Vacuum Tube Calculations; Picture Ultra Audion

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

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

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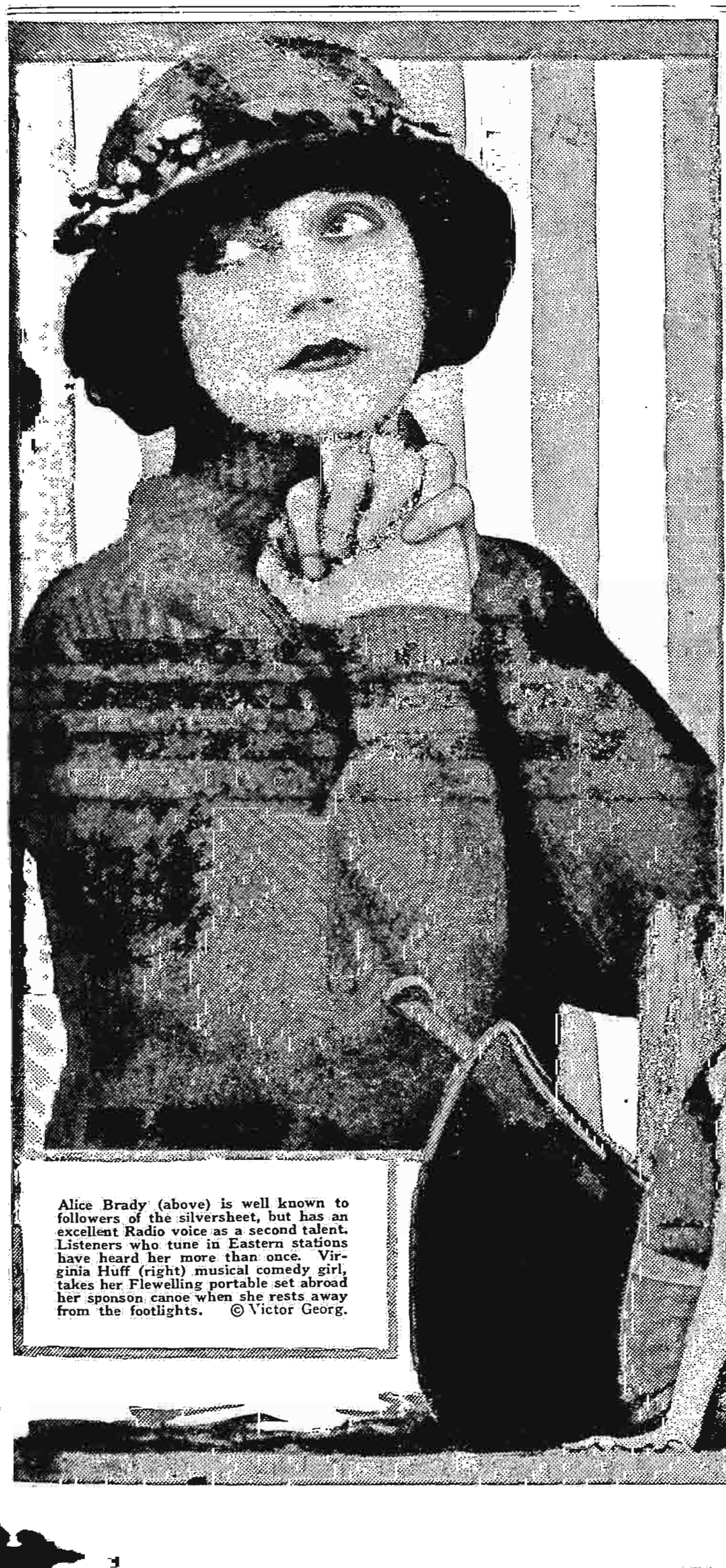
IMPROVES PIANO MUSIC



Alice Brady (above) is well known to followers of the silversheet, but has an excellent Radio voice as a second talent. Listeners who tune in Eastern stations have heard her more than once. Virginia Huff (right) musical comedy girl, takes her Flewelling portable set abroad her sponson canoe when she rests away from the footlights. © Victor Georg.

TEST SHOWS RADIO AID TO HYPNOSIS

Youth in New York Experiment Put to Sleep by Means of Airphone in Brooklyn

NEW YORK.—An experiment designed to show that hypnotism can be practiced by Radio, and that the flow of blood in the subject's body can be arrested, making a bloodless operation possible, was performed here recently.

Operating from Station WHN in the Ridgewood section of Brooklyn, the hypnotist focused his powers on a youth seated before newspapermen.

Over the Radio he ordered the youth to become rigid. A newspaper man waved a match in front of the subject's eyes, insisting that he did not blink and therefore was completely under. The youth was restored, then put under again. His body was stretched across two chairs and a medical student sat on his stomach to prove that he was rigid.

Then the youth was put under for the third time, and over the Radio came a command that the blood leave his arm and flow into his body. A needle was thrust into the flesh of the subject. No blood appeared.

NEWSPAPER DONATES WGM TO UNIVERSITY

ATLANTA, GA.—Station WGM, formerly owned and operated by the Atlanta Constitution, has been donated by the newspaper to Georgia Institute of Technology located here. "Old Reliable," as it is called, will soon be operated and directed by the university. The institution has a special course in Radio and will use the WGM equipment in training students.

WGY MAKES USE OF NEW MICROPHONE

True Piano Quality, Even Low Notes, Put on Air Faithfully

Corrects Loud Speakers

Magneto Pick-Up Gives Tones in Proper Ratio—Good on Phonograph Also

SCHENECTADY, N. Y.—Transmission of true piano quality has been a real problem for the Radio engineer, but WGY engineers have solved it. The difficulty is similar to that which has confronted the maker of phonograph records. The blows of the hammers on a piano are distinguishable but the singing quality and the overtones which are relatively weak have not been reproduced through loud speakers or phones.

Engineers connected with the studio of WGY, the Schenectady broadcasting station of the General Electric Company, have devoted a great deal of time to the development of a device which will make the piano solo a real feature of a broadcasting program.

Description of Device

The device, in brief, consists of a magnetic system between the poles of which is pivoted a suitable coil system. The magnet is firmly fastened to the frame of the piano and the coil is anchored to the sound board. By means of this pick-up device all tones in the piano are faithfully converted into corresponding electric currents which control the Radio transmitter. When heard on the loud speaker the piano is no longer a tinkling sound. The listener in gets all the characteristics of this percussion type of instrument, the blow of the hammer, the singing tone and the overtones.

The piano pick-up is free from the familiar hiss of the carbon microphone as well as the objectionable blasting that takes place when an artist plays too loudly for the microphone.

(Continued on page 2)

PARTS OFFER DRAWS FOREIGN RADIO FANS

INTEREST ABROAD PROVES AIRPHONE'S PROGRESS

Demand for Devices Comes from Old and Young Many Letters of Inquiry Reveal

SPECIAL REWARD OFFER

Coupon Number 11

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

No better evidence to the ever growing interest in things Radio is obtainable than the increasing number of inquiries and remittances in relation to the Radio Digest's special offer to furnish parts at low cost.

From all parts of the United States and Canada and even from distant foreign countries come letters bearing the scrawl of children, the halting, uncertain chirography of the aged, and the firm, forceful script of men of affairs.

The supply of parts is still sufficient, but the manner in which requests for them are made necessitates the repetition of the following instructions:

The numbers of the coupons sent to the office of the Radio Digest must be consecutive; they need not begin with No. 1, but they must run in order; you may send as many coupon series as you want; with these coupons name the parts you want and send the money. You will receive the parts forthwith.

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 series turned in by any one reader.

Another point to remember is that cash, checks and money orders but no postage stamps will be accepted.

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. The eight classes of items follow:

Class A Articles

For two consecutively numbered coupons and thirty cents ($0.30) any one of the following articles will be sent: 1 Carter Imp Jack and Plug; 1 Carter 15-Ohm Resistance Unit; 1 Schindler .00025 mfd. Build-up Mica Condenser; 1 Schindler .0005 mfd. Build-up Mica Condenser; 1 Shindler .001 mfd. Build-Up Mica Condenser; 1 Schindler .002 mfd. Build-Up Mica Condenser; 1 Schindler .0025 mfd. Build-Up Mica Condenser; 1 Martin-Copeland Sta Put Plug; Walnart Standard Tube Socket; Walnart UV-199 Socket; Ray-O-Vac Dry Battery, 1½ volts; Dubilier Micadons Type 601 (.0001, .00025, .0005, .001, .002, .0025, .003 or .004 mfd.); Premier Gird Condenser (.00025 or .0005 mfd.); Premier Variable Resistance; 1 Carter 25-ohm Resistance Unit; Standard Socket Adapter for Delta Midget Tube; Electrad Grid Leak (1, 1.5 and 2 megohms, with clips); Amsco 3-inch Dial; Amsco Inductance Switch; Freshman Micon Condensers, (.00005, .00025, .00035, .0005, .001, .0015, .002, .0025, or .003 mfd.); Teleradio V. T. Socket; B-Metal Mounted Crystal; Aerovox Lightning Switch; Aerovox Series Parallel Switch; Aerovox Contact Lever; Na-Ald Small Space Socket; Se-Ar-De Vernier Adjuster; Basco Switch Lever Assembly.

Class B Articles

For four consecutively numbered coupons and sixty cents ($0.60) any one of the following articles will be sent: 1 Carter .04 mfd. Special Fixed Condenser; 1 Carter Jack Switch; 1 Carter Hold-Tite Jack, One Spring Open Circuit; 1 Carter Hold-Tite Jack, Two Spring Closed Circuit; 1 Carter Hold-Tite Jack, Threa Spring Filament Control; 1 Carter Hold-Tite Jack, Four Spring Closed Circuit; 1 Carter Hold-Tite Jack, Five Spring Filament Control; 1 Pudlin Variable Grid Leak with .00025 mfd. Condenser; 1 Federal Universal Phone Plug; 1 Federal Open Circuit Jack; 1 Federal Closed Circuit Jack; 1 Federal Double Circuit Jack; 1 Martin-Copeland Shur Grip Plug; 1 Martin-Copeland WD-11 Socket; 1 Martin-Copeland WD-11 Adapter; 1 Martin-Copeland UV-199 Socket; 1 Martin-Copeland UV-199 Adapter 1 Martin-Copeland Pull Switch; 1 Martin-Copeland 5-point Inductance Switch; 1 Martin-Copeland Variable Grid Leak; 1 Martin-Copeland SPST Knife Switch 1 Martin-Copeland SPDT Knife Switch; 1 Martin-Copeland DPST Knife Switch; 1 Martin-Copeland DPDT Knife Switch; Walnart Variable Grid Leak; Walnart Inductance Switch; Duhilier Micadons Type 600 (.0001, .00025, .0005, .001, .002, .0025, .003, .004, or .005 mfd.); Duhilier Micadons Type 610 (.001, .002, .0025, .003, .004, or .005 mfd.); Duhilier Micadons Type 601 (.006 mfd.); Duhilier By-Laws Condenser (.1, .25, or 5 mfd.); Premier Universal Tube Socket; Premier Radio Dial (3/16, ¼, or 5/16 in. black or white face); Premier Universal Radio Jack, Open Circuit; Premier Universal Radio Jack, Two-Circuit Three Spring; Premier Universal Radio Jack, Two-Circuit Four Spring; Premier Universal Radio Jack, Filament Control Three Spring; Premier Switch Lever and 10 Points; Turney Spider Web Coil (SW-10 with .038 milhenry inductance, SW-15 with .066 MH., or SW-20 with .300 MH.); Amsco 6-Ohm Rheostat; Freshman Fix-O Grid Leak and Condenser; Freshman Variable Resistance Leak (with or without condenser); Freshman Micon Condensere (.006 or .005 mfd.); Teleradio 6-Ohm Rheostat; Teleradio 30-Ohm Rheostat; Teleradio Lightning Arrester; B-Metal Crystal Tube Detector Type A; B-Metal Adjustable Detector Type D; Aerovox Rheostat; Se-Ar-De Vacuum Tube Socket; Basco Crystal Detector Assembly; Basco Rheostat, 3-ohm or 6-ohm.

Class C Articles

For six consecutively numbered coupons and ninety cents ($0.90) any one of the following articles will be sent: 1 Carter 6-Ohm Vernier Control Rheostat; 1 Carter "Tu-Way" Plug; 1 Federal Panel Mount Socket; 1 Federal 6-Ohm Rheostat; 1 Federal 3-Ohm (Power) Rheostat; 1 Amperite Automatic Filament Control (with mounting); 1 Martin-Copeland Marco Rheostat; 1 Martin-Copeland Series Parallel Switch; 1 Martin-Copeland DPDT Panel Switch; 1 Martin-Copeland 7-Point Inductance Switch; 1 Martin-Copeland 9-Point Inductance Switch; 1 Martin-Copeland 11-Point Inductance Switch; Walnart Variable Grid Leak with .00025 mfd. Condenser; Walnart Variable Condenser (3-plate .00006 mfd.); Ray-O-Vac Dry Battery, 2 cells 1½ volts; Dubilier Ducon; Dubilier Micadon Type 600 (.006 mfd.); Dubilier Micadon Type 610 (.01 or .02 mfd.); Dubilier By-Pass Condenser (1 mfd.), Premier Universal Radio Jack, Filament Control Five Spring; CRL Variable Grid Leak, without condenser; Premier No. 250 Variable Resistance, panel mounting; Thordarson Vernier Rheostat; Ritter Loop Aerial; Martin Copeland Variable Grid Leak; Amsco Multiple Point Inductance Switch; Amsco 20-Ohm Rheostat; Amsco 50-Ohm Rheostat; Freshman Antenella; Freshman Micon Condenser, .01 mfd.; Teleradio Variable Condensers, (3-plate or 11-plate); Set "Read 'EM" Binding Posts (9); B-Metal Crystal Tube Detector Type B; Illinois Cushion Resilient Socket; Aerovox Antenna Plug; Aerovox Potentiometer; Aerovox Crystal Detector; Se-Ar-De Adjustable Vernier Condenser; Basco Tuning Coil; Basco Vernier Rheostat.

Class D Articles

For eight consecutive coupons and one dollar and twenty cents ($1.20) any one of the following articles will be sent: 1 Carter 20-Ohm Vernier Control Rheostat; 1 Schindler Radio Frequency Transformer; 1 Martin-Copeland 13-Point Inductance Switch; 1 Martin-Copeland 15-Point Inductance Switch; 1 Martin-Copeland 19-Point Inductance Switcth; Walnart Variable Condenser (5-Plate .0001 mfd.); Ray-O-Vac No. 4151 B Battery, 22½ volts; Ray-O-Vac Dry Battery, 3 cells 4½ volts; Electrad Variohm, with mica condenser; Dubilier By-Pass Condenser (2 mfd.); CRL Variable Grid Leak with Condenser; Resistometer (Type A or 2A); Thordarson Variable Condenser, .00025 mfd.; Amsco 300-Ohm Potentiometer; Freshman Micon Condenser, .015 mfd.; Teleradio Variable Condenser, 23-plate; Aerovox Crystal Detector and Condenser, mounted; Se-Ar-De Variable Grid Leak, with condenser mounting; Fil-Ko-Stat; R. S. C. Vernier Condenser, 3-plate; Basco Mahogany Cabinet.

Class E Articles

For ten consecutively numbered conpons and one dollar and fifty cents ($1.50) any one of the following articles will be sent: 1 Carter 6-Ohm Automatic Control Rheostat; 1 Carter 20 Ohm Automatic Control Rheostat; 1 Demcal 3-Plate Variable Condenser; Walnart Variable Condenser (13-Plate .00025 mfd.); Ray-O-Vac Dry Battery, 4 cells 1½ volts; Dubilier Variodon (.0004 or .0006 mfd.); Resistometer (Type B); Delta Midget Tube and Socket; Thordarson Variable Condenser, .0005 mfd.; Freshman Micon Condenser, .02 mfd.; B-Metal Crystal Tube Detector Type C; Aerovox 3-Gang Socket; Aerovox Double Slide Tuning Coil; Na-Ald 3-Plate Vernier Condenser, with dial.

Class F Articles

For twelve consecutively numbered coupons and one dollar and eighty cents $(1.80) the following will be sent; 1 Acme Pot-Rheo (potentiometer and rheostat); Walnart Variable Condenser (23-Plata .0005 mfd.); Ray-O-Vac No. 2151 B Battery, 22½ volts; Dubilier By-Pass Condenser (3 mfd.); Premier Variable Condenser without dial (.00039 mfd.); Thordarson Variable Condenser, .001 mfd.; Amsco Compensating Grid Condenser; Freshman Micon Condenser, 0.25 mfd.; Teleradio Variable Condenser, 43-plate; Se-Ar-De 3-Plate Condenser.

Class G Articles

For fourteen consecutively numbered coupons and two dollars and forty cents ($2.40) any one of the following articles will be sent: 1 Federal 7-Plate Variable Condenser; 1 Federal 11-Plate Variable Condenser; 1 Federal 21-Plate Variable Condenser; 1 Federal Anti-capacity Switch; 1 Demcal Variable Condenser 11-Plate Walnart Variable Condenser (43-Plate .001 mfd.); Dubilier Variadon (.001 mfd.); Dubilier By-Pass Condenser (4 mfd.); Premier Variable Condenser with dial (.00078 mfd.); Premier Hegehog A. F. Transformer, 4 to 1 Ratio; Thordason A. F. Transformer, 3.5 to 1 Ratio; Thordason Variable Condenser, with vernier, knob and dial (.0005 mfd.); Thordason Variable Condenser, with vernier, knob and dial (.00025 mfd.); Ritter Grand Crystal Set; Amsco Double H. C. Coil Mounting; Na-Ald 13-Plate Precision Condenser, with dial (.000297 mfd.); Na-Ald 23-Plate Precision Condenser, with dial (.000523 mfd.); Se-Ar-De 9-Plate Condenser; Se-Ar-De 17-Plate Condenser; R. S. C. Variable Condenser, 23-plate.

Class H Articles

For sixteen consecutively numbered coupons and three dollars ($3.00) any one of the following articles will be sent: 1 Federal Audio Frequency Transformer No. 228 W; 1 Demcal 23-Plate Variable Condenser; 1 Acme Audio Frequency Transformer; 1 Acme Radio Frequency Transformer (R-2, R-3, or R-4); Walnart Variable Condenser (13-Plate vernier; Walnart Variable Condenser (23-Plate vernier); Ray-O-Vac No. 2301 "B" Battery 45 volts; Ray-O-Vac Dry Battery, 6 cells 1½ volts; Dubilier Duratran (R. F. transformer); Premier Micrometer Variocoupler with dial; Premier Variable Condenser with dial (.0015 mfd.); Premier Variable Condenser with vernier (.0004 mfd.); Premier Hegehog A. F. Transformer, 10 to 1 Ratio; Premier Hegehog A. F. Transformer, Tube Socket Type, 4 to 1 Ratio; Turney Spider Web Coil Mount, Type B; Thordarson A. F. Transformer, 6 to 1 Ratio; Thordarson Variable Condenser, with vernier, knob and dial (.001 mfd.); T. B. H. Radio Heat Set, 2,000 ohms; Tulip Loud Speaker, 15-inch, white; Teleradio Vernier Condenser, 23-plate; Teleradio 2,000-Ohm Head Set; Na-Ald Tuned R. F. Transformer, ono stage; Na-Ald 43-Plate Precision Condenser, with dial (.001 mfd.); Se-Ar-De 35-Plate Condenser; R. S. C. Variable Condenser, 43-plate; Basco Radio Frequency Transformer.

KGW Sends Forest Fire Talks

WASHINGTON, D. C.—Talks on forest fire prevention are being broadcast every two weeks from the Portland, Oregon office of the Forest Service through arrangement with the Portland Oregonian, Station KGW. These talks, according to estimates, reach from 10,000 to 15,000 people.

CONTENTS

Radio Digest, Illustrated, Volume VI, Number 5, published Chicago, Illinois, August 11, 1923. Published weekly by Radio Digest Publishing Company, 123 West Madison Street, Chicago, Illinois. Subscription rates, yearly, Five Dollars; Foreign, Six Dollars; single copies, Ten Cents. Entered as second-class matter at the postoffice at Chicago, Illinois, under the Act of March 3, 1879.

Looking Ahead

Coming—Watch for This—a Series of Articles on Making a Neutrodyne Set—In an early issue H. J. Marx will begin a series of several articles telling how to make this latest of receivers. The outfit built by Mr. Marx and now being tested, is capable of doing wonders in the midst of summer. The set, how to make which will be told, uses a two-step neutrodyned Radio frequency, detector, two-step audio frequency circuit. Do you want a neutrodyne set? Read this series!

Multi-Tube Reflex Circuits by Thomas W. Benson Next Issue—Mr. Benson will tell Radio Beginners all about two and three tube reflex sets next week. This week's chapter he devotes to single tube reflex hook-ups. Turn to page eleven.

Difficult Tube Characteristics Explained by H. J. Marx—A continuation next week of the series Part II of which is found on page thirteen this issue.

A Vernier Variable Condenser from a Hard Rubber Dial—Read this kink along with others on page twelve of the August 18 number.

Simple Two Tube Hook-Up—A circuit needing but little apparatus, but as efficient as the best. See this hook-up diagram in the next number.

And Don't Forget the New Advance Programs, Part One of the Broadcasting Station Directory, the Picture Diagram, and Flewelling's Answers to Queries, all to be found in the August 18 issue.

HEAR WDAP AS FAR IN DAY AS IN NIGHT

SHOW POWER AMPLIFIER MOST EFFICIENT

WDAP Men, on 2,100 Mile Auto Trip, Make Two Important Discoveries

CHICAGO.—Two phases of Radio operation were developed recently during a test of its apparatus by Station WDAP, the Chicago Board of Trade. The experiment showed that the power amplifier type of transmitter was most efficient, that is, its carrying capacity was greatest in relation to the output of one kilowatt. The test revealed also that daytime reception was almost as satisfactory as night reception.

The reception test was made during an automobile trip from Chicago to Dubuque, Waterloo, Crystal Springs, and Fort Dodge, Iowa; Sioux Falls, S. D.; Minneapolis, Minn., and return to Chicago, a distance of about 1,200 miles. L. B. Mitchell, Radio operator for the Board of Trade, and Thorne Donnelley of WDAP received the messages, market quotations and time signals, by means of a three tube regenerative set. The set weighed twelve pounds and the batteries, six pounds. The antenna was strung in trees en route and from hotel windows.

Although the recorded transmission range of WDAP is 300 miles, the test showed a daytime capacity of 600 miles, it was reported. Changes in radiation were announced by means of long distance telephone from the station to the autoists. The average radiation of WDAP is ten amperes but in the test it was raised as high as fourteen and lowered to six. The minimum radiation served as well as the maximum. The latter was shown by means of a test in Sioux City, about 390 miles from Chicago.

AIDS PIANO MUSIC

(Continued from page 1)

When the carbon or condenser microphone is used to pick-up a vocal solo with piano accompaniment the problem is to place the microphone in such a position that it picks up both voice and instrument in their proper ratio. The position of the microphone must be changed for each artist. The Radiophan has probably noticed that as the singer increases the volume the accompaniment fades out, in other words the soloist "paralyzes" the microphone. When the piano magneto-microphone is used the intensity of the piano may be adjusted electrically in the control room, even while the selection is being rendered, as the voice is recorded on the customary carbon or condenser microphone.

In the grand piano at WGY there are three of these devices, one in the extreme treble, one in the middle register and one in the bass. These three outputs can be readily balanced in the control room for the best results on receiving sets without tampering in any way with the instrument.

Overcomes Fault of Loud Speakers

Another feature of the magneto-microphone is that it allows WGY to correct for the shortcomings of the present loud speakers. All loud speakers subdue the sounds of lower frequencies, from approximately middle C on the piano down. To give good piano music for users of the loud speaker it would be necessary for the transmitting station to distort the music from the instrument, making the lower section of the piano several times as loud as the treble. Some stations have actually tried to regrade their pianos to improve them for broadcasting. This means that the music, as heard by the musician at the keyboard, is distorted and the good musician, even though convinced that his Radio audience is getting perfect tones, cannot do his best work on a regraded piano.

The magneto-microphone may also be used in broadcasting phonograph music where the federal license of the station permits the use of recorded music. When the carbon microphone is used the mechanical energy of the phonograph is converted into sound energy in the usual way and is picked up by the microphone. With the magneto-microphone the needle is attached to the coil and the mechanical energy is converted directly into electrical energy without recourse to any sound whatever, thus giving truer reproduction.

Open Plant to Handle Lake Shipping Messages

CLEVELAND, O.—The Inter-City Radio & Telegraph company has been opened at Hotel Cleveland to handle the Radio business of the lake shipping interests. The new station, WHT, will receive messages from lake ships and wire them to the proper offices.

This work was formerly done by the navy station at the foot of E. 9th street, but no appropriation was granted to continue the work, and the new station was organized by the co-operation of 125 ship owners.

DANCE IN WILDS TO JAZZ ETHER MUSIC

WOLVES HOWL AS TRADERS LISTEN IN TO CFCN

White Inhabitants. Isolated from Civilization, Get Entertainment Through Air—Indians Mystified

CALGARY, ALTA.—In a rude little shack located in an isolated stretch of virgin territory in the wilds of Northern Canada where few white men have had the hardihood to penetrate; with vicious timber wolves howling their song of starvation and death close by; and the Indians who know naught of cities or the refinements of civilization looking on in awed amazement, a few whites dance to jazz music.

The jazz, the very latest on the music mart, comes silently and mysteriously out of the night. The Indians know not from where, but to the whites it is simple. At least they, with their blasé acceptance of all the truly marvelous scientific discoveries of a mechanical age, consider it simple.

Radio Supplies Entertainment

The answer, of course, is the Radiophone, the omnipotent, the ever-present, the ever- entertaining, carrying news bulletins, jazz, classical music, educational information and emergency calls to all the far corners of the earth from the centers of population.

Far from the maddening crowd and the busy roar of cities; cut off from the outside world by the great white snows; located in a shack thousands of miles inland in a God-forsaken spot unknown but to a few whites and some Redmen, a shack illuminated by the startling brilliancy of the northern lights, F. L. Connor, factor of a fur trading post and Alex J. Williams, mail stage driver, intrepid forerunners of a vast civilization to come, nightly hear jazz music and news bulletins from Calgary, "The Metropolis of Alberta," and other cities in the "outside".

Indians Mystified

In a letter to W. W. Grant, owner of CFCN, the station of W. W. Grant Radio Ltd., at Calgary, F. L. Connor, trading post factor at Sturgeon Lake, Calais Post Office, Alberta, says:

"I have seen some peculiar situations during the late war but I must confess that the experience of listening to Calgary this evening was in a class by itself.

"At a short distance from the log house we stay in could be heard the brush wolves howling and the red glow of fires in front of the Indian tepees could be plainly seen, while inside we were listening to the latest jazz from the Plaza Cabaret at Calgary.

"We called some of the Indians in to listen on the set, and while they enjoyed the music immensely, they could not credit our explanation of how it was producted and went home firmly convinced that we were all 'Wi-ta-koo,' which means crazy."

Wired Radio Experiments Make Progress in Germany

BERLIN, GERMANY. — Experimental work in Wired-Radio is progressing here. Recently communication was effected between this city and Stolp on the Baltic coast over a 400-kilometer line. This high frequency telephone line has been turned over to the Federal Post authorities by the firm of A. G. Lorenz. Three calls at a time were put through successfully; one on the normal wave length, another on a 45-kilometer wave, and a third on a wave of 25 kilometers. Instead of tube transmitters, a special high frequency generator was used.

Takes Radio Post at U. of Wis.

CHICAGO.—R. V. Ray, a graduate of the course in electrical engineering at the University of Illinois and a commercial Radio operator of several years' experiece, has accepted the position of chief operator of the University of Wisconsin station, WHA, and instructor in Radio with the physics department.

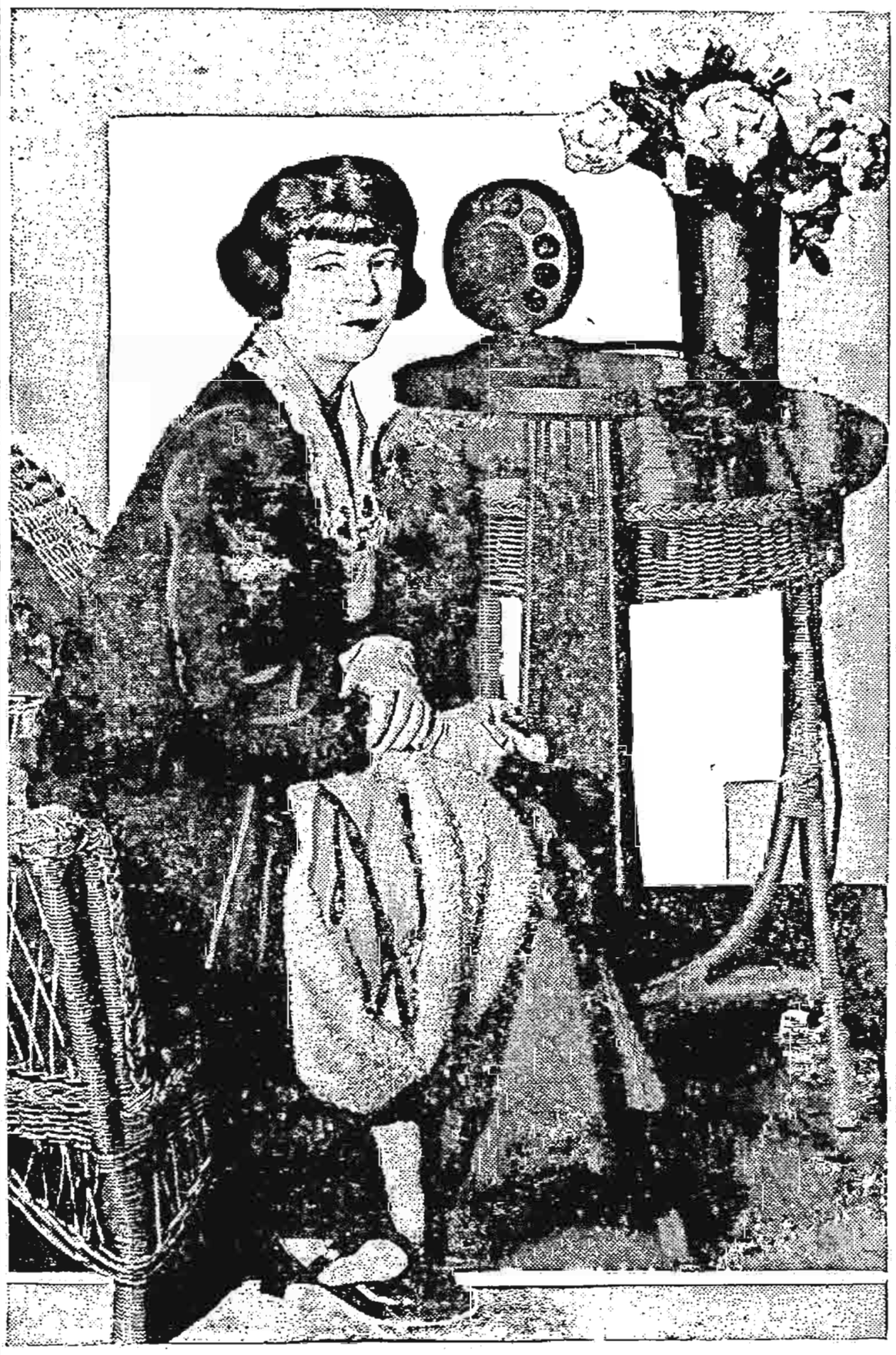
ALABAMANS TAKE UP RADIO FOR MARKETS

BIRMINGHAM, ALA.—Many of the small towns and even rural sections of Alabama are now using Radio. Farmers and merchants in the smaller places are receiving market reports daily from the air. At the little town of Jasper the Bluebird Drug Company has a receiving set. With the outfit they received the results of the Willard-Firpo fight for the entertainment of their friends and customers.

STATION WMH, EARLY ON THE AIR, REOPENS

CINCINNATI, O.—Station WMH of the Precision Equipment Company here, has resumed its Radio programs. This station was one of the first in America to broadcast. Powell Crosley, Jr., president of the company, has arranged with the manager to give daily programs at noon and at four in the afternoon on Tuesday and Friday. There will be no broadcasting on Saturday and Sunday.

MAE MARSH TELLS OF MOVIES



Mae Marsh doesn't devote all of her time to the screen. No sir! WOR, Newark, fans will testify to this, for they heard her tell all about the movies. Her first picture paid her the "fabulous" salary of three dollars a day. The salary then rose to five in the second, but in her third, as she put it, "for some unknown reason it dropped back to three."

Alabama Radio Nabs Auto Thieves

BIRMINGHAM, ALA.—Since automobile thieves have become so numerous here, Chief of Police Fred A. McDuff has resorted to the use of Radio as a means of locating the thieves and bringing them to justice.

Each day Chief McDuff furnishes Station WSY with the numbers and a brief description of the cars stolen, and this information is then put on the air. By this means several stolen automobiles have already been found and returned to their owners.

AIR SLEUTH HUNTS ESCAPED CONVICTS

TRAILS FELONS FLEEING PHILADELPHIA PRISON

Station WOO Warns Ships and Coast Towns to Watch for Fugitives Aboard Launch

PHILADELPHIA. — Radio is being used by the police officials of this city as one of the most important means of warning people of the escape of six desperate convicts from the Eastern Penitentiary, this city. The message has been so effective that coast guards, police in every small town in a half dozen eastern states around Pennsylvania, and ships and revenue cutters in the Chesapeake Bay and the Atlantic Ocean are on the lookout, and their capture is expected at any time.

The men escaped over a high stone wall by the means of a rope and ladder, which had been concealed in a large cedar chest. This chest was made by one of the escaped men, who was an expert cabinet maker. After gaining their way to the street, the six men commandeered an auto truck and got away. They later abandoned the truck and seized a high powered automobile, taking the driver with them. They left him on a road in Maryland. It is believed that at this point the party broke up, two men going one way, the other four going another. The four men seized a thirty-foot power boat at Pocomoke City, and put out on the Chesapeake Bay. There was enough fuel in the boat to get the men to Bermuda, but it is believed they were making for Norfolk to join the rum fleet lying off that place.

Station WOO to Aid

Station WOO, Wanamaker's here, which regularly broadcasts police reports, sent out the following message, dictated by Captain Souder, chief of the detectives in Philadelphia:

"Regarding the six convicts who escaped from the Eastern Penitentiary on July 14, we have received information that four suspicious characters stole a dory at Pocomoke City, Md. This boat is a pleasure craft with the deck covered with an awning and the name 'Sunbeam' painted on the side.

"We believe these men to be some of the escaped prisoners. Anyone having information with regard to the Sunbeam and crew will communicate with the nearest police authorities and instruct them to notify the Detective Bureau in Philadelphia at once."

CANADA REMOVES TAX FROM AUTO RADIO SET

Protests of American Autoists Bring Relief from Tariff

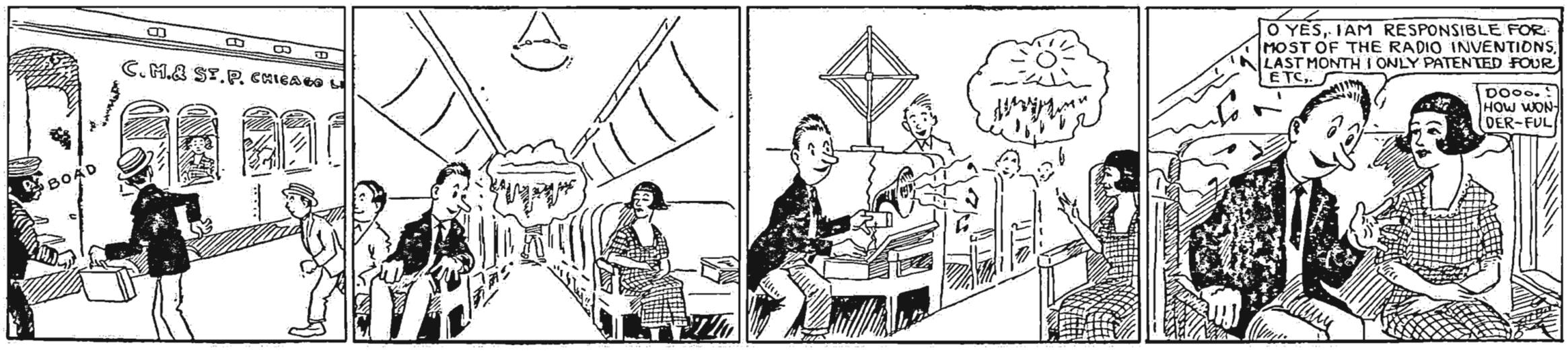
CLEVELAND.—Radio equipment on cars operated by American tourists can now be taken into Canada without payment of the former special duty, between the state departments of the United States and Canada at the instance of the American Automobile Association.

The question came up as the result of a trip to Toronto made by a member of the Cleveland Motor Club. The Toronto authorities permitted the American citizen to drive his car into Canada under the reciprocal arrangement that exists but held that the Radio outfit attached to his car was not a part of the automobile and required him to give a cash bond of $70.

Officials of the motor club took this matter up with the division of customs of the U. S. Treasury Department and with the Department of Customs and Excises of the Canadian government and as a result automobile reciprocity was extended to cover Radio equipment when attached to a car.

The most northerly Radio station in Canada is at Norway House, at the northern end of Lake Winnipeg.

THE ANTENNA BROTHERS — Spir L. and Lew P. — Hot Stuff! It Even Melts Ice



GAY PAREE LISTENS TO BOULEVARD SET

CROWDS GATHER TO HEAR PUBLIC BROADCASTS

Fourteen Amplifiers in Front of Newspaper Office; Traffic Noise No Hindrance

By Carl H. Butman

PARIS.—Le Matin, the well-known Parisian Daily, is operating a concert Radio receiving set in front of its office here, where crowds gather to listen to news, concerts and statistics from fourteen amplifying horns. The amplifiers are sufficiently loud to be heard over the terrific traffic noises.

The public listening in station was installed by the Societé Francais Radio Electrique which broadcasts two concerts daily on 1780 meters. Other broadcasting is done by the Eiffel Tower on 2600 meters, and the Superior School of the Telegraph and Telephone Service of the Government on 450 meters.

No provision for a royalty to broadcasters has been made in France, beyond the payment of an annual fee of ten francs to the French Postal Service by owners of receiving sets. The Eiffel Tower programs are sent out for the general public, and the Superior School broadcasts are carried on in the interest of education and experimentation.

Sells Sets to Support Station

The Societé Francais Radio Electrique, however, states that it obtains its remuneration by the sale of the "Radiola" receiving sets adapted to the broadcasting system used by the Societé, explaining that in order to receive its concerts properly it is essential that a Radiola set be used. The assertions of the company are borne out by private set owners who say that other receiving sets are unsuitable for the company's broadcasts, concerts being heard very indistinctly with other sets, if at all.

Listening-in is becoming popular in France, although not as extensively as in the United States. Anyone may own a receiving set, but transmitting outfits must be licensed by the French government.

Most of the French broadcasts are on long wave lengths, except those of the Superior School. However, the French Military authorities are experimenting in broadcasting on waves as low as 45 meters.

Illinois Tri-City Fans Start Research League

ROCK ISLAND, ILL.—An organization called the General Radio Research league has been formed by experts and enthusiasts of Rock Island, Moline and Davenport, Iowa, for the purpose of promoting a more thorough knowledge of Radio in all its branches. The organization expects to establish headquarters fully equipped with a large transmitting and receiving station and supplied with all the latest literature on the subject.

FLEWELLING ANSWERS TO QUERIES

By E. T. Flewelling

(Editor's Note.—This department is written by Mr. Flewelling, the inventor of the famous super circuit. From the questions sent him each week care of Radio Digest, he picks the ones considered most informative for all and answers them in this column.)

Effect of .006 Condenser.

(Submitted by J. E. E., New York)

Question. I am securing excellent results from the Flewelling Super circuit, but find that the .006 condenser has no effect in the circuit. Why?

Answer. If you find that the .006 condenser has no effect in the circuit, then you may be very sure that you are not getting the correct action in your set and are, therefore, not securing maximum results, even though you seem to be pleased with what you are doing now. Your trouble is very probably due to not knowing what the set sounds like when it is working correctly. Place the .006 condenser in the circuit, as has been shown, and with the set not connected to any antenna or ground, adjust the tuning controls and the variable grid leak until you hear the small shrill whistle that we have spoken about so many times. When this is heard just study what effect on the whistle the various controls have and keep these effects in the action when you try an antenna or ground on the set. Note that in using the single condenser Super without antenna or ground, it is necessary to connect post "A" to post "B" in order to secure any effect from the tuning condenser.

Single vs. Three Condensers.

(Submitted by J. E. J., Oak Hill, Ohio)

Question. Is the circuit using the single condenser the same as the one previously shown, which uses three condensers? Will a varicoupler work as well as honeycomb coils? I have heard that this circuit is noisy in reception. Is this so?

Answer. The circuit using but one condenser is of course different from that using three condensers, but the action and the results are the same. It is simply an improvement and simplification of the original three condenser Super. There is no need to build the three condenser set if you have the single condenser layout.

Yes, a variocoupler will work about as well, especially if the rotor, which would be used as the tickler, is rewound so that it will have 100 to 130 turns upon it. This can easily be done by using smaller wire to enable you to get the larger number of turns in the same space.

The Flewelling set is noisy to some extent when tuning in a station, but after the station is correctly tuned all noises cease and reception is as clear as desired.

U. S. PUSHES RADIO MONOPOLY PROBE

But Trade Commission's Report Will Be Delayed Until Congress Meets

WASHINGTON, D. C.—Experts of the Federal Trade Commission who are investigating the alleged Radio monopoly as the result of the congressional resolution, report progress.

It was originally intended to complete the field work of the investigation by June 30. The commission is not speeding the investigation because it will not make public its results until Congress convenes in December. It is expected that the field work will be completed soon. The data will be assembled in the offices of the commission, then the whole report will be laid before the commission before it is sent to Congress.

Asks Radio Ordinance

ELYRIA, O.—The Elyria Radio club is preparing an ordinance for the city council which will regulate the installation of Radio outfits in that city.

Gen. Gouraud's Private Car Is Radio Equipped

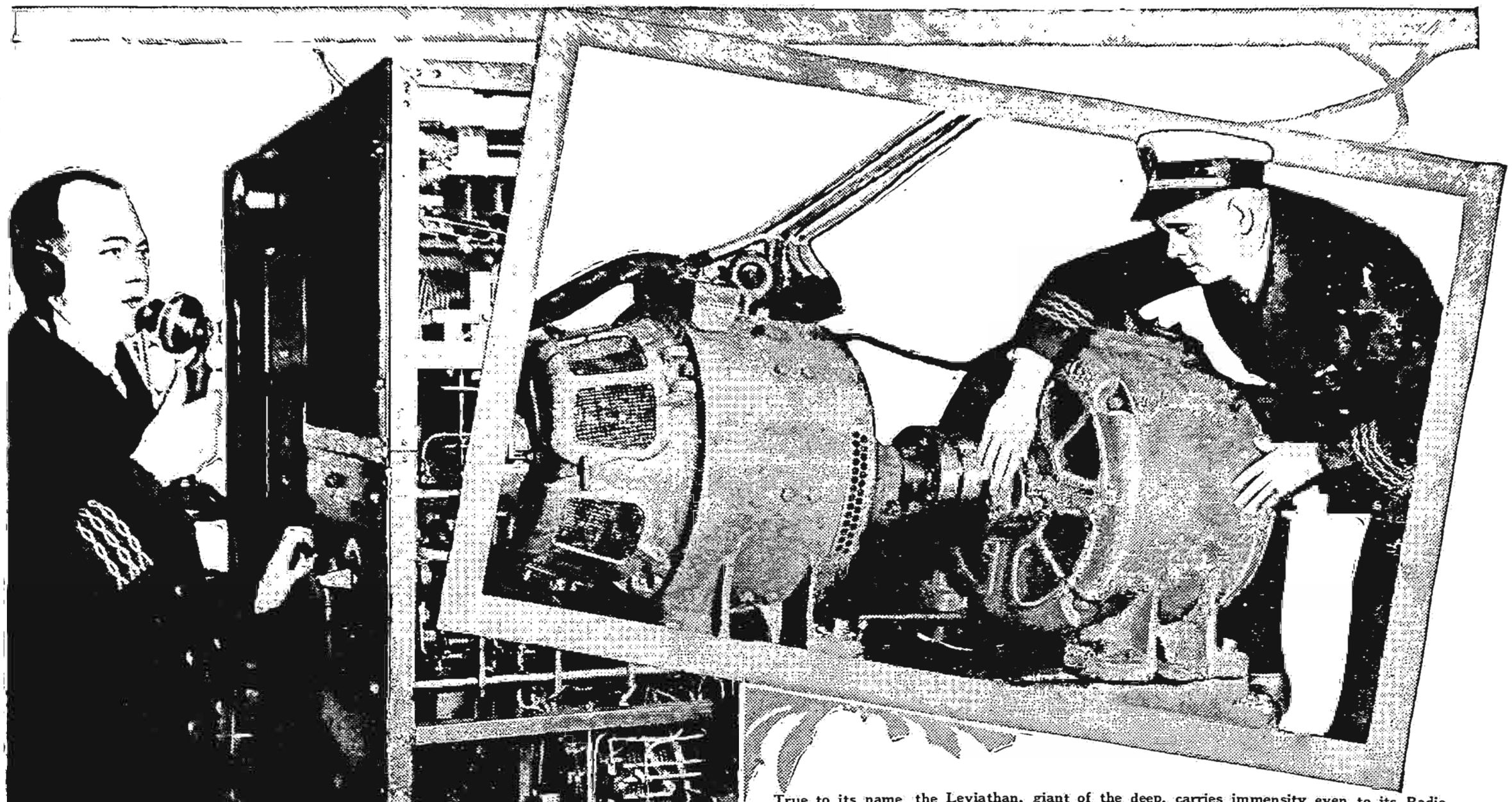
Listens in to Programs as He Crosses Country

CHICAGO.—A Radio outfit is installed in the private car Berwick, in which General Henri J. E. Gouraud, the "Lion of the Argonne," and his party are making a tour of the United States. The outfit has enabled the famous French general who was the guest for six weeks of the Rainbow Division Veterans, to get greetings from cities as his train approached them. Pittsburgh, KDKA, was the first city picked up by the general's party. The private car Berwick was then in the Union Station in Washington.

Passenger Train Carries Set

CLEVELAND.—The B. & O. has recently introduced Radio-equipped trains. Trains Nos. 57 and 58, running between Cincinnati and Louisville are now carrying Radio receiving sets.

LEVIATHAN, KING OF OCEAN RADIO



True to its name, the Leviathan, giant of the deep, carries immensity even to its Radio plant. The Leviathan of the American merchant marine bears the largest and most comprehensive Radio apparatus afloat. Her principal transmitting set is six times more powerful than any other on the seas. There are three additional and complete Radio stations aboard for independent or emergency operation. Besides these, two of the lifeboats are equipped with sending and receiving sets. All four stations are established in a remarkably small space, an enclosure so limited as to area in comparison with the apparatus that their installation compelled the admiration of the world's greatest Radio engineers. The main antenna is more than 600 feet long and is 200 feet high. The transmitting vacuum tubes, high power type, have 16,000 volts on their plates. A ten kilowatt motor generator provides the power plant and enables a sending range of more than 5,000 miles and the operation of a duplex high speed receiving set. By means of its Radio plant the Leviathan may communicate say with France or England simultaneously with ships at sea and relay the messages of craft with lesser Radio equipment. The design of the Leviathan's airphone differs but slightly from that of the most powerful land stations. Photo at left shows Chief Radio Operator Pickerell at the phone transmitting panel. At the right he is touching the coupling on the ten kilowatt motor generator

RECEIVING RECORDS? SEND 'EM IN—

(The following extracts are from letters of Radiophans, who have been doing good distance work. Readers submitting letters for publication should describe or diagram their sets.—DX Record Editor)

"On my set, which is a one-tube regenerative tuner, I have heard the following stations:

"CFCA, CKCE, Toronto, Can.; CKAC, CKCS, Montreal, Can.; KDKA, WCAE, Pittsburgh; KSD, St. Louis; KYW, WDAP, Chicago; WBZ, Springfield, Mass.; WDAF, Kansas City; WEAF, WJZ, New York; WGR, Buffalo; WGY, Schenectady; WHAM, Rochester; WHAS, Louisville; WHAZ, Troy; WIK, McKeesport, Pa.; WJAX, WHK, Cleveland; WLW, Cincinnati; WMAK, Lockport, N. Y.; WMC, Memphis, Tenn.; WOAW, Omaha; WOR, Newark, N. J.; WDAR, WIP, WFI, Philadelphia, Pa.; WWJ, Detroit.

"I think this is probably a pretty good record for one tube."—W. Mogan, 268 Carlton St., Toronto, Canada.

"I heard WFAA station of the Dallas News and Journal at Dallas, Texas, a distance of 950 miles.

"I use one WD-12 vacuum tube."—F. J. Williams, Box 703, Tampa, Fla.

"The following stations have been picked up with my one-tube portable set, type AD, Se-Ar-De:

"CFCN, 590; KPO, 705; KFI, 975; KHJ, 975."—S. S. Atwood, Esperance, Wash.

"My cousin and I have been using the Reinartz hook-up for four months. We find it very good. We are using the one-tube set as was described in the RADIO DIGEST several months ago. I am sending the list of 125 stations we have heard:

CHXC, CKAC, KDKA, KQV, KSD, KWH, KYW, NAA, PWX, WAAB, WBAA, WBAH, WBAN, WBAP, WBAV, WBAY, WBU, WBZ, WCAE, WCAP, WCAU, WCAV, WCAX, WCBD, WCX, WDAF, WDAJ, WDAP, WDAR, WDZ, WEAB, WEAE, WEAF, WEAK, WEAN, WEAO, WEAR, WEAS, WEB, WFAA, WFI, WGAZ, WGI, WGM, WGR, WGY, WHAG, WHAK, WHAM, WHAS, WHAY, WHAZ, WHB, WHK, WIP, WJAS, WJAX, WJAZ, WJX, WJY, WJZ, WKAV, WKAY, WLAC, WLAG, WLAK, WLW, WMAC, WMAK, WMC, WOAW, WOC, WOO, WOR, WOS, WOV, WPAB, WPAL, WQAK, WQAO, WRW, WSB, WSY, WTAC, WWJ, WPAD, WSAI, WHN, WMAQ, WHAV, WKAW, WMAF, WQAA, WAAW, WIAB, WABE, WEAP, WDT. We are 125 miles east of Pittsburgh."—Raymond M. Bell, Lewistown, Pa.

AN EVENING AT HOME WITH THE LISTENER IN

(SEE NOTE BELOW FOR INSTRUCTIONS)

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
CFCN, Calgary, Alta.	440	10:00-11:00	.....	.....	.....	11:30- 1:30	11:00- 1:00	.....
CKAC, Montreal, Que.	430	.....	6:00- 9:00	.....	6:00- 9:00	.....	6:00- 9:00	3:00- 4:30
KDKA, E. Pittsburgh, Pa.	326	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	6:30- 7:30
KFAF, Denver, Colo.	360	9:00-10:00	9:00-10:00	.....	9:00-10:00	9:00-10:00	9:00-10:00	.....
KFDB, San Francisco, Calif.	509	9:00- 9:30	9:00- 9:30	9:00- 9:30	9:00- 9:30	9:00- 9:30	9:00- 9:30	9:00- 9:30
KFI, Los Angeles, Calif.	469	8:45- 1:00	8:45- 1:00	8:45- 2:00	8:45- 1:00	8:45- 2:00	8:45- 2:00	10:00- 1:00
KGW, Portland, Ore.	492	9:30- 2:00	12:00- 1:00	10:00-11:00	12:00- 1:00	9:00- 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
KPO, San Francisco, Calif.	423	10:00-12:00	10:00-12:00	.....	10:00-12:00	.....	10:00- 2:00	10:00-12:00
KSD, St. Louis, Mo.	546	8:00-10:00	8:00-10:00	8:00-10:00	.....	8:00-10:00	8:00-10:00	.....
KYW, Chicago, Ill.	345	.....	7:00- 9:00	7:00- 9:00	7:00- 9:00	7:00- 9:00	7:00- 9:00	6:00- 7:00
NAA, Radio, Va.	435	5:45- 7:20	6:05- 7:20	6:25- 8:40	5:45- 7:40	7:00- 7:40	.....	.....
PWX, Havana, Cuba	400	.....	.....	8:00-10:30	.....	.....	8:00-10:30	.....
WBAP, Fort Worth, Texas	476	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	7:00- 7:20	3:30- 4:30
WBZ, Springfield, Mass.	337	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30- 8:00	7:00- 8:00
WCX, Detroit, Mich.	517	7:00-10:00	7:00-12:00	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	10:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30	7:30-11:30
WDAP, Chicago, Ill.	390	.....	10:00- 2:00	.....	10:00- 2:00	.....	10:00- 2:00	9:00-12:00
WDAR, Philadelphia, Pa.	395	5:30- 6:00	5:30- 8:00	5:30- 9:00	5:30- 6:00	6:00- 1:00	5:30- 6:00	.....
WDT, New York, N. Y.	405	.....	.....	5:00- 5:50	.....	9:00-11:00	.....	.....
WEAF, New York, N. Y.	492	.....	5:30- 6:00	5:30- 8:00	5:30- 8:00	5:30- 6:00	5:30- 8:00	.....
WFAA, Dallas, Tex.	476	8:30- 9:30	8:30-12:00	8:30- 9:30	8:30-12:00	8:30- 9:30	8:30-12:00	9:30-10:30
WFI, Philadelphia, Pa.	395	5:00- 5:30	5:00- 7:00	5:00- 9:30	5:00- 7:00	5:00- 5:30	.....	5:30- 6:30
WGI, Medford, Mass.	360	.....	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30-10:00
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	7:30- 8:00
WGR, Buffalo, N. Y.	319	6:00- 8:00	.....	6:00- 8:00	.....	6:00- 8:00	.....	.....
WGY, Schenectady, N. Y.	380	6:45- 9:00	6:45- 9:00	.....	6:45- 9:00	6:45-11:00	.....	5:30- 6:30
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	.....
WHAZ, Troy, N. Y.	380	8:00- 9:30	.....	.....	.....	.....	.....	.....
WHB, Kansas City, Mo.	411	.....	8:00-10:00	.....	8:00-10:00	.....	.....	8:00-10:00
WHK, Cleveland, O.	360	5:00- 5:30	5:00- 5:30	7:00- 8:55	5:00- 5:30	5:00- 5:30	5:00- 5:30	7:00- 8:55
WIP, Philadelphia, Pa.	509	4:00- 5:30	5:00-10:00	5:00- 5:30	5:00- 8:00	5:00- 5:30	6:00-10:00	.....
WJAX, Cleveland, O.	390	.....	6:30- 8:30	.....	.....	.....	.....	.....
WJY, New York, N. Y.	405	.....	.....	.....	5:30- 9:30	5:30- 9:30	.....	1:15- 4:00
WJZ, New York, N. Y.	455	5:30- 9:30	5:30- 9:30	5:30- 9:30	6:30- 9:30	5:30- 9:30	5:30- 9:30	6:30- 8:30
WKAQ, San Juan, P. R.	360	.....	9:25-10:55	.....	.....	.....	9:25-10:55	.....
WLAG, Minneapolis, Minn.	417	6:30-10:30	6:30-10:30	.....	5:30-10:30	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	.....	6:00- 9:00	6:00- 9:00	6:00- 9:00	6:00- 9:00	6:00- 9:00	.....
WMC, Memphis, Tenn.	500	8:00- 9:30	8:00-12:00	.....	8:00- 9:30	8:00-12:00	8:00- 9:30	.....
WOAI, San Antonio, Texas	385	.....	9:30-10:30	.....	7:30- 8:30	.....	.....	9:30-10:30
WOAW, Omaha, Neb.	526	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	7:00- 8:30	.....	10:00-11:00	7:00- 8:30	7:00- 8:30	9:30-10:30	7:00- 9:00
WOO, Philadelphia, Pa.	509	5:45- 9:00	.....	.....	.....	5:45- 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	.....	.....
WSAI, Cincinnati, O.	309	.....	7:00- 9:00	.....	7:00- 9:00	.....	9:00-11:00	.....
WSB, Atlanta, Ga.	429	7:00-12:00	7:00-12:00	7:00-12:00	7:00-12:00	7:00 12:00	7:00-12:00	7:30- 9:00
WSY, Birmingham, Ala.	360	8:00- 8:45	.....	8:00- 8:45	.....	8:00- 8:45	.....	7:30- 8:30
WWJ, Detroit, Mich.	517	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.

NEW STATION USES 15 AMPLIFICATION UNITS

WMAF, Fairhaven, Mass., Upsets Theory as to Distortion

NEW BEDFORD, Mass.—Another powerful broadcasting station has just come in for the delectation of Radiophans in WMAF, Col. Edward H. R. Green's new 500-watt transmitting station at Round Hills, just outside of Fairhaven. The station is connected with the WEAF studio in New York by telephone, so that the two stations may broadcast simultaneously, WMAF on 360 meters and WEAF on 492 meters.

The transmitter at the Green station is similar to that used at WEAF, WOO, WOR and many other prominent stations. The set employs two 250-watt oscillator tubes and two of the same size for modulators, connected in a constant current or Heising modulation circuit.

There are fifteen stages of amplification in the land line from New York, five at New York, six at three intermediate points in twos and four stages at Round Hills. This represents a tremendous amplification that until recently was considered impossible without accompanying distortion of a very disturbing nature. The WMAF antenna is supported by two steel towers 143 feet high. The four-wire flat top aerial is 115 feet long and has a vertical lead-in 140 feet long.

WRC, Call of New Station to Operate in Washington

WASHINGTON.—WRC is the call assigned to the Washington Radio Corporation station of this city. Officials of the corporation are planning to open the station early in August with due ceremonies and an excellent program, details of which are being arranged by the program manager, Ralph Edmunds, formerly identified with several opera companies and moving picture interests. His contact with musicians and actors, it is believed, will serve Mr. Edmunds excellently in preparing and executing exceptional broadcast programs. WRC is a duplicate of the large New York station, WJY-WJZ, on Aeolian Hall. At the outset, only about one-half kilowatt of power will be used. All parts of the transmitter are in duplicate, to provide for breakdowns.

NEW UNDERGROUND LIFE SAVING TESTS

CARRY ON EXPERIMENTS IN COAL FIELD

Bureau of Mines Assigns Engineer to Further Efforts to Rescue Imperilled Workers

WASHINGTON.—In connection with its efforts to keep apace with all safety and rescue developments, the Bureau of Mines is planning to continue its investigations with Radio communication underground. The development of Radio has been rapid and officials of the bureau feel that any application to mine rescue work must not be neglected.

J. J. Jakowsky, mechanical engineer, has been designated to undertake certain experiments in Radio communication at the Bureau's experimental coal mine at Bruceton, Pa. Mr. Jakowsky was attached to the Signal Corps during the war, where he had considerable experience with Radio work. The co-operation of the Radio Supervisor at Pittsburgh in the new Radio experiments has been promised by the Department of Commerce.

Earlier Experiments in Mine

Some months ago preliminary Radio experiments in sending and receiving underground at the Bruceton mine were conducted with partial success. In reporting the matter the bureau stated that the experiments consisted in receiving signals from without the mine by means of a receiver located inside the mine, and in sending and receiving messages underground through the strata. It was found that with a receiving instrument set at a point 100 feet underground, signals from Station KDKA, East Pittsburgh, Pa., could be heard distinctly, at a distance of about eighteen miles from the experimental mine. In sending waves underground, a 20-watt transmitter was used in such a manner as to send out continuous waves of 200 to 300 meters length. On account of the limited time no attempt was made to modify the apparatus in such a manner as to produce waves of greater length. It was found that signals could be heard distinctly through fifty feet of coal strata, but that the audibility fell off rapidly as this distance was increased.

Find Vertical Antenna Best

In all experiments a vertical antenna was found to give the better results. The horizontal antenna gave practically no reception. A loop of a single turn was used with fair results. All these experiments were tried with a wave length of 200 to 300 meters, except the reception from KDKA, which was 360 meters.

In conclusion the report stated:

"The present preliminary experiments, while unsuccessful in indicating any practical method of using Radio waves for underground communications, nevertheless indicate clearly that electromagnetic waves may be made to travel through solid strata. The absorption or loss of intensity with distance is very great for the short wave lengths used in these experiments. Longer wave lengths are known to suffer less absorption and may possibly be found practically effective under certain conditions."

DYING MAN LISTENS IN TO RADIO SERMON

SCHENECTADY, N. Y.—An aged resident of Trumansburg, N. Y., on his deathbed, listened in with members of his family to a Radio sermon recently delivered by Rev. G. A. Bierdemann, pastor of the Trinity Evangelical Lutheran Church of Albany, N. Y. The sermon was broadcast from WGY, the station here of the General Electric Company. The dying man enjoyed every word of the broadcast.

Use Remote Control to Broadcast Organ Tunes

Instrument and Huge Choir Heard Clearly In Los Angeles Test

LOS ANGELES, CALIF.—For the first time in Los Angeles an organ recital and choir of 130 voices were picked up by remote control panels and broadcast recently with clear beauty to the listeners in of Radioland by KHJ, the Los Angeles Times.

Commencing at 9:30 a. m., KHJ sent out organ music for half an hour, transmitting the splendid tones of the new $50,000 organ in the First Methodist Episcopal church, of which the Rev. Elmer E. Helms is pastor. Prof. Arthur Blakeley, noted organist, presided at the console of the Ewart Watchorn Memorial organ.

Lightning Bolt Hits WGI; Antenna Tower Untouched

MEDFORD, MASS.—If any further evidence were necessary to prove the safety of Radio, there was plenty of it furnished here recently during a severe electrical storm. Lightning entered the Amrad broadcasting station, WGI, during the worst of the storm which was very severe locally. Investigation showed that it was attracted by the electric light wires. These were completely demolished and service was paralyzed. However the 320-foot steel antenna tower used in connection with the broadcasting was not touched, nor the powerful broadcasting apparatus, thereby proving that a Radio antenna and a receiving or transmitting set does not attract lightning in any way.

Bars Church Set as Too Modern

NEW YORK.—Bishop William T. Manning recently ordered removed from the high altar of the Cathedral of St. John the Divine, a $9,000 Radio receiver and a system of amplifiers, declaring the installation was "carrying modernism a bit far." He made no objection to the system as a whole.

DEBATE BY GEORGIA LAWMAKERS ON AIR

Listeners in Southeast Hear Session Through "Old Reliable," Station WGM

ATLANTA, GA.—Station WGM of the Atlanta Constitution here, recently broadcast for the first time a full morning session of the Georgia house of representatives.

The broadcasting of the capitol sessions by WGM constitutes the opening of a new field of service for Radiophone broadcasting stations. It means that the entire southeastern part of the United States is covered by the doings of the legislators in their sessions.

The session featured debate on bills providing for investigation of the highway department and for increased state revenues.

Station WGM broadcasts the sessions regularly now as a part of its regular service to Georgia listeners in.

WSAT to Again Transmit Concerts Over Panhandle

PLAINVIEW, TEX.—Station WSAT of this city will resume the sending out of entertainment programs soon with a much larger and better set. The Plainview Electric Company, which owns and operates the station, will be assisted by the Chamber of Commerce in arranging programs, which will also give reports on Panhandle road conditions, crop reports from this section and Plainview news items.

The new broadcasting set uses a 300-meter wave length. Its aerial is one of the highest structures in West Texas. The broadcasting room is located in the municipal auditorium and a short extension to the stage will enable the operator to broadcast all programs given in the auditorium.

GERMANS FLASH 51,139 WORDS IN SINGLE DAY

Bulk to U. S.; Operators Set New Record

NAUEN, GERMANY.—German Radio stations flashed 51,139 words abroad in one day recently, surpassing all previous records. 35,420 words went to the United States while most of the remainder was sent to Spain, Italy, Russia and Egypt. The bulk of the traffic was handled here and at the Eilwesen station.

Extensive changes now in progress on POZ, the plant here, with the object of increasing the power and flexibility. Separate antennae are being constructed for the American, Asiatic, African and the two European services. Special preparations are being made for the new Buenos Ayres service, which is to be opened for public communication in the course of a few months. POZ will work with the station at Monte Grande, near Buenos Ayres, which is to be maintained and operated by a combination of English, French, German and American Radio companies.

The Week's Advance Broadcast Programs

Tuesday, August 7

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Light Cavalry," Star Orchestra; Margaret Sloan, soprano; "Annie Laurie," "Serenade," W. Woods, cornet; "La Czarine," "Spring Song," "The Merry Widow," March from "Aida," orchestra.

KDKA (Eastern, 326), 7:20 P. M., Musical program, "Triumphal March," "The Hunters," "Neapolitan Street Song," "The Band," "We'll Keep Old Glory Flying," "Bridal Chorus from the Opera the Rose Maiden," "All the World Is Sunshine," "Stars of the Summer Night," "Laughing Song," "Indian Love Song," "Until I Awake," "Kashmira Love Song," Myrtle Brown, soprano, Clarence Wylam baritone, Juliet Bartlett and Grace Holloway, accompanists, assisted by Sebastian Sapienza, clarinet.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert featuring Sherdina B. Aston; 2:30-3:30, Matinee musicale, arranged by Sherdina B. Aston, Marimba; 6:45-7:30, Children's hour, Uncle John; 8:00-10.00, Program, arranged by Alhambra Chamber of Commerce.

KPO (Pacific, 423), 8:00-10.00 P. M., Musical program, arranged by Lela Gordon Saling, soprano.

KYW (Central, Daylight Saving, 345), 7:00-7:58 P. M., Musical program, May Goldberg, soprano, Harriet Weeber, accompanist, Mark Love, baritone; Dorothy Lois Nolan; Cope Harvey's Orchestra at College Inn; Herblo Mintz, pianist.

WDAR (Eastern, Daylight Savings, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater, dinner music, Arcadia Cafe Concert Orchestra; 2:00-3:00, Children's hour, short talk and music test; 4:30-5:55, Short talk, Affairs of the Heart, Betsy Logan; 5:55, Baseball scores.

WFAA (Central, 476), 8:30-9:30 P. M., Band from Garland, Texas, in concert with L. R. Vidier, director; 11:00-12:00, Orchestra and musicians in vocal and instrumental groupings from Garland, Texas.

WFI (Eastern, Daylight Savings, 395), 1:00 P. M., Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Concert; 6:30, Final baseball scores; dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00-7:30, Children's Own Half Hour, Stories by Cousin Sue; 8:00, Boy Scout Radio Corps, under direction of a Philadelphia troop; 8:30, Concert; 10:30, Dance music, Meyer Davis Bellevue Stratford Dance Orchestra.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M. Weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 4:00-5:30, Catherine Stang, violinist; Martha Gomph, harpist; Tea time music, Hotel Statler's Palm Room; 6:35-8:45, Digest of the day's news, topics of scientific interest; 11:45, Weatber.

WGY (Eastern, 380), 7:45 P. M., Musical Program, "Bohemian Girl" Balfe Band; Reading, "The Boon of the Summer Camp," Heury W. Wack; "Lassus Trombone," "Twilight Echoes," Band selections; "Angel's Serenade," Hepzibah C. James, soprano, Carleton James, accompanist; "The Rey Waltes on Scotch Melodies," Band; "Elegie," Hepzibah C. James, soprano; "Sunny South," "The Fuzzy Wuzzy Bird," Band selections; "I've Something Sweet to Tell You," Hepzibah C. James, soprano; "Hunting Scene," "Home, Sweet Home, the World Over," Band selections.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00, Concert, Al Gorman's Orchestra; Reading, "An Interesting Historical Episode."

WIP (Eastern, Daylight Saving, 509), 1:00 P. M., Organ recital, Karl Bonawitz, Germantown Theater; 3:00, Artist recital; 6:00, Dinner dance music, Dick Regan's WIP Little Symphony Orchestra, final baseball scores; 7:00-7:30, Bedtime stories, Uncle Wip; 8:00, Short talk and song recital; 9:00, Dance music.

WJAX (Eastern, 390), 7:30 P. M., Concert, Cleveland News.

WLW (Eastern, 309), 10:00 P. M., Musical program, "Kentucky Babe," Deidel, "Twilight Is Lovelight," arranged from Rubenstein's Melody, Maud Davis, soprano, Norma Hetsch, alto, A. C. Keffen, tenor, Fred Otto, bass; Violin solos, Stanley Davis accompanied by William Griebel; Songs, L. & N. Quartet, "Good Night, Beloved," Ciro Tinsuti; Reading, Mrs. Wm. Griebel, "The Last Conversation of Sally in the Hollow"; Entertainment by Circle Orchestra, latest dance selections.

WMAQ (Central, Daylight Saving, 448), 4:30 P. M. Glenn Dillard Gunn School of Music; 9:00, La Salle Roof Garden Orchestra direction E. E. Sheets, Jr.; 9:15, Lillian Moyer, soprano.

WMC (Central, 500) 8:30 P. M., Musical program, Burks Novelty Orchestra; 11:00, Midnight Frolics.

WOC (Central, 484), 3:30 P. M., Educational talk, A. G. Hinrichs; 5:45, Chimes concert.

WOO (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sport results and police reports.

WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:00, Concert; News Orchestra; Schmeman's Band.

Wednesday, August 8

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Faust," Star Orchestra; "The Star," Lois Erie Watson, contralto; "Chanson Arabe," Manny Roth, violinist; "Cavalleria Rusticana," orchestra; "Three Fishers," Miss Watson; "Luna," orchestra; "Alice Where Art Thou," Manny Roth; "Ono Fleeting Hour," orchestra; "The Call of the Maytime," Miss Watson; "Moment Musical," orchestra.

KDKA (Eastern, 326), 7:30 P. M., Concert, Little Symphony Orchestra under direction Victor Saudek, assisted by George Kirk, baritone; Orchestra numbers: Overture, "Fingal's Cave," "Mendelssohn Concert Waltz," "Summer Evening," "The Firefly," "Serenade," "The Lost Chord," "Scenes from the Merry Widow," "The Masked Ball"; Baritone solos, "The Evening Star," "The Toreador Soug," The Armorer Song."

KHJ (Pacific, 495), 12:30-1:15 P. M., Concert; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's hour, Uncle John; 8:00-10:00, May Robison, pianist, and Altheda Oliver, mezzo-soprano.

KSD (Central, 546), 8:00 P. M., Music from St. Louis Fashion Show, Municipal Theater.

KYW (Central, Daylight Saving, 345), 7:00-7:58 P. M., Musical program by Lia Eckes, dramatic soprano, Genevieve Byrne, pianist, K. S. Sheppard, tenor, C. W. Foster, baritone, Mrs. C. Bradley, accompanist; Cope Harvey's Orchestra at College Inn, Hotel Sherman; "Open the Gates of the Temple," "The Voice in the Wilderness," "Concert Etude," "The Two Larks," "O Mio Fernado," "My Ain Folk," Popular dance Selections, Cope Harvey's Orchestra; "My Mother," "Whispering Hope," "Take Joy Home," "A Dream," "Love's Dream," "Butterfly Etude," "Oh Promise Me." Under the Beech Tree."

PWX (Eastern, 400), 900:-11:30 P. M., Concert, General Staff Band of the Cuban Army.

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, Popular selections, Arcadia Cafe Concert Orchestra; 4:30-5:55, Recital; 5:55, Baseball scores; 8:00-1:00 A. M., dance music, Arcadia Cafe Dance Orchestra, Howard Lanin, director; special studio features.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Concert, Loretta Kerk, pianist; 6:30, Final baseball scores; dinner music, Meyer Davis Bellevue Stratford Concert Orchestra.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M. Weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 4:00-5:30, Catherine Stang, violinist, Martha Gomph, harpist; Tea time music, Hotel Statler's palm room; 6:35-8:45, Digest of the day's news; 9:00-11:45, Concerts; 11:45, weather.

WHAS (Central, 400), 400-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00, Concert, Mrs. Jane W. Murroll, Mrs. J. P. Ferguson, Anna Blankenbaker, Mary Aubrey, Victoria Meagher, Mario Koehler, Mary Gordon, sopranos; Mrs. Shirley Graves, Josephine Miller, contraltos, Ruth Miller, Dorothy Miller, Lucille Schneider, pianists; Reading, "An Interesting Historical Episode."

WHK (Eastern, 360), 8:00 P. M., Concert, WHK Trio; Rabson's Radio Release; Automobile Road Report.

WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Artist recital; 4:00, Piano solos; 6:00, Dance music, final baseball scores; 7:00-7:30, Bedtime stories, Uncle WIP.

WLW (Eastern, 309), 8:00 P. M., Selections by Aichele Novelty Dance Orchestra; Violin solos, Rubin Phillips; Soprano solos, Mrs. Agnes Soeller, accompanied by her daughter, Elsa, "The Lost Chord," "He Was a Prince"; Talk by T. C. O'Donnell, Editor Writer's Digest; Piano solos, Larry Hess, "Hungarian Rhapsody," "Nola"; Soprano solos, Elizabeth Hess, Larry Hess, accompanist, "Spring Awakening," "Prince Charming"; Selections by Aichele Novelty Dance Orchestra.

WMAQ (Central, Daylight Saving, 448), 5:30 P. M., Cosmopolitan School of Music; 7:00, Georgene Faulkner, the Story Lady, stories for children; Mrs. Amanda Burhop, pianist; 9:00, LaSalle Roof Garden Orchestra, direction E. E. Sheets, Jr.; 9:15, Evelyn Kahn, soprano; Granville English, tenor.

WOC (Central, 484), 3:30 P. M., Educational talk.

What Time Is It?

Pacific | Mountain or Pacific Daylight Saving | Central or Mountain Daylight Saving | Eastern or Central Daylight Saving | Eastern Daylight Saving

THE above clock dials are shown to clear up the misunderstanding which the various time bands and the Daylight Saving plan are creating. Although each dial registers time one hour ahead or behind of its neighbor, the exact period indicated on each dial is the same as that on every other. This chart will aid in the use of the advance programs and the schedules in the Radiophone Broadcasting Station Directory, both of which give the hours stated in the particular kind of time in use at each station. Only features are listed in the advance programs below. Much additional data and such parts of station schedules as are regular features week in and week out, will be found in the station directory which appears serially continuously on page eight.

Thursday, August 9

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Egyptian," Star Orchestra; "The Fairy Lute," Jean McLean, soprano; "Melody in F," Jacques Sterin, cellist; "Graceful Dance," orchestra; "Good Morning Brother Sunshine," Miss McLean; "Only a Year Ago," orchestra; "Air," Mr. Sterin; "I Wonder Why," Miss McLean; Selection from "The Chocolate Soldier," orchestra.

KDKA (Eastern, 326), 7:20 P. M., Musical program, soprano solo, "Ah, Love but a Day," "Miserere," "Fylbelin," "Flow, Gently, Sweet Afton," "Thou Art Weary," "Gypsy Song," "Una Furtina Lagrima," "The Little Irish Girl," "Tho Lilac Tree," "Hungarian Rhapsody," "Old Folks at Home," "Caprice Viennois."

KHJ (Pacific, 395), 12:30-1:15 P. M., Musical program; 2:30-3:30, Matinee musicale; 6:45-730, Children's hour, Uncle John; 800-10:00, De Luxe program.

KPO (Pacific, 423), 8:00-9:00 P. M., Organ recital, Gladys Salisbury; 9:00-10:00 P. M., Concert, Prof. Lopa's Royal Hawaiian Orchestra.

KYW (Central, Daylight Saving, 345), 7:00-7:58 P. M., Herbie Mintz, pianist, Cope Harvey's Orchestra at College Inn, Hotel Sherman.

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 talk

(Continued on page 9)

WOO (Eastern, Daylight Saving, 509), 11:00-11:30 A. M. Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt, trumpets; 7:30-7:45, Baseball scores and police reports.

WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:00, News Orchestra; Schmeman's Band.

Radiophone Broadcasting Stations

Corrected Every Week—Part IV

State, City, Call

Alabama:
Auburn, WMAV
Birmingham, WSY
Mobile, WEAP
Montgomery, WKAN

Arizona:
Phoenix, KDYW, KFAD
Tucson, KFDH

Arkansas:
Fayetteville, KFDY
Fort Smith, WGAR
Little Rock, WCAV
Pine Bluff, WOK

California:
Altadena, KGO
Bakersfield, KDZB
Berkeley, KQI, KRE
Del Monte, KLN
El Monte, KUY
Fresno, KMJ
Hollywood, KFAR
Loug Beach, KSS
Los Augeles, KDZF, KFCL, KFL, KHJ, KJS, KNV, KNX, KUS, KWH
Los Gates, KFHQ
Modesto, KXD
Oakland, KLS, KLX, KZM
Richmond, KFCM
Sacramento, KFBK
San Diego, KDPT, KDYM, KFBC, KFFA
San Francisco, KFBD, KPO, KUO
San Jose, KFAQ, KQW
San Luis Obispo, KFBE
Santa Ana, KFAW
Santa Barbara, KFHJ
Selma, KFJH
Stanford Univ., KFGH
Stockton, KJQ, KWG
Venice, KFAV

Colorado:
Boulder, KFAJ
Colorado Springs, KFFQ, KFCK
Denver, AA3, DN4, KDZQ, KEEP, KFAF, KFDL, KFEL, KFIC, KFLE, KLZ
Greeley, KFJD, KFKA
Greeley, KFJD
Gunnison, KFHA
Lakeside, KFKH
Trinidad, KFBS, KFHY

Connecticut:
Bridgeport, WKAX
Hartford, WDAK
New Haven, WPAJ
Storrs, WABL
Waterbury, WQAD

Delaware:
Wilmington, WHAV, WOAT

District of Columbia:
Washington, WABE, WCAP, WDM, WEAS, WHAQ, WIL, WIAY, WJH, WMU, WQAW, WRC

Florida:
Jacksonville, WABG, WDAL
Miami, WQAM
Pensacola, WGAN, WLAV
St. Petersburgh, WSAG
Tampa, WDAE

Georgia:
Atlanta, WGM, WSB
College Park, WDAJ
Gainesville, WKAY
Macon, WMAZ
Savannah, WRAB

State, City, Call

Idaho:
Boise, KFAU, KFDD, KFFB
Kellogg, KFEY
Moscow, KFAN

Illinois:
Belvidere, WOAG
Carthage, WCAZ
Chicago, KYW, WAAF, WBU, WDAP, WJAZ, WMAQ, WPAD, WSAH
Decatur, WBAO, WHAP
Elgin, WTAS
Lake Forest, WABA
Mattoon, WQAL
McLeanshoro, WRAS
Mt. Vernon, WABF
Peoria, WJAN, WQAX
Rockford, WIAB
Sterling, WBBC
Tuscola, WDZ
Urbana, WRM
Ziou, WCBD

Indiana:
Auderson, WABC
Brookville, WSAL
Greencastle, WLAX
Huntington, WHAY
La Porte, WRAF
Marion, WIAQ
Mishawaka, WOAO
Muncie, WJAF
South Bend, WABJ, WGAZ
West Lafayette, WBAA

Iowa:
Ames, WOI
Boone, KFGQ
Burlington, WIAS, WLAT
Cedar Rapids, WJAM, WKAA
Centerville, WDAX
Council Bluffs, WPAF
Davenport, WHAI, WOC
Des Moiues, KFDJ, WGF
Duhuque, WQAK
Fort Dodge, KFER, WEAB
Gladbrook, KFIK
Iowa City, WHAA
Lamoni, KFFV
Le Mars, KFCY, WIAU
Marshalltown, KFJB
Newton, WIAH
Oskaloosa, KFHL
Sigourney, WOAD
Sioux City, WEAU
Waterloo, WHAC, WRAN

Kansas:
Anthony, WBL
Atwood, WEAD
Beloit, WPAR
Cheney, KFGP
Emporia, WAAZ
Independence, KFIX
Iola, KFID
Lindshorg, WDAD
Louisburg, KFIL
Manhattan, WTG
Marion, WRAD
Parsons, WOAJ
Pittsburgh, KFIV
Topeka, WJAQ, WPAM
Wichita, KFHI, WAAP, WEAH

Kentucky:
Bowling Green, WNAB
Frankfort, WOAK
Lexington, WQAH
Louisville, WHAS WLAP
Paducah, WIAR

Louisiana:
Alexandria, KFFY
Baton Rouge, KFGC
New Orleans, WAAB, WAAC, WCAG, WGV, WIAF, WWL
Shreveport, KFDX, KFHF, WGAQ

State, City, Call

Maine:
Bangor, WABI
Houlton, WLAN

Maryland:
Baltimore, WCAO, WEAR, WKC, WNAY
Frosthurg, WPAQ

Massachusetts:
Boston, WNAC
Dartmouth, WMAF, WSAQ
Fall River, WSAR, WTAB
Lowell, WQAS
Medford Hillside, WGI
New Bedford, WDAU
Springfield, WBZ
Worcester, WABK, WDAS

Michigan:
Ann Arbor, WQAJ
Berrien Springs, KFGZ
Dearhorn, WWJ
Detroit, KOP, WCX, WWJ
East Lanaing, WKAR
Flint, WEAA
Kalamazoo, WOAP, WLAQ
Lansing, WHAL
Rodgers, WCAF
Saginaw, WABM, WIAW

Minnesota:
Baudette, KFGY
Duluth, WJAP, WMAT
Hutchinson, WFAN
Minneapolis, KFDZ, KFEX, WBAD, WBAH, WCAS, WLAG, WRAH
Moorhead, WPAU
Northfield, WCAL
St. Cloud, WFAM
St. Paul, AV7, WAAH

Missouri:
Butler, WNAR
Cameron, WFAQ
Cape Girardeau, WSAB
Columbia, WAAN
Independence, WPAG
Jefferson City, WOS
Joplin, WHAH
Kansas City, WDAF, WHB, WMAJ, WOQ
Marshall, WJAT
Moberly, KFFP
Rockport, WMAD
St. Joseph, KFHD, WEAK
St. Louis, KFEZ, KFGJ, KFIB, KSD, WCK, WEB, WEW, WMAY, WRAO
Springfield, WIAI, WKAS, WQAB
Tarkio, WIAT
Webster Grove, WOAL

Montana:
Billings, KFCH
Bozeman, KFDO
Butte, KFAP
Great Falls, KDYS
Havre, KFBB

Nebraska:
David City, WRAR
Fremont, WOAE
Grand Island, KFJA
Hastings, WQAY
Kearney, KFHP
Lincoln, KFDU, WFAV, WJAB, WKAC, WMAH, WQAP
Norfolk, WJAG
Oak, KFEQ
Omaha, KFCZ, KFFX, WAAW, WIAK, WNAL, WOAW, WOV
Tecumseh, WTAU
University Place, WCAJ
Utica, KFGV
York, KFDR

State, City, Call

Nevada:
Reno, KDZK
Sparks, KFFR

New Hampshire:
Chesham, WSAU
Laconia, WKAV

New Jersey:
Atlantic City, WHAR
Camden, WRP
Gloucester City, WRAX
Jersey City, WNO
Moorestown, WBAF
Newark, WAAM, WBS, WOR, WRAZ
N. Plainfield, WEAM
Ocean City, WIAD
Paterson, WBAN
Trenton, WMAL, WOAX

New Mexico:
State College, KOB

New York:
Albany, WNJ
Amsterdam, WPAS
Buffalo, WGR
Canandaigua, WSAW
Canton, WCAD
Cazenovia, WMAC
Ithaca, WEAI
Lockport, WMAK
New York, KDOW, WBAY, WDT, WEAF, WJX, WJY, WJZ, WLAW, WSAP
Poughkeepsie, WFAF
Rochester, WABO, WHAM
Ridgewood, WHN
Schenectady, WGY, WRL
Syracuse, WDAI, WFAB, WLAH, WNAN
Tarrytown, WRW
Troy, WHAZ
Utica, WSL
Waterford, WFAG

North Carolina:
Asheville, WFAJ
Charlotte, WBT
Greensboro, WQAZ
Raleigh, WLAC

North Dakota:
Fargo, WDAY, WPAK
Grand Forks, WOAB
Mayville, KFHU
Wahpetou, WMAW

Ohio:
Canton, WWB
Cincinnati, WAAD, WHAG, WIZ, WLW, WMH, WSAI
Cleveland, KDPM, WHK, WJAX
Columbua, WBAV, WCAH, WEAO, WMAN, WPAL
Dayton, WAI, WABD, WJAJ
Fairfield, WL2
Granville, WJD
Greenville, WCBB
Hamilton, WBAU, WRK
Lehanon, WPG
Lima, WOAC
Marietta, WBAW
Middleport, WSAK
Newark, WBBA
Sandusky, WABH, WQAF
Springfield, WNAP
Steubenville, WTAK
Stockdale, WJAK
Warren, WLAZ
Washington C. O., WGAX
Wooster, WGAU
Youngstown, WDBF

Oklahoma:
Aidmore, WOAA
Chickasha, KFGD

State, City, Call

Norman, WNAD
Oklahoma City, KFJF, WKY
Okmulgee, WPAC
Tulsa, WGAF, WLAL

Oregon:
Astoria, KFJI
Arlington, KFGL
Baker, KFDA
Corvallis, KFDJ
Eugene, KFAT
Hillshoro, KFFO
Hood River, KFHB, KQP
Medford, KFAY
Pendleton, KFFE
Portland, KDYQ, KFEC, KFIF, KGG, KGN, KGW
Salem, KFCD

Pennsylvania:
Allentown, WCBA, WSAN
Altoona, WGAW
Clearfield, WPI
Easton, WMAP
Erie, WOAV
Grove City, WSAJ
Harrisburg, WABB
Johnstown, WTAC
Lancaster, WDBC, WGAL
McKeesport, WIK
Parkeshurg, WQAA
Philadelphia, WCAU, WDAR, WFI, WGL, WIP, WNAT, WOO, WWAD
Pittsburgh, KDKA, KQV, WCAE, WJAS
Reading, WBBD, WRAW
Scranton, WQAN, WRAY
State College, WPAB
Villanova, WCAM
Wilkes-Barre, WBAX, WNAH

Rhode Island:
Cranston, WKAP
Edgewood, WEAG
East Providence, WKAD
Providence, WEAN, WJAR, WRAH, WSAD, WTAG

South Carolina:
Charleston, WNAQ, WOAH
Clemson College, WSAC
Greenville, WQAV

South Dakota:
Brookings, KFDY
Platte, KFIJ
Rapid City, WCAT
Sioux Falls, WFAT
Vermillion, WEAJ
Yankton, WNAX

Tennessee:
Knoxville, WNAV
Lawrenceburg, WOAN
Memphis, WMC

Texas:
Abilene, WQAQ
Amarillo, WDAG, WRAU
Austin, WCM, WNAS
Beaumont, WMAM
College Station, WTAW
Dallas, KFFZ, WDAO, WFAA, WRR
El Paso, WDAH, WPAT
Fort Worth, WBAP
Galveston, WHAB, WIAC
Houston, WCAK, WEAY, WEV, WRAA
Laredo, WWAX
Orange, KFGX
Plainview, WSAT
Port Arthur, WFAH
San Antonio, AS6, WCAR, WAOI
Stanford, WOAZ
Tyler, WOAF
Waco, WJAD, WLAJ, WWAC
Wichita Falls, WKAF

Utah:
Ogden, KFCP

State, City, Call

Salt Lake City, KDYL, KZN

Vermont:
Bellows Falls, WLAK
Burlington, WCAX
Springfield, WQAE

Virginia:
Arlington, NAA
Blacksburg, WEAE
Fortress Monroe, WNAW
Portsmouth, WOAQ
Westhampton, WQAT

Washington:
Aberdeen, KNT
Bellingham, KDZR
Everett, KFBL
Lacey, KGY
Neah Bay, KFHH
Pullman, KFAE
Seattle, KDZE, KDZT, KFHR, KFIY, KFJC, KHQ, KJR, KTW
Spokane, KFDC, KFIO, KFZ
Tacoma, BE1, KFBG, KFEJ, KGB, KMO
Walla Walla, KFCF
Wenatchee, KDZI, KZV
Yakima, KFIQ

West Virginia:
Clarksburg, WHAK

Wisconsin:
Beloit, WKAW
Fond du Lac, KFIZ
Kenosha, WOAR
La Crosse, WABN
Madison, WGAY, WHA
Milwaukee, WAAK, WCAY, WHAD, WIAO
Neenah, WIAJ
St. Croix Falls, WRAL
Waupaca, WPAH

Wyoming:
Casper, KFDF
Douglas, KFEV
Laramie, KFBU

Alaska:
Fairbanks, WLAY
Juneau, KFIU

Hawaii:
Honolulu, KDYX, KGU, KYQ
Lihue, KFHS

Porto Rico:
San Juan, WKAQ

Canada:
Calgary, CHBC, CFAC, CFCN, CJCY
Edmonton, CFCK, CJCA
Fort Frances, CFPC
Halifax, CFCE, CJCS
Hamilton, CKOC
Iroquois Falls, CFCH
London, CFCX, CHCS, CJGGC, CKQC
Montreal, CFCF, CHCX, CHYC, CJBC, CKAC
Nelson, CJCB
Olds, CJCX
Ottawa, CHXC, OA
Regina, CKCK
St. John, CJCI, CKCR
Toronto, CFCA, CFTC, CHCB, CJCD, CJCH, CJCN, CJSC, CKCE, CKKC
Vancouver, CFCB, CFYC, CHCA, CJCE
Winnipeg, CHCF, CKCB, CKY, CKZC, CJNC

Cuba:
Havana, PWX
Tuinucu, 6KW

Reviews of Books

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

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

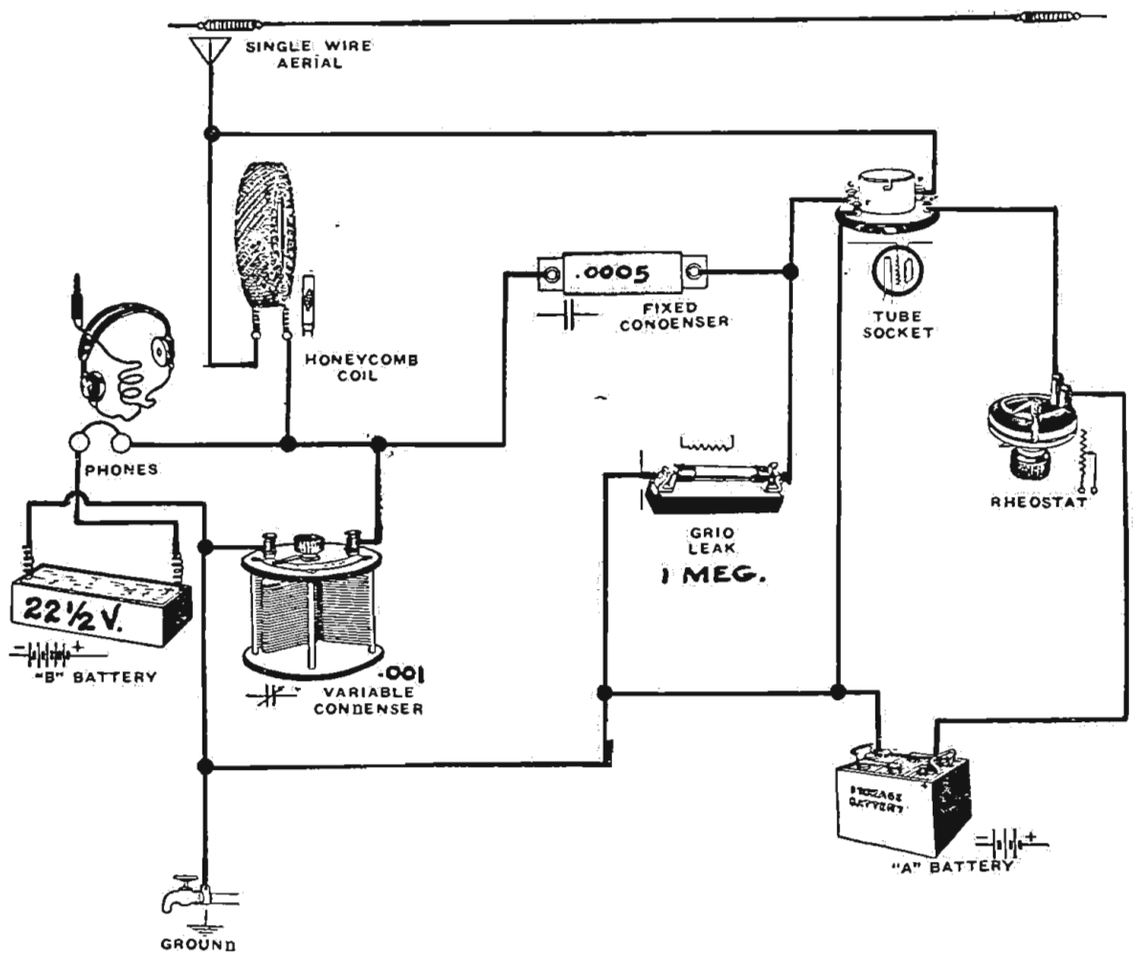
Elements of Radiotelegraphy. By Elery W. Stone. The text was written for the guidance and instruction of Radio students in the communication service of the Navy. It is an instruction book for Radio schools. Price, $2.50.

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

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

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

FOR WIDE WAVE LENGTH RANGE



THIS simplex diagram presents an extremely efficient circuit; it is not only simple to construct, but covers a wide range of wave length. The cost of necessary apparatus is low; an assortment of honeycomb coils, including 35, 50, 75 and 100, will supply even the unusual demands of the ordinary fan. The device resembles somewhat the well-known ultra-audion; its operation is very similar. Tuning is confined to the variable condenser, which should be of the vernier adjustment type.

A detector tube can be used with 22½ volts on the plate, but if an amplifier tube is used it probably would be advisable to increase the plate voltage.

The rheostat used depends on the type of tube, likewise the voltage of the A battery.

The Reader's View

Results with "Nacireman"

In one of your recent issues you published "Nacireman" latest easy super hook-up RD-87. This hook-up has been tested satisfactorily, results with the following minor changes: It was found that a Cunningham No. 301 with 45 volts on the plate gave better results than a WD-11, NV No. 199 or No. 201-A with higher or lower voltages on the plate. It was also found that an aerial of No. 14-gauge insulated wire 25 feet long made in circular form around the four sides of an enclosed porch and insulated from the building gave much better results than your idea of a piece of wire under the carpet or on the picture moulding.

In addition to using a No. 301-A Cunningham tube, I am using a Cutler-Hammer 30-ohm rheostat and potentiometer, a Baldwin split variometer for inductance and two 23-plate variable condensers without vernier I have found the rheostat to be very critical, but when properly adjusted the volume on stations up to 12 miles is the equivalent of a detector and one step of audio.

It is my opinion that the C-2 condenser for tuning the 750-turn soup coil can be replaced satisfactorily by a .0005 fixed mica condenser. Very great care must be taken in the wiring; avoid parallel leads and crowding on account of body capacity effect.

Your description of this hook-up says nothing about distance. For your information, with the above-described hook-up I have been able to pick up stations WIP and WFI in Philadelphia, which are about 90 miles (air line) from my location.

For the fan who is interested in a non-power loud speaker for home use, this hook-up, in my opinion, with two steps of audio frequency, certainly should give very satisfactory results. If convenient I would be glad to see in some future issue of The Radio Digest what you consider the proper manner of applying amplification to the RD-87.—E. P. Parker, New York City.

ADVANCE PROGRAMS

(Continued from page 7)

Betsy Logan; musical features; 4:30-5:55, Recital; 5:55, Baseball scores.

WFAA (Central, 476), 8:30-9:30 P. M., Masonic service program under direction of Grand Lodge of Texas Masonic Service Committee.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Song recital; 6:30, dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; Final baseball scores; 7:00-7:30, Children's Own Half Hour, stories by Cousin Sue; 8:30, Concert and dance music.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Weather forecast for Lakes Erie and Ontario marine and aviation interests, 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 4:00-5:30, Catherine Stang, violinist; Martha Gomph, harpist; Tea time music, Palm Room, Hotel Statler; 6:35-8:45, Digest of the day's news, Boy Scout Radiograms, Employment Bulletin; 11:45, Weather.

WGY (Eastern, 380) 7:45 P. M., Musical Program "My Own," "When You Lose Your Heart to Someone," "Mose," "Remember the Waltz," Charles Fisher and Frank Gorman, Abe Olman, accompanist and composer; Camp Fire Girls' Program, "Walking Song," Talk, "Camp Fire Ideals," "The Camp Fire Watchword," "The Desires and Law of the Fire," "Boat Song," "Credo of the Camp Fire," "Haunt of the Witches," contralto solo, "Ode to the Fire," song, "Mystic Fire," Camp Fire Girls; "A Story of the Seven Crafts," "The Star," soprano solo; "Mammy's Moon," "Lay Me to Sleep," Camp Fire girls.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00, Concert, arranged by Mrs. John E. Harmon, Jr.; Reading, "An Interesting Historical Episode."

WIP (Eastern, Daylight Saving, 509), 1:00 P. M., Organ recital, Karl Bonawitz, Germantown Theater; 3:00, Song recital; 6:45, Final baseball scores; 8:20, Dance music, Ace Brigode and his Ten Virginians, Hotel Walton Roof; 9:00, Organ recital, Karl Bonawitz.

WJAX (Eastern, 390), 8:00 P. M., Concert, Cleveland Yacht Club Boys' Band.

WLW (Eastern, 309), 10:00 P. M., Program by Wurlitzer Concert Company. Direction William H. Duning, "Shipmates," "Old Bass Viol," Gordon Osterhaut, baritone; "Souvenir," "Old Refrain," Henry Risch, blind violinist; Reading, Gordon Osterhaut, "Down by Bingham's Grocery Store"; Selections, Mattie Lee Risch, blind soprano; Sinclair Dance Orchestra, latest dance selections.

WMAQ (Central, Daylight Saving, 448), 9:00 P. M., La Salle Roof Garden Orchestra, direction E. E. Sheets, Jr.; 9:15, Faye W. Gettrust, soprano.

WMC (Central, 500), 8:30 P. M., Musical program, Chisca Philharmonic Orchestra, Miss Clara Ahern, director.

WDC (Central, 484), 3:30 P. M., Educational talk, Karl G. Stephan; 5:45, Chimes concert; 6:30, Sandman's visit.

WDD (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker's Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt, trumpets; 7:30-7:45, Sport results and police reports.

WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:00, Concert, News Orchestra; Schmeman's Band.

Friday, August 10

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "A Day in Venice," Star Orchestra; Rupert Lucas, baritone; "Nocturne in E Flat," Harry Adaskin, violinist; "Pleading," "Pizzicato Polka," orchestra; "Prelude to the Deluge," Mr. Adaskin; "Espana," "Serenade D'Amour," orchestra.

KDKA (Eastern, 326), 7:20 P. M., Concert by the KDKA String Ensemble.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's hour, Uncle John; 8:00-10:00, Program by Letter Carriers' Band of Los Angeles.

KSD (Central, 546), 8:00 P. M., Concert, Concordia Gymnastic Society Band.

KYW (Central, Daylight Saving, 345), 10:00-11:30 P. M., Musical program, Herbie Mintz and Harry Geise, pianists; Cope Harvey's Orchestra at College Inn; Diana Shanks, pianist and Cele Shanks, pianist; Diana Shanks will play "Florence," "Sparks," "Grand Valse"; Cele Shanks will play: "Hungarian," "Witches Dance," "Contrabandist"; Diana and Cele Shanks will play on two pianos: "Barber of Seville."

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, Musical selections, Arcadia Cafe Concert Orchestra; short talk by Betsy Logan; 4:30-5:55, Musical program; 5:55, Baseball scores; 7:30-8:00, Bedtime stories, Dream Daddy; 8:00-1:00 A. M., Short talks; Artist recital; dance music, Howard Lanin's Arcadia Cafe Dance Orchestra; playlet by the Groonough players; songs by Harry Glyn. No Saturday or Sunday Programs.

WFAA (Central, 476), 8:30-9:30 P. M., Mrs. V. O. Bosser, violinist, Mrs. Eugene Duggan, singer.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music, Myer Davis Bellevue Stratford Concert Orchestra; 3:00, Address; 3:15, Musical selections; 6:30, Final baseball scores; dinner music, Meyer Davis Bellevue Stratford Orchestra. No Saturday or Sunday Proram.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 4:00-5:30, Catherine Stang, violinist; Martha Gomph, harpist; Tea time music, Palm Room, Hotel Statler; 6:35-8:45, Digest of the day's news, Road reports; 9:00-11:45, Concert; 11:45, Weather.

WGY (Eastern, 380), 7:45 P. M., Musical program and three one-act plays by WYG Student Players; Comedy, "A Marriage Proposal"; Domestic tragedy, "The Holdup;" Comedy, "The Best Man;" "2nd Sonata in G Minor-Op. 22," Anninna McCrory Evans, pianist; 10:30, Fox Trot, "Holding Hands," Reuttling's Imperial Orchestra; Fox trot, "Tillie," orchestra; "Drifting Dreamland," Arthur Gunn, baritone; "Why Don't My Dreams Come True," "Grand Daddy," "Take a Look at Molly," orchestra; "Climb on Top of Your Trouble," Arthur Gunn; "Sun Kist Rose," "Sometime," orchestra, "Sunset Valley," Arthur Gunn; "I'd Rather Fox Trot than Waltz," "Oh! You Little Sun-uv-er-Gun," orchestra.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00, Musical program, Charles Jackson's Novelty Orchestra; Margaret Edwards, soprano; Reading, Eugenia Baumgardner.

WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Artist recital; 6:45, Radio Baseball Dope by Monto Cross, Old-time baseball star; 7:00-7:30, Bedtime stories, Uncle Wip. No Saturday or Sunday Programs.

WMAQ (Central, Daylight Saving, 448), 4:30 P. M., Chimes; 9:00, LaSalle Roof Garden Orchestra direction E. E. Sheetz, Jr.; 9:15, F. W. Agard, tenor, Robert Cougle, pianist.

WMC (Central, 500), 8:30 P. M., Musical program, Alaskan Garden Orchestra, Joe Bennett, director; 11:00 P. M., Midnight Frolics.

WDC (Central, 484), 3:30 P. M., Educational talk, C. E. Willent; 5:45, Chimes concert, 6:30, Sandman.

WDD (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; trumpets; 7:30-7:45, Sport results and police reports; 7:45-8:30, Dinner music, Adelphia Hotel Roof Garden Orchestra, A. Candelori, director; 8:30, Address and song recital; 8:45, Dance music, Hotel Adelphia Roof Garden Orchestra, Walter Miller, director; 11:10, Dance music, Hotel Adelphia Roof Garden Orchestra. No Saturday or Sunday programs.

WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:00, Concert, News Orchestra; Schmeman's Band.

Saturday, August 11

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Mignonette," Star Orchestra; Ina Lockart, contralto; "Romance Sans Paroles," Jacques Sterin, cellist; "Prelude," "Berceuse," orchestra; "Chanson Triste," Mr. Sterin; "The Geish," orchestra.

KDKA (Eastern, 326), 7:20 P. M., Concert under direction T. J. Vastine, selection: "The Lost Continent," Suit in four parts consisting of "Nocturn and Morning Hymn of Praise." "A Court Function," "I Love Thee," "The Destruction of Atlantis," "Espanola," selection from Rigoletto; Clarinet solo, "Potpourri Musical Joker"; Cornet duet 'Al and Pal," "Pas Das Fleurs."

KHJ (Pacific, 395), 12:30-1:15 P. M., Music; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's hour, Uncle John; 8:00-10:00, De Luxe program.

KPD (Pacific, 423), 8:00-10:30 P. M., Concert, Art Weidner's Fairmount Hotel Dance Orchestra.

KSD (Central, 546), 8:00 P. M., Concert, Missouri Theater talent.

KYW (Central, Daylight Saving, 345), 7:00-7:58 P. M., Harry Geise, pianist; Cope Harvey's Orchestra at College Inn, Hotel Sherman.

PWX (Eastern, 400), 9:00-11:30 P. M., Musical program, Maria Fantoli, soprano; Gustavo Carrasco, tenor.

WFAA (Central, 476), 8:30-9:30 P. M., Bon Veda Mixed Quartet in recital, George Ashley Brewster, director and accompanists; 11:00-12:00, Piano recital, William A. Sutherland, Jr.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Special weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 4:00-5:30, Catherine Stang, vionlinist, Martha Gomph, harpist; Tea time music, Palm Room, Hotel Statler; 6:35-8:45, Digest of the day's news; 11:45, Weather.

WHAS (Central, 400), 4:00-5:00 P. M., Concert, Mary Anderson Theater Orchestra; 7:30-9:00, Concert, Henry M. Shilling's Orchestra; Reading, "An Interesting Historical Episode."

WMAQ (Central, Daylight Saving, 448), 7:00 P. M., Music from the Chicago Theater; 9:00, LaSalle Roof Garden Orchestra, direction E. E. Sheetz, Jr.

WDC (Central, 484), 3:30 P. M., Educational talk, C. C. Hall; 5:45, Chimes concert; 6:30, Sandman; 9:30-10:00, Dance program, P.S.C. Orchestra.

WWJ (Eastern, 517), 3:00 P. M., Concert, Schmeman's Band; 7:30, Concert, Schmeman's Band.

Sunday, August 12

KPD (Pacific, 423), 8:30-10:00 P. M., Concert, Rudy Seiger's Fairmount Hotel Concert Orchestra.

KYW (Central, Daylight Saving, 345), 10:00 A. M., Sunday morning service broadcast from St. Chrysostom's Church, Rev. Dr. Norman Huttou, rector; 5:00-8:00 P. M., Classical and semi-classical selections by Sisson Trio, broadcast from dining room of Sisson Hotel.

WFAA (Central, 476), 9:30 A. M., Sacred music recital; 10:00-11:00, Paul E. Asbley's Texans Orchestra; 2:30-3:30 P. M., Radio Chapel Bible class, half hour of bible study, half hour of Gospel songs.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Special weather forecast for Lakes Erio and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 3:00, Vesper service; 4:00-5:30, Catherine Stang, violinist, Martha Gomph, harpist; Tea time music, Palm Room, Hotel Statler; 6:00-6:30, George Albert Bouchard, organist; 11:45, Weather.

WGY (Eastern, 380), 10:00 A. M., "Sarabande," Edward Rice, violinist, Doris Fraucis, organist; Doxology, call to worship; Invocatiof and Lord's Prayer; Reading, Gloria; Scripture Lesson; Hymn, "Through the Night of Doubt and Sorrow"; Prayer; Offertory, violin solo with organ; Hymn, "Jerusalem the Golden"; Sermon, John W. Langdale, D. D.; Prayer and benediction; Silent prayer; Postlude, "Meditation," violin solo with organ.

WHAS (Central, 400, 9:57 A. M., Organ music; 10:00, Church services, Methodist Temple, Rev. Dr. Wilfred Clark Phelps, substitute pastor; Temple Choir, Mrs. Jane Graves, organist; 4:00-5:00 P. M., Concert under direction of Hazel McClellan.

WHK (Eastern, 360), 8:00 P. M., Operatic selections and vocal music, WHK Orchestra and soloists.

WMC (Central, 500), 11:00 A. M., Services from St. Johns Methodist Church.

WWJ (Eastern, 517), 2:00 P. M., News Orchestra 3:00, Concert, Schmeman's Band; 7:30 P. M., Church Services, St. Paul's Cathedral.

Monday, August 13

KPD (Pacific, 423), 8:00-9:00 P. M., Organ music; 9:00-10:00 P. M., Musical program, Adelaide Parton, violinist; Ruth Friedlander, pianist; Giuseppe Carcione, tenor; Mrs. S. Y. Frazer, soprano.

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, Musical features; 4:30-5:55, Concert; short talk, Affairs of the Heart by Betsy Logan; 5:55, Baseball scores.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Concert by Philadelphia artists, Loretta Kerk, pianist; 6:30, Final baseball scores; dinner music, Meyer Davis Bellevue Stratford Orchestra.

WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Special weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist, Hotel Statler; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 4:00-5:30, Catherine Stang, violinist; Martha Gomph, harpist; Tea time music, Palm Room, Hotel Statler; 6:35-8:45, Digest of the day's news; 9:00-11:45, Concert, 11:45, Weather.

WGY (Eastern, 380), 7:45 P. M., "The Gallant Salamander," Roland James, baritone, David J. Woolcock, accompanist; "The Lost Watch," Carey Booth, tenor; Reading, "Something of Interest to All" (Courtesy Youth's Companion); "Will-o'-the-Wisp," Roland James; "Castagnettes," Mrs. Van Veachton Rogers, pianist; "Open the Gates of the Temple," Carey Booth and David Woolcock; "The Lord Worketh Wonders," Roland James; "War March of the Priests," Mrs. Rogers; "Vale," Carey Booth; "The Moon Hath Raised Her Lamp Above," Carey Booth and Roland James.

WHAS (Central, 400), 4:00-5:00 P. M., Concert Mary Anderson Theater Orchestra.

WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Artist recital; 6:45, Radio Baseball Dope, Monto Cross, old-time baseball stars; 7:00-7:30, Bedtime stories, Uncle Wip.

WDD (Eastern, Daylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Dinner music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sport results and police reports; 7:45, Dinner music, Hotel Adelphia Roof Garden Concert Orchestra, A. Candelori, director; 8:30, Selections, WOO Orchestra, Robert E. Golden, director; song recital, artists to be announced by Radio; 9:30, Organ recital, Mary E. Vogt.

WANTED—FACTORY OUTPUTS

We are interested in securing Radio factory outputs. We are interested in a Chicago Branch Manager. The R-C OUTLET INTERNATIONAL DISTRIBUTORS, 303 Fourth Avenue, New York, N. Y.

Radio Equipment

EDISON Elements for making "B" Batteries, 6c per pair; tubes, 2c each. Nickel Wire, Insulators and Cabinets at reasonable prices. TODD ELECTRIC CO., 178 Lafayette St., New York City.

Spark Transmitters Junked by U. S. Naval Air Service

WASHINGTON, D. C.—Spark transmitters with the exception of those in use at Pensacola for training will be discarded and replaced by new tube sets soon.. Five of the new Radio spotting sets have passed satisfactory tests and are being shipped to the air squadrons, battle fleet. These sets will replace those now in use there. When the latter are released they will be issued to other stations to replace the spark sets.

Every owner of a Radio set in Canada is required to have a license.

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

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Cool Waves from the North Pole

The Top of the Earth Heard From

RADIOPHANS and polar exploration fans and everybody who is interested in outdoor adventure of any sort are having a good time this summer. Heretofore, when an arctic explorer reached a point beyond the last telegraph station to the northward he and his party faded into oblivion until their return, which might be in one year or in three, or never.

Now, with Donald MacMillan's good ship Bowdoin equipped with the best Radio transmitting and receiving apparatus in the world, and with Donald Mix to run it, the quietest stay-at-home has his fill of vicarious travel. Those who live in the hottest cities may keep their minds cool as they voyage along with the Bowdoin.

Romance grows not less, with the progress of invention, but more, and its thrills become more accessible.

Delving Into the Mysteries

When the Set You Have Built Works, It Thrills

ONE of the principal reasons why Radio has taken such strong hold on the public is the fact that the new science allows one to experiment to his heart's content—to delve into the unknown where mysterious phenomena abound. No other field thus far discovered presents such an opportunity for research to the person who has had but little training and practice as to the fundamentals.

We continually hear of persons who, without previous knowledge of the science, construct their own Radio sets. Thousands of men and women of almost every age spend hours day and night, winding coils, tearing down their sets and rebuilding them, changing various units, and applying various "kinks" as they come to mind. The concert or lecture brought to their ears is really secondary. It is the mysterious working of the apparatus which fascinates the experimenter, and gives him the biggest thrill.

While the construction of a Radio receiver according to some circuit or diagram requires but little technical knowledge on the part of the builder he must at least follow the plans carefully, in a painstaking manner. This is especially true of the more complicated circuits featuring super regeneration or the use of many tubes.

Missing Man Found

By-products of Broadcasting Are Important

THE value of the Radio broadcasting station in its relation to locating missing persons and articles was recently fully demonstrated when Herbert Weber was located within a day after his description had been put upon the air. This marks one of the first recoveries of a person by Radio although thousands of messages and descriptions have been sent to all parts of the world by Radio.

Herbert Weber was deaf and dumb and his wife could not locate him. He had wandered away, and so the wife turned to the new agency, Radio, to help her in her search. She gave a full description of him and it was broadcast after church services on Sunday from a local broadcasting station. A listener in at a distant city heard this message of distress and began a search for the missing man. It was not until the next afternoon that the deaf and dumb man was found wandering along a country road. The searcher approached him and wrote on a paper the message he had heard on his Radio receiving set. The man wrote back that he was the missing one and within a short time he was safely home.

This broadcast of the description of the missing man and his recovery by Radio shows that the power of this marvelous instrument seems almost unlimited in its scope. Police departments use it, individuals avail themselves of the opportunity to broadcast messages and institutions are ever eager to make their messages reach into distant fields through the Radio. Personal messages from some of the broadcasting stations are not yet permitted, but it will be only a short time before every home will be equipped with all the necessary apparatus.

RADIO INDIGEST

"Radio"

Flinging free from the guardian wires, into the blue alone,
The human voice goes souring forth, the simple spoken tone,
Bridging the breadth of the sea's expanse, the mountains' cloud-capped height,
Over the fertile prairies broad, the forest's fragrant night.
Calling across from land to land the greetings of friendship go,
With the intimate touch of the spoken word, its warm and human glow.
Before this Wonder the distance shrinks and a listening world draws close,
Its petty cavils and hates forgot as the sense of Brotherhood grows.
Before this Wonder the past gleams pale, but the future with promise bright
For the spoken word on the Radio heralds a New Dawn's light.

—*GRACE ISABEL COLBRON.*

INDI-GEST KINKS?
SEND A DOLLAR—

THERE are many little Indi-Gest kinks worked out in the home that would hamper your fellow Radioknut and cause him much worry. Indi-Gest is very much interested in securing such material and is willing to accept a dollar for each kink printed. Send a stamped envelope so rejected copy may be returned. Under no circumstances will the dollar be sent back.

INDI-GEST KINKS DEPARTMENT

INDI-GEST KINKS

This Is Re-Markable

Dear Indi: Here's one for the w.k. Indi-Gest Kinks Dept. Am sending the dollar in marks, shipping them on the only boat big enough to carry them across the briny pond, the Leviathan. This is the kink:

To shield a set properly so as to avoid all body capacity, solder all switch contacts and lever busings, binding posts and connections to all other apparatus, onto a piece of thin gauge aluminum the same area as, and behind, the insulating panel. This will stop all body capacity, howling, tube noises, and even the broadcasters themselves.

P. S. I believe I forgot to enclose the dollar, but mailed the letter before finding out. Excuse me. S. W.

Try to Hum This One

Dear Indi: By bringing the lead-in from my antenna down so as to lay across the house lighting current supply wires, a very nice alternating current hum can be obtained. Enclosed is a negative dollar for this kink. POLLY W.

This Works. We've Tried It

Dear Indi: Here is a kink which I am sure many Radioknuts bothered with damped wave reception will appreciate. As there are a number of operators here sending damp waves my grid leak was leaking so badly that my parts were always wet. To avoid this, have a few lengths of rubber tubing waxed to the tops of your vacuum tubes. After breaking the tips off, the tubes will draw all the dampness out and deposit it in the tube bases. Then get new tubes. CAPACITY JACK.

P. S. While inclosing the $1 I noticed it had No. 13 on it so didn't send it. C. J.

THE NEW WIDOW

I'm a widow: not grass or the crepe and weed kind,
I am lonesome and weary in body and mind;
How I miss my late husband's affectionate hug,
Since the day he was stung by that Radio bug.

My late husband is late in all the word implies,
He is late in retiring, he is late to arise,
He is late to his work, he is late getting home,
He is late sitting down 'neath the dining room dome.

What I say after dinner, the man never hears,
For 'tis then the receivers are over his ears;
I'm no more his darling, his dear little kiddo;
I am a forsaken, poor Radio widow.

RAY D. O'KNUTT.

A-B-C Lessons for Indigest Beginners

Chapter VIII—Bring on Your Summer Snow

BY GOSH

HIS for high-tension
On C. W. stuff you know;
Be cautious with the gentlemen,
Or they'll plant you 'neath the snow.

THERE'S A REASON

Sleeping here is Tom McGurdey,
Had no arrester on his set,
It was struck just once by lightning—
There's a reason—you can bet.

—*ROTOR E. GAPP.*

INDI-GEST Q. & A.

Referred to the P. & Q. Dept.

Dear Indi: I have purchased a good hydrometer syringe but there was no instruction sheet in the box and I would like to know how to tell the positive from the negative pole using same. I like your column very much and believe you will be able to answer this one with ease (not eeeeeeeeee)'s. B. R. S.

Water, Gas and Taximeter

Dear Indi: Have been listening for broadcasts from Walla Walla since initial announcement but N. D. Am using a neutoflexorator designed by Lem Stebbins but only hear static and howls. Please advise me how many meters the station uses and what they are. J. A.

Maybe It's the Humidity

Condensed

By DIELECTRIC

During the last month several of the broadcasting stations have been observing lengthy silent periods for the purpose of rebuilding their plants. It is perhaps the best season of the year for such work, if choice is made dependent on the size of Radio audiences. Stations WMAQ and WDAP, both of Chicago, are again on the air after alterations to studio and apparatus. No one in Radio is content with things as they have been.

At last! We are promised silent periods, numerals and letters when the army experts have perfected a scheme of code transmission at frequencies lower than the human ear can detect. The irritation caused by trying to listen to a concert through a repetition of three dots and dash will be no more, after a little while. Both code and broadcasts should receive added benefits from this new system, as both may be used at one time with no interference whatever.

In view of the many attempts to prove that broadcasting reduces the attendance at opera and concerts, it is interesting to note the substance of replies to a survey made by "Musical America." Coming from all parts of the country, these statements show the consensus among musical managers as a denial of the reported slump in ticket sales due to listeners in being able to hear good music in their homes. It is further shown, however, that the majority hold to the belief that transmission is too imperfect yet to have a conclusive bearing on the subject.

Correspondence courses in swimming may be a success or they may not, but at least one instance of teaching young boys the art via Radio has shown the utility of the latter method. With a group of youngsters lined up at the pool, a loud speaker and the swimming director in the studio of Station WLW, a real test was made which proved entirely satisfactory. There is no good reason to doubt that this method could be followed on a larger scale with results as good, lessening fatalities and arousing interest more widely.

The more Radio is used with a view to testing its effect on the deaf, the more favorable seems the outcome. B. K. Ford, of Chicago, deserves much credit for his patience in working through this medium with the deaf of that city. Experiments are being made generally by those in contact with the deaf in the hope of promoting such a degree of hearing that their lives may be brighter and their usefulness increased.

Interest in amateur DX work is just as keen as ever it was. From the latest account as to a definitely arranged schedule for transmitting signals across the Pacific it was learned that amateurs in Australia picked up messages from this country consistently and clearly. We are eager to know if amateurs east of the Rockies got across. Again it is Radio which gives promise of creating a spirit of fraternity among the hoi polloi of this old globe.

Since the arrival of Radio quite a list of new words has come into common use. Perhaps the newer of these is "Radario." It has been found that in presenting a drama to Radio audiences an entirely new technique is required, in the absence of vision. To encourage the development of Radariotists (a little clumsy, that) prizes are offered by the Writers' Digest for the three best productions. WLW will broadcast these at the close of the contest.

First Steps for Beginners in Radio

Chapter XII—One Tube Reflex Circuits

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 XIII—Multi-Tube Reflex Circuit Operation.
Chapter XIV—Headsets and Loud Talkers.
Chapter XV—Filament Batteries.
Chapter XVI—Plate Batteries.
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 advent of reflex circuits seemed to promise something radically new, but a consideration of their principle of operation will show that there is really nothing new in the phenomena. We have seen from previous chapters that a tube can be used to amplifiy at both Radio and audio frequencies. Since amplification in both cases is accomplished in a similar manner, it should be possible to amplify both frequencies simultaneously, the real problem being to keep the frequencies separate to prevent interaction and a jumble of sounds instead of music.

Luckily this is readily done; the simple reason is that they differ so greatly in their frequency. To handle the two frequencies in the same circuit use is made of two other principles that should be familiar to the reader. The first is that a condenser will permit a high frequency current to flow through it; the other is that a large inductance will choke a high frequency current but permit direct current to flow through. By using these two instruments we can devise a circuit that will handle both Radio and audio frequency currents without interaction.

When only one tube is used we can then have one stage of Radio frequency amplification and one of audio. For detection, use must be made of another tube or a crystal detector. For the reason that a crystal detector gives clearer reception, is cheaper in construction and maintenance and in the fixed types requires no adjustment, crystal detectors are usually employed.

Assembly of Parts on Single Tube Reflex

Let us see, then, how these various instruments may be assembled to use a single tube for both forms of amplification at the same time. Referring to Figure 51 we find a loop aerial with a variable condenser across it to tune to the waves desired. The received currents are fed directly into the tube as in a Radio frequency amplifier, connections being made to the grid and to the filament through the consenser C 1. This condenser will pass the Radio frequency currents without difficulty.

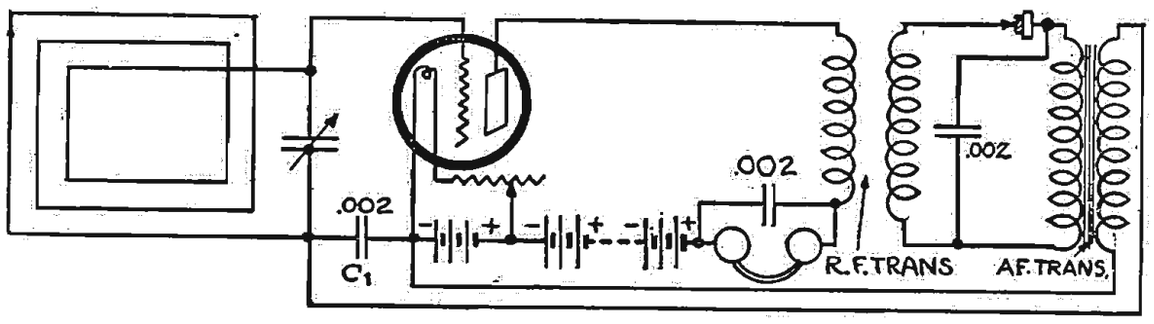


Figure 51—Simplest form of one-tube reflex to show principles of operation

When signals are being received the plate current will be varied in accordance, with a step up in intensily, but still inaudible by reason of their frequency being above audibility. These currents flow through a Radio frequency transformer and the condenser across the phones in the plate circuit. The transformer then induces currents in the circuit containing the detector which is required for detection and rendering the signals audible.

This circuit includes a condenser and audio frequency transformer; according to the operation of the detector, currents at audible frequency will flow into the primary of this transformer. The output of the transformer is now fed back into the grid circuit of the tube by its connection across the condenser in the grid circuit. This condenser will not short the low frequency audible currents; therefore the audible currents are impressed on the grid circuit and again amplified. The audible currents in the plate circuit will not flow through the condenser across the phone; hence the signals are made audible.

Condensers Must Be Mica Dielectric

There are, however, numerous little details that make or mar a circuit of this type. Take, for instance, the condensers. They must be of the mica dielectric type to prevent loss of current or variation in capacity. It has been said that the small condensers used, usually .002 mfd., will not pass audio frequency currents. As a matter of fact the amount of current a condenser will pass depends on the frequency of the current; so some current will flow at audible frequency but not enough to make much difference as far as short circuiting the phones or secondary of the audio frequency transformer. So when a circuit of this type does not function properly it is advisable to try different capacities at these points. The capacity should be such as to pass all the Radio frequency current and little or none of the audio frequency.

Nothing definite can be said about the transformers; some seem to function perfectly and others give little or no results. They should be of the shielded type to prevent feed backs and howling. Often a plate voltage too low will cause reflex sets to work improperly; a high plate voltage should be used to obtain good results. Since hard tubes are used in these circuits exclusively the voltage may be pushed as high as 120 volts without harming the tube. Too much voltage on the plate will be indicated by the tube turning blue.

The very nature of the circuit using as it does a feed back phenomenon for its operation, makes it very prone to self-oscillation. Self-oscillation of the circuit can be prevented to a large extent by adding a potentiometer. This instrument is also valuable in that it serves to bias the grid to a proper amount to put the operating range of the tube on the steepest part of its characteristic curve and thus give the greatest amplification.

Better Way to Bar Oscillation

A better method of preventing oscillations is to add a variable resistance in the plate circuit to stabilize the tube. This resistance should have a range of 500 to 2000 ohms. One of the old type B battery potentiometers serves the purpose nicely, or one can be made using the lead from a medium hard lead pencil for the resistance and arranging a slider to move over the lead and thus vary the resistance. The effect of the resistance is to damp out any oscillations in the circuit, since a circuit will not oscillate when its ohmic resistance is four times as great as its radiation resistance.

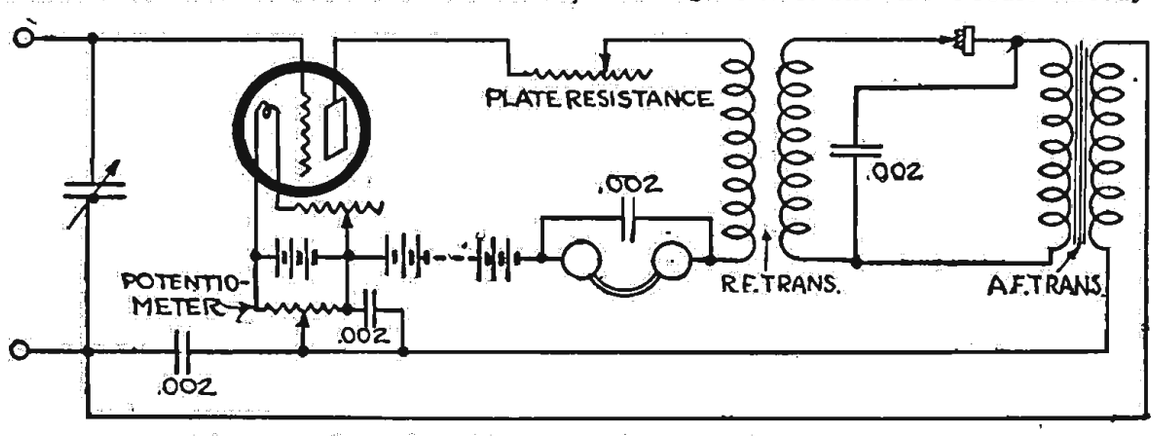


Figure 52—One-tube reflex with refinements for best operation

The detector is likewise important; it is necessary to employ a type of detector that will not burn out with strong signals passing through it. Some form employing iron pyrites will give good results.

In Figure 52 is shown a circuit embodying the refinements mentioned above. It will give very good results when its operation is mastered. A potentiometer is shunted across the A battery to bias the grid, a fixed condenser being connected from the contact arm to the battery terminal to prevent change of tuning when the arm is moved. The resistance is also shown in the plate circuit to prevent oscillations.

Any type of hard tube capable of standing 60 to 80 volts on the plate can be employed in this circuit, but the tubes using 1.5 volts on the filament will not function very well, particularly in reflex circuits containing two or more tubes. This is due to the fact that the plate current in these tubes is limited by their construction; when the tube is required to do double work the maximum signal intensity is not as great as in a hard tube capable of carrying larger plate currents. In single tube reflexes the dry cell tubes give fair results, but where amplification is carried further in two and three tube sets they do not function well.

In beginning to experiment with reflex circuits the experimenter is advised to mount the instruments temporarily in the position they will occupy in the finished set and to test the circuit thoroughly before assembling the set. When good results are obtained the set can then be permanently wired.

It should be remembered that the selectivity of the set depends entirely on the tuning apparatus used with it and the height and length of the aerial. The circuit shown employs a loop aerial because this is the simplest arrangement; good work can be done with this device. It gives freedom from static, and selectivity due both to its small size and the ability to utilize the directional effects of this form of aerial. Where greater range is desired with an outdoor aerial it will be necessary to use a variocoupler to obtain selectivity with condensers in both aerial and secondary circuits to obtain close tuning and selectivity.

Having covered here the principle of the operation of the reflex circuits, the second part will consider the application of the same principle to two and three tube sets.

(TO BE CONTINUED.)

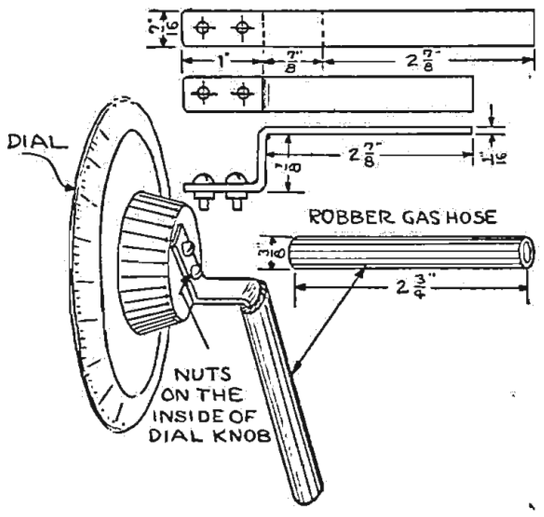
Good Regenerative Set Made Simple

Volume Obtained with a Small Number of Parts

In my opinion, regeneration has only been scratched so far; the ordinary fan who attempts this super-sensitive regenerative hook-up will be surprised by its volume.

The following diagram is self explanatory. I have robbed this of almost everything to make it as simple as possible, yet bring maximum results. Owing to its many fine adjustments, verniers in condensers and rheostats are of very little value. But remember that you cannot tune this super-sensitive set successfully without some non-conductive body capacity effect on your dial. It will begin to squeal before you touch your dial. I am using a little rubber-covered lever or handle, which brings your hand three inches away from your dial and takes the place of the vernier for fine adjustments. It is a pleasure to tune with these.

The lever is mounted on the knob. Drill two 1/8-inch holes in the knob and tap them.



If you have no tap, turn the screws into the holes; they will cut their own threads.

Windings in Variocoupler.

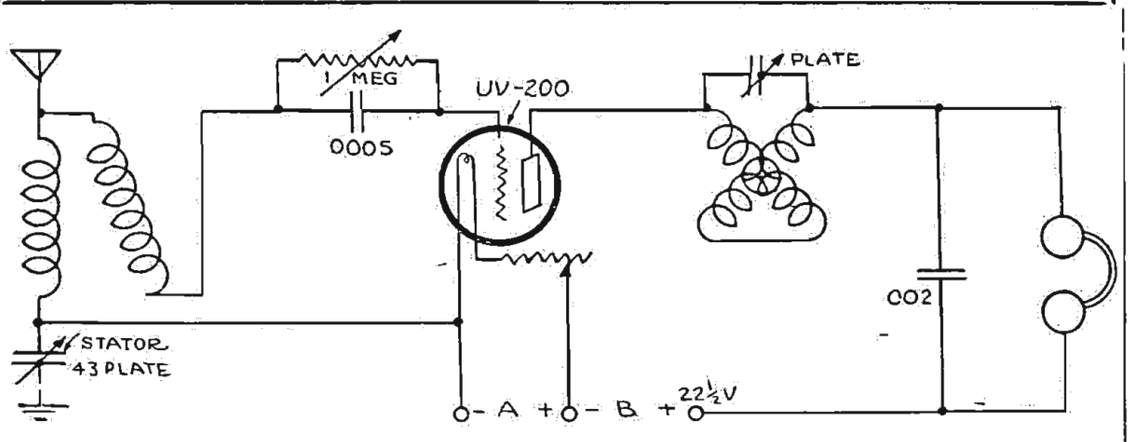
My variocoupler has 42 turns on stator and 40 turns on rotar, but it is my opinion that anywhere up to 100 turns in coupler would work satisfactory. Twenty-three plate condenser should give pretty near the same results as a 43-plate. I am using a variable grid leak; about one megohm is the right capacity. There is nothing critical about its operation. The detector tube can be run with less plate voltage. The variometer should have about a total of 100 turns and should be as closely coupled as possible, so that you can make the fine adjustments.

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

MINIMUM OF PARTS IN HOOK-UP



It is important that your B battery have a full 22½ volts. If it has been used some time, a second B battery should be used, tapping in an additional three or six volts as the case may require. Just a little testing should give you the desired results; just as soon as you get too much you will weaken the signals; in fact, you can kill them with 45 volts.

Positions of Variometer and Variocoupler

Mount your variometer at least four inches from the variocoupler, due to inductive interference; herein lies the strong point in the working of this set for loud signals. And the 3-plate condenser hooked across the variometer brings regeneration out full blast. Connection on these two should be made as short as possible. I don't think it makes any difference as to the way they are connected. The other instruments can be mounted to suit the individual taste.

As there are so many different variocouplers and variometers on the market, I would suggest, even if your signals are fairly strong, to change the leads of the rotar of variocoupler to see if you cannot increase the signals. After you find the loudest connection here, try the same procedure with the stator. Just try this; it may be worth your while.

Manner of Operation

Do not turn your rheostat so that the tube is lighted too bright; about ¼ should be enough, because you can bring it out full blast with the variometer. If it should squeal or snarl, it is an indication that regeneration has been carried too far; just back a little with your variometer; then your signals should be loudest with rotar and stator of variometer in the same position and the plates of the 3-plate condenser all the way in. If the set squeals, move your variometer or 3-plate condenser from these positions. A little practice will bring the desired results. Tuning is accomplished with the 43-plate condenser and rotor of the variocoupler.

One stage of amplification can be added without using any higher plate voltage, but 45 volts must be the limit, tapping in your transformer at 21 volts, as illustrated in my previous hook-up, omitting the 3-plate condenser across primary of transformer. For ordinary purposes you will never require it. I have one stage mounted but very seldom use it.—O. P. Klein, Leduc, Can.

Capacity of Condensers

Considerable improvement in the tuning qualities of a receiving set is obtained by the use of a vernier condenser in the antenna circuit and also in the secondary circuit. The vernier condenser may be of the 23-plate variable type, having a capacity of .0005 mfd., shunted by a 3-plate variable condenser. The movable plates of the antenna series variable condenser should be connected to the ground wire and the stationary plates connected to the tuner so as to reduce the effect of hand or body capacity. Condensers of the movable plate type have the following approximate values of capacity:

Type—	Capacity in Mfd.
43-plate	.001
23-plate	.0005
11-plate	.00025
8-plate (vernier)	.00018

Don't Lose that Sensitive Spot

If the crystal detector is mounted on a piece of felt from ½ to ¾-inch thick, the cat whisker can be kept on sensitive spot with ease. The receiving with a crystal set will also be considerably improved.

Cause of Sound Distortion

Distortion of sounds from a Radio receiving set is sometimes caused when many steps or amplification are used and not sufficient amount of high plate voltage is employed on the last tube or tubes.

Iron Filings in Compound Make Transformer Core

The main objection to the iron core Radio frequency transformer lies in the inability to secure thin enough laminations for the core. Laminations such as are used in the audio frequency transformers have a tendency to "lag" and are therefore inefficient. This may be easily overcome by using soft, fine iron filings for the core.

The filings may be secured from most any machine shop or may be readily made if a grindstone is available. Place them on a sheet of iron, stove lid is suitable, and heat them to as high a degree as possible without melting them together, they are then allowed to cool evenly and naturally. This heating process is to anneal the filings so that they will not become polarized.

To make the core pour these filings into molten battery compound, paraffin, or better yet melt an old wax Edison cylinder phonograph record, stir the filing into the solution until it has taken all it will hold together and still be workable.

The filings are then poured into the form for the core.

The best way is to wind the secondary and primary coils, insulate the windings and leads to prevent possible shorts and grounds from the conductivity of the filings, pour the compound with the filings in it around and in the center of the transformer coils, in this way securing closed core construction.—E. A. Johnstone, Pocatello, Idaho.

A variocoupler should be used when making a crystal set, because this unit can be employed when changing the set to a vacuum tube outfit.

Difficult Tube Characteristics Explained

Part II—Methods of Computing Them

By H. J. Marx

THE preceding article described some of the more unusual and difficult characteristics of vacuum tubes. The next step is to find how these characteristics can be ascertained; later we shall analyze the possibilities of vacuum tubes by means of their characteristics. The UV-201 A tube will be used throughout in illustrating how the work is done. Later, the same characteristics will be worked out for other tubes and presented for comparison.

Amplification Constant

It has been said that the amplification constant is the maximum voltage amplification obtainable from a tube. Its value is determined by means of the grid and plate voltages. It expresses the ratio of a change of grid potential to a change in plate potential when the change in plate current is the same.

There are two ways of increasing the plate current flow outside of the filament control; one is to increase the plate battery voltage; the other is to increase the grid potential by making it more positive. Of these, the latter is the more important. Volume in reception is dependent on the amplitude of the pulsations in the plate current. In other words, the smaller the grid potential variation required for a given change in plate current, the more efficient will be the tube.

How to Derive Amplification Constant

In deriving the amplification constant, a given value of plate current is assumed; then taking a given reduction in plate voltage, the grid voltage increase necessary to bring the plate current back to its former value is ascertained. This plate voltage difference divided by the grid voltage increase gives us the amplification constant.

Expressed in a formula we have:

$$\mu = \frac{E'p - Ep}{Eg - E'g}$$

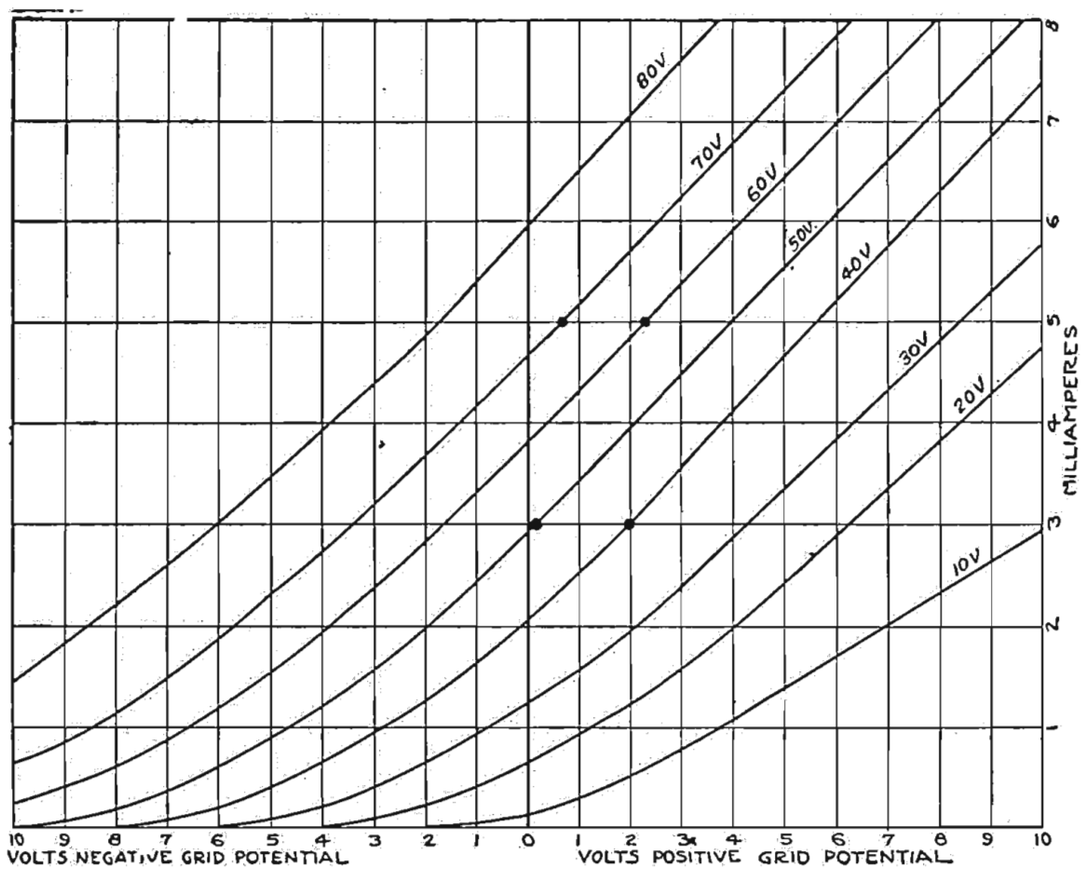


Figure 1

Let the plate current values be taken as 3 milliamperes; then at a plate voltage of 50 the grid potential is .25 volts positive. Then if the plate voltage is reduced to 40, the grid potential must be increased to 2 volts positive in order to get the plate value back to 3 milliamperes. Substituting these values in the formula we get:

$$\mu = \frac{50 - 40}{2 - .25}$$

or $\mu = 5.7$

Repeating this procedure at a plate current of 5 milliamperes, at 70 volts plate potential the grid is .75 volts positive; when the plate potential is reduced to 60 the grid must be increased to 2.4 positive to keep the plate current at 5. Substituting these values in the formula we get:

$$\mu = \frac{70 - 60}{2.4 - .7}$$

$\mu = 5.8$

The amplification constant does not remain in a fixed value, as will be noticed. The value decreases somewhat at lower voltages. It is sometimes given in the form of a curve with its values plotted for variations in plate voltages. Due to inaccuracy of readings and outside factors in the circuit these values may have a possible 5 per cent error, but will be found sufficiently accurate for the purpose the amateur requires of it.

As to Plate Resistance

Making use of Ohms law, the direct current resistance of the plate circuit is equal to the plate voltage divided by the plate current. The alternating current resistance, however, depends on the slope of the curves; since the curves are not straight lines, it is not the same as the direct current resistance.

If the readings are taken at a zero grid potential the alternating plate current resistance equals $\frac{Ep}{2\,Ip}$ where Ip is the plate current in amperes. This will give a fair estimate of the plate resistance value. For convenience the values of the plate resistance are calculated on this basis at the zero grid potential and the plate resistance curve shown in Figure 2 is drawn. Then the resistance value at any specified plate voltage and grid potential other than zero can be found by applying the following formula:

$$E'p = Ep + \mu\, Eg$$

This formula gives the effective plate voltage; this value is used in reading off the proper resistance in the curve of Figure 2.

For example, let it be assumed that the plate resistance at 60 volts plate and 4 volts negative grid potential are desired, then

$$E'p = 60 + (5.8 \times [-4]) = 60 - 23.2$$

$E'p = 36.8$ volts.

Therefore, reading from Figure 2:

Pr=10,400 ohms

The negative value of the grid potential changes the plus sign to subtraction.

(TO BE CONTINUED)

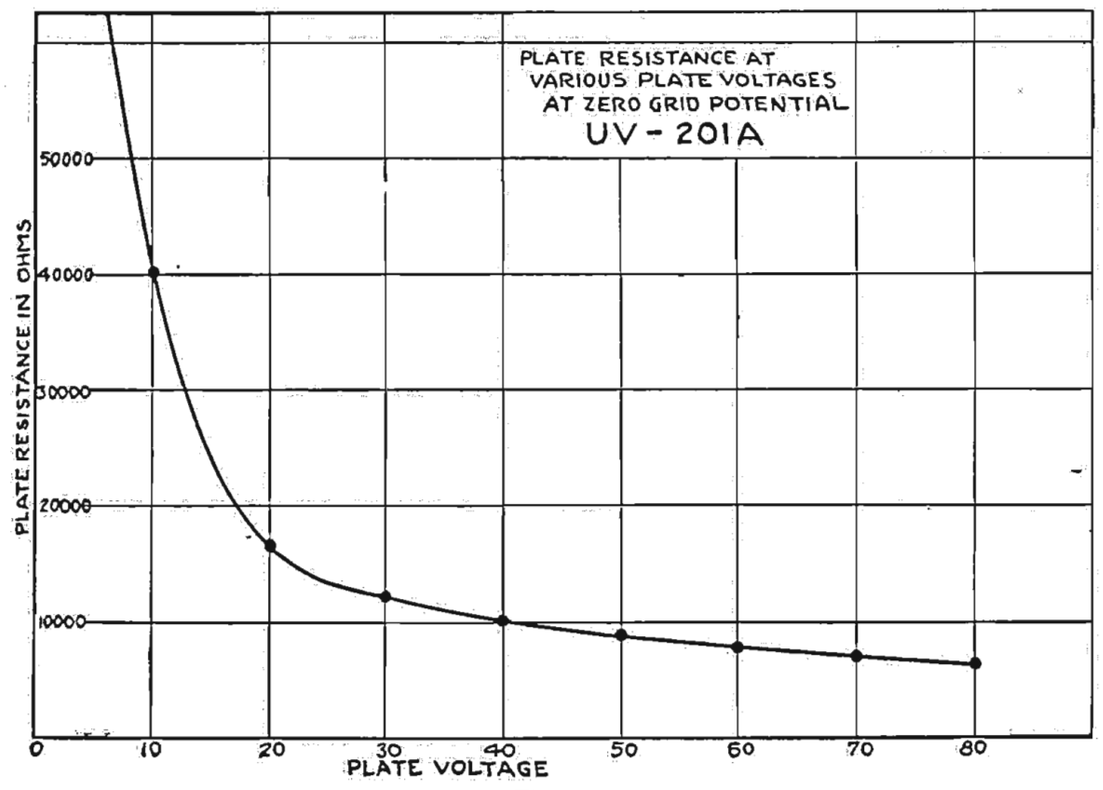


Figure 2

where Ep=plate voltage and Eg=grid voltage.

Figure 1 is a chart showing the plate current and grid potential values with plate voltages in steps of 10 running from 10 to 80. These curves were taken on a typical 201-A tube in the manner described in the June 21 issue of Radio Digest.

Distance of Set from Aerial

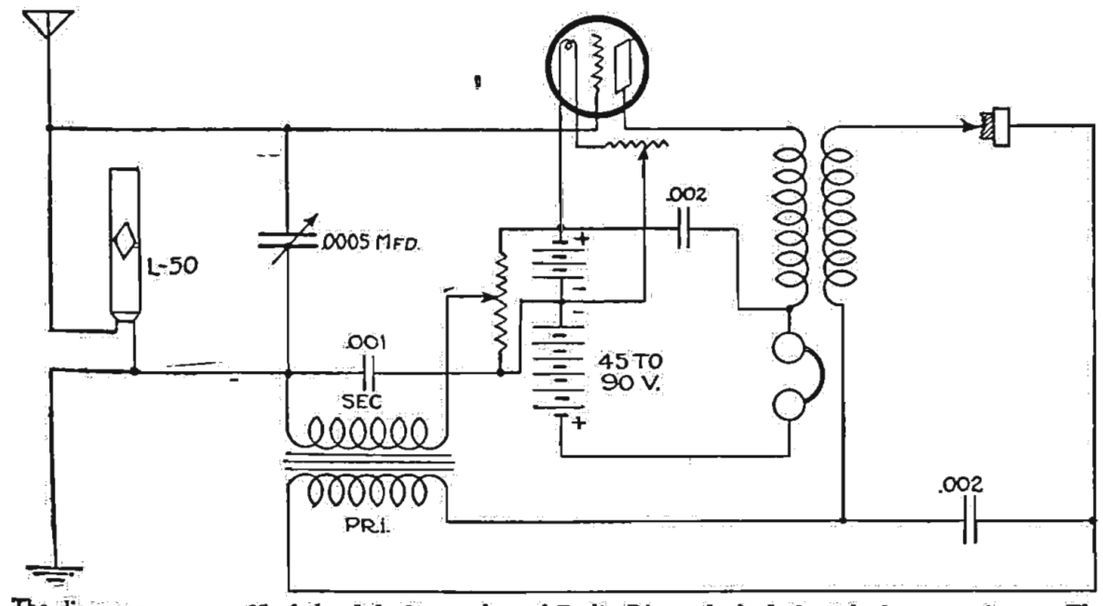
The lower a Radio set is placed with respect to the aerial, the better the results obtained. For example, with the aerial 40 feet off the earth, the best results are obtained with the apparatus on the street floor instead of in the attic.

Position of Transformers

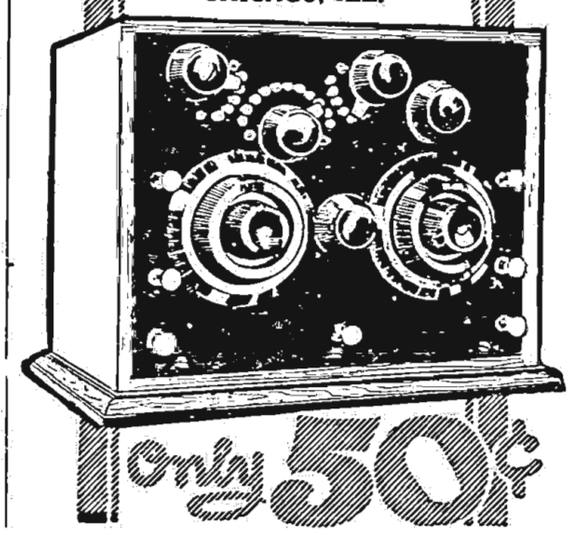
If there is a continual singing noise when the amplifiers are used it is caused by the tubes or amplifying transformers being too close together. If available space is limited, place the transformers at right angles. It is not advisable to use more than two stages of audio frequency amplification.

A variometer has two coils connected in series, while a variocoupler has two coils independent of each other.

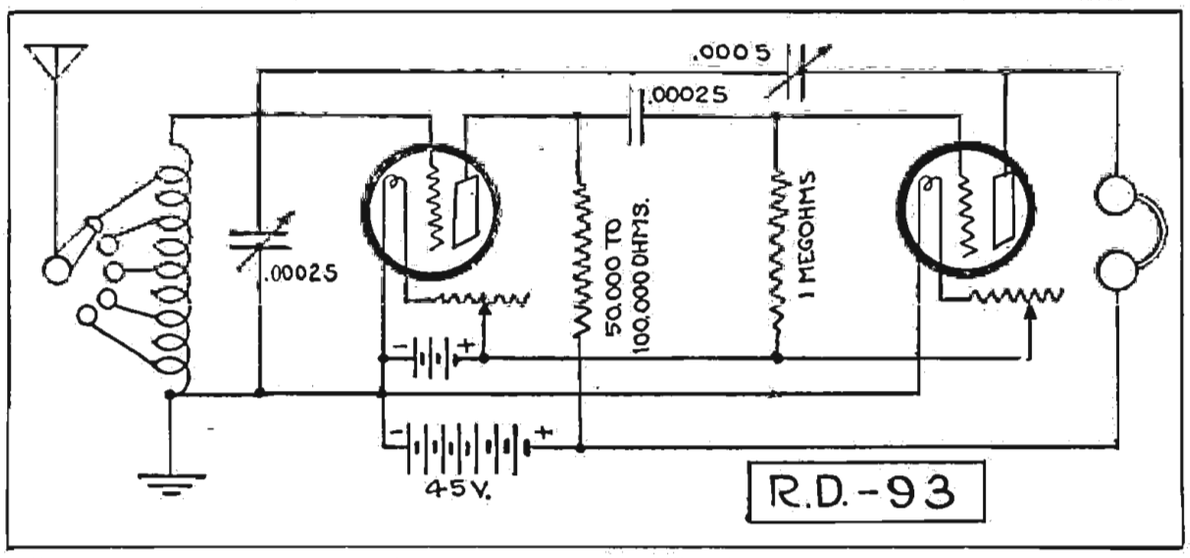
TELEPHONE RECEIVERS OMITTED



The diagram on page 13 of the July 21 number of Radio Digest lacked the telephone receivers. The illustration is repeated showing the proper location of the phones in the circuit.



AN ENGLISH REGENERATIVE HOOK-UP



IN the hook-up shown a single stage of resistance coupled Radio frequency amplification is used with a regenerative detector stage. A capacity controlled feed back between the detector plate and the initial secondary circuit is used. Both tubes are amplifiers and require 45 volts in the plate battery. The tuning unit is a tapped inductance covering a wavelength range, in conjunction with a .00025 mfd. variable condenser of 180 to 600 meters.

The resistance unit will vary from 50,000 to 100,000 ohms, depending on the type of tubes used. The grid leak should have a value of one megohm, used with a .00025 mfd. grid condenser. The capacity feed back is controlled by means of a .0005 mfd. variable condenser.

Attention should be paid to the method used in connecting leads to the condensers to minimize body capacity effects. The side of the variable condenser with the heavy dot indicates the rotating plates terminal.

The rheostat and A battery are dependent on the type of tubes used.

Audio frequency amplification can be added in the usual manner if more volume is desired. This circuit is well adapted for long distance reception.

Cabinet Wood Finishing

Enclosing Fine Receiving Apparatus

By W. S. Standiford

LARGE numbers of Radio amateurs throughout the United States and Canada are constructing their own Radiophone sets to "listen-in" to broadcast music, etc., many of their outfits being very good working ones when used a few times, until the spaces between the leaves of their variable condensers and jacks clog with dust, then trouble occurs. In order to make their apparatus give the least amount of trouble, manufacturers of Radio sets enclose them in a wooden cabinet, which not only adds to their appearance, but efficiency in working.

In sharp contrast to this, many amateurs do not enclose their outfits in a case, but try to keep the dust away from the delicate parts by frequent cleaning, a process that not only wastes time, but is liable to press some wires too close together and out of shape, thus making other difficulties such as buzzing sounds during operation. As a general rule, most Radio novices can make neat looking cabinets but fall down in their finishing work, which is very crudely done and mars the appearance of the completed article. As this is due, in most cases, to a lack of knowledge of the processes and materials needed to do a good job of varnishing and polishing, rather than to any carelessness, there is no doubt but that the information given in this article will supply "a long-felt want" of Radio contractors.

Varnish for Finishing

Varnish is used as a base for many finishes, whether it is used for automobiles, furniture or Radio outfits. When learned, this work is very easy to do, but certain precautions have to be taken if a satisfactory and fine looking job is desired. It is of the utmost importance to have a clean, smooth surface in order to get a first-class finish. At the outset, it cannot be emphasized too strongly that a smooth exterior is necessary whether the wood is to be painted, enameled, oil-finished in natural woods or varnished.

The first thing to do is to decide upon what kind of wood the box is to be made of; whether it is open or close-grained and also if it contains any sap, as such conditions will cause different methods of working to be adopted. This is a matter of the utmost importance and should be locked into before proceeding with the finishing work. In order that the amateur finisher may not go astray, a list of open and close-grained woods are appended; the handling of each kind being described later on.

Kinds of Wood

The open grained woods are oak, ash, chestnut, walnut, mahogany and butternut. These woods require fillers. The close grained woods are pine, cherry, maple, birch, cypress, whitewood, poplar, sycamore, beech and redwood. These and others like them do not need fillers, but can be finished in natural colors, or stained as preferred. Five operations in wood finishing are needed, although, in the case of close-grained woods the filling process can be omitted. For varnished cabinets sandpapering, staining, filling, varnishing and the final polishing comprise the list. Directions for each process will be given in rotation as the work progresses.

Preparing the Surface

Plane the wood as smooth as possible, then tack a piece of 00 sandpaper on a smooth block and rub with the grain, using moderate pressure and taking care when working near the edges, not to round them. Wipe all dust from the surface with a cloth so none will remain to make rough spots.

Staining comes next, if pine or poplar are used to imitate the appearance of the more costly woods. By using the former, Radio set containers can be made that will look as if an expensive natural colored wood was used. In wood finishing much trouble in working will be avoided by the purchase of the best stains obtainable. There are two kinds of stains on the market, oil and water, each having their good points. Oil stains are those in which the coloring pigments are dissolved in linseed oil or turpentine, water being the solvent for the other. As pine wood, in some cases, has more or less sap, this wood after coloring with an oil or water stain, when the latter is dry, should have two coats of white shellac varnish put on, and each coat after drying is to be lightly sandpapered to smooth its grain down.

This shellac effectually keeps any sap from discoloring the finish. Varnishing, rubbing down and polishing are the things to do in order named. The best way to use water or oil stains is to apply it with a brush and then rub it into the wood with a piece of cheesecloth. This distributes the color evenly and absorbs surplus moisture which in the case of water stains is apt to raise the grain of the wood, thus making more sandpapering necessary, and also makes a more uniform color tone. If the first application does not give as deep a color as desired, give it another one. If the amateur desires to use an open grain wood such as mahogany or walnut, using stains to make them deeper in color, the pores will have to be filled after staining; otherwise, staining can be omitted, but not filling, which is necessary. Supposing that such a wood has been stained, get a paste filler of a color to match the stain as nearly as possible; put some of the filler on a piece of cloth and rub it on the wood. As soon as this filler has dried a little (don't let it get hard, continue to rub the surface until all pores are filled up, rubbing off any surplus, the main idea being to have nothing but the pores contain filler.

Applying the Varnish

After it is dry and smooth, give it a coat of white shellac varnish, which should be rather thin. If it is thick dilute with alcohol. All surplus varnish must be wiped off the brush before applying to the surface; for if too thick a coating is applied it will not be clear and will allow the stain to show. The first coat of shellac should dry in about three hours, after which put on another coat. Rub the dried surface with the finest grained sandpaper until the wood is smooth. Don't rub too hard or the shellac varnish will be cut through. Varnishing comes next. Good brushes should be used. Cheap ones will not give good results as the bristles coming out will cause trouble. The varnish must not be too cold as this prevents it from flowing freely. Have enough varnish on the brush to just give a level coating when it is brushed across the grain. Finish off by rubbing lightly with the grain, letting it dry 30 hours or until hard.

Hand Rubbed Finish

Purchase some FF grade of pumice stone at a paint store, some linseed oil and a rubbing felt. Dip the latter into the oil, thence in pumice stone which will now adhere to the felt. Rub your varnished surface lightly along the grain and continue this process until all small depressions have disappeared. This may be observed by looking diagonally over the wood's surface when it is held to the light. All hollow places will now show as dark spots. The surplus pumice stone is to be removed with a soft dry cloth. Give it another coating of varnish and repeat the operation with the pumice stone. The cabinet will now have a "dead" non-glossy finish.

Those who prefer a shining polish can easily obtain it by dipping a piece of felt into linseed oil and powdered rotten stone and going over the surface in the same manner as with the pumice stone. A higher polish can be obtained on the last coat by giving the rotten stone treatment and then rubbing the hard varnish with a soft cloth dipped into linseed oil, using plenty of pressure until a high polish is obtained. The surplus oil ought to be wiped off with a chamois skin. The foregoing gives a durable finish, one that will not scar easily.

If all the work has been done carefully, the Radio will have neat looking cabinets that will compare well with the purchased article. The work will also look good to his friends who do not understand polishing work. Varnished and polished woodwork of all descriptions should not have any strong soap powders applied for cleaning purposes to remove finger marks as it will turn white in spots. Use nothing but a good furniture polish which will clean it very nicely and restore its finish at the same time.

Filament Aids Regeneration

Owners of ultra audion sets who obtain long distance results are always those who pay attention to the lighting of the tube. It is characteristic of this kind of set that it will regenerate with the filament at almost any brilliancy, but its maximum efficiency ocours only when the grid leak and rheostat are set at one particular point. With many tubes the feed back is at its maximum without howl or distortion when the filament is barely heated. A vernier rheostat is necessary for control of regeneration.

To Prevent Scraping Dials

The scraping of dials on the panel of a Radio set can be corrected by placing a thin piece of felt on the back of the dials. They will then work smoothly, without noise.—Susan Haymes, Fort Worth, Texas.

Questions and Answers

Antenna and Ground

(4019) WES, Manchester, N. H.

I would like to ask the following questions:

How would an acrial work about 140 feet almost entirely over water; how high would it have to be above the water?

Could a lake be used for a ground; what is the best method?

I am situated in a valley; the side of the hill near me is quite densely wooded. Up to a few days ago I could receive almost anything desired, but last evening I could get nothing but WGY and that not exceptionally good. Would the leafing of the trees have this effect, or would you say that it was something in the set? I have gone over it very carefully and found nothing wrong.

A.—The antenna construction as described would undoubtedly afford high efficiency.

To effect a ground, as suggested, the best method would be to solder a wire to an ash can or large piece of galvanized iron and dump it into the lake.

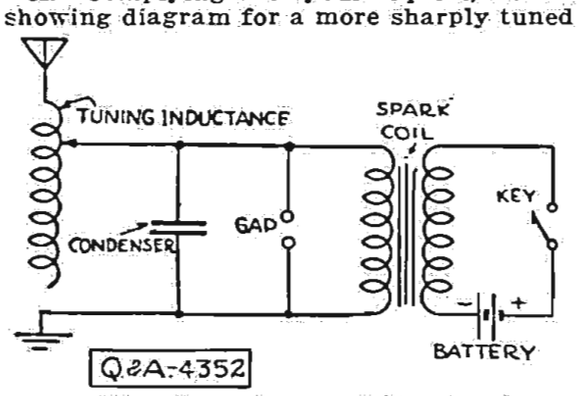
Your described location is not ideal, theoretically, for best reception; undoubtedly the foliage of the trees acts as a deterrent. Every little leaf and fiber in the tree will act as a miniature wireless sponge; after they are through soaking the signal there will not be much left for your set to acknowledge. Have antenna as far removed as possible from this interference.

Sharply Tuned Transmitter

(4352) WJW, Middletown, Ind.

Please publish a hook-up of a spark coil transmitter not using the "plain aerial," connecting the ground to one side of the gap and the aerial to the other.

A.—Complying with your request, we are showing diagram for a more sharply tuned



transmitter than the usual direct antenna excitation method affords. The inductance may consist of thirty turns of number twelve wire wound on an oatmeal box and tapped at every turn.

Variocoupler Windings

(4044)CS, Wymore, Nebr.

I am a subscriber to your paper. I just received the June 2 issue; in looking over the Question and Answer department I noticed (No. 2298) JB., Minnesota City, Minn.

He wants to wind a coupler for wave lengths 180 to 550 meters, and asks how many turns of wire to use. Your answer is 50 turns on primary and 36 on secondary.

I have been using a coupler with 60 turns on the primary, 39 on the secondary. The secondary is tuned with a variometer; I can't get more than 425 meters to save my life.

Why misinform your anxious inquirers? If you can't give authentic advice, it would be better not to give any.

If this is your policy, when my subscription runs out I shall get the latest (?) Radio dope elsewhere.

I notice Flewelling's variocoupler is wound with 130 turns on primary and 100 to 125 turns on secondary to use as a single circuit. What do you say?

A.—We have carefully noted the contents of your letter, and regret your animus in what you are inclined to believe is unreliable advice to the readers of the Radio Digest.

We are placing ourselves on record as open at all times to constuctive criticism; we are at no time assuming infallibility, although we pride ourselves on the personal, interested and generally admitted superior service rendered.

In the matter under discussion we take pleasure in giving to you a detailed explanation of varying conditions that are taken into consideration in answering a specific inquiry.

Referring to Question and Answer 2298, quoted: the answer given is correct. The inquiry specified "180 to 550 meters" wave length. It would of course be impossible to tune the secondary circuit to 180 meters if more than 36 turns were used, without the employment of a series condenser which would impair the effectiveness of the circuit to an impracticable, if not prohibitive degree. It is readily seen that it would not be feasible to use more turns on the secondary and to take a tap for extremely low wave lengths. If a variometer with a sufficient number of turns is employed the circuit will accomplish 550 meters. If the construction of the variometer does not permit this, a loading inductance may be inserted simply without impairing efficiency. It can be accomplished by using fewer turns on the secondary and building a wave length range up with loading coils. It is seen that the tuning will be much sharper than if wave length were accomplished wholly by the number of turns on the secondary coil. It is highly advisable not to use too many turns on the secondary.

In the matter of a primary circuit: tuning in any case is very broad and is governed by the length of the antenna; thus the number of turns is not extremely important. Fifty-six should suffice for present wave lengths.

As to your citation of variocoupler used in Flewelling circuit, we are reminding you that the rotor is used as a tickler coil and not as a secondary tuning unit. This coil is of special construction, designed by the author to balance and perfect a very critical circuit.

Reflex De Luxe

(3920) OLH, Scammon, Kans.

I have built the three-tube "Reflex De Luxe" receiver according to the diagram in the May 5 Radio Digest. I did not use the panel layout, for I built mine to fit in a victrola and used a panel 11½x13 inches in a vertical position, intending to place the loop on top of the cabinet, making a small felt-covered base with a single circuit jack in it to receive the plug direct on the end of the loop, then taking leads with the 4-foot flexible insulated wire from the jack, attaching another phone plug to the end of the line to the plug-in on front of the vertical panel. I followed the diagram exactly, excepting that I probably used different makes of transformers and other apparatus. I have had good success with the receiver on the three tubes, that is, using all three stages, but when I plug-in on the second stage I get nothing but loud, howling noises. I am going to tell you about the apparatus I used; maybe you can help me overcome this trouble. I used 2 Erla No. 1 reflex R. F. transformers and 3 Chelsea, all alike, A. F. transformers, 1 Bradleyometer, 400 ohm, 1 ordinary wire rheostat to control the last tube that carries audio only, and an Acmestat No. 251 to control the first two tubes that carry both audio and Radio current, 1 Work Rite variocoupler, 1 23-plate plain condenser in the primary and 1 23-plate vernier condenser in the secondary and loop circuit.

I used Schwindler "Built Up" mica, copper fixed condensers, .0015 and 4 .002 and 2 Freshman .006 condensers, 1 Freshman variable grid leak, from which I removed the grid condenser, resealing it, using the grid leak only. This leak seems rather critical as to adjustment. One Grewol fixed crystal detector I mounted to the outside of the panel. My wiring is insulated throughout except where I cut through the insulation to solder on leads. The panel is shielded. My instruments are mounted partly on a baseboard, that is, the tubes and transformers and fixed condensers; the other parts are mounted on a ¾-inch celeron panel. I use 2 Cunlngham C-301 in the first two sockets and 1 Radiotron 201-A tube in the last or third audio stage. By using all three tubes I get good results, having heard Chicago, Kansas City, Minneapolis, Atlanta, Dallas, Texas, and other stations. It also operates as a single circuit. But so far I have had no results except howling on the first two tubes when plugged-in on them. I have considered the reversing of the leads on the transformers. I would be pleased to hear from you and to receive any suggestions you might give me to overcome this difficulty.

A.—We have noted carefully your specifications and difficulties encountered in the operation of the reflex circuit as shown in the Radio Digest of May 5.

We are citing factors that may be acting as a deterrent to the full possibilities to be expected: It is suggested that the condenser across the second audio frequency transformer may be open or in some other way defective; the jack may not be making a good contact; some discrepancy in wire may have occurred or the trouble may be due to a defect in the transformer, which condition is not without precedent.

With these suggestions and the assurance of the excellence of the properly constructed reflex circuit under discussion, we are confident that you will be able to overcome the limitations experienced.

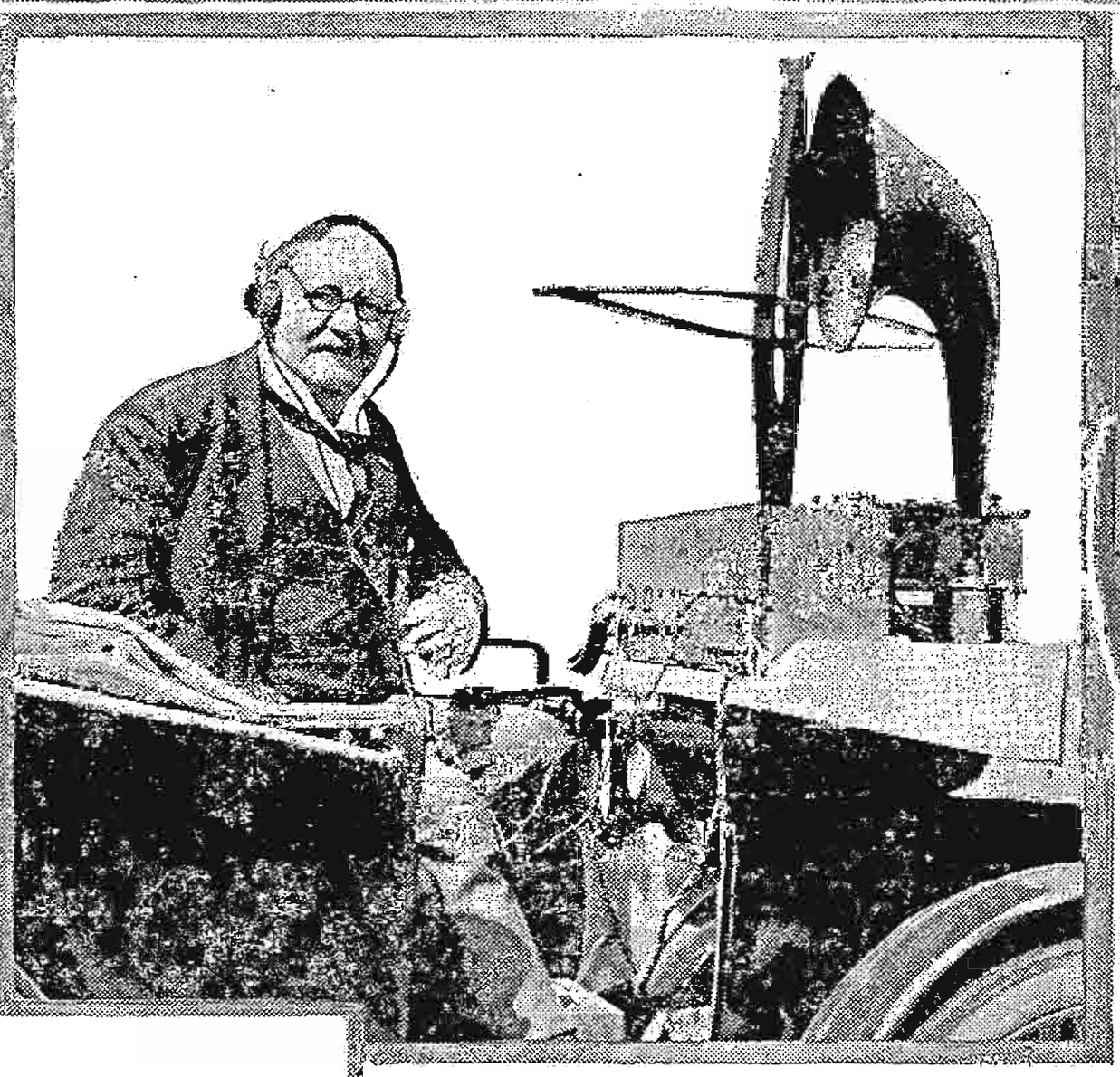
The apparatus you have indicated should be effective.

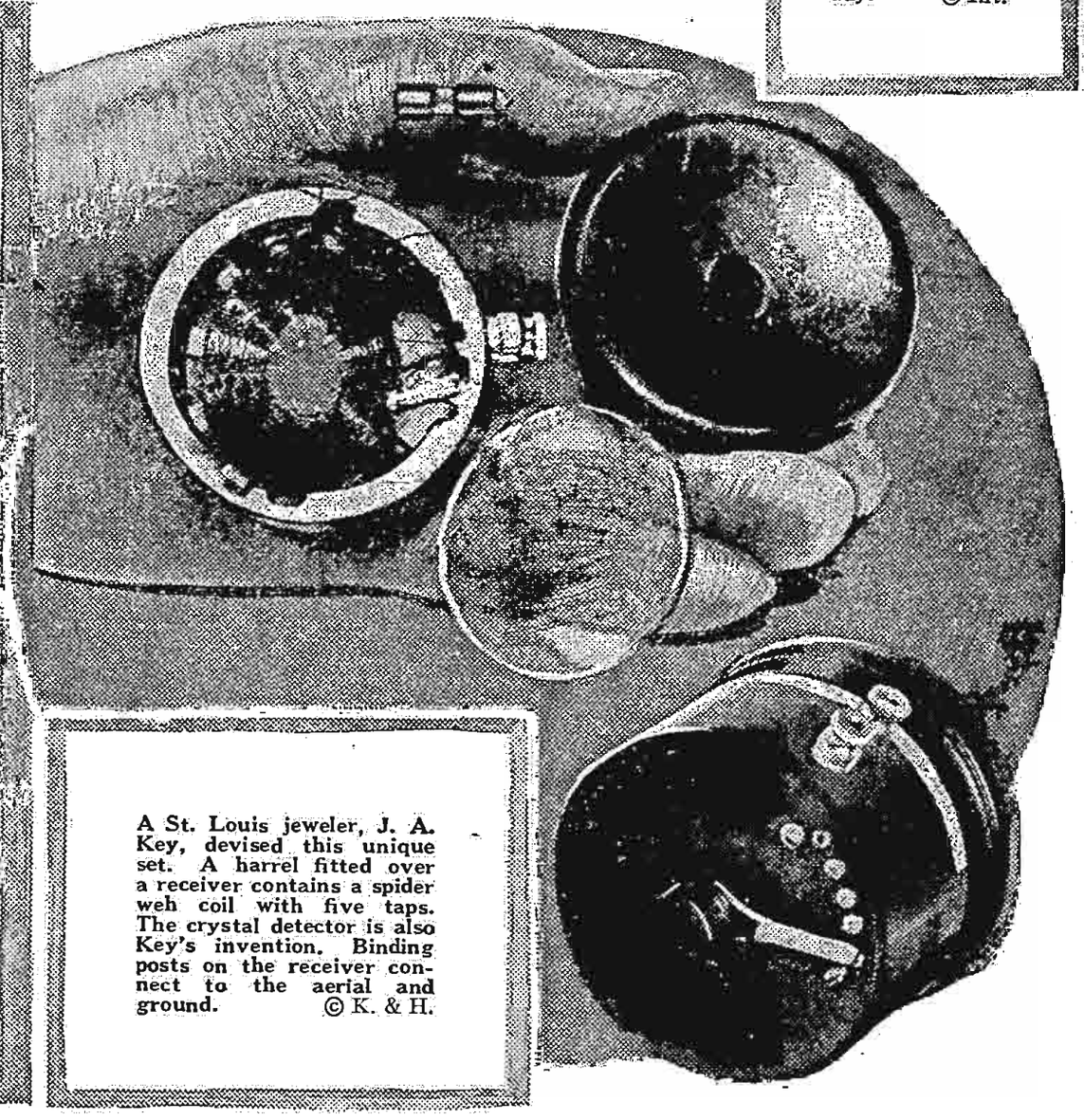
The Question and Answer Department is purely a service department and the publishers would like to have your assistance in helping to keep it up to the highest standard, therefore when asking questions please make out your query on a separate piece of paper and written on one side only. Do not mix your questions with other material, write that on a separate piece of paper. Each one must go to a different department. Then, too, we have so many who fail to put their name and address on each sheet. Please remember this when you write your letters, and also to enclose a stamped self-addressed envelope. Unsigned letters are not answered. The Radio Digest does not consider it good business ethics to furnish hook-up diagrams of any standard manufacturer's receiving sets.

It is estimated that the sun's rays absorb 70 per cent of the strength from Radio waves.

Radio Illustrated

The original Radio hounds, Caesar, a Newfoundland, five feet high, and Buddy, a Boston hull, helonging to J. J. Klibert of Burbank, Calif. They just love their wave lengths and listen in all day. © Int.





A St. Louis jeweler, J. A. Key, devised this unique set. A harrel fitted over a receiver contains a spider web coil with five taps. The crystal detector is also Key's invention. Binding posts on the receiver connect to the aerial and ground. © K. & H.

Col. Edward R. Green in his electric automobile equipped with a seven tube receiving set and loop aerial for detecting the location of amateurs when they interfere. Col. Green is the son of the late Hetty Green, noted for her great wealth. © Int.

Guess who the two couple are? Most any names would do considering the popularity of outdoor Radio. The scene at the left is found at many rivers and lakes at this time of the year. © K. & H.