in cabinet with two stage amplifier and loud speaker built in. Could this be done without infringing on existing patents? Would the tuner be patentable, and would it be advisable to patent

it before beginning its manufacture?
 A.—The circuit of your description is regenerative in principle and as such comes under the Armstrong patent rights. To construct for commercial purposes would make you amenable to the law. The tuner unit could doubtless be manufactured for sale, but not the completed sets.

We advise that you take the matter of patent to the United States patent office, Washington, D. C., for authoritative information. It is the better part of wisdom to be well informed and protected before proceeding.

To be sure of good reception, the Radiophon should see that all connections are well soldered. Many a failure in reception can be traced to poor connections.

A sewing machine motor will create noises in a radio set.

We Have Secured Exclusive Services

of
E. J. Flewelling
 as our
Radio Engineer

Mr. Flewelling has under development a series of parts that will assemble into such an ideal Radio set that is so full of good features we hesitate to use the necessary adjective to describe it fully.

Announcement of the availability of these parts will be made in Radio Digest.

BUELL MFG. COMPANY
 1806 Michigan Blvd., CHICAGO

Special Sets Made to Order

Let us quote you on any circuit. Sets made under expert supervision. We repair sets and test tubes.
FORBES RADIO CO.
 127 N. Dearborn St. Chicago, Ill.

FREE Your Choice

Of one Bound Volume, with each Annual Subscription when mailed direct to us. You have Vol. 2, 3, 4 or 5 from which to make your selection.

Supply Limited



Greatest Collection of Radio Information Ever Published

- Rehartz Long Distance Circuit
 - Ultra-Rehartz Circuit
 - Flewelling "Filter" Circuit
 - Grimes "Inverted Duplex" Circuit
 - Signal Tube Reflex Circuit
 - Armstrong "Super-Heterodyne" Circuit
 - Two, Three and Four Tube Reflex Circuits
 - A. B. C. Lessons for Radio Beginners
- In addition to these features these volumes contain many interesting articles, receiving set diagrams, how to make articles, new apparatus, pictures and illustrations, hook-up diagrams, broadcasting stations, technical articles and book reviews.

63 Numbers

Volumes 2, 3, 4, and 5 Now Ready

Your choice of one Bound Volume is free and postpaid with your one year's subscription or renewal.

13 Numbers in the Bound Volume
 52 Numbers in Year's Subscription

This offer good only in the U. S. and possessions. One dollar additional for Canadian or foreign countries. Additional volumes at \$2.00 each, but are only available to annual subscribers. This on account of our limited supply.

Orders for these Bound Volumes must be mailed us direct with full remittance as they can not be supplied on orders through subscription agencies or news dealers.

Remittance must be by check, money order or draft. (Stamps not accepted.)

COUPON

123 W. Madison Street, Chicago, Illinois

- CHECK OFF THE DESIRED
- One year's subscription and choice of one volume. Send Vol. _____ Check or M. O. enclosed.....\$5.00
 - One year's subscription and choice of two volumes. Send Vols. _____ Check or M. O. enclosed.....\$7.00
 - One year's subscription and additional Volumes Nos.

Name.....
 Address.....
 City..... State.....

Something You'll Want to Keep

8 Free Hook-Ups and Symbols

Just send a two-cent stamp and a dealer's name. No further obligation, but possibly a reminder that you need a perfect crystal. If so, slip 50 cents for both into the envelope, and thank yourself ever after that you tried a B-Metal Loud Talking Crystal. It's a piece of radio jewelry and works as good as it looks. Sold under our liberal Money Back Guarantee to Satisfy.

B-METAL REFINING COMPANY
 3134 TRUMBULL AVE., DETROIT, MICH.

TRIGGER OF NEW YORK RADIO

EVERYTHING SOLD ON MONEY-BACK GUARANTEE. WE HANDLE NO BOOTLEG MERCHANDISE.

BRANDES.....\$5.25	PANELS, Fine Grd. 7x10.....\$0.85	7x14.....\$1.25
ROYAL.....3.50	7x18.....1.45	7x24.....1.80
COCKADAY Best parts, complete. GUARANTEED.....\$12.50	ATLAS Loud Speaker, List \$25.....\$16.50	
ERLA REFLEX One Tube Sets will operate loud speaker; guaranteed. Complete parts.....\$22.50	Our 2-tube assembled set works loud speaker.....\$25.00	
WONDERFUL 1 tube set, guaranteed, all assembled.....\$15.00	We save you money on anything you buy.	
ERLA Radio Transformers.....\$4.50	43 plate Condenser.....\$1.85	25 plate Venier.....2.50
ACME.....4.25	43 plate Venier.....3.75	D. C. Battery Charger.....4.25
KLOSNER 8 & 30 Ohm Rheostat......65	ACME Transformer.....3.75	AMBASSADOR 3000 Ohm Phones.....8.98
TILLMAN 8 & 30 Ohm Rheostat......65	CRYSTAL Detectors......45, .80, .90 and 1.50	FRESHMAN Var. Grid Leak & Condenser......70
REWLER Socket......60		
W, D. 11 & U. V. 199 Sockets......50		
25 plate Condenser.....1.50		

We carry a complete line. Let us know your wants. Merchandise is shipped IMMEDIATELY. Postage prepaid on orders of \$5.00. All others please include postage.

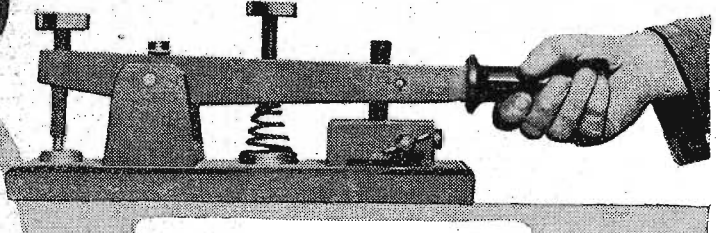
TRIGGER OF NEW YORK

160 East 69th Street, Near Third Avenue, New York City

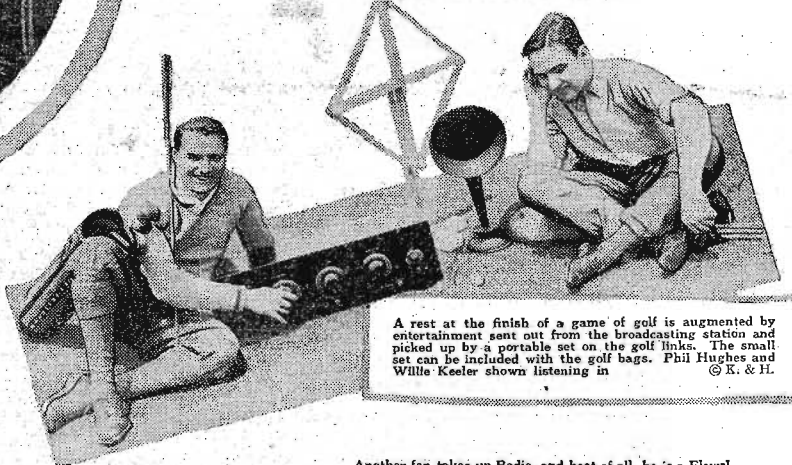
Radio Illustrated



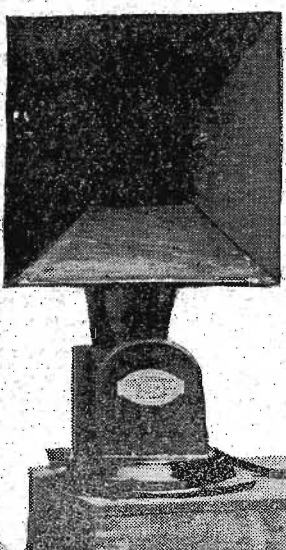
Rather young to broadcast. Baby Alfred Jerome giving station call signal GOO—and finishes with a concert perfectly suitable to the baby audience © K. & H.



We look with a smile on the old apparatus first used in Radio communication. A "pump key" is shown which was used to transmit messages at a speed of thirty words a minute. It was made to handle high voltage currents © Photonews



A rest at the finish of a game of golf is augmented by entertainment sent out from the broadcasting station and picked up by a portable set on the golf links. The small set can be included with the golf bags. Phil Hughes and Willie Keeler shown listening in © K. & H.



Another fan takes up Radio, and best of all, he is a Flewelling booster. Little Master Coleman takes his set out on the porch and uses a loop aerial to pick up the concerts. He has a smile that sticks or he is listening to something very interesting

