

Radio Digest

EVERY WEEK **Illustrated** TEN CENTS

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

Vol. VI Copyright, 1923 R. D. P. Co. Inc. SATURDAY, AUGUST 11, 1923 No. 5

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 .0025 mfd. Build-up Mica Condenser; 1 Schindler .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; Walnut Standard Tube Socket; Walnut UV-199 Socket; Ray-O-Vac Dry Battery, 1 1/2 volts; Dubilier Micadons Type 601 (.0001, .00025, .0005, .001, .002, .0025, .003 or .004 mfd.); Premier Grid 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); Amisco 3-inch Dial; Amisco 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, Three 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 Grid 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 DPST Knife Switch; 1 Martin-Copeland DPST Knife Switch; Walnut Variable Grid Leak; Walnut Inductance Switch; Dubilier Micadons Type 600 (.0001, .00025, .0005, .001, .002, .0025, .003, .004, or .005 mfd.); Dubilier Micadons Type 610 (.001, .002, .0025, .003, .004, or .005 mfd.); Dubilier Micadons Type 601 (.005 mfd.); Dubilier By-Laws Condenser (.1, .25, or 5 mfd.); Premier Universal Tube Socket; Premier Radio Dial (3/16, 1/4, 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.); Amisco 6-Ohm Rheostat; Freshman Fix-O Grid Leak and Condenser; Freshman Variable Resistance Leak (with or without condenser); Freshman Micon Condensers (.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 "Tui-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; Walnut Variable Grid Leak with .00025 mfd. Condenser; Walnut Variable Condenser (3-plate .00006 mfd.); Ray-O-Vac Dry Battery, 2 cells 1 1/2 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; Amisco Multiple Point Inductance Switch; Amisco 20-Ohm Rheostat; Amisco 50-Ohm Rheostat; Freshman Antenna; 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 consecutively numbered 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 Switch; Walnut Variable Condenser (5-Plate .0001 mfd.); Ray-O-Vac No. 4151 B Battery, 2 1/2 volts; Ray-O-Vac Dry Battery, 3 cells 4 1/2 volts; Electrad Variom, with mica condenser; Dubilier By-Pass Condenser (2 mfd.); CRL Variable Grid Leak with Condenser; Resistorometer (Type A or 2A); Thordarson Variable Condenser, .00025 mfd.; Amisco 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 coupons 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; Walnut Variable Condenser (13-Plate .00025 mfd.); Ray-O-Vac Dry Battery, 4 cells 1 1/2 volts; Dubilier Variodion (.0004 or .0005 mfd.); Resistorometer (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);

Walnut Variable Condenser (23-Plate .0005 mfd.); Ray-O-Vac No. 2151 B Battery, 2 1/2 volts; Dubilier By-Pass Condenser (3 mfd.); Premier Variable Condenser without dial (.00039 mfd.); Thordarson Variable Condenser, .001 mfd.; Amisco Compensating Grid Condenser; Freshman Micon Condenser, .025 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 Antenna Capacity Switch; 1 Demcal Variable Condenser 11-Plate Walnut Variable Condenser (43-Plate .001 mfd.); Dubilier Variodion (.001 mfd.); Dubilier By-Pass Condenser (4 mfd.); Premier Variable Condenser with dial (.00078 mfd.); Premier Heghog A. F. Transformer, 4 to 1 Ratio; Thordarson A. F. Transformer, 3.5 to 1 Ratio; Thordarson Variable Condenser, with vernier, knob and dial (.0005 mfd.); Thordarson Variable Condenser, with vernier, knob and dial (.00025 mfd.); Ritter Grand Crystal Set; Amisco Double H. Coil Mounting; 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); Walnut Variable Condenser (13-Plate vernier); Walnut Variable Condenser (23-Plate vernier); Ray-O-Vac No. 2301 "B" Battery 4 1/2 volts; Ray-O-Vac Dry Battery, 6 cells 1 1/2 volts; Dubilier Duratron (R. F. transformer); Premier Micrometer Variocoupler with dial; Premier Variable Condenser with dial (.0015 mfd.); Premier Variable Condenser with vernier (.0004 mfd.); Premier Heghog 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; Tully Loud Speaker, 15-inch, white; Teleradio Vernier Condenser 23-plate; Teleradio 2,000-Ohm Head Set; Na-Ald Tuned R. F. Transformer, one 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.

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 Donnelly 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 Radiophon 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 re-grade 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.

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.

"All the Live News of Radio".....1 to 9
 Mae Marsh Tells of Movies.....3
 Flewelling Answers to Queries.....4
 Leviathan King of Ocean Radio; An Evening at Home with the Listener In.....5
 The Week's Advance Broadcast Programs.....7
 Radiophone Broadcasting Station Directory, Part IV—State, City—Station Index; Picture Hook-up; Reviews of Books; The Reader's View.....8
 Editorials; Indi-Gest; Condensed by Dielectric.....10
 First Steps for Beginners in Radio, Chapter XII—One-Tube Reflex Circuits, by Thomas W. Benson.....11
 Good Regenerative Set Made Simple; Other Workshop Kinks.....12
 Difficult Tube Characteristics Explained, Part II—Methods of Computing Them, by H. J. Marx.....13
 Cabinet Wood Finishing, by W. S. Standiford; An English Regenerative Hook-up, R.D.-93.....14
 Questions and Answers.....15
 Radio Illustrated, a Page of Pictures.....16

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 neutrodyne 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.

Have a Copy with You on Your Vacation WHEN YOU WANT

Radio Digest

YOU WANT IT! BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

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

Please find enclosed check M. O. for Five Dollars (Six, Foreign) for One Year's Subscription to Radio Digest, Illustrated.

Name.....

Address.....

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

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 teepees 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 produced 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' experience, has accepted the position of chief operator of the University of Wisconsin station, WHA, and instructor in Radio with the physics department.

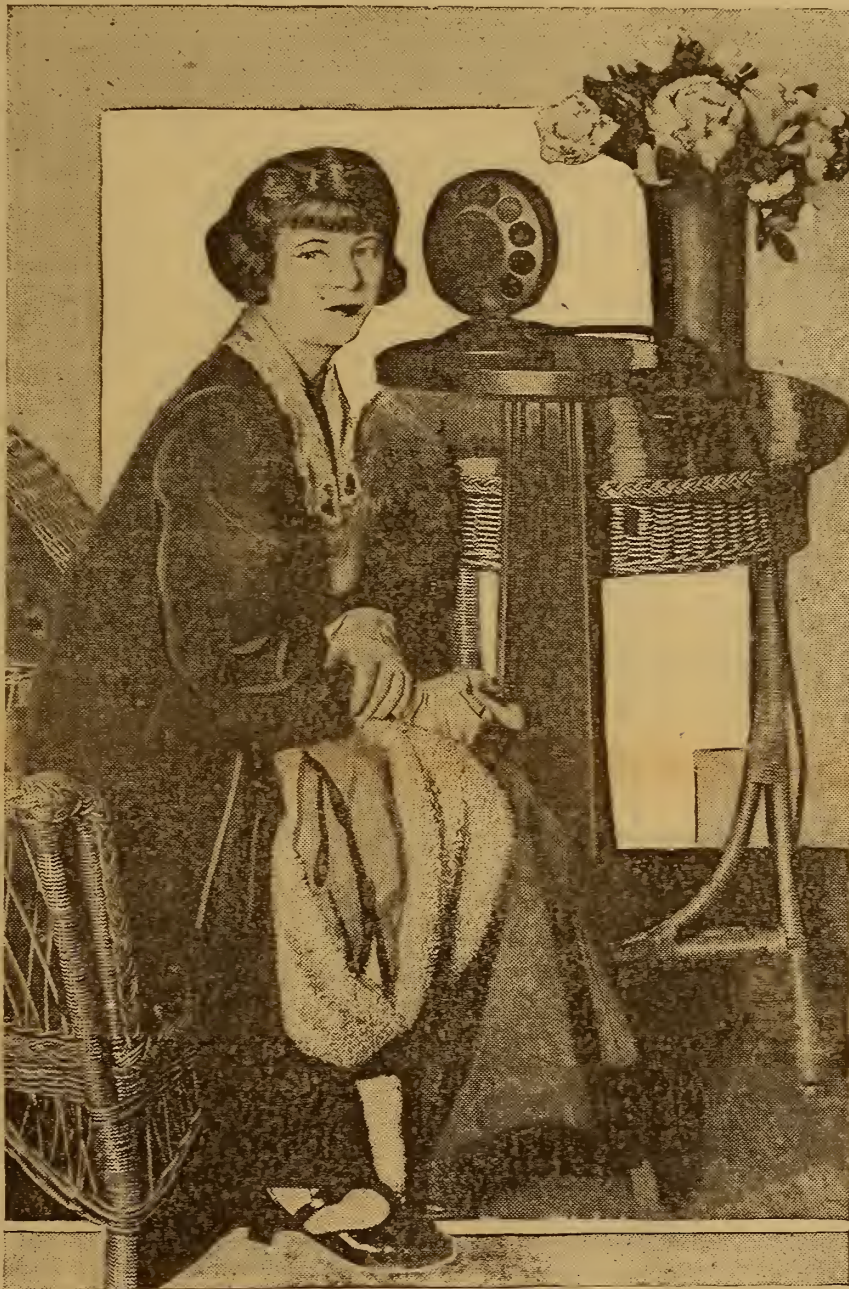
ALABAMANS TAKE UP RADIO FOR MARKETS

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.

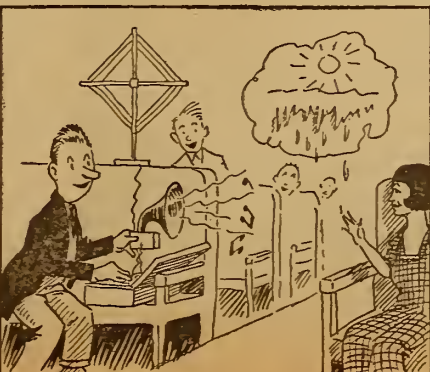
Officials of the motor club took this matter up with the division of customs of the U. S. Treasury Department and with the Department of Customs and Excises of the Canadian government and as a result automobile reciprocity was extended to cover Radio equipment when attached to a car.

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 Societe 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 Societe 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 Societe, 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.

WE REPAIR YOUR VACUUM TUBES

WD-11, WD-12, UV-199, UV-201-A, C-301-A, UV-200, C-300, AP Detectors, UV-201, C-301, AP Amplifiers, DV-6, DV-6-A, UV-202

And Guarantee Them Equal to New
QUICK SERVICE Include with your order remittance to cover repair plus parcel postage for one pound per tube.

Abalene Radio 14 Vesey Street New York, N.Y.

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 variocoupler 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.

Power Amplifying Transformers

We can furnish tapped wound transformers in sets of two for experimental amplifiers. These transformers can be used on second and third stages without distortion in circuits similar to the so-called "push-pull" circuits.

Transformers are enclosed in heavy drawn steel case. Price \$12.50 per set of two, at your dealers or sent direct upon receipt of price and dealer's name. Every transformer guaranteed against defect. Send today.

Modern Electric Mfg. Co.

Toledo, Ohio

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.

Freshman Fix - O

A Fixed Resistance Leak Combination—4 in ONE



Freshman Condenser Leak Mounting Freshman Fixed Leak SAFE-T HANDLE

Price Complete

65c

Furnished in any value of Resistance from 1/2 to 10 Megohms. The only Resistance Leak using no carbon, graphite or lamp black—and guaranteed to be permanently constant. Separate Condenser and Mountings, 40c. Separate Leaks with Safe-T Handle, 30c. At your dealers, otherwise send purchase price and you will be supplied postpaid.

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

LANDLORDS?

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

ELECTRIC SOLDERING IRON

EVERY RADIO FAN has been looking for this iron for both radio and home use. Operates on A. C. or D. C. current. GUARANTEED one year. Sent anywhere in U. S. or Canada Parcel Post prepaid on receipt of money order for \$2.28. FANS Send 2c stamp for our list of RADIO BARGAINS

RADIO BARGAINS

17 N. LA SALLE ST.—CHICAGO

One Half Actual Size



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

One Half Actual Size



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

This symbol of quality is your protection 

Radiotrons

To Get Distance—and Get it Clearly

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

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

Radiotron WD-200
The long distance detector \$5.00

For quality of reception and length of service, every man wants a RADIOTRON. Experienced amateurs and broadcast listeners know the sensitivity and dependable performance of these tubes. UV-199 for portable sets because it operates on flashlight batteries—WD-11 and WD-12, the dry cell tubes, for use everywhere—especially on farms and at the summer bungalow—UV-200 and UV-201-A for use with a storage battery. There is a Radiotron for every need.

Look for the RCA trade mark, and the name RADIOTRON. Each is a guarantee of satisfaction.

Radio Corporation of America

At the Nearest R C A Dealer

Sales Department, Suite 3002
233 Broadway, New York

District Sales Offices
10 South La Salle St., Chicago, Ill.
433 California St., San Francisco, Cal.

For the Bungalow

No summer cottage or bungalow is complete without

The New GREBE Broadcast Receiver

Each night a fresh program of delightful entertainment—a concert—a dance!

Anyone can set up this Receiver in a moment. Your Dealer will be glad to explain its Seven Points of Satisfaction.

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

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




NEW UNDERGROUND LIFE SAVING TESTS

CARRY ON EXPERIMENTS IN COAL FIELD

Bureau of Mines Assigns Engineer to Further Efforts to Rescue Imperiled 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 Bruce-ton, 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.

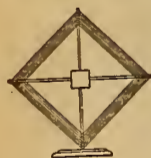
Earlier Experiments in Mine

Some months ago preliminary Radio experiments in sending and receiving underground at the Bruce-ton 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."



RITTER PORTABLE LOOP

Is just as efficient as the most expensive made, yet our price is only \$1. By mail 10c extra.

RITTER RADIO CORP.
230 Canal Street, New York

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.



WE REPAIR WD-11, \$3.50 and OTHER VACUUM TUBES

Excepting VT-I and VT-II

MAIL ORDERS Solicited and Promptly Attended To

H & H RADIO CO.
516 Clinton Avenue NEWARK, N. J.

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.

YOU DON'T NEED Tubes

to get out of town. Even in the summer I hear Omaha, Kansas City, Fort Worth and Davenport on my crystal set without amplification. Works over 1,000 miles in winter. Send self-addressed envelope for further information or \$1.00 for complete copyrighted drawings and instructions. Everything clearly explained. Satisfaction GUARANTEED. Leon Lambert, 501 South Volusia, Wichita, Kan.

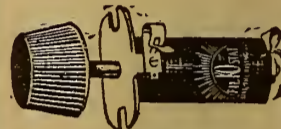
GERMANS FLASH 51,139 WORDS IN SINGLE DAY

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.

For REAL Filament Control



Your set is probably in DX stations you never heard because your rheostat cannot control your filament action. The Filkostat gives infinite adjustment and enables you to magnify the weak stations and bring them in strong and clear.

FIL-KO-STAT

At dealers in high grade Radio Supplies, everywhere. \$2

SUMMER SAVING on Type 400 MELCO RECEIVER

at distributor's price of only... \$17.50 Regular List Price \$35

The Melco Type 400 Radio Receiver covers all broadcasting ranges thoroughly from 165 to 600 meters and assures a great degree of selectivity on the average small outdoor aerial. The Melco is the ideal summer set because it is least affected by electrical disturbances. Sold with our absolute money-back guarantee.

Shipped immediately on receipt of purchase price—F. O. B. N. Y.

WRITE FOR DESCRIPTIVE BOOKLET

AMSCO PRODUCTS, Inc.

Broome & Lafayette Street Fairbanks Building NEW YORK CITY

Melco Type 400 and Amplifier



Two-Stage Amplifying Unit for use with the Melco-400, also regularly costing \$35, now only... \$17.50

"MAKE PERFECTION YOUR SELECTION"

BRANDES Superior Phones. \$5.45 \$8.00 list—Special.....

N. & K. PHONES 6000 Ohms. Made in Germany. The best Phones made. List \$16.00..... \$6.50

COCKADAY Complete parts for this wonderful circuit; only best material used. Guaranteed to work properly. Special complete... \$13.95

REINARTZ We specialize in the Reinartz circuit. Complete standard parts. We guarantee results..... \$11.95

VARIABLE CONDENSERS (Moulded Ends)

	List Price	Our Price
3 Plate	2.00	1.25
11 Plate	3.50	1.75
17 Plate	4.00	1.95
23 Plate	4.00	1.95
43 Plate	5.00	2.25
11 Plate Vernier	5.00	3.25
17 Plate Vernier	6.00	3.25
23 Plate Vernier	6.60	3.50
43 Plate Vernier	7.50	3.95

NEUTRODYNE Complete parts for 4 tube Fada Neutrodyne Set. Mostly Fada parts used.

MUSIC MASTER Loud Speaker. Supreme Quality. Clear and Loud. List \$30. Special. \$25.75

FLEWELLING CIRCUIT Complete parts, including two mounted Coil Mountings. Only standard advertised parts used. Complete..... \$13.95

2 STEP AMPLIFIER Completely assembled, ready to use. None better made..... \$11.95

PANELS—3/16" Thick

	Hard Rubber	Hard Bakelite	Hard Rubber	Hard Bakelite
7x10.....	\$0.95	\$1.35	7x18.....	\$1.65
7x12.....	1.25	1.60	7x21.....	1.85
7x14.....	1.40	1.95	7x24.....	2.15

CABINETS
Extra fine quality—Hinged top—Mahogany finish.
7x16.....\$2.75 7x18.....\$3.50
7x12.....2.95 7x21.....3.95
7x14.....3.25 12x14.....3.95

PERFECTION RADIO CORPORATION, Six New York Retail Stores Add Parcel Post Do Not Send Stamps 208 page complete Radio catalogue free with orders of \$5.00 on request. Otherwise prepaid for 25 cents.

The New Grebe Broadcast Receiver



Mr. Abrahamson, of Detroit Elec. Co., writes on July 7:—"Last night, with the Grebe Broadcast Receiver, we tuned in the following stations: N. Y. City, Schenectady, Chicago and Omaha. In spite of high temperature and heavy atmosphere, reception was exceptionally clear, using only 20-foot indoor wire. Unable to receive any results at all on other sets during the same time."

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

Ask Your Dealer

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



The Week's Advance Broadcast Programs

Tuesday, August 7

CFCA (Eastern, Daylight Saving, 400), 8:00-9:30 P. M., Concert, "Light Cavalry," Star Orchestra; Margaret Sloan, soprano; "Annie Laurie," "Serenade," W. Woods, cornet; "La Zarine," "Spring Song," "The Merry Widow," March, 8:00 P. M., Musical program, 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 Awaka," "Kashimira Love Song," Marie Brown, soprano, Clarence Wylam baritone, Juliet Bartlett and Grace Holloway, accompanists, assisted by Sebastian Sapientza, clarinet.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert featuring Sheridita B. Aston, 2:30-3:30, Matinee musicale, arranged by Sheridita B. Aston, Marluba; 6:45-7:30, Children's hour, Uncle John; 8:00-10:00, Program, arranged by Lela Gordon, Salina, soprano.

KPD (Pacific, 423), 8:00-9:00 P. M., Organ recital, arranged by 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., Musical program, May Goldberg, soprano, Harriet Weeber, accompanist, Mark Love, baritone; Dorothy Lois Nolan; Cope Harvey's Orchestra at College Inn; Herbie Mintz, pianist.

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, Children's hour, short talk and music test; 4:00-5:55, 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. Vidler, director; 11:00-12:00, Orchestra and musicians in vocal and instrumental groupings from Garland, Texas.

WFI (Eastern, Daylight Saving, 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 Stanz, violinist; Martha Gombh, 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, Weather.

WJAX (Eastern, 390), 7:45 P. M., Musical program, "Bohemian Girl" Balfe Band; Reading, "The Boon of the Summer Camp," Henry W. Wack; Band selections; Trombone, "Twilight Echoes," Band selections; "Angels' Serenade," Hepzibah C. James, soprano, Carlton James, accompanist; "The Rey Waltzes 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; "Putterdy Etude," "A Dream," "Love's Dream," "Putterdy Etude," "Oh Promise Me," Under the Beech Tree.

PWX (Eastern, 400), 9:00-11:30 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, Loreita Kerik, 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 Stanz, violinist, Martha Gombh, harpist; Tea time music, Hotel Statler's palm room; 6:35-8:45, Digest of the day's news; 9:00-11:45, Concert; 11:45, weather.

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, Earl Bonawitz, Germantown Theater; 3:00, Artist recital; 6:50, 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), 8:00 P. M., Musical program, "Kentucky Babe," Deidel, "Twilight is Lovelight," arranged from Rubenstein's Melody, Maud Davis, soprano, Norma Hetsch, alto, C. Koffen, tenor, Fred prano, Norma Hetsch, alto, C. Koffen, tenor, Fred prano, 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), 11:00-11:54 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), 8:00-9:30 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;

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

WFI (Eastern, Daylight Saving, 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 Stanz, violinist, Martha Gombh, harpist; Tea time music, Hotel Statler's palm room; 6:35-8:45, Digest of the day's news; 9:00-11:45, Concert; 11:45, weather.

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, Earl Bonawitz, Germantown Theater; 3:00, Artist recital; 6:50, 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), 8:00 P. M., Musical program, "Kentucky Babe," Deidel, "Twilight is Lovelight," arranged from Rubenstein's Melody, Maud Davis, soprano, Norma Hetsch, alto, C. Koffen, tenor, Fred prano, Norma Hetsch, alto, C. Koffen, tenor, Fred prano, 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), 11:00-11:54 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.

"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 Soudak, assisted by George Kirk, baritone; Orchestra numbers: Overture, "Fingals' 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 Song," The Armorer Song.

Jane W. Murrell, Mrs. J. P. Ferguson, Anna Blankenbaker, Mary Aubrey, Victoria Meagher, Mario Koehler, Mary Gordon, sopranos; Mrs. Shirley Graves, Josephino Miller, contraltos; Ruth Miller, Dorothy Miller, Lucille Schneider, pianists; Reading, "An Interesting Historical Episode."

WHK (Eastern, 360), 8:00 P. M., Concert, WHK Trio; Babson'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.

Clyde G. Korn; 8:00, Recital, Erwin Swindoll, organist; 10:00, Musical program, Martin Lerch, tenor, Louis Wareham, baritone, W. C. Kissinger, violinist, Dr. Penrose, pianist.

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.

What Time Is It?



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.

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 Robinson, pianist, and Althea 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 Eekes, 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 Fernando," "My Ain Folk," Popular dance selections, Cope Harvey's Orchestra; "My Mother," "Whispering Hope," "Take Joy Home," "A Dream," "Love's Dream," "Putterdy Etude," "Oh Promise Me," Under the Beech Tree.

PWX (Eastern, 400), 9:00-11:30 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, Loreita Kerik, 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 Stanz, violinist, Martha Gombh, harpist; Tea time music, Hotel Statler's palm room; 6:35-8:45, Digest of the day's news; 9:00-11:45, Concert; 11:45, weather.

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, Earl Bonawitz, Germantown Theater; 3:00, Artist recital; 6:50, 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), 8:00 P. M., Musical program, "Kentucky Babe," Deidel, "Twilight is Lovelight," arranged from Rubenstein's Melody, Maud Davis, soprano, Norma Hetsch, alto, C. Koffen, tenor, Fred prano, Norma Hetsch, alto, C. Koffen, tenor, Fred prano, 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), 11:00-11:54 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.

WLW (Eastern, 309), 8:00 P. M., Selections by Atchele 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 Atchele Novelty Dance Orchestra.

WMAQ (Central, Daylight Saving, 448), 5:30 P. M., Cosmopolitan School of Music; 7:00, Georgette 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.

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 Stern, cellist; "Graceful Dance," orchestra; "Good Morning Brother Sunshine," Miss McLean; "Only a Year Ago," orchestra; "Air," Mr. Stern; "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," "Misereere," "Fybeln," "Flow, Gently, Sweet Afton," "Thou Art Weary," "Gypsy Song," "Una Furina Lagrima," "The Little Irish Girl," "The 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; 6:45-7:30, Children's hour, Uncle John; 8:00-10:00, De Luxe program.

KPD (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)

Reflex Fans, Wake Up!

Tuned Radio Frequency will not only increase distance, signal strength, selectivity and the flexibility of a reflex or a radio frequency outfit, it will function with remarkable simple control adjustment impossible to be had with untuned radio frequency. The present radio frequency transformers are a fixed apparatus, void of variation, untuned, so to speak. This instrument is the very heart of the circuit. Choose it and you have a non-functioing radio set. You vary every piece of apparatus on the set for perfect balance. Why not use a real tuned variable radio frequency transformer and listen to perfect radio reception, mellow, still loud, and clear. With the Jaynxon Tuned Radio Frequency Transformer added to your present outfit you will have a very agreeable surprise. Complete simple DX, Loud Speaker One Tube Hook-up with each transformer. Satisfaction guaranteed. \$3. Order yours right now.

JAYNXON LABORATORY
57 Dey Street New York City

RADIO VIA PARCEL POST AT N. Y. PRICES

Standard Parts Only, in Original Packing
NO SALVAGED GOODS SOLD
Where "Money Back Policy Prevails"

MARGO \$1.00
Vacuum Tube 1 1/2 Volt 1 Socket 25c

Operates on one dry cell, either with or without B battery. Wiring diagram FREE with each tube. 10c extra for parcel post insured.

PHONES For Parcel Post Ins. Add	
Dietzen 3,000 Ohm.....	\$3.75 .12
Holtzer Cabot, Universal Type.....	7.95 .14
Brandes.....	5.75 .14
Dictograph.....	5.75 .14
COUPLERS	
Ames Variocoupler.....	2.45 .12
VARIABLE CONDENSERS	
Dietzen 14-Plate Vernier.....	2.65 .14
Dietzen 24-Plate Vernier.....	2.95 .16
Dietzen 46-Plate Vernier.....	3.45 .18
Murlock 43-Plate.....	3.45 .18
TRANSFORMERS (Aude Frequency)	
Dietzen.....	3.45 .12
Sampson.....	4.95 .14
Ames 4 1/2 to 1.....	2.95 .12
TRANSFORMERS (Radio Frequency)	
Cotoco.....	2.45 .12
Owl.....	.95 .10
MISCELLANEOUS	
Ritter Portable Loop.....	1.00 .10
Argus Lightning Arrester.....	.95 .09
Welsh Peanut Tube.....	2.00 .08
Peanut Tube Socket.....	.50 .08
Switch Lever, Fada Type.....	1.19 .06
Ammeter Testing B Battery.....	.49 .08
Two Slide Tuning Coll.....	1.25 .12
Hydrometers.....	.49 .08
Double Phonograph Attachment.....	.95 .08
Cockaday Coil.....	2.25 .14
2 Coil Honeycomb Mounts.....	2.95 .12
Wave Trap.....	4.95 .15
Electric Soldering Iron.....	3.95 .15
100 Feet Copper Antenna Wire.....	.39 .08
RHEOSTATS	
Bradleystat.....	1.49 .10
SOCKETS	
Bell V. T. & W. D. 11.....	.89 .10
V. T. Bakelite.....	.50 .10
DIALS	
2-inch.....	.25 .06
3-inch.....	.35 .08
4-inch.....	.49 .08

Coast to Coast on One Tube and No Body Capacity

These popular hook-ups use UV-199, WD-11 or WD-12 Tubes. One hook-up gives selectivity and 1500 miles with absolutely no body capacity, while the other gives the remarkable distance of coast to coast. Both prints postpaid for 50 cents or any of the above tubes postpaid \$5.45. Formerly operated by C. W. Kautz. We welcome his customers.

Radio Outfitting & Supply Co.
Box 1107 LANCASTER, PA.

The latest and most essential part of an efficient tube set



Variable Resistance Leaks FOR PANEL MOUNTING

Mounted on any panel in a few seconds—2 screws serving as connections behind panel.

Get stations you never heard before
No pencil markings. Assure unbroken range of 180 degrees. Clarifies signals—eliminates hissing.

Complete with either .00025 or .0005 mfd. Micon Cond. \$1.00
Without Condenser75c

At your dealers—otherwise send purchase price and you will be supplied without further charge.

Chas. Freshman Co. Inc.
Radio Condenser Products
106 Seventh Ave. New York

WILLARD RADIO COMPANY 291 BROADWAY NEW YORK CITY

FLEWELLING CIRCUIT Complete Parts
Baseboard, two honeycomb coils, mountings and coil plugs, 3 .006 condensers, .002 phone condenser, variable grid leak and condenser, grid leak 1/2 meg, 23 plate variable condenser, vernier rheostat, tube socket, 3" dial, 8 binding posts, 16 ft. bus bar, PANEL ALREADY DRILLED, TOGETHER WITH DIAGRAM AND INSTRUCTIONS..... \$11.95

Parts for TWO-STAGE AUDIO FREQUENCY AMPLIFIER, for either of above circuits, with drilled panel and book of instructions..... \$11.00

REINARTZ CIRCUIT Complete Parts
Baseboard, Reinartz coil increased wave length, tube socket, vernier rheostat, 23 plate and 13 plate variable condensers, 3 inductance switches, 2 3" dials, variable grid leak and condenser, .002 phone condenser, 16 ft. bus bar, 23 switch points, 29 nuts, 6 stops, 8 binding posts, PANEL ALREADY DRILLED, TOGETHER WITH DIAGRAM AND INSTRUCTIONS..... \$10.95

ALUMINUM LOUD SPEAKING HORN, nickel plated, high polish, list \$8.00.....	\$3.75
3000 OHM TELEPHONE HEADSET, list \$8.00.....	3.50
AUDIO-FREQUENCY TRANSFORMER, designed for use with W. D. 11 tube, also excellent for all other tubes, list \$4.50.....	2.75
VARIOCOUPLER, Litz wire wound secondary, 150-600 meters, list \$4.50.....	2.25
Triple Coil Mounting, value \$3.35.....	2.45
Multiple Point Inductance Switch with knob and dial (15 points).....	1.45
Reinartz coil, increased wave length.....	1.55
Honeycomb coil, mounted 50 turns.....	\$0.95
Honeycomb coil, mounted 75 turns.....	1.00
Freshman var. grid leak and cond.....	.75
Freshman variable grid leak.....	.60
V. T. Socket.....	.40
CONDENSERS	
3 Plate Variable, value \$1.75.....	\$1.05
13 Plate Variable, value 2.50.....	1.20
23 Plate Variable, value 3.50.....	1.35
43 Plate Variable, value 4.50.....	1.95
13 Plate Vernier, value \$5.50.....	3.75
23 Plate Vernier, value 8.00.....	4.00
43 Plate Vernier, value 6.50.....	4.25

Every article we sell is guaranteed by the manufacturer and us—Mail orders filled immediately—Postage prepaid on all orders of \$5.00 or more, east of the Mississippi River only. All others include postage.

ATWIST OF THE WRIST—IT'S SET

YELLOW TIP MICROMETER ADJUSTING CRYSTAL DETECTOR

Increases the Efficiency of Your Crystal Set!

Finer tuning, clearest possible reception, constant adjustment until you wish to change, then—"A Twist of the Wrist—It's Set." Excellent for reflex and other circuits. Write for folder and name of your nearest dealer.

2

Wholesale Radio Equipment Co.
Exclusive Factory Representatives
35 William Street, Newark, N. J.
Dealers and Jobbers Write for Attractive Proposition

Radiophone Broadcasting Stations

Corrected Every Week—Part IV

State, City, Call	State, City, Call	State, City, Call	State, City, Call	State, City, Call	State, City, Call	
Alabama: Auburn, WMAV Birmingham, WSY Mobile, WEAP Montgomery, WKAN	Idaho: Boise, KFAU, KFDD, KFFB Kelloug, KFEY Moscow, KPAN	Maine: Bangor, WABI Houlton, WLAN	Nevada: Reno, KDZK Sparks, KFFR	Norman, WNAD Oklahoma City, KFJF, WKY Okmulgee, WPAC Tulsa, WGAF, WLAL	Salt Lake City, KDYL, KZN	
Arizona: Phoenix, KDIW, KFAD Tucson, KFDD	Illinois: Belvidere, WOAG Carthage, WCAZ Chicago, KTW, WAAF, WBU, WPAW, WJAZ, WMAQ, WPAD, WSAH Decatur, WBAO, WHAP Elgin, WTAS Lake Forest, WABA Mattoon, WQAL McLeansboro, WRAS Mt. Vernon, WABF Peoria, WJAN, WQAX Rockford, WLAB Springfield, WBCB Tuscola, WDW Urbana, WRM Zion, WCBD	Maryland: Baltimore, WCAO, WEAR, WKC, WNAV Frostburg, WPAQ	New Hampshire: Chesham, WSAU Laconia, WKAU	Oregon: Astoria, KFJI Arlington, KFGL Baker, KFPA Corvallis, KFJD Eugene, KFAT Hillsboro, KFPO Hood River, KFHB, KQP Medford, KFAY Pendleton, KFPE Portland, KDYO, KFEC, KFIP, KGG, KGN, KGW Salem, KFCD	Vermont: Bellows Falls, WLAK Burlington, WCAX Springfield, WQAE	
Arkansas: Fayetteville, KFDV Fort Smith, WGAB Little Rock, WCAV Pine Bluff, WOK	Indiana: Anderson, WABC Brookville, WSAL Greencastle, WLAX Huntington, WHAY La Porte, WRAF Marion, WIAQ Mishawaka, WAOO Muncie, WJAF South Bend, WABJ, WGAZ West Lafayette, WBAA	Massachusetts: Boston, WNAC Dartmouth, WMAF, WSAQ Fall River, WSAR, WTAB Lowell, WQAS Medford Hillside, WGI New Bedford, WDAU Springfield, WDAF Worcester, WABK, WDAS	New Jersey: Atlantic City, WHAR Camden, WBP Gloucester City, WRAX Jersey City, WNO Moorestown, WBAF Newark, WAAM, WBS, WOR, WRZ N. Plainfield, WEAM Ocean City, WIAD Paterson, WBAN Trenton, WMAL, WOAX	Pennsylvania: Allentown, WCEA, WBSN Altoona, WGAW Clearfield, WPI Easton, WMAP Erie, WOAY Grove City, WSAJ Harrisburg, WABE Johnstown, WTAC Lancaster, WDRC, WGAL McKeesport, WIK Parkersburg, WQAQ Philadelphia, WCAU, WDAF, WFL, WGL, WIP, WNAU, WOO, WVAD Pittsburgh, KDKA, KQV, WCAE, WTAS Reading, WBBD, WRAV Scranton, WQAN, WRAY State College, WPAB Villanova, WCAM Wilkes-Barre, WBAX, WNAH	Virginia: Arlington, NAA Blacksburg, WEAE Fortress Monroe, WNAW Portsmouth, WOAQ Westhampton, WQAT	
California: Altadena, KGO Bakersfield, KDZB Berkeley, KQI, KRE Del Monte, KLN El Monte, KUY Fresno, KML Hollywood, KFAR Loug Beach, KSS Los Angeles, KDZF, KFCL, KFL, KJJ, KJS, KNV, KXN, KUS, KWH Los Gatos, KFHQ Modesto, KND Oakland, KLS, KLL, 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, KFAY Santa Barbara, KFJH Selma, KFJH Stanford Univ., KFGH Stockton, KJQ, KWG Venice, KFAV	Iowa: Ames, WOI Boone, KFGQ Burlington, WIAS, WLAT Cedar Rapids, WJAM, WKAA Centerville, WDAY Council Bluffs, WPAF Davenport, WHAL, WOC Des Moines, KFDD, WGF Dubuque, WQAK Fort Dodge, KEER, WEAB Gladbrook, KFJK Iowa City, WHAA Lamoni, KFFV Le Mars, KFVY, WIAU Marshalltown, KFBB Newton, WIAH Oskaloosa, KFHL Sgourney, WOAD Sioux City, WEAU Waterloo, WHAC, WRAN	Michigan: Ann Arbor, WQAJ Berrien Springs, KFGZ Dearborn, WWI Detroit, KOP, WCX, WWJ East Lanning, WKAR Flint, WEAA Kalamazoo, WQAP, WLAQ Lansing, WHAL Rogers, WCAF Saginaw, WABM, WIAW	New Mexico: State College, KOB	New York: Albany, WNJ Amsterdam, WPAS Buffalo, WGR Canandaigua, WSAW Canton, WCAQ Cazenovia, WMAC Ithaca, WJAI Lockport, WMAK New York, KDOW, WBY, WDT, WEAF, WJX, WJY, WJZ, WLAJ, WSAF Poughkeepsie, WFAF Rochester, WABO, WHEM Ridgewood, WHN Schenectady, WGY, WRL Syracuse, WDAI, WFAB, WLAH, WNAJ Tarrytown, WRW Troy, WHZ Utica, WFAQ Waterford, WFAG	West Virginia: Walla Walla, KFCE Wenatchee, KDZI, KZV Yakima, KFJQ	
Colorado: Boulder, KFAJ Colorado Springs, KFFO, KFCK Denver, AA3, DN4, KDZQ, KEEP, KFAE, KFBL, KFEL, KFIC, KFLE, KIZ Greeley, KFJD, KFKA Greeley, KFJD Gunnison, KFHA Lakeside, KFKA Trinidad, KFBK, KFHY	Kansas: Anthony, WBL Atwood, WEAD Beloit, WPAR Cheney, KFPG Emporia, WAAZ Independence, KFJX Iola, KFID Lindsborg, WDAD Louisburg, KFLL Manhattan, WTG Marion, WRAD Parsons, WQAJ Pittsburgh, KFIV Topeka, WJAO, WJAM Wichita, KFHI, WAAJ, WEAH	Minnesota: Baudette, KFGY Duluth, WJAP, WMAT Hutchinson, WPAF Minneapolis, KFDD, KFEX, WBAJ, WBAH, WCAS, WLAG, WRAH Moorhead, WPAU Northfield, WCAL St. Cloud, WJAM St. Paul, AV7, WAAH	North Carolina: Asheville, WFAJ Charlotte, WBT Greensboro, WQAZ Raleigh, WLAC	South Carolina: Charleston, WNAQ, WQAH Clemson College, WSAC Greenville, WQAV	Wisconsin: Beloit, WKAU Fond du Lac, KFIZ Kenosha, WQAR La Crosse, WABN Madison, WQAY, WEA Milwaukee, WAAK, WCAV, WHAJ, WJAO Neesh, WJAJ St. Croix Falls, WRAL Waupaca, WPAH	
Connecticut: Bridgeport, WKAX Hartford, WDAK New Haven, WPAJ Storrs, WABL Waterbury, WQAD	Delaware: Wilmington, WHAV, WOAT	Missouri: Butler, WNAR Cameron, WFAQ Cape Girardeau, WSAB Columbia, WAAJ Independence, WPAQ Jefferson City, WOS Joplin, WHAH Kansas City, WDAF, WEB, WMAJ, WQQ Marshall, WJAT Moberly, KFPP Rockport, WMAJ St. Joseph, KFHD, WEAK St. Louis, KFEZ, KFGI, KFIB, KSD, WCK, WEB, WEW, WMAJ, WRAO Springfield, WLAL, WKAS, WQAB Tarkio, WIAT Webster Grove, WOAL	North Dakota: Fargo, WDAY, WPAK Grand Forks, WOAB Mayville, KFHU Wahpetou, WJLAW	South Dakota: Brookings, KFDY Platte, KFJH Rapid City, WCAT Sioux Falls, WFAT Vermillion, WFAJ Yankton, WNAX	Wyoming: Casper, KFDF Douglas, KFEV Laramie, KFBU	
District of Columbia: Washington, WABE, WCAP, WDM, WEAS, WHAQ, WIL, WIAY, WJL, WML, WQAW, WRC	Florida: Jacksonville, WABG, WDAJ Miami, WQAM Pensacola, WGAN, WLAV St. Petersburg, WSAQ Tampa, WDAE	Montana: Billings, KFCH Bozeman, KFDO Butte, KFAP Great Falls, KDYS Havre, KFBB	Ohio: Canton, WWB Cincinnati, WAAD, WHAG, WIZ, WLW, WME, WSAI Cleveland, KDPM, WHK, WJAX Columbus, WBAY, WCAH, WJAO, WLAN, WPAJ Dayton, WAI, WABD, WJAJ Fairfield, WLZ Granville, WJD Greenville, WCBW Hamilton, WBAU, WRK Lebanon, WFG Lima, WOAC Marietta, WBAW Middleport, WSAK Newark, WBA Sandusky, WABH, WQAF Springfield, WNAJ Steubenville, WPAK Stockdale, WJAK Warren, WLAZ Washington C. O., WGAX Wooster, WGAU Youngstown, WDBF	Tennessee: Cincinnati, WNAV Lawrenceburg, WQAN Memphis, WMC	Texas: Abilene, WQAO Amarillo, WDAJ, WRAU Austin, WCM, WNAS Beaumont, WBAJ College Station, WTAW Dallas, KFFZ, WDAO, WFAA, WRR El Paso, WDAH, WPAT Fort Worth, WFAJ Galveston, WHAB, WIAC Houston, WCAK, WEAT, WEV, WRAA Laredo, WVAJ Orange, KFGJ Plainsville, WSAJ Port Arthur, WFAH San Antonio, AS6, WCAE, WAOL Stanford, WQAZ Tyler, WQAF Waco, WIAD, WLAJ, WWAC Wichita Falls, WKAJ	Utah: Ogden, KFCEP

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.

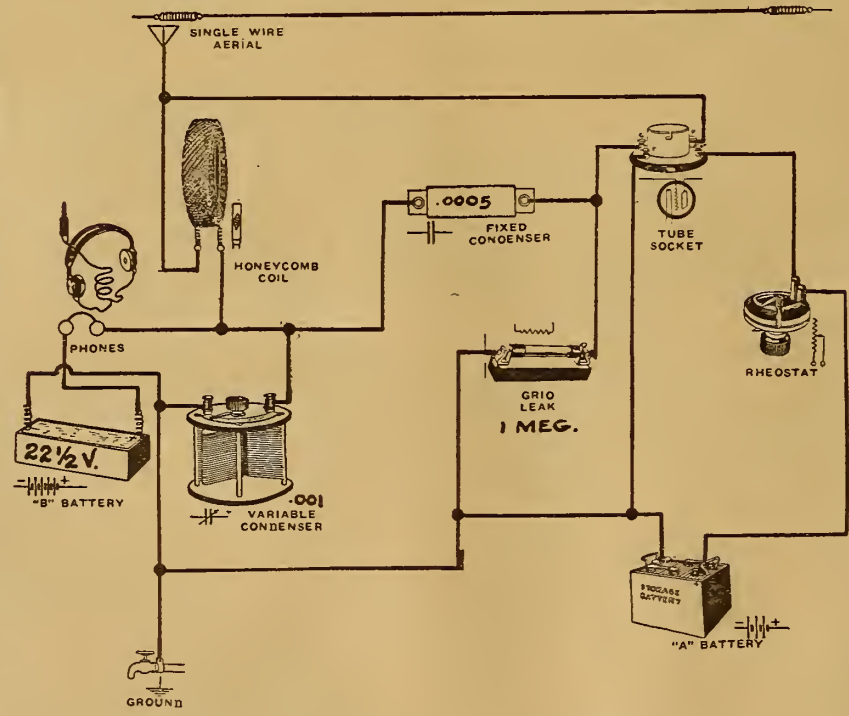
Elements of Radiotelegraphy. By Elery W. Stone. The text was written for the guidance and instruction of Radio students in the communication service of the Navy. It is an instruction book for Radio schools. Price, \$2.50.

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 simple 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 22 1/2 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; 5:56, Baseball scores. WFAA (Central, 476), 8:30-9:30 P. M., Masonic service program...

plandist; 10:30, Fox Trot, "Holding Hands." Reutling's Imperial Orchestra; Fox Trot, "Tillie," orchestra; "Drifting Dreamland," Arthur Gunn, baritone...

Sunday morning service broadcast from St. Chrysostom's Church, Rev. Dr. Norman Hutcheon, rector; 5:00-8:00 P. M., Classical and semi-classical selections by Sisson Trio...

All" (Courtesy Youth's Companion); "Will-o'-the-Wisp," Roland James; "Castagnettes," Mrs. Van Weaden Rogers, pianist...

Saturday, August 11

CFCF (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "Mignonette," Star Orchestra; Ina Lockart, contralto...

Monday, August 13

KPD (Pacific, 423), 8:00-9:00 P. M., Organ music; 9:00-10:30 P. M., Musical program, Adelaide Paxton, violinist; Ruth Friedlander, pianist...

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...

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

CARTER Plugs Jacks Jack Switches Vernier Control Rheostats Automatic Control Rheostats Inductance Switches

ERLA DUO-REFLEX SET Complete parts for Eria Reflex Circuit. The only one tube circuit on which you can use a loud speaker. Reg. price, \$42.25. Our price, \$27.95

REINARTZ CIRCUIT Every part complete, including drilled panel and book of diagrams and instructions. \$10.25 SUPERSENSITIVE REGENERATIVE RECEIVER

AMRAD TWO STAGE AMPLIFIER Complete in Mahogany Cabinet. \$40.00 value. Either Radio or Audio Frequency. \$17.95

100 RADIO HOOK-UPS. Everything guaranteed as firsts. Send for special price list No. 9. We pay postage.

RADIO SUPPLY STORES 254 West Stiegel Street Manheim, Pa.

Friday, August 10

CFCF (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Concert, "A Day in Venice," Star Orchestra; Ripit Lucas, baritone; "Nocturne in E Flat," Harry Adams, violinist...

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., Musical program, Herbie Mintz and Harry Geise, pianists...

CUNNINGHAM TUBES REPAIRED. C-300 or UV-200... \$2.75 C-301 or UV201... 3.00 C-302 or UV-202... 3.50 C-301A or UV201A... 3.50

RADIO TUBE CORP. 55 Halsey Street Newark, N. J. TUBES SENT PARCEL POST, C. D. D.

CITY RADIO CO. 70 Cortlandt Street, New York City. WEEKLY SPECIAL BRANDES SUPERIOR HEADSET \$5.75

TRANSFORMERS ALL AMERICAN... \$3.55 THORBARSON... 2.75 MARLB... 2.75 ACME... 3.50 ATWATER-KENT... 3.75

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.

LARGEST RADIO STORE IN AMERICA BUILD YOUR OWN SET ALL INSTRUCTIONS INCLUDED ALL PANELS DRILLED—READY TO MOUNT

FLEWELLING CIRCUIT COMPLETE!! CONSISTING OF Reg. Price Our Price 6x14 Formica Panel... \$1.26 \$1.10 23 Plate Variable Condensers... 3.30 1.45

LONG RANGE \$10.00 VALUE HEAD SETS \$3.65 Made in style and design proved by use and experiment to be the best. Coil wound with about 6,500 turns of No. 40 enamel coated copper wire.

HAZELTINE NEUTRODYNE CIRCUIT COMPLETE!! ALL PARTS LICENSED UNDER HAZELTINE PATENTS 1 7x21x1/16 drilled formica panel

Regular Price... \$22.16 Dur Price \$12.45

MASTER BALDWIN PHONES Type C with head band and cord... \$6.95 Type C unit... 3.95

MASTER BALDWIN PHONES Type C with head band and cord... \$6.95 Type C unit... 3.95

ALL MDSE. GUARANTEED BY US TO BE OF FIRST QUALITY 509 So. State St. CHICAGO, ILL.

CHICAGO SALVAGE STOCK STORE

MAIL ORDERS ADDRESS DEPT. R. D. CHICAGO, ILL.

"B-T" UNIVERSAL VERNIER TUNER does away with tapped coils and switches on REINARTZ CIRCUITS and improves range clearness and selectivity wonderfully. Covers new broadcasting wave lengths. Also a wonder-worker in practically all the older circuits, including reflex. Price, from your dealer or postpaid, \$5.00. Hookup diagrams free.

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

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 amplify 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 con-

denser 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.

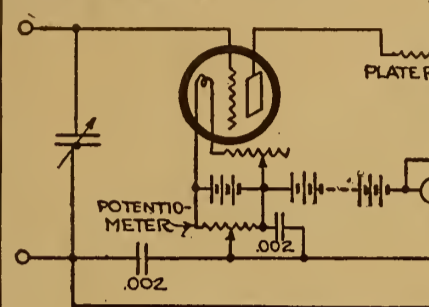


Figure 52—One-tube reflex with refinements for best operation

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

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 embody-

flex 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.)

Electric Soldering Iron

\$2.50

A. C. OR D. C. CURRENT

DEALERS—Attractive Discounts

NOTE: We are the Largest Exclusive Radio Jobbers in the Middle West

HUDSON-ROSS

123 W. Madison St. Chicago

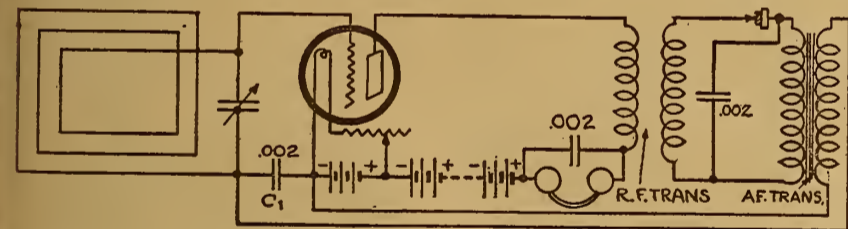


Figure 51—Simplest form of one-tube reflex to show principles of operation

denser 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 condenser C 1. This condenser will pass the Radio frequency currents without difficulty.

When signals are being received the plate current will be varied in accordance, with a step up in intensity, 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.

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.

TWO SUPERSENSITIVE CIRCUITS

(Both Copyrighted)

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

This copyrighted circuit is the most successful of any Reinartz modification yet produced, and is limited the most. Thousands are in use.

My W. D. II Circuit is especially designed for use with the "Pickie" tube and brings out the full value of that little tube as no other circuit can. Stations 1000 miles away come in clearly on one tube. This set is small, complete, portable. For the man who wishes the highest efficiency, this is the set to build. Price of blueprint and specifications, 50c. or with complete and perfect windings, \$3.00. Photo of set with every order.

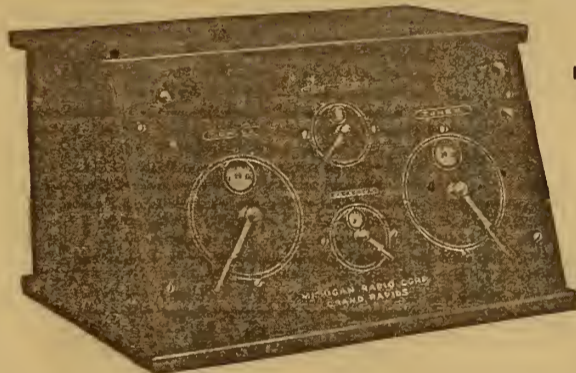
Either set is easy to build, easy to operate. Everything clearly shown.

Sets built from these plans will receive all broadcasting stations operating under the new laws. Their wave length range is from 140 to 670 meters.

S. A. TWITCHELL

1925 Western Ave. Minneapolis, Minn.

Our Latest Triumph



The Michigan

"Midget"

\$27.00

Long-Distance Wonder Worker That Tunes Out Local Broadcasting

The most dependable long-distance Receiver ever assembled in so small space. Convenient for campers and tourists, yet equally suited to home use the year-round. Handsome mahogany finished cabinet 14 1/4 in. long, 7 7/8 in. high, 9 5/8 in. deep at base.

Operates with any of the dry cell tubes as well as with standard 6 volt tubes. Cabinet will hold three No. 6 dry cells and 22 volt "B" Battery.

Lever in place of dials make tuning easier and accurate. Wonderfully clear, pure-toned reception through headphones—add two stage amplifier for loud speaker reception. A Radio Engineering triumph.

Price, without tubes or battery, F. O. B. Grand Rapids, \$27.00.

Ask your dealer. If he cannot supply you, remit to us and send his name and address.

Send for list of Michigan Quality Radio Receivers and Parts; variometers, variocouplers, all-range couplers, special rheostats—50c, potentiometers—200 ohm and 400 ohm—60c, etc.

Dealers, the set you have been waiting for to make complete package "over the counter sales."

MICHIGAN RADIO CORPORATION

GRAND RAPIDS, MICHIGAN

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.

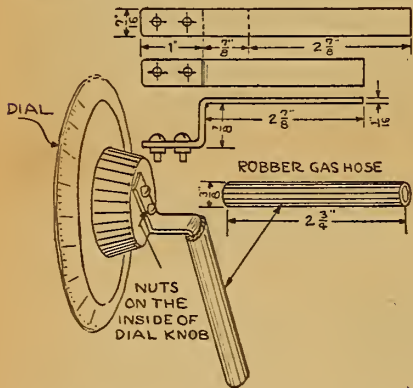
WORKSHOP KINKS? EARN A DOLLAR—

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

tory. 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.

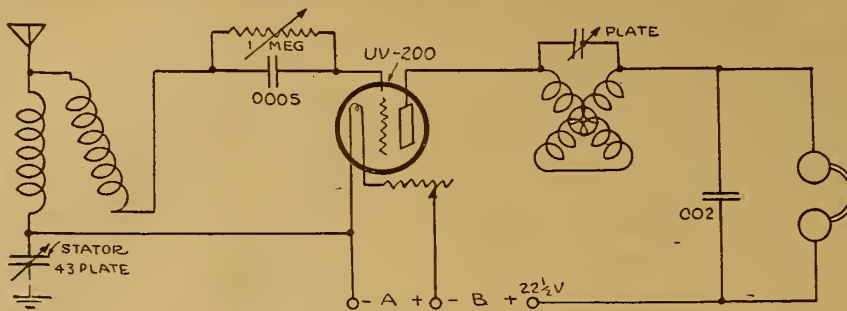


If you have no tap, turn the screws into the holes; they will cut their own threads.

Windings in Variocoupler.

My variocoupler has 42 turns on stator and 40 turns on rotor, 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.

MINIMUM OF PARTS IN HOOK-UP



It is important that your B battery have a full 22 1/2 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.

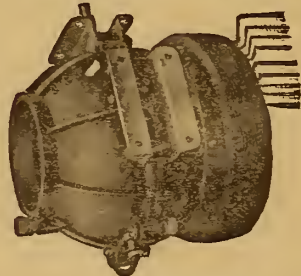
As there are so many different variocouplers and variometers on the market, I would suggest, even if your signals are fairly strong, to change the leads of the rotor of variocoupler to see if you cannot increase the signals. After you find the loudest connection here, try the same procedure with the 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 1/4 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 rotor 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.

Kellogg Radio Equipment For Better Results



VARIOCOUPLER

The Kellogg variocoupler is of the same standard design as our variometer, being made of molded Bakelite, with reinforced construction.

For increasing the wave length from 500 to 2,500 meters, the Kellogg standard wound induction is added to the variocoupler.

It is arranged for either panel or base mounting. No. 501 Variocoupler \$9.00 With No. 502 Diamond Wound Coil, as shown in illustration. . . . \$13.00

Kellogg Switchboard & Supply Company
CHICAGO

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.

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-plate001
23-plate0005
11-plate00025
8-plate (vernier)00018

Don't Lose that Sensitive Spot

If the crystal detector is mounted on a piece of felt from 1/2 to 3/4-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.



Crystal Tube Detector

Replaces crystal and cat whisker. Always set and alive, loud and clear. No more fishing for live spots. Guaranteed to detect perfectly. Simple to connect—full instructions. Needs no batteries and never burns out. Made of the famous B-Metal. Sold by all live dealers or can be ordered from

The B-Metal Refining Co.
3134 Trumbull Avenue
Detroit, Mich.

Price \$1.50

Federal Audio Frequency Transformer No. 226

Amplification Without Distortion

This transformer pronounced by leading radio engineers, after exhaustive tests, to excel in all essentials.

Federal A. F. Transformer No. 226 can be used with any vacuum tubes in common use.

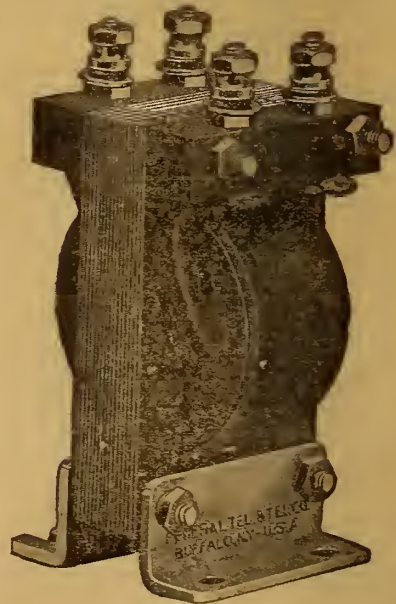
It furnishes greater amplification and faithfulness of reproduction of both voice and orchestral music.

Install a No. 226 on your present set. It will prove a revelation to you.

Send today for illustrated catalog describing them fully

Federal Telephone & Telegraph Co.
BUFFALO, N. Y.

Western District Office: 417 South Dearborn St., Chicago, Illinois



Your Dealer Sells
Federal No. 226

130 GUARANTEED RADIO PRODUCTS

FORMICA

A Laminated Phenolic Condensation Product
SHEETS TUBES RODS

RADIO PANELS POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

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

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

STARRETT MFG. CO.
519 SOUTH GREEN ST. CHICAGO

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:

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

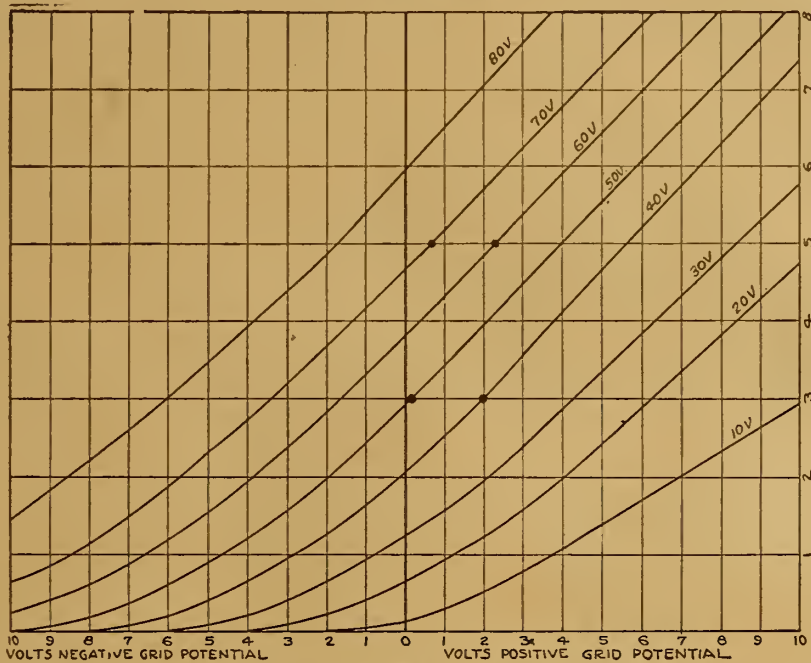


Figure 1

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:

$$\mu = \frac{70 - 60}{2.4 - .7} = 5.8$$

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 $\frac{Ep}{2Ip}$ where Ip is the plate

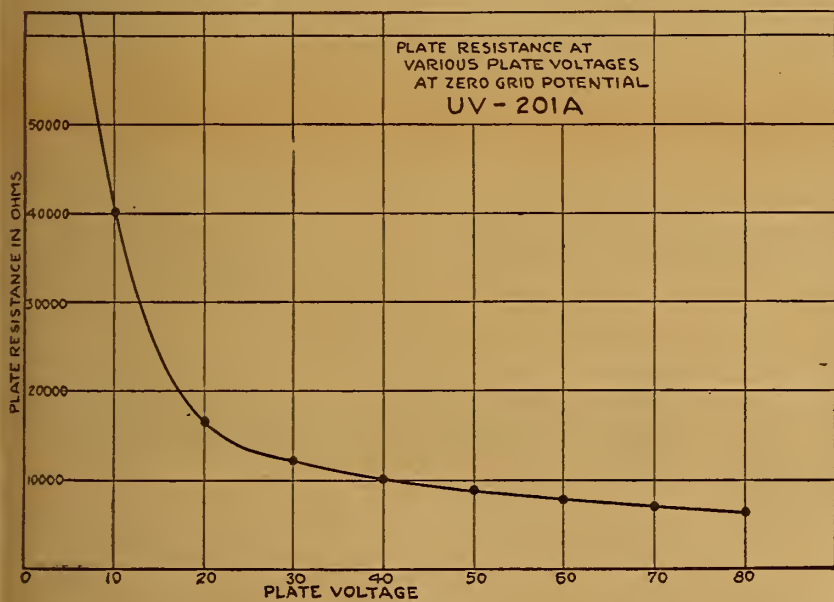


Figure 2

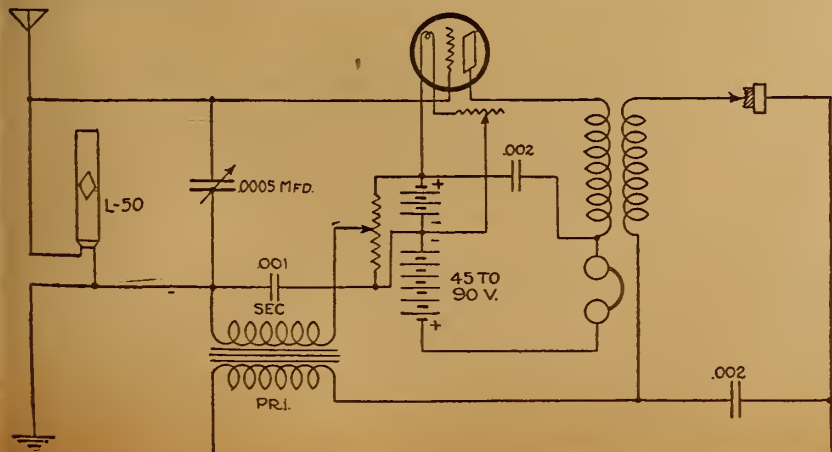
where Ep =plate voltage and Eg =grid voltage.

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.

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

$$\mu = \frac{50 - 40}{2.25 - .75} = 5.7$$

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.

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

$$E'p = 60 + (5.8 \times [-4]) = 60 - 23.2 = 36.8 \text{ volts.}$$

Therefore, reading from Figure 2:
 $Pr = 10,400 \text{ ohms}$

The negative value of the grid potential changes the plus sign to subtraction. (TO BE CONTINUED)

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.

How to Make a Reinartz Receiver

Complete

BLUE PRINTS

for the construction of a Reinartz Receiving Unit and two step amplifier.

INSTRUCTIONS FOR ASSEMBLY

Description of apparatus and accessories and details of tuning.

WINDING A REINARTZ COIL

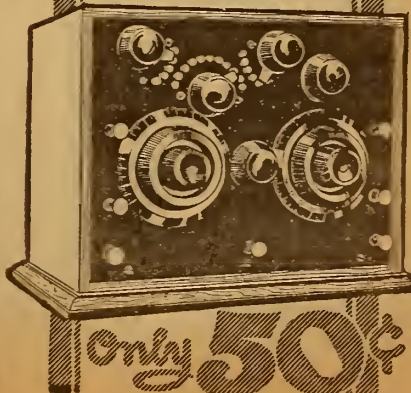
Cabinet Dimensions
Panel Layouts
List of Parts

Send only money orders — no checks or stamps. Coins at your own risk.

Book Department

Radio Digest

123 West Madison Street
CHICAGO, ILL.



Only 50¢

FEDERAL
DISTRIBUTORS
DEALERS—ATTRACTIVE DISCOUNTS

NOTE: We are the Largest Exclusive Radio Jobbers in the Middle West

HUDSON-ROSS
123 W. Madison St. Chicago

PREMIER
"HEGEHOG"
TRADE MARK
AUDIO
FREQUENCY TRANSFORMER

PAT. PEND. HALF SIZE

MAXIMUM VOLUME
MINIMUM DISTORTION
100 PER CENT SHIELDED
MOUNTS ANYWHERE

PRICE \$3.50

RATIOS—1 to 3, 1 to 4, or 1 to 5

The Most Efficient, Compact Transformer ever designed. Ask Your Dealer for the Premier "Hegehog."

Full Specifications on Request

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

Questions and Answers

Antenna and Ground

(4019) WES, Manchester, N. H.
I would like to ask the following questions:

How would an aerial 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.

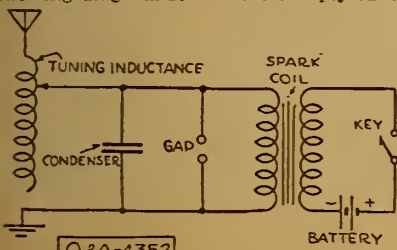
To effect a ground, as suggested, the best method would be to solder a wire to an ash can or large piece of galvanized iron and dump it into the lake.

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



Q 2A-4352

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 150 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 constructive criticism; we are at no time assuming infallibility, although we pride ourselves on the personal, interested and generally admitted superior service rendered.



THE PERFECT SYNTHETIC CRYSTAL DETECTOR, SENSITIVE OVER ENTIRE SURFACE. No Hunting for "Spots." Loud and Clear. Endorsed by thousands of satisfied users. Sensitiveness Guaranteed. **50c** Price, Mounted.
14 K. GOLD SUPERSENSITIVE RUSONITE CATWHISKER. Permanent. Will Not Oxidize. Price, Mounted. **25c**
RUSONITE REFLEX CRYSTAL. Manufactured Expressly for Reflex Circuits. Will Stand Up Under Heavy Plate Volt-**\$1.00** age. Guaranteed. Price, Mounted.
Order from your dealer or direct from
RUSONITE PRODUCTS CORP.
15 Park Row New York, N. Y.

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

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

condensers; the other parts are mounted on a 1/4-inch celeron panel. I use 2 Cunningham 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.

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

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.

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 lengths 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) OLL, 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 11 1/2 x 13 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

DONT PASS THIS-BUY

World Radio Batteries SAVE YOU 50%

WRITTEN 2-YR GUAR

6 Volts—60 Amps.,	\$10.00	6 Volts—100 Amps.,	\$14.50
6 Volts—80 Amps.,	\$12.50	6 Volts—120 Amps.,	\$16.00

SPECIAL 2-Volt Storage Battery for WD-11 and WD-12 Tubes. Will give \$5 200 HOURS on single charge....

World-Radio-Batteries
Are unconditionally guaranteed
Because you deal direct with a manufacturer who is responsible for the performance and quality of the Battery.

Full Rating Guaranteed
MAIL YOUR ORDER TODAY. WE SHIP EXPRESS C. O. D., SUBJECT TO INSPECTION, OR WILL ALLOW 5% FOR CASH WITH ORDER. ALL ORDERS SHIPPED SAME DAY AS RECEIVED.

WORLD BATTERY COMPANY,
60 E. Roosevelt Rd., Dept. L, Chicago, Ill.

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 Acemestat 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

REFLEX
Erla Reflex Transformers
DEALERS: SEND FOR LITERATURE
NOTE: We are the Largest Exclusive Radio Jobbers in the Middle West

HUDSON-ROSS
123 W. Madison St. Chicago

FREE Your Choice

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

Supply Limited



8 Numbers

Greatest Collection of Radio Information Ever Published

- Reinartz Long Distance Circuit
- Ultra-Reinartz Circuit
- Flewelling "Fliver" Circuit
- Grimes "Inverse Duplex" Circuit
- Single Tube Reflex Circuit
- Armstrong "Super-Heterodyne" Circuit
- Two, Three and Four Tube Reflex Circuits
- A. B. C. Lessons for Radio Beginners

In addition to these features these volumes contain many instructive articles, receiving set diagrams, how to make articles, new apparatus, pictures and illustrations, hook-up diagrams, broadcasting stations, technical articles and book reviews.

Volumes 2, 3, 4, and 5 Now Ready

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

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

This offer good only in the U. S. and possessions. One dollar additional for Canadian or foreign countries.

Additional volumes are \$2.00 each, but are only available to annual subscribers. This on account of our limited supply.

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

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

COUPON 8-11

PUBLISHER, RADIO DIGEST
123 W. Madison Street, Chicago, Illinois

CHECK OFFER DESIRED

One year's subscription and choice of one volume. Send Vol. _____ Check or M. O. enclosed. \$5.00

One year's subscription and choice of two volumes. Send Vols. _____ Check or M. O. enclosed. \$7.00

One year's subscription and additional Volumes Nos. _____

Name _____

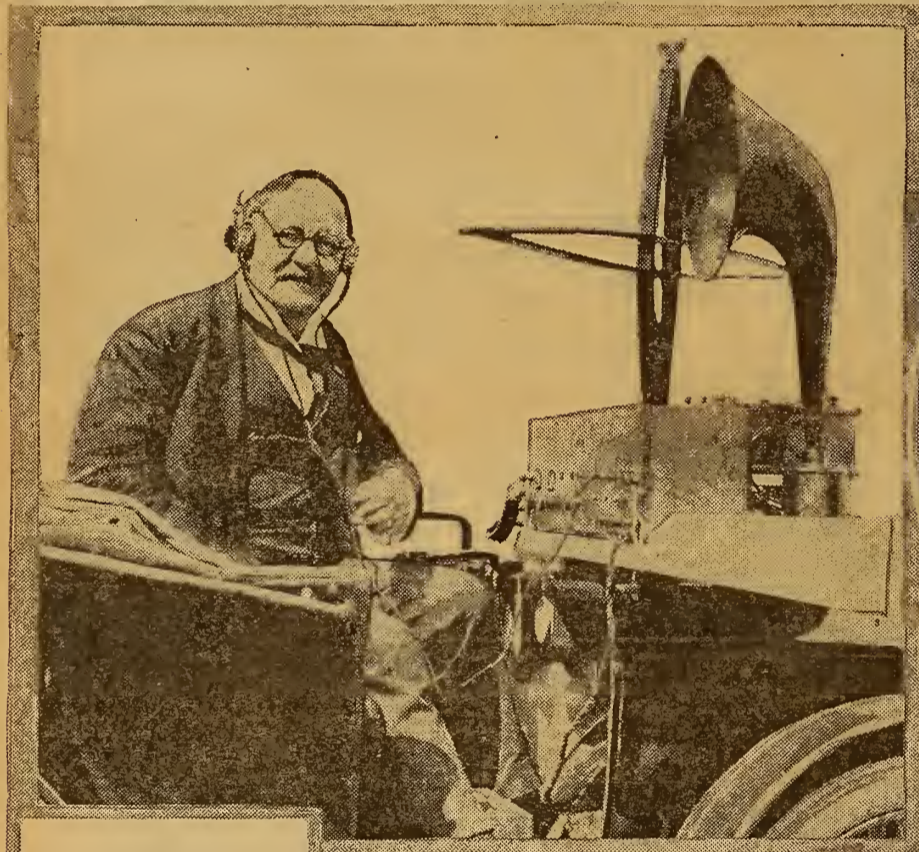
Address _____

City _____ State _____

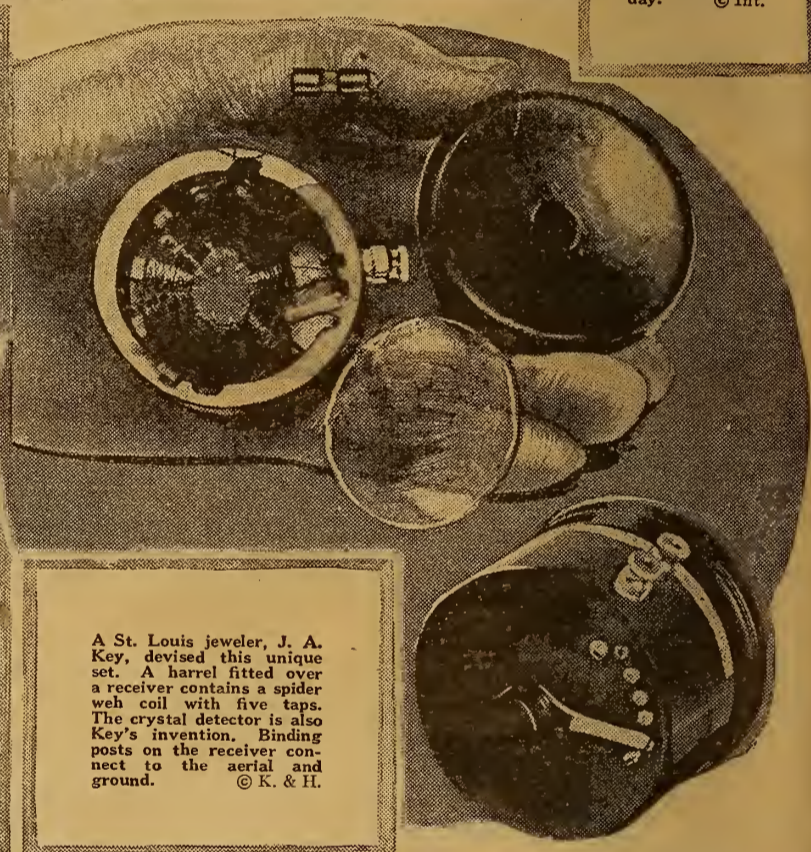


Radio Illustrated

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



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.



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.



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.