How to Build Five Tube Neutrodyne—This Issue

Raado

Vol. VI

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SATURDAY, AUGUST 25, 1923

FINDS BURIED TREASURE

SCORES VICTORY IN WESTINGHOUSE SUIT

CUTTING AND WASHINGTON GIVES BIG FIRM JOLT

Buyer of Armstrong Patent Starts New Suit Attempting to Entangle Klitzen Radio Corporation

(Special to RADIO DIGEST)

NEW YORK.—Hardly had the ink dried on the decision of Judge Learned Hand of the United States District Court here in his decision favorable to the defendants, handed down in the suit of the Westinghouse Electric and Manufacturing Company versus the Cutting and Washington Radio Corporation. until the Westinghouse Company entered a suit in the Eastern District Federal Court of Wisconsin, asking for a preliminary in-junction against the Klitzen Radio Corpora-tion of Racine, Wisconsin, one of the Armstrong licensees, restraining them from selling their products through channels of distribution not named in the original Armstrong license agreement. The Westinghouse bill of complaint against the Klitzen Corporation follows closely that filed against the Cutting and Washington Company, for the court of the co which only a temporary injunction was granted by Judge Hand on July 29, pending a six months' period in which the Cutting and Washington Company will have time to prepare itself to manufacture its sets under the Court's interpretation of the conditions of the Armstrong license.

Westinghouse Bill of Complaint The complaint bill of the Westinghouse

Company alleges that the Klitzen Radio Corporation sells through Jobbers and dealers and has manufacturing agents to make the Klitzen sets. It also alleges a conspiracy with the Alladin Sales Corporation. The case comes up for hearing August 29 in Milwaukee. The Westinghouse Company is represented by Quarels, Spence & Quarels, attorneys of Milwau-The Klitzen Company by Thompson, Myers & Kearney, of Racine.

With the new Klitzen suit the Radio Corporation and Westing-house Company now have suits pending against four of the independent Radio manufacturers making sets under the license granted them by Armstrong prior

(Continued on page 5)



NEW DEVICE BARES WAY

Louisiana Inventor Declares Machine Reveals Secreted Riches by Buzzing

Tests Bring \$59,700

Experiments Indicate Contrivance Locates Various Metals by Varying Sound Volume

By R. A. Sullivan

BATON ROUGE, LA.—All things in time may be known to Radio, even the secrets of the ages and the mysteries hidden deep in the earth and its waters—this is the prediction of most of those who saw re-cently the operation of the Radio treasurefinder invented, after many troublous years, by Emmett Green of this city. By means of his machine Green is reported to have found an urn, secreted by a Frenchman more than sixty years ago, containing bonds worth now more than \$58,000.

It is considered fitting that what is likely to rank soon among the wonders of the world should be tried and found not wanting in the mystic swamps and baffling bayous of the Father of Waters.

Romance and tragedy, the days of buccaneers and the Spanish Main, of proud Dons and langorous Creoles, of swashbucklers and fair women, of cringing slaves, cruel men and wily, of the clash of blue and gray—all these may be recalled by a machine that looks like the wrecked half of a toy wagon.

When the treasure-finder is perfected and marketed, hidden treasures are likely to be as safe as a bootlegger at a camp-

(Continued on page 2)

Above: Virginia Pearson, famous film beauty, flirts with the WJZ microphone and the great station's many listeners in. Below is Lillian Miller listening in to stations fifty miles and further away using only a barb wire fence as an aerial. Her simple-to-operate two-tube portable set makes such stunts easy, even in the midst of the summer's heat

WBAP Quits Broadcasting Music Until September 17

FORT WORTH, TEX.-No more musical programs will be broadcast by WBAP, Star-Telegram station here, until September 17. Then it is planned to resume the concerts ordinarily given daily from 7:30 to 9:30 p. m., Central Standard time.

Noted Writer's Songs Form Fine Program Sent by WOR

NEWARK, N. J .- L. Wolfe Gilbert, one of America's favorite song writers, was an unusually interesting feature on the program of Station WOR, L. Bamberger and company, here recently. He gave a program entirely of his own work.

LETTERS STILL SHOW PARTS OFFER VALUE

MISSIVES FROM FAR AND NEAR INDICATE WORTH

All Points of Compass Swing to Those Who Continue to Voice Appreciation

SPECIAL REWARD OFFER Coupon Number 13

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

Save Me — I Am Valuable

The best test as to the manner in which the parts offer of the Radio Digest is received far and near continues to be the number and tenor of letters from those who have accepted the offer or ask more information concerning it.

Here are a few of the significant missives received during the last few days.

"These coupon offers are a great scheme.
______, Little Rock, Ark." Down in Ohio a young man writes that he is "well pleased" with the socket sent to him; he sent the money for more. From 'way up in Groton, N. H., a young chap sent word that he was "saving up more for some of the more costly apparatus" listed in the parts offer.

Letters from Burlington, Ia.; Toronto, Canada; Granite City, Ill., and Wichita Falls, Tex., show the wide effects of the offer and a deep appreciation therefor.

Rules to Remember

Ona point must be emphasized to those contemplating taking advantaga of the special offer; that is, that the coupons turned in for any item must ha numbered consecutively, as for axampla, 1, 2, 3, and 4 or 3, Tha number of conpons necessary and tha cash remittance, of course, depend on tha ltam sought by tha reader. There is no limit to ths number of series turned in by any ona reader.

Another point to remamher is that cash, checks and money orders but no postaga stamps will be accepted. To maka selection mora simpla tha items have been divided into eight classes, each class depending on the number of consecutiva 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 sant: 1 Carter Imp Jack and Plug; 1 Carter 15-Ohm Resistance Unit; I Schindler .00025 mfd. Build-up Mica Condenser; 1 Schindler .0005 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 Schindler .0025 mfd. Build-Up Mica Condenser; denser; 1 Martin-Copeland Sta Put Plug; Walnart Standard Tube Socket: Walnart UV-199 Socket; Ray-O-Vac Dry Battery, 11/2 volts; Dubilier Micadons Type 601 (.0001, .00025, .0005, .001, .002, .0025, .003 or .004 mfd.); Premier Gird Condenser (.00025 or .0005 mfd.); Premier Variable Resistance; 1 Carter 25-ohm Resistance Unit; Standard Socket Adapter for Dalta Midget Tube; Electrad Grid Leak (1, 1.5 and 2 megohms, with clips); Amsco 3-inch Dial; Amsco Inductance Switch; Freshman Micon Condensers, (.0005, .00025, .00035, .0005, .001, .0015, .002, .0025, or .003 mfd.); Teleradio V. T. Sockst; 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; 3" Radion Dial, black; 2\fmu" Radion Dial, hlack; 3"x1" Radion knob with shafts, \(\frac{1}{2}\text{s}'' \) or \(\frac{1}{2}\text{s}'' \), hlack; 3" Badion Dial with Shafts, \(\frac{1}{2}\text{s}'' \) or \(\frac{1}{2}\text{s}'' \), hlack; 3" Badion Dial with Shafts, \(\frac{1}{2}\text{s}'' \) or \(\frac{1}{2}\text{s}'' \), hlack; 3" Badion Dial with Shafts, \(\frac{1}{2}\text{s}'' \) or \(\frac{1}{2}\text{s}'' \). Dial, ribbed surface.

Class B Articles For four consacutively numbered conpons and sixty cents (\$0.60) any one of the following articles will be 1 Carter .04 mfd. Special Fixed Condenser 1 Carter Jack Switch; 1 Carter Hold-Tite Jack, Ona Spring Open Circuit; 1 Carter Hold-Tita 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 Fadaral Universal Phona Plug; 1 Federal Open Circuit Jack; 1 Federal Closed Circuit Jack: 1 Federal Doubla Circuit Jack: 1 Martin-Copeland Shur Grip Plug; 1 Martin-Copeland WD-11 Sockat: 1 Martin-Copeland WD-11 Adapter; 1 Martin-Copeland UV-199 Socket: 1 Martin-Copeland UV-199 Adapter 1 Martin-Copeland Pull Switch; Martin-Copeland 5-point Inductance Switch; 1 Martin Variabla Grid Leak; 1 Martin-Copeland SPST Knife Switch 1 Martin-Copeland SPDT Knife Switch; 1 Martin-Copeland DPST Knife Switch; 1 Martin-Copeland DPDT Knife Switch; Walnart Variable Grid Leak; Walnart Inductance Switch; Dubiller 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.); Dnbilier Micadon Type 601 (.006 mfd.); Dnbilier By-Pass Condenser (1, .25, or .5 mfd.): Premier Universal Tube Socket; Premier Radio Dial (3/16, ¼, or 5/16 in. black or whita face); Premiar 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, Fllament Control Three Spring; Premier Switch Lever and 10 Points; Turney Web Coil (SW-10 with .038 milhenry inductance SW-15 with .066 MH., or SW-20 with .300 MH.); Amsco 6-Ohm Rheostat: Freshman Fix-O Grid Leak and Condenser; Freshman Variable Resistance Leak (with or without condenser); Freshman Micon Condensers (.006 or .005 mfd.); Teleradio 6-Ohm Rheostat; Teleradio 30-Ohm Rheostat; Teleradio Lightning Arrester; B-Metal Crystal Tune Detector Type A; B-Metal Adjustable Detector Type D; Aerovox Rheostat; Se-Ar-De Vacuum Tuha Socket; Basco Crystal Detector Assambiy; Basco Rheostat, 3-ohm or 6-ohm; 3¼" Radion Dial, black; 4" Radion Dial, black; 4" Badion Dial, black, ribbed surface.

Class C Articles For six consecutively numbered coupons and ninety cents (\$0.90) any one of the following articles will be sent: 1 Carter 6-Ohm Vernier Control Rheostat; 1 Carter

"Tu-Way" Plug: 1 Faderal Panel Mount Sockat; 1 Federal 6-Ohm Bheostat; 1 Federal 3-Ohm (Power) Rheostat; 1 Amperite Automatic Filamant Control (with mounting); 1 Martin-Copeland Marco Rheostat; 1 Martin-Copaland Series Parallel Switch; 1 Martin-Copeland DPDT Panel Switch; 1 Martin-Copeland 7-Point Inductanca Switch; 1 Martin-Copeland 9-Point Inductance Switch; 1 Martin-Copeland 11-Point Inductance Switch; Walnart Variable Grid Leak with .00025 mfd. Condenser; Walnart Variabla Condenser (3-plate .00006 mfd.); Ray-O-Vac Dry Battery, 2 cells 11/2 volts; Dubilier Ducon; Dubilier Micadon Type 600 (.006 mfd.); Dubiliar Micadon Type 610 (.01 or .02 mfd.); Dubilier By-Pass Condenser (1 mfd.), Premier Universal Badio Jack, Filament Control Five Spring; CRL Variabla Grid Leak, without condenser; Premier No. 250 Variabla Resistance, panel mounting; Thordarson Vernier Rheostat

Aerovox Double Slida Tuning Coil; Na-Ald 3-Plate Vernier Condenser, with dlai; Radion Panel &"x7"x18" mahoganite; Radion Panel &"x7"x21", black.

Class P Articles

For twelvo consecutively numbared coupons and ona dollar and eighty cents \$(1.80) tha following will be sent; I Acma Pot-Rheo (potentiometer and rheostat); Walnart Variabla Condenser (23-Plata .0005 mfd.); Ray-O-Vac No. 2151 B Battery, 22½ volts; Duhiliar By-Pass Condenser (3 mfd.); Pramier Variabla Condenser without dial (.00039 mfd.); Thordarson Variable Condenser, .001 mfd.; Amsco Compensating Grid Condenser, Frachman Missan Condenser of the Total Condenser. dansar; Freshman Micon Condenser, 0.25 mfd.; Talaradlo Variable Condenser, 43-plate; Se-Ar-De 3-Plate Condenser; Radion Panel 16"x7"x21", mahoganite; Radion Panel 16"x7"x24", black; Radion Panel 14"x10"x12", hlack; Radion Panel 16"x9"x14", mahoganite; Radion Panel 16"x10"x12", mahoganita.

Jack, Filament Control Five Spring; CRL Variable Grid Leak, without condenser; Premier No. 250 Variable Resistance, panel mounting; Thordarson Vernier Rheestat; Ritter Loop Aerial; Martin Copeland Variable Grid Leak; Amsco Multipla Point Inductance Switch; Amsco 20-0hm Rheostat; Amsco 50-0hm Rheostat; Freshman Antenella; Freshman Micon Condenser, of India or II-plate; Set "Read EZM" Binding Posts (9); B-Metal Crystal Tube Detector Type B; Illinios Cushine Resilient Sockat; Aerovox Antenna Plug; Aerovox Potentiometer; Aerovox Crystal Detector; See-Ar-Da Adjustable Vernier Confenser; Basco Tuning Coli; Basco Vernier Rheostat; Radion Fanel Articles Glass D Articles

For eight consecutive coupons and one dollar and twenty cents (51,20) any one of the following articles will be sent: 1 Carter 20-0hm Vernier Confenser; Radio Frequency Transformer; 1 Martin-Copeland 13-Point Inductance Switch; Ma

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Looking Ahead

How to Drill the Panel for the Five Tube Neutrodyne-Next week H. J. Marx will give the panel layout and further assembly instructions in Part II of his series on the construction of the remarkable Hazeltine Neutrodyne set, the greatest improvement in Radio frequency amplification since its conception.

How a Baldwin Receiver and Various Loud Speakers Operate-will be the topic of Thomas W. Benson in the second part of the fourteenth chapter of, "First Steps for Beginners in Radio." Few Radiophans understand the working of the delicate device which changes the electrical energy back into sound.

Another Single Tube Reflex Circuit—Watch next number for R.D.-95, a modification of the popular reflex hook-up which requires but one tube. This single tube set uses a loop aerial. See it next week.

Haven't You Often Wished You Could Use a Crystal Set on the Locals—and have your set arranged so you could switch over to the tube for long distance stations? Watch for this kink on page twelve of the September 1 issue.

Besides the Above, Remember the Regular Features—Flewelling Answers to Queries, Part III of the Radiophone Broadcasting Station Directory, and a Simplex Picture Diagram for the fans who recognize the pictures of the various Radio parts but do not know the symbols.

Newsstands Don't Always Have One Left

WHEN YOU WANT

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Publisher Radio Digest, 123 West Madison St., Chicago, Illinois.
Please find enclosed check M. O. for Five Dollars (Six, Foreign) for Ona Year's Subscription to Radio Digest, Illustrated.
Nama
Address
City

CHINESE IN ARMS ON JAP MONOPOLY

"Fighting for Air"—American Interests Threatened

SAN FRANCISCO.—"China is literally fighting for the air," said Emmet White, former director of the insular and foreign division of the American Red Cross, who arrived here recently from the Far East.

"Throughout the country," said White. "students and other leaders of progress are holding demonstrations to prevent the monopolization of Radio communication to and from China.

"The British and Japanese are attempting in every manner to have abrogated the Federal Telegraph Company's contract with the Chinese government, which would allow Americans in the field."

Recent dispatches say that the Federal company has been definitely sidetracked. by the Chinese because of Japanese pres-

FIND BURIED TREASURE

(Continued from page 1)

meeting, say those who have witnessed tests of the device. The time may be near, they assert, when, instead of working for a living, a man, meandering in suspected places, may with Green's contrivance find a fortune in the mold. The business of safety-deposit vaults and banks should be enlarged by the new apparatus. But its greatest value is said to lie in its purported ability to find metals or minerals hundreds, even thousands of feet under ground.

Green, since the advent of Radio, has tried to apply it to the transmission of regulated signals or sounds through the earth. During the course of his experimients he learned that, in the vicinity of metalliferous bodies, his machine indicated their presence by a characteristic buzzing sound. This tendency, evinced toward metal objects above ground, was as marked toward subsurface deposits.

Finds Treasure Telling Letter

It was while Green tinkered with what his neighbors called "that contraption" that Carl David of Pointe Coupee, La., found in an old trunk a letter, written in French, telling of the burial of the urn containing the bonds. But that part of the missive which described the location of the treasure had become illegible.

David, having heard of Green and his machine, sought his aid. The two men, carrying the apparatus, plodded many a weary day over the ground formerly owned and tilled by the Frenchman. They waited for the buzz that would reveal the cache. There came many a faint murmur from the earth as if in protest to such violation. Finally there came a loud, distinct, insistent buzz. Green and David stopped and dug. They found, three feet under ground, the urn and the bonds, the latter wrapped in oiled paper.

Gold Found in Baton Bouge

Another reported instance as to the efficiency of the treasure-finder was that in which \$1,700 in gold was said to have been found underground recently in Baton Rouge. This latest test was made in the presence of newspaper representatives from New Orleans and this city,

The contrivance may be described as two wheels or loops mounted horizontally at each end of a frame. These wire wound loops are called "exploring fields." A generator, placed usually about forty feet away from the loop device, produces the power. The operator uses a set especially designed for the detection of the buzz which in volume is said to vary in relation to different metals. A loud buzz means one kind, a low buzz another.

Detects Minerals Six Feet Deep

The waves impinging on the mineral bodies are detected by the sensitive receiver which then emits the buzzing sound. The buzz becomes distinct as soon as either exploring field or loop nears a metal object or area. Metal six feet underground has been found, it is said, by the machine. Its use requires two men-one to carry the exploring fields and receiving set, the other to bear the auxiliary apparatus.

Green has said that his machine has detected the presence of gold, silver and other precious metals in their native state. But he said he has not forgotten his prime object, that of sending Radio messages through the earth, from one side of the globe to another.

So intense is the interest in Green's device that a number of parties for the recovery of the treasure said to have been hidden by Jean Lafitte, the pirate who aided the United States against the British in the war of 1812, are likely to be orsoon. Lafitte's booty is believed to be buried in the lowlands of the Gulf of

WRW Seeks Murderer

TARRYTOWN, N. Y.—The Westchester authorities broadcast through local Station WRW a general alarm recently for a negro wanted as a suspect in the murder of Dorothy Kauffman, a governess, at the home of Magruder Craighead in Greenburgh.

Throughout the United States there are nearly 600 incorporated manufacturers of Radio apparatus.

WRITES CHILD PLAY FOR BROADCASTING

WLW TELLS OF RADARIO READY FOR SENDING

Station in Cincinnati Makes Known Method of Producing Air Theatricals

CINCINNATI, O .- T. C. O'Donnell, who has written several plays and stories for children and spoken from WLW, the Crosley Manufacturing Company here, has written the first original Radario especially for children. It is called "The Magic Journey" and will be given in September from the broadcasting station.

Some new Radiophans do not know that Radario plays were originated by Fred Smith, studio director of WLW. Mr. O'Donnell, editor of Writer's Digest, which is conducting a \$100 prize contest for the three best Radarios, says this about them:

What Is a Radario?

"The word Radario can best be defined by giving a brief history of the broadcasting of one-act plays, as written for and produced on the stage. It was found that with the aid of occasional interpolations by the studio director, describing the entrance and exit of characters, and with each part given by a reader with a distinctive voice, it was possible to render the play so clearly that the listener could

readily follow the play.
"But—directions by the studio director did interrupt the dialogue and the action of the play-to that degree the play failed of perfectly adaption to Radio broadcasting. Fred Smith hit upon a means of obviating this difficulty. His idea was to construct the play so that the dialogue would convey to the listener the entire

How Entrance Is Shown

"For example, in a scene with two young women conversing about the young man whom they are expecting, on his appearance the studio director in the usual play would have said, 'At this point Reginald Fairfield enters and greets the young women. The Radario version would go almost like this:

"Phyllis: Oh, here comes Reggie now!

Hello, Reggie!"
"Reginald: Why, here you are! Hello,
Phyllis! Hello, Dorothy! and the dialogue
would go on smoothly and the entire action be as clear to the listener as though the studio director or 'descriptionist' as he is now called had described the action

"To this new form Mr. Smith gave the name 'Radario,' a word which has quickly become fixed in the language.

"An essential of the Radario is that it tell a complete story, in other words, that it have a plot. It must be brief, not occupying more than twenty minutes on the program. And if variety is introduced in the form of a song by one of the performers or a bit of orchestra music or a novelty such as a whistling solo, so much the

WSY, ONE YEAR OLD, SAYS AIM IS ETHICS

Birmingham's Station Moralizes on Its First Anniversary

BIRMINGHAM, ALA.-Radio broadcasting in Birmingham passed its milestone recently with the usual program by WSY, Alabama Power company station. A brief resume of the accomplishments of WSY during its first year of existence was given by Miss George Bryant, an-

She said, in part: "WSY has been dedicated to the service of Alabama, not to the service of the Alabama Power company. As it has been in the past, our policy in the future will be to keep service on the highest plane efficiency, permitting no one to use it in the furtherance of any individual's, firm's or corporation's interest. It stands for the highest ideals in music, religion and things educational." has been made by the Dominion govern- voted annually for the last two music, religion and things educational."

NOT GLANDS BUT NEW VOICE ENLIVENS WBZ

SPRINGFIELD, MASS.—WBZ, the Westinghouse station here, has been rejuvenated. It has inherited WJZ's old "voice"; installation has begun. The old WJZ transmitter is twice as powerful as the one in use now at WBZ. The inherited "voice" has an antenna input of 1,000 watts, twice as much as that of the New England plant.

MISSIVE PROVES WOC IS HEARD 10,150 MILES

AVENPORT, IA.—Station WOC, Palmer school of chiropractic, has been heard in Manila, Philippine islands. The signals were heard several times last winter by a Major Reickel of the Radio department of the army, it was reported. The report was verified recently when a cousin of the major visited the station and exhibited a letter in confirmation.

WHY THE MOVING MEN WORK



Pearl Eaton (left) and Lois Wilde want everybody to know they have a Radio set, even the neighbors. With this in mind they have placed their loud speaker on the window sill so that the © K. & H. people next door will get an earful of the afternoon concerts

Canada Grant for Telegraph Five Times That for Radio

CALGARY, ALTA.—A grant of \$55,000

tions at McMurray in Northern Alberta, Fort Simpsom, on the MacKenzie River, and Dawson in the Yukon, which will displace the telegraph in use at present from McMurray north and into Dawson. A sum ranging from \$275,000 to \$300,000 has been voted annually for the last twenty-three

ATLANTA JOURNAL'S **NEW STUDIO BEAUTY**

WSB, REMODELED, RANKED AMONG LAND'S FINEST

Equipment of Studio in Southern Newspaper's Plant Not Only Costly but Exquisite

ATLANTA, GA.-Dixie's most beautiful broadcasting studio is now the home of Station WSB, "The Voice of the South."

The Johns-Manville staff of acoustic experts has just completed the remodeling, beautifying and improving of the first sound-deadened concert chamber in the

The Atlanta Journal's Radio studio, although designed and constructed at a time when only two or three similar rooms were in existence, set a precedent in acoustic engineering that many of the finest stations in America have since followed.

WSB's newly remodeled, rejuvenated and redecorated studio, however, represents a further refinement and a marked advance in acoustic science. The new concert chamber will insure even better modulation and clarity.

Beautifully Arranged

And as for appearances, no studio in the South could be any prettier. The color scheme and general design follow the idea of simplicity, as was the case with the original room.

The walls are four inches thick. Alternate layers of especially prepared felt, fibre and cotton fabric occupy the space, with air pockets intervening.

The surface is finished with sound-absorbent fabric, which literally permits the music to filter into the walls instead of rebounding. The principle is exactly the reverse of a sounding board, or shell, used for amplifying and magnifying any tone that strikes it. The only sound allowed to enter the microphone is the original tone as it is sung, played or spoken.

Description of Studio

The ceiling and upper walls are snowwhite. The lower walls are finished with a broad panel of cream-colored monk's cloth, a heavy, loosely-woven fabric. Snow-white paneling separates the upper and lower sections of the walls and divides the background in rectangles.

The windows are curtained with dark blue side draperies and cream-colored inner draperies. The lounge extending around two sides of the room is upholstered in blue. A heavy taupe rug covers the floor.

Decked in its new regalia, the place where WSB's army of artists play and sing for the invisible audience now stands as not only the largest, most modern and technically correct broadcasting chamber in Dixie, but likewise as a real beauty

Work Starts on Second Largest Army Station

Construction Begins on Towers Near Salt Lake City

SALT LAKE CITY, UTAH .-- Actual construction has begun on the towers of the second largest army Radio station in America now being erected at Fort Douglas, near this city. The towers adjoin the present towers east of Mt. Olivet cemetery. The work is in charge of Robert Loghry, Radio engineer of the army. Mr. Loghry said the new station will operate solely on continuous waves and will be designed so that broadcast receivers will not know it is in operation except under unusual conditions.

The new station will be constructed at a reported cost of \$300,000. It will have a capacity of twenty-five kilowatts, with a ten-kilowatt input in the antenna.

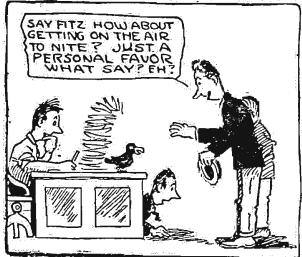
Atlanta Gets Supervisor

ATLANTA, GA.—The Supervisor of Radio for the Fourth District, Walter Van Nostrand, Jr., has opened his office in the Federal Building.

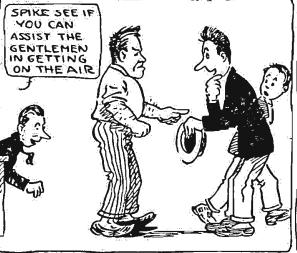
THE ANTENNA BROTHERS

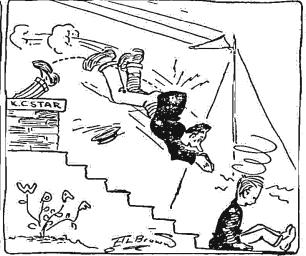
Spir L. and Lew P.

A Bit of Atmosphere









NEW DEVICE OUSTS STATIC, SAYS NAVY

WASHINGTON HAILS TESTS OF NAVY'S CLARIPHONE

More Than 10,000 Pieces Used in Construction of Contrivance Declared Successful

WASHINGTON.—The Scott clariphone, an acoustic device for the elimination of static, will undoubtedly be acknowledged as one of the greatest advancements in Radio communication when perfected, naval Radio experts declare. Through its selective action, the clariphone subdues mechanical sounds of a discontinuous character, sustains the continuous notes and uniformly pitched sounds, thus enabling stations transmitting long distances through static interference to be

read much more easily.

Although the inventor, Chief Electrician William J. Scott, U. S. N., began work on the static eliminator eleven years ago and filed an application in the patent office in January, 1921, little except the name of the filtering device has been made public. Radio Digest first announced the device several months ago. Since successful tests at the bureau of standards and at naval Radio central in Washington, naval officials have decided to release more information regarding the unique apparatus in the interest of those who are also fighting summer static in an effort to perfect Radio communication.

Experiments Indicate Great Future

'While the clariphone is still in its experimental stage, the results obtained from the tests in Radio central seem to indicate that the entire elimination of static may be hoped for in the near future," a naval expert asserts.

Without going into the technical details (and the operation is complicated) the writer can vouch for the fact that the instrument works. While in one of the receiving stations on the third floor of the Navy building a few days ago, naval operators tuned in NPG, San Francisco, faintly through bad static. By changing from the telephone headset on the regular receiving apparatus to a pair of head phones connected with the clariphone, a remarkable improvement was at once noted; the static was reduced materially and the distant signals from San Francisco came in more clearly and sharply. Dispatches from the Naval Stations NBA, Balboa, and NPL, San Diego, were read with ease when the clariphone was connected, whereas the dots and dashes were difficult to distinguish through the phones directly on the receiving set.

How Device Looks and Operates

The apparatus consists of a large metallic chamber or tube about four feet long and eighteen inches in diameter, with adjustable ends. From the chamber eight smaller tubes or "telescopes" project radially in pairs. Each telescope contains a watch-case telephone receiver used for introducing the Radio signals into the receiving chamber. The incoming sound is then passed through the chamber constically where it is broken up several hundred times, the inventor explains, by the internal arrangement.

PATENTS ON RADIO

Can you secure a patent on your Radio invention?
Does your apparatus or circuit infringe existing patents? These questions and others can be answered promptly by consulting my special library of Radio patents compiled to assist Radio inventors and manufacturers. Send for booklet on Radio patents.

Ouray Building

JOHN B. BRADY WASHINGTON, D. C.

FLEWELLING ANSWERS TO QUERIES

By E. T. Flewelling

(Editor's Note.-This department is written | most frequently asked in order that we by Mr. Flewelling, the inventor of the famous super circuit. From the questions sent him each week earc of Radio Digest, he picks the one considered most informative for all and answers it in this column.)

Condenser to Eliminate Capacity

(Submitted by M. E. S., Chicago, Ill.) Question. Quoting from your answer to G. H. D. in the July 28 issue of Radio Digest, you say: "It is a great puzzle to the writer why so many of these condensers are in use when it is so easy to purchase a type that will practically spell the elimination of hand capacity effects." Please do me the favor of telling me what condenser you are referring to and where I can get it.

Answer. Because the number of questions that we answer in this department

All of the static is absorbed by more

than 10,000 separate pieces used in its

construction; exactly how, is not divulged.

To a lesser degree, the signal sounds

themselves are also absorbed in the filter-

is picked up by four microphones, two on

the top of the cylinder and one on each end.

The microphones are connected in paral-

lel to the primary of a transformer, the secondary being connected to a headset

where the operator receives the outcoming

signals after the static is eliminated.

The sound of the signals may also be

heard through two acoustic phones also

attached to the top of the apparatus.

When the emitted sounds are found too

weak, they may be amplified in the usual

mechanism may be the patent office recog-

nizes it as a pioneer invention. Scott has patents pending in the United States and

several foreign countries. The clariphone

will operate for the elimination of static

in Radio telegraphic and even in telephonic

communication, it is said. Scott also liopes

to be able to eliminate all interference

from nearby stations using wave lengths

which are close to the wave length to

Is Routed by Subsea Cable

SAN FRANCISCO.-The only commer-

cial Radiophone link in the world, which

for the last three years has been handling telephone business between Catalina island,

30 miles off the cost of California, and the

wire lines of the Bell system, has been

A NEW

Western Electric

LOUD SPEAKER

DEALERS WRITE!

C. W. THOMPSON COMPANY

MATTOON, ILLINOIS

SEND

MONEY ORDER

which the instrument is tuned.

able for broadcasting.

Only Airphone Trade Link

the internal acoustical

manner.

Whatever

may help the greatest number in the space allowed.

Flewelling evidently "started something" when he referred to the condenser. Queries similar to yours are pouring in but as we are accommodating, here is your answer: the condenser referred to cannot be named in deference to the usual policy but I am sure that you can find such a type if you will look hard enough for it, if not now then in the near future, because some manufacturer or other is going to see the value of it and make such a condenser. You have my word for it that once you find it you will use no other. The matter of body capacity effects comes within the scope of this answer because of the numerous queries concerning it. I can but emphasize previous statements that with properly designed apparatus you will have is of necessity limited we must pick those no body capacity worth bothering about.

Two More Stations for - England's String of Six

ing process. A weaker, but a clear, note British Program Directors Hit Snag in Finding Talent

> LONDON.—Six broadcasting stations are operating in the British Isles. The original plan contemplated eight, and this will probably be carried out by establishing the seventh station at Bournemouth and another at Aberdeen to cover the North of Scotland.

> It was expected that sufficient power could be radiated from station 5SC at Glasgow to serve Scotland, but the Gram-pian Mountains act as a shield for the Glasgow signals, preventing them from reaching the northeast coast with the

proper strength.

The British Radio impresarios are having the same trouble as the program directors in the United States in securing talent to entertain through the air. The Society of Authors, Composers and Playwrights at a recent meeting unanimously agreed that no member of the society should permit his works to be broadcast without a fee. The theatrical interests have broken off negotiations with the broadcasting company, and concert companies have stipulated in contracts with singers that they shall not sing into the microphones.

CANADA FIGHTS RACE TIPS BY AIRPHONE

DOMINION POLICE ASK AID AGAINST GAMBLING

Efforts of Authorities to Suppress "Sporting" Publications
Described as Futile

TORONTO, ONT.-Provincial police authorities of Ontario, engaged in a campaign to suppress the circulation of racing "tip" publications, are seeking the co-operation of the Radio license branch of the dominion department of agriculture.

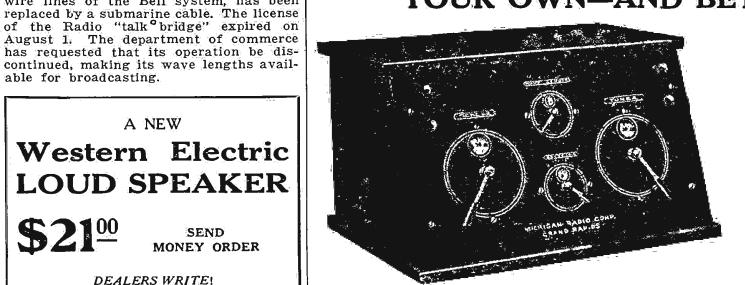
The provincial police say they have information that several racing tip publishers have already made arrangements to supply subscribers by means of Radio, and will ask that licenses of broadcasting stations sending such data be revoked.

Authorities Question Remedy

It is understood that the attitude taken by the inspectors of the dominion Radio license branch is that the revocation of Canadian broadcasting licenses would put out of business only a half dozen racing tip publishers in Toronto and Hamilton, while subscribers to Buffalo racing tip services could receive their tips with little danger of interference. Radio receiving sets are so numerous and common in Ontario, and change hands so frequently, that the Radio inspectors would be put to unreasonable work and trouble to gather all unlicensed sets owned by persons interested in betting on the races or suspected of peddling racing information received by Radio.



CHEAPER THAN BUILDING YOUR OWN—AND BETTER



The Michigan Midget **Keceiver** \$27.00

A Long-Distance Wonder Worker

We get stations from coast to coast, including all the new wave-lengths up to 600 meters, with the "Midget," and they come in clear and strong.

Use standard 6-volt tube or any of the new low-voltage dry cell tubes.

Tho the handsome mahogany-finish cabinet is only 141/2 in. long, it holds three No. 6 dry cells and one 22½ volt B

Sloping front panel, with lever-tuning, is a great improvement on straight panel and knob-and-dial tuning. Easier, more accurate.

Receives through one or more head phones.

Add our two-stage amplifier for loud speaker reception. Send for the Midget circular. Give name and address of your favorite radio dealer.

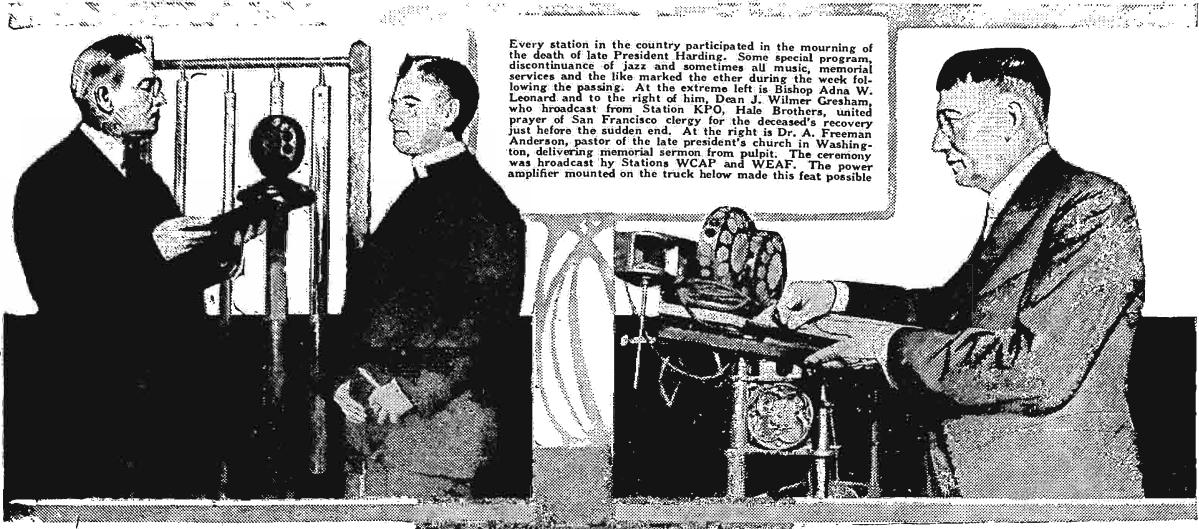
DEALERS. The Midget is a quick-turnover seller and every sale creates others—a wonderful endless-chain of satisfaction.

MICHIGAN RADIO

GRAND RAPIDS, MICHIGAN



PLANTS JOIN IN MOURNING HARDING



Above and Right @ Int.

TWIN CITY BUSINESS **BACKS STATION WLAG**

PACT SIGNED FOR JOINT OPERATION OF PLANT

New Programs to Announce That Broadcasting Is from "Land of 10,000 Lakes"

MINNEAPOLIS, MINN.—Contracts for the joint operation of Station WLAG here as a Twin Cities broadcasting station and contracts for the joint maintenance of the station were signed by a group of St. Paul and Minneapolis business men recently. The consolidation has gone into effect already, as has a new Twin City program schedule. A total subsidy of \$48,000 for the maintenance of the station for the fiscal year August 1, 1923 to August 1, 1924, was subscribed at the meet-

The announcement was made by Theodore Sander, jr., industrial secretary, St. Paul association.

\$16,000 from St. Paul

Two St. Paul firms and two St. Paul groups subscribed \$16,000. This represents four shares at \$4,000 each at par. Two additional shares will be disposed of to St. Paul firms or St. Paul groups, Mr. Sander said.

The St. Paul firms include Brown and Bigelow and the Purity Baking company. The St. Paul groups represent the wholesale and jobbing and the retail subdivisions of the St. Paul association.

Physical properties of the station will be maintained as at present at the Oak Grove hotel. A St. Paul studio is to be established soon, Mr. Sander said. exact location had not been determined.

"From Land of 10,000 Lakes"

Joint committees of the two cities are at work on schedules of entertainment to be provided by the station. The same committees also will be in charge of program arrangements, once the schedule of entertainment has been perfected.

The station will retain its call, WLAG, but will announce itself in programs as the Twin Cities broadcasting station "from the land of 10,000 lakes."

CUTTING GAINS VICTORY

(Continued from page 1)

to his selling his patent to the Westinghouse Company. The fireworks were started by the Radio Corporation of America, in a spring suit against J. H. Bunnell & Co., Inc., and A. H. Grebe & Co., Inc. These were followed, in turn, by suits against the Radiocraft and De Forest companies, Cutting and Washington and now Klitzen.

Claim Demoralization Aim All these suits, friends of the small independent manufacturers of regenerative sets. who bought their license rights from E. H. Armstrong while he was practically unheard of and ignored by the Westinghouse

Company, claim have been brought for the sole purpose of demoralizing the production of usefulness for the filament and thereof independent Radio sets, more than for fore shortens the life of the tube.

Above © K. & H.

Tennis Star Broadcasts Tips from 2LO, London

Famed Suzanne Delights Thousands with Piquant Stories

LONDON.-Mile. Suzanne Lenglen, the famous lawn tennis star, recently entertained hundreds of thousands of listeners in with a piquant talk about herself and her habits. She broadcast over 2LO, Marconi house here. In winning French manner she tripped from one thing to another, and surprised her unseen audience with her command of English. She told her admirers how she kept her stockings up in play, why she sometimes cried on the court, what is like to be a champion at Wimbledon, and what a false legend it was which depicted her as a slave of her father, who was really very kind and

any other purpose. It is said that these suits are part of a plan of the Radio Corporation of America and the Westinghouse Company to monopolize the manufacturing of all regenerative Radio sets under the Armstrong patent. If successful, it is said, the Radiophan would pay dearly for the legal victories of the alleged trust over the smaller set-makers who are not able to set aside such large sums of money for court ignting purposes.

"Just a trick to frighten the Armstrong licensees," said a prominent independent Radio manufacturer in commenting on the latest suit of the Westinghouse Company.

"Big Firm Heckling Licensees" "Seems the Westinghouse people are only trying to heckle the Armstrong-licensed independent manufacturers at the opening of the Radio season, to gain a distinct advantage in sales. It is a well-known fact that the alleged trust for some time has been collecting volumes of evidence against non-licensed manufacturers, who, it is claimed, are daily infringing the Armstrong patent, yet no suit has been entered against any of these infringers. There is only one conclusion and that is that the trust is afraid to test the legality and validity of the Armstrong patent, owing to many questionable developments since the last adjudication."

"The Armstrong patent situation is similar in analogy to the Selden tie up in the automotive industry. Not until the Selden patent was broken and shown invalid did the automobile make the rapid strides that it has. Well-established rumors are affoat that the Armstrong patent is in the same fix as was the Selden. It is said that the regenerative principle was in use considerable time prior to E. H. Armstrong's sworn date of conception of his invention, and that definite proof, even the apparatus, is in the possession of certain persons who are prepared to show the Armstrong patent is not valid on priority."

When Tube Life Is Cut

Vacuum tube filaments should never be operated with a greater filament current than is absolutely necessary as the tungsten wire forming the filament evaporates rapidly when the current is increased sufficiently to render the metal white hot. Naturally this results in curtailed hours

AN EVENING AT HOME WITH THE LISTENER IN

								
Station and City	Mct.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCA Toronto, Ont	400	6:00- 7:00	G:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:00- 7:00	6:45- 7:45
CFCN, Calgary, Alta.	440	10:00-11:00		*****	1121111111111		11:00- 1:00	
CKAC, Montreal, Que	430		6:00- 9:00		6:00- 9:00		6:00- 9:00	3:00- 4:30
KDKA, E. Pittsburgh, Pa	326	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	5:00- 9:00	6:30- 7:30
KFAF, Denver Colo	360	9:00-10:00	9:00-10:00		9:00-10:00	9:00-10:00	9:00-10:00	
KFL Los Angeles, Calif	469	8:45- 1:00	8:45- 1:00	8:45- 2:00	8:45- 1:00	8:45- 2:00	8:45- 2:00	10:00- 1:00
KGW. Portland, Orc	492	9:30- 2:00	12:00- 1:00	10:00-11:00		9:00- 2:00	12:00- 1:00	9:00-10:00
KHJ, Los Angeles, Calif	395	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	8:45-12:00	10:00-12:00
KPO, San Francisco, Calif	423	10:00-12:00	10:00-12:00		10:00-12:00	# # m m m m m m m m m m m m m m m m m m	10:00- 2:00	10:00-12:00
KSD, St. Louis, Mo	546	8:00-10:00	8:00-10:00	8:00-10:00	a angradapanapana a	8:00-10:00	8:00-10:00	मानुष्यास्तुत्र सामृत्यामुख्य
KYW, Chicago, Ill	345		7:00- 9:00	7:00- 9:00	7:00- 9:00	7:00- 9:00	7:00- 9:00	6:00- 7:00
NAA, Radio Va	435	5:45- 7:20	6:05- 7:20	6:25- 8:40	5:45- 7:40	7:00- 7:40	444464444	sije aratera araje e
PWX, Havana, Cuba	400	48-11-11-6	*****	8:00-10:30	*********	-941	8:00-10:30	12122112
WBAP, Fort Worth, Texas.	476	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	9:30-10:30	7:00- 7:30	7:30- 8:00
WBZ, Springfield, Mass	337	5:00- 8:00	6:30-8:00		6:30-8:00	5:00- 8:00	6:30-8:00	7:00- 8:00
WCX, Detroit, Mich	517	7:00-10:00	7:00-12:00		7:00-10:00	7:00-10:00		4:00- 5:00
WDAF, Kansas City, Mo	411	6:00- 1:00	6:00- 1:00		6:00- 1:00	6:00- 1:00	6:00- 1:00	11:45- 1:00
WDAJ, College Park, Ga	258	7:30-11:30		10:30-11:30	7:30-11:30	7:30-11:30		7:30-11:30
WDAP, Chicago, Ill. WDAR, Philadelphia, Pa	360	5:30- 6:00	9:00- 1:00 5:30- 8:00	E-20 0.00	9:00- 1:00 5:30- 6:00	6.00 1.00	9:00- 1:00	8:00-11:00
WDT, New York, N. Y	395 405			5:30- 9:00 5:00- 5:50	3:30- 0.00	6:00- 1:00 9:00-10:00	5:30- 6:00	* * *)*;* * * *;*;* *
WEAF, New York, N. Y	492	व्यक्तिक स्थान	5:30- 6:00		5:30- 8:00	5:30-10:00	5:30- 8:00	******
WFAA, Dallas, Tex	476	8:30- 9:30	8:30-12:00	3.30- 6.00	8:30- 9:30	8:30- 9:30	8:30-12:00	9:30-11:00
WFI, Philadelphia, Pa	395	5:00- 5:30	5:00- 7:00	5:00- 9:30	5:00- 7:00	5:00- 5:30	0:30-12:00	5:30- 6:30
WGI, Medford, Mass	360	0.00- 0.00	6:30- 8:00		6:30- 8:00	6:30- 8:00	6:30- 8:00	6:30-10:00
WGM, Atlanta, Ga	429	9:30-10:30		12:00- 1:00	9:30-10:30	9:30-10:30	9:30-10:30	7:30- 8:00
WGR, Buffalo, N. Y	319	6:00- 8:00	*******	6:00- 8:00		6:00- 8:00	*****	
WGY, Schenectady, N. Y	380	6:45- 9:00	6:45- 9:00		6:45- 9:00	6:45-11:00		5:30- 6:30
WHA, Madison, Wis	360	7:30- 8:30		7:30- 8:30		7:30- 8:30	**************************************	
WHAS, Louisville, Ky	400	9 T 4 4 5 Y 4 1 4 Y	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	7:30- 9:00	*****
WHAZ, Troy, N. Y	380	8:00- 9:30						
WHB, Kansas City, Mo	411	أفيعه وميوره و	8:00-10:00	مخفوه وخران سوسا	8:00-10:00	*****	2492494444	8:00-10:00
WHK, Cleveland, O	360	5:00- 5:30	5:00- 5:30	7:00- 8:55	5:00- 5:30	5:00- 5:30	5:00- 5:30	7:00- 8:55
WIP, Philadelphia, Pa	509	4:00- 5:30	5:00-10:00	5:00- 5:30	5:00- 8:00	5:00- 5:30	6:00-10:00	a grajela arakara a
WJAX, Cleveland. O	390	के के संक्ष्म के संक्षा है।	6:30- 8:30	444		12.12.11.11	ay ay ay ay ay	71122123
WJAZ, Chicago, Ill.	448		9:00- 1:00	9:00- 1:00	9:00- 1:00	9:00- 1:00	9:00- 1:00	4:00- 7:00
WJY, New York, N. Y WJZ, New York, N. Y	405	5:30- 9:30	F-20 0.20	5.20 0.20	5:30- 9:30	5:30- 9:30	-1-22-2-2-22	1:15- 4:00
WYAO Son Juan D D	455	5:30- 8:30	5:30- 9:30 9:25-10:55	5:30- 9:30	6:30- 9:30	5:30- 9:30	5:30 9:30	6:30- 8:30
WKAQ, San Juan, P R WLAG, Minneapolis, Minn.	360 417	6:30-10:30	6:30-10:30	*******	5.20 10.20	6.20 10.20	9:25-10:55	7.20 0.20
WLW, Cincinnati, O	309	7:00- 9:00	9:00-11:00	7:00- 9:00	5:30-10:30 9:00-11:00	6:30-10:30	6:30-10:30	7:30- 8:30
WMAQ, Chicago, Ill	448	1.00- 3.00	6:00- 9:00	6:00- 9:00	6:00- 9:00	6:00- 9:00	6:00- 9:00	*****
WMC, Memphis, Tenn	500	8:00- 9:30	8:00-12:00	0.00- 2.00	8:00- 9:30	8:00-12:00	8:00- 9:30	
WOAL San Antonio, Texas.	385	44.44.44.44.44	9:30-10:30		7:30- 8:30	70.00-12.00	0.00- 5.50	9:30-10:30
WOAW, Omaha, Neb.	528	9.00-10:00	9:00-10:00		9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00
WOC, Davenport, Ia.	484	7:00- 8:30	*********	10:00-11:00	7:00- 8:30	7:00- 8:30	9:30-10:30	
WOO, Philadelphia, Pa	509	5:45- 9:00	T 4: 0: 4 % 4 4:414 #			5:45- 9:00	0.00-10.00	
WOR, Newark, N. J.	405	6:00-10:00	5:15- 6:30	6:00-9:00	5:15- 6:30			
WOS, Jefferson City, Mo	441	8:00- 9:30		8:00- 9:30	#2 # 58 # \$7 #9 #3 # # #	8:00- 9:30		
WSAI, Cincinnati O	309	agrajorajaja aras	7:00-9:00		7:00-9:00		9:00-11:00	
WSB, Atlanta, Ga	429	7:00-12:00	7:00-12:00			7:00 12:00	7:00-12:00	
WSY, Birmingham, Ala	360	8:00-8:45	11:00:00:00:	8:00- 8:45	**********	8:00- 8:45		7:30- 8:30
WWJ, Detroit, Mich	517	6:00- 7:30	6:00- 7:30	6:00- 7:30	6:00- 7:30	6:00- 7:30	ariesinis.	4:30- 5:30

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

UNCLE SAM TO TAP **BOWELS OF EARTH**

SURVEYORS TO TEST RADIO IN CANYON MILE DEEP

Party of Ten Geologists Begins Long Journey from Arizona Only with Receiver

PHOENIX.—Equipped with a special Radio receiving set, a party of ten explorers from the geological survey left Lees Ferry in northern Arizona early in August, for a 300-mile trip down the Colorado to the mouth of the Virgin River, at Rioville, Nev.

Unfortunately these modern surveyors, who are following the route first explored by Major Powell fifty-four years ago, were unable to carry a transmitting set, due to weight and space. But they are carrying a modern receiving set and will be able to hear what is going on in the world during the three months, although they will be unable to relate daily their adventures.

Arrangements have been made, however with the Radio stations of the Deseret News, KZN, Salt Lake City, and the Los Angeles Times, KHJ, to broadcast bulletins sent from trail crossings.

To Tell World of Rapids Trip

The dispatches will be relayed by runners and telephone or telegraph when the party gets far enough down the Colorado to reach the regular lines of communication. In this manner the world will be advised of the progress of the exploration in the canyon and passage of the four boats through some of the wildest rapids in the country.

The special Radio set was reconstructed by R. L. Atkinson of the survey, from a manufactured regenerative set, adapted to two stages of amplification with new The whole outfit, including the batteries, is packed in a waterproof, wooden box with sponge rubber to keep it from jarring during the long boat trip. An especially constructed antenna on a reel, capable of being erected at camp sites on the banks of the river, can be strung from short poles or from projecting rocks to a length of 150 feet.

Expect to Find "Dead" Spots

A preliminary Radio test at Lees Ferry has already been made. It is reported that the explorers received broadcasts from Los Angeles, 430 miles away, without difficulty at night. The real reception test, Col. C. H. Birdseye, in charge of the party believes, will come when they are in the lowest part of the canyon, estimated as a mile deep, near El Tovar, where dead spots and static may be encountered.

Besides the geological and topographical results achieved, the trip will also prove of material interest in the development of Radio communication, in relation to experiments undertaken by the bureau of mines and other governmental bureaus to see how far Radio will carry into the "bowels of the earth."

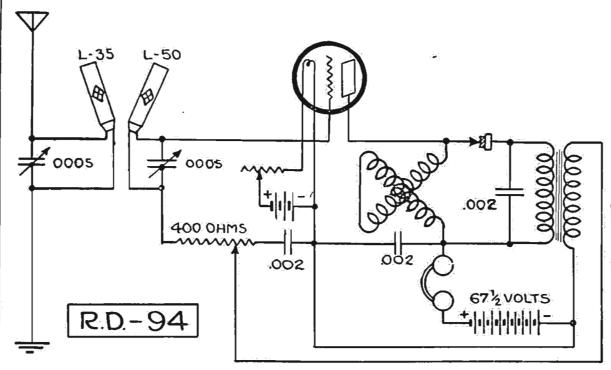
Out to Improve Air

BUFFALO, N. Y.—The Buffalo Chamber THE PERFECT SYNTHETIC of Commerce has named a special committee to study methods of improving all forms of Radio communication in the Buffalo district. The committee consists of John F. Condon, W. T. Huber, John B. McKillen and August C. Smith.

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.

SINGLE TUBE REFLEX CIRCUIT



SINGLE tube reflex differing considerably from the type usually seen is presented in the diagram R.D. 94. This circuit is used wth a good outdoor antenna and ground.

The tuning element consists of two inductively coupled honey-comb coils, each shunted with a .0005 mfd variable condenser, preferably with vernier control. If the antenna is high and long it may be advisable to use a .001 condenser in the primary, and to connect it in series on the antenna or ground side.

The coupling from the first tube to the crystal detector is accomplished through the use of a variometer, which should be of the type with low internal capacity. The cheaper types are by no means recommended.

The crystal detector can be of the fixed or adjustable type. Naturally care should be taken that an efficient detector is selected. Any of the average standard audio frequency transformers will serve. Three by-pass condensers of .002 mfd capacity are used. The 400 ohm potentiometer controls the reflexing of the audio frequency currents and helps stabilize the tube.

The voltage of the plate battery should be at least 67½ or even more if the tube and transformer will permit it. Many of the dry cell tubes are found to operate unsatisfactorily in reflex work so the tubes to be used should be carefully selected and tested.

This circuit is a simple one in tuning and will give very satisfactory results in relation to local and long distance receiving.



TECTOR, SENSITIVE OVER ENTIRE SUR-FACE. No Hunting for "Spots." Loud and Clear. Endorsed by thousands of satisfied users. Sensitiveness Guaranteed. Price, Mounted.....

RUSONITE REFLEX CRYSTAL. Manufactured Expressly for Reflex Circuits. Will Stand Up Under Heavy Plate Voltage. Guaranteed. Price, Mounted. \$1.00

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

New GREBE Broadcast Receiver

has Seven Points of Satisfaction



Government Cuts Funds but New Norway Radio Succeeds

WASHINGTON, D. C .- The Norwegian government telegraph administration has received Radiophone apparatus for the plant at Bergen, Norway. Preliminary tests have been very successful but the installation has not aroused the interest that was expected, mainly because the appropriation for duplex apparatus to enble the simultaneous transmission of messages both ways was stricken from the estimates. The proposal for a new telephone line between Bergen and the Rundemanden Radio station has met the same



James Curtis of Michigan writes, "I used to get 3 stations at one time until I bought a Ritter Loop: now I can tune out any station I choose."

RITTER PORTABLE LOOPS are directional. Price \$1. By mail 10c extra.

RITTER RADIO CORP. 230 Canal Street, New York City

LAWS HALT GERMAN ADVANCE IN RADIO

Prohibition of Private Sets Stifles Ambition, United States Consul Reports

BERLIN.—The German Radio club of this city has attracted a considerable membership and is at present endeavoring to bring pressure to bear on the govern-ment to relax prohibition of private installations. All Radio is under the monopolistic control of the posts administration.

The American consul reported recently: "It is in a sense surprising that in respect to private Radio enterprise Germany is so far behind other countries. Commenting upon this circumstance at a meeting of the Radio Club recently, a wellinformed speaker interested a large gathering of members with an outline of recent Radio progress and cited the experimental work of Slaby, Braun, Graf Arco Goldschmidt, and the Meissner brothers, as deserving special appreciation. It is, he said, to the Meissner brothers that the world is indebted for the present method of amplification which makes possible the manufacture of small pocket sets now so popular in the United States.

By means of a small closed circuit (loop) antenna demonstrated by the speaker, London was easily heard. He concluded his lecture by saying. "Wbereas in former times Germany was well in the front in Radio matters, it is now far behind, as a result of official opposition."



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The Week's Advance Broadcast Programs

Tuesday, August 21

CFCA (Eastern Daylight Saving, 400), 8:00-9:00 P. M., Overture, Selection from "The Barber of Seville," Star Concert Ochestra; "Queen of the Earth, Albert Downing, tenor; "Hungarian Dances No. 2." Mannie Roth, Violinist; "Laughing Eyes," Star Concert Orchestra; "For You Alone," Albert Downing, tenor; "Espana," Star Concert Orchestra; "Ylenness Melody," Mannie Roth, Violinist; "Thou Art Risen My Beloved." Albert Downing, tenor; Selection from "Gypsy Love," Star Concert Orchestra.

KH1 (Pacific, 395), 12:20-1:15 P. M., Concert; 2:30-3:30, Matinee musicale; 6:45-7:30, Children's hour, presenting Phyllis Jones, piznist, nine years of age, and Edwin Peters, reader; 8:00-10:00, De Luxe Program, Sir Frank Popham Young, in readings, KDKA (Eastern, 326), 5:15 P. M., Dinner concert, Grand Symphony Orchestra; 6:55, Children's Period; 7:20, Concert by the Lion's Club, KGW (Pacific, 492), 10:00-11:00 P. M., Dance music by George Oisen and his orchestra.

KSD (Central, 546), 8:00 P. M., Musical program, KPO (Pacific, 423), 8:00-10:00 P. M., Marian Patricia Cavanaugh, pianist; Samoset Glee Club, Musacus Trio; Alice Bradley, soprano; Mme, Durine, accompanist, KYW (Central, Daylight Saving, 345), 1:35-2:00 P. M.,

Caranaugh, pianist; Sainoset Glee Cuo; Musacus Trio; Alice Bradley, soprano; Mme. Durine, accompanist.

KYW (Cantral, Daylight Saving, 345), 1:35-2:00 P. M., Concert, Lyon & Healy Concert Dept.; 5:50, Children's Bedtime Story; 7:00-758, Musical program, courtesy of Giovanni Gennaro's School of Italian Bel Canto; Cope Harvey's orchestra, College Inn, Herble Minta, pianist; Sallie Menkes, accompanist.

WBZ (Eastern, 337), 5:45 P. M., Organ recital, Mrs. Elsis Robbins Gross, organist; 6:30, Bedtime story for children: 7:00, Concert, Ruth Drummoud, soprano; Nina J. Feriole, baritone; Pauline Cabrelli, pianist and accompanist.

WDAR (Eastern, Daylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; Dinner music, Arcade Cafe Concert Orchestra; 2:10-3:00, Musical program, 4:30-5:55, 'Affairs of the Haart,' Betsy Logan; 7:30-8:00, Bedtime stories, Dream Daddy.

WDT (Eastern, Daylight Saving, 405), 12:00-12:30 P. M., Vocal sclections, "Hop, Skip and Jump," "Decze, Dozo and Dem," "I Don't Care Whose Mama You Are," Harry Pease and Ed Nelson, composers and singers; "Wonderful One," "Swinging Down the Lane," 'Fancy Nancy Clancy," Jimmy Flynn, Jack Val, accompanist; "Carolina Mammy," "Cut Yourself a Piece of Cake," "Crying for You," Lewis Piotti, Jack Val, accompanist: "Blue Hoosier Blues," "Hi-Lee Hl-Lo," "Runnin' Wild," Bob Miller, Jack Williams, French harpist; Louise Jarman, planist; 1:00-12:00, Kidd Springs Orchestra, Paul E. Ashley, directing.

WFA (Eastern, Daylight Saving, 395), 1:00 P. M.,

Williams, French harpist; Louise Jarman, plants, 11:00-12:00, Kidd Springs Orchestra, Paul E. Ashley, directing.

WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner dance music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Song recital; 7:00-7:30, Safety talk, Stanley Cowman; 8:00, Boy Scout Radio Corps, under auspices Boy Scouts of America; 8:30, Song recital; 10:30, Dance music, Meyer Davis Bellevue Stratford Dance Orchestra.

WGI (Eastera, 360), 12:00 Noon, Organ recital on the Estey Reed Organ, Mr. E. Lewis Dunbam; 7:30 P. M., Concert, arranged by Charles L. H. Wagner, poet and composer.

WGR (Eastern, Daylight Saving, 3:19), 11:45 A. M., Weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard at the Wurlitzer, Hotel Statler; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 6:30-7:00, George Albert Bouchard at the Wurlitzer, Hotel Statler; 7:00-8:45, Digest of the day's news, topics of scientific interest; Evening (time indefinite), banquet and reception, National Association of Insurance Agents, Hotel Statler; 11:45, Second weather iorecast.

surance Agents, Hotel Statler; 11:45, Second weather forecast.

WGY (Eastern, 380), 7:45 P. M., Sbakespearean program, Orchestra selection, "Songs from Shakespeare's Time," including "British Grenadiers," "The Hunt Is Up," "Come Again, Sweet Love," 'You Gentlemeu of England," "The Knitting Song," Greenwood Orchestra; Reading, 'Love Looks Not with the Eyes," from "Midsummer Night's Dream," Ruth Schilling; "Merchant of Venice," Edward H. Smith and Frank Oliver; Orchestra selection, "Morris Dance"; Reading, "Romeo and Julet," Ruth Schilling and Edward H. Smith; Selection, "Danse Bretonne"; Reading, "Merchant of Venice," E. H. Smith, assisted by Frank Oliver; Selection, "Shepherd Dance," from "Thenry VIII'; Reading from "Twelfth Night," Ruth Schilling, E. Smith and Frank Oliver; Orchestra selection, "Wedding March," from "Midsummer Night's Dream."

WHAS (Gentral 400), 4:00.5-00 P.

Night's Dream.

Night's Dream."
WHAS (Central, 400), 4:00-5:00 P. M., Concert by the Mary Anderson Theatre Orchestra; Ollie Jones, conductor; 7:30-9:00. Concert by Bits Orchestra.
WIP (Eastern, Daylight Saving, 509), 1:00 P. M., Organ recital, Karl Bonawitz Germantown Theater; 3:00, Minsical selections; 6:00, Dinner music, WIP Concert Orchestra, Dick Regan, director; 7:00-7:30, Bedtime stories, Uncle Wip; 8:00, Short talk; 8:15, Song recital.

Concert Orchestra, Dick Regan, director; 7:30-7:30, Bedtime stories, Uncle Wip; 8:30, Short talk; 8:15, Song recital.

WIAX (Eastern, 390), 7:30 P. M., Special musical program, Cleveland News Leader.

WLW (Eastern, 309), 10:00 P. M., Selections, Circle Dance Orchestra and Police Quartet, Fred Orth, tenor; H. Edward Dean, 2nd tenor; Edward Boeneke, baritone; Arlington Beebe, bass.

WDC (Cantral, 484), 12:00 Noon, Chimes concert; 5:45 P. M., Chimes concert.

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

WWJ (Eastern, 517), 9:45 A. M., Fred Shaw, planist and songster, and Vera Collins, planist, presenting "Ironing Day" program: 12:05 P. M., Detroit News Orchestra; 3:00, Concert, Schmeman's Band; 7:50, Concert, Detroit News Orchestra.

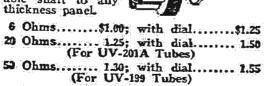
Wednesday, August 22

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P. M., Overture, "The Marriage of Figaro," Star Concert Orchestra: "The Watchful Lover," Elcho Fiddes, tenor; "Berceuse," Jacques Sterin, cello solo; "En-trance of the Boyers," Star Concert Orchestra: "Song of Extle," Elcho Fiddes, tenor; Intermezzo from



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Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Music; 2:30-3:30,
Matinee musicale, Lucila Leon, planist; 6:45-7:30,
Children's hour, Helene Pirie, six years of age,
reader; Redtime program; 8:00-10:00, Do Luxo pro-

gram, Graco Senior Brearley, planist.

KDKA (Eastern, 326), 5:15 P. M., Dinner concert,
Little Symphony Orchestra, Victor Saudek, director;
6:45, Children's period; 7:20, Concert, Little Sym-

barltone; "A Perfect Day," Clyric Quartette; "Lovo Sends a Little Gift of Roses," W. S. Struber. WFI (Eastern, Daylight Saving, 395), 1:00 P. M., Dinner music, Meyer Davis Believue Stratford Concert Orchestra; 6:30, Concert, Meyer Davis Believue Stratford Concert Orchestra; 7:00-7:30, Children's half bour, Stories by Cousin Sue.

WGI (Eastern, 360), 12:00 Neon, Organ Recital, E. Lewis Dunham, on the Estey Roed Organ; 5:00 P. M., "Twilight Tales," Eunice L. Randall; 6:45, Girls' Hour, Eunice L. Randall; 6:45, Girls' Hour, Eunice L. Randall; Camp Fire Girls," by "Big Smoke"; 7:30, Concert, Dean Winslow Hanscom, Dramtic Tenor.

What Time Is It?



Pacific



Pacific Daylight

Saving



tain Daylight Saving



Saving



Central Daylight Daylight

HE 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.

phony Orchestra, Thomas A. Snllivan, tenor.

KDKA (Easters, 326), 5:15 P. W., Dinner concert,
Westinghouse Band, T. J. Vastine, director; 6:45,
Children's period; 7:20, Concert, Westinghouse Band.

KGW (Pacific, 492), 3:30-4:00 P. M., Children's program, music and story by Aunt Nell; 8:00-9:00,
Musical program, by Genevieve Gilbert, assisted by
G. Randelph Thomas; 10:00-11:00, Dance music by
George Olsen and his orchestra

KSD (Central, 546), 8:00 P. M., Musical program of
Fashion Show, broadcast from Municipal theater.

KWY (Central, Daylight Saving, 345), 5:50 P. M.,
Children's Bedtime story; 7:00-7:58, Musical program, Elsie Ferguson Calvin, soprano; Louise Carter
Richardson, pianist; John Stamford, tenor; Cope
Harvey's orchestra at College Inn, Harry Geise,
pianist.

Harvey's orchestra at College Inn. Harry Geise, pianist.

PWX (Inter-colonial, 480). Concert, General Statt Band of the Cuba Army.

WBZ (Eastern, 337). 5:30 P. M., Dinner concert, "Morning, Noon and Night," "Le Beve," "Sobre las Olas," "Divertisement," piano solo, "Loin du Bal." "Love Song," "Orientale," "Panquita," "Guardmont Patrol"; 6:30, Bedtime Story for the Children; 6:50, Humorous program; 7:10, Concert by Grace Loomis Kempton, soprano; Elmer Paddock, barifone; Marion Abbott, pianist; Fabriola Richardson, soprano, assisted by the WBZ trio, "Rakocsy," "Andante Sostenuto" (cello solo), "Epithalame," "Scherzo," "Minuet."

"Minuet."

WDAR (Easters, Daylight Saving, 395), 12:00-12:54
P. M., Organ recital, Stanley Theater: Dinner music,
Arcade Cafe Concert Orchestra; 2:00-3:00, Musical
program, Arcade Cafe Concert Orchestra, Feri Sarkozi, director; 4:30-5:30, Song recital; 7:30, Bedtime
stories, Dream Daddy; 8:30, Dance music and special features, Howard Lanin and Arcadia Cafe Dance
Orchestra

Orchestra.

WDT (Eastern, Daylight Saving, 405), 12:00-12:55
P. M., Concert, Roosevelt Garden Orchestra, direction
Aldo Ricci; Songs by Will Donaldson and Sam
Coslow; Vocal selections, Sam Wallace; 7:00-8:00,
Walt Stevens, tenor; "The Viking," "Honey Babe,"
Clyric Quartette; "Barbier De Seville," W. S. Stuber,

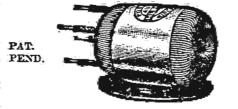
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WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Weather forecast for Lakes Erie and Ontario marine and aviatiou interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicago Board of Trade, New York Stock Exchange; 6:30-7:00, George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news; Evening (time indefinite) Ball-room music, annual ball, National Association of Insurance Agents; 11:45, Weather.

WHAS (Central, 400), 4:00-5:00 P. M., Concert by the Mary Anderson Theatre orchestra; Ollie Jones, conductor; 7:30-9:00, Concert, under the auspices of Grace Adams Stephens.

WHK (360, Eastern), 8:00 P. M., Musical numbers by WHK Trio; Road reports; Babson's Radio release.

WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Recital; 6:00, Jordan Lewis Dance Orchestra; Baseball scores; 7:00-7:30, Bedtime stories, Uncle Wip, WLW (Eastern, 309), 8:00 P. M., Selections, Arnold's orchestra, Walter, piamist, Walter Diefel, violinist, Charles Jester, saxopbonist, Charles Jester, saxopbonist, Charles Tester, aaxopphonist, Joe Aprile, banjo, Larry Schroeder, traps; Marie Lindsey, violinist, Helen Lindsey, accompanist; Selections, W. Arnold's Dance Orchestra; Emma Beiser Scully, pianist; featuring original compositions; Songs by William Scully, Jr.; Emma Beiser Scully, pianist; Songs, Ella Marshall Cox; Selections, W. Arnold's orchestra.

WOC (Central, 484), 12:00 noon, Chimes concert; 6:30 P. M., Sandman's Visit; 8:00 Pipe Organ recital, Edwin Swindell, organist, Pearl Weaver, contralto; 10:00, Artist Musical Program, Erwin Swindell, director.

W00 (Eastern, Daylight Saving, 509), 11:00-11:30 A.
M., Organ rocital, Mary E. Vogt; 12:00-12:55 P. M.,
Lunchcon music, Wanamaker Tea Room Orchestra;
4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sport results and police reports.
WWJ (Eastern, 517, 12:05 P. M., Concert, Detroit News orchestra; 3:00, Concert, Sheman's band; 7:00, Concert, Detroit News Orchestra.

cert, Detroit News Orchestra,

Thursday, August 23

CFCA (Eastern, Daylight Saving, 400). 8:00-9:00 P. M., Schetion from "The Mikado," Star Concert Orchestra; "In Love," Star Concert Orchestra: "Songs My Mother Taught Me," Mannle Roth, Violinist: Selection, Ina Lockart, Contraito; "Poupee Valsante." Star Concert Orchestra; "On Wings of Song," Harry Adaskin, Violinist: "Chant Sans Paroles," Star Concert Orchestra; "March Lorraine," Star Concert Orchestra:

Orchestra, March Lottaine, Stat Concert Orchestra.

KHJ (Paelfio, 395), 12:30-1:15 P. M., Concert: 2:30-3:30, Matinee musicale: 6:45-7:30 P. M., Children'a hour: 8:00-10:00, Do Luxe program.

hour; 8:00-10:00, Do Laxe program.

KDKA (Eastern, 326), 5:15 P. M., Dinner Concert,
Grand Symphony orchestra; 6:45, Children's Period;
7:20, Concert, "G Mlnor," "Schon Rosmarin," "Meditation," "Traumerel," Theodore T. Tayior, planist,

Ralph E. Banks, baritone, KGW (Paclic, 492), 3:30-4:00 P. M., Child Training program; Reading from the writing Angelo Patri; 10:00-11:00, Dance music by George Olsen and his

orchestra.

KPO (Pacific, 423), 8:00-10:00 P. M., Program arranged by W. E. Haynes, and organ recital.

KYW (Central, Daylight Saving, 345), 1:35-2:00 P. M.,

Concert, Lyon & Healy; 5:50, Children's bedtime
story; 7:00-7:58, Musical program, Lyon & Healy;

Cope Harvey's orchestra at College Inn, Herbio
Mintz, pianist, Sallie Menkes, accompanist; 8:05,

"Twenty Minutes of Good Reading," Rev. C. J.

Pernin, S. J., head of English Dept., Loyola University.

WBZ (Eastern, 337), 5:45 P. M., Organ recital Capitol Theatre, Mrs. Elsie Robbins Gross, organist; 6:30, Bedtime story for the children; 7:30, Musical program, Frank Albano, accordionist and Frank Ciccareli, baritone and guitarist.

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, Betsy Logan; 4:30-5:55, Song recital; 7:30,
Bedtime stories by the Dream Daddy.

WDT (Eastern, Daylight Saving, 405), 12:00-1:00 P. M.,
Jazz concert, Harry Roberts Pekin Cafe Orchestra; Recital, Bucks Franzen, piano accordionist; "I Passed
Your Window," "Until," "Somewhere a Voice Is
Calling," Myrtle Mangham, soprano; "My Own,"
"Mose," "Remember the Waltz," Sam Wallace,
Vaughn De Leath, pianist.

(Continued on page 9)

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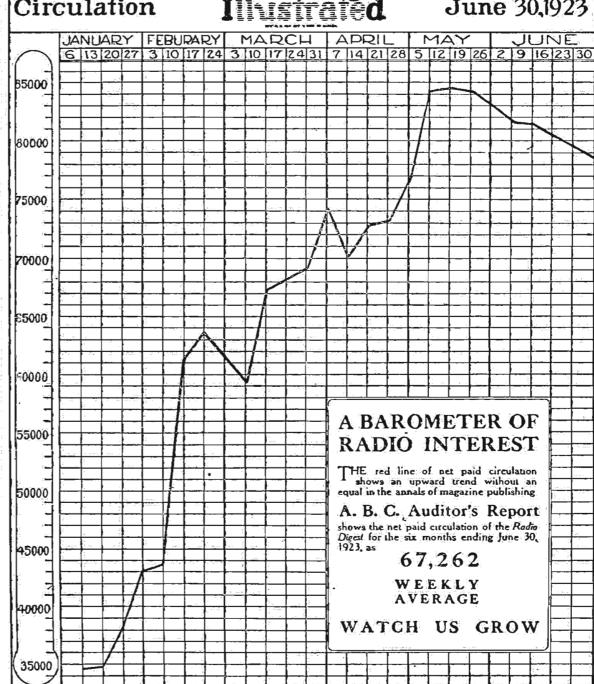
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Radiophone Broadcasting Stations

Corrected Every Week-Part II

(NOTE.—The second part of the schedule list appears below. The first appeared last week and the third part will appear next week.)

(NOTE.—The second part of the schedule list appears below. Tho first appeared last week and the third part will appear next week.)

KUD, San Francisco, Calif. 360 meters. 1,500 ml. San Francisco Examiner. Slogan, "The Voice of the West." Daily ex Sun, 9-10 am, chat to house-wives; 11-12, reports; 2:30-3:30 pm, lecture, news; 9 am, 12 m, 6:45 pm, weather reports. Sun, 9-10 am, 5-6 pm, news. Pacific.

KUS, Los Angeles, Calif. 360 meters. 300 mi. City Dye Works. & Laundry Co. Daily ex Sun, 7-7:30 am. setting up exercises; 12-12:30 pm, concert, time, Mon, Thurs, Fri, 2-2:30 pm, features. Tues. Fri, 4-4:30 pm, code practice. Wed, Fri, 6-6:45 pm, concert. Pacific.

KUY, El Monte, Calif. 360 meters. 500 ml. Coast Radio Co. Wed, 4-4:30 pm. Sat, 3-4 pm. Pacific. KWG, Stockton, Calif. 1,500 mi. Portable Wireless Telephone Co. Daily ex Sun, 4-5 pm, news, concert, markets. Tues and Fri, 8-9 pm, concert. Sun, 2-3 pm, concert. Pacific.

KWH, Los Angeles, Calif. 360 meters. 250 ml. Examiner. Daily ex Sun, 1:30-1:40 pm, 5:30-6, 6-6:15, 8:20-9. reports, entertainment. Sun, 8:30-9 pm, church service. Pacific.

KXD, Modesto, Calif. 360 meters. 100 ml. Modesto Herald Pub. Co. Daily ex Sun, Mon, 6:30-7 pm. Mon, 7-9 pm, Sun 1-2 pm. Pacific.

KYQ, Honolulu, Hawaii. 360 meters. Electric Shop. No definite schedule.

KYW, Chicago, Ill. 345 meters. 2,000 ml. Westinghouse Elec. & Mfg. Co. Daily ex Sun, 9:30 am, 10, 10:30, 11, markets; 11:35, watcher; 11:30, news; 11:35, table talk; 12, 12:30, 1, 1:20, 2:15, 2:30, markets; 3, 3:30, 4, newa; 4:15, markets; 4:30, 5, news; 6:30, markets; 6:50 bedtime story; 8, concert, 9, special. Sun, 11 am, 3:30 pm, 7, church services. Central, Daylight Saving.

KZM, Oakland, Calif. 360 meters. 200 ml. Western Radio Institute (Hotel Oakland). Daily ex Sun, 3:30-4:15 pm, weather. Mon, Wed, Fri, 1st to 15th each month, 8:45-9:30 pm; 15th to last each month, 8-8:45 pm, weather. Sun, 15th to last each month, 8-8:45 pm, weather. Sun, 15th to last each month, 8-8:45 pm, weather. Sun, 15th to last each month, 8-8:

15th to last each month, 11 am-12:30 pm, church services. Eastern.

NAA, Radio. Vs. 435 msters. 2,000 mi. U. S. Navy Dept. Daily ex Sun, 9:45-10:40 am, 12:25-12:40 pm, 1:45-2:20, markets, weather; 2:45-3 (Tues, only). Dept. Interior: 3:25-4:40, 5:05-5:20, markets, weather 10:05-10:20, weather. Mon, 6:45-8:20 pm, Dept. programs. Tues, 7:05-8:20 pm, Dept. programs. Wed, 7:25-7:40 pm, Dept. programs; 8:05-9:40, Marine Band. Thurs, 6:45-8:40 pm, Dept. programs. Frl. 8:05-8:40 pm, band concert. Eastern.

DA, Ottawa, Ont., Can. Dept. of Marine & Fisheries, PWX, Havana, Cuba. 400 meters. 1,500 mi. International Tel. & Teleg. Corp. Wed, Sat, 9-11:30 pm, music. Eastern.

WAAB, New Orleans, La. 268 meters. Valdemar Jen-

WAAC. New Orleans, La. 360 meters.
Mechanics Inst. No regular achedule.
WAAD, Cincinnati, O. 360 meters.
Mechanics Inst. No regular achedule.
Webster Savine Savine

WAAD, Cincinnati, O. 360 meters. 200 mi. Ohio Mechanics Inst. No regular achedule. Central, Daylight Saving.

WAAF, Chicago, Ill. 286 meters. 300 mi. Chicago. Daily Drovers Journal. Daily ex Sun, 8:40 am, 10:30, 10:45, 12:30 pm, 12:45, 3, 4:30, live stock and weather reports. Central.

WAAH, St. Paul, Minn. 360 meters. 500 mi. Commonwealth Elec. Co. Slogan, "From the Land of Ten Thousand Lakes." Temporarily discontinued.

WAAK, Milwaukee, Wis. 280 meters. 300 mi. Gimbel Bros. Daily ex Sun, 10 am, 11:10, 12:10 pm, 1:25, 3. Daily ex Wed and Sat, 7:15, 7:30 pm. Central.

WAAM, Newark, N. J. 263 meters. 300 mi. I. R. Nelson Co. Dally ex Sun, 11 am-2 pm, 8-10:30, music. Eastern.

WAAN, Columbia, Mo. 254 meters. 500 mi. United Electric Co. Daily ex Sun, 12-12:30 pm, educational program; 10:30 pm, weather. Tues, Fri, 8 pm. entertainment. Central.

WAAW, Omaha, Neb. 278 meters. 500 Omaha Grain Exchange. Daily ex Sun, 8:45 am, 9:45, 10:45, 11:45, 12:15 pm, 12:45-1:15, 8, market reports; 8:15-9 pm, music. Central.

WAAZ, Emporia, Kans, 360 meters. 250 mi. Hollister-Miller Motor Co. Tues, Thurs, 7-8 pm, entertainment. Temporary schedule. Central.

WABB, Harrisburg, Pa. 266 meters. Dr. John B. Lawrence.

WABC, Anderson, Ind. 229 meters. Fulwider-Grimes

WABC, Anderson, Ind. 229 meters. Fulwider-Grimes

WABC, Anderson, Ind. 223 meters. Futwidet-Grinds
Battery Co.
WABD, Dayton, O. 283 meters. Parker High School.
WABE, Washington, D. C. 283 meters. Y. M. C. A.
WABF, Mt. Vernon, Ill. 234 meters. Mt. Vernon
Register-News Co.
WABG, Jackaonville, Fla. 248 meters. 50 mi. Arnold
Edwards Piano Co. Daily ex Sun, Thurs, 3-4 pm,
concert. Wed, Sat, 9-10:30 pm, music. Mon, Thurs,
8-10 pm, concert. Eastern.
WABH, Sandusky, O. 240 meters, Lake Shore Tire Co.
WABI, Bangor, Me. 240 meters. Bangor Ry. & Elec.
Co.

WABJ. South Bend, Ind. 240 meters. The Radio Laboratories.

WABK, Worcester, Mass. 252 msters. First Baptist Church.

WABL, Storrs, Conn. 283 meters. Connecticut Agri.

College.
WABM, Saginaw, Mich.
WABN, La Crosse, Wia.
WABD, Rochester, N. Y.
254 meters.
Waldo C. Grover.
WABD, Rochester, N. Y.
252 meters.
Lake Ave. Bap-

tist Church.
WAI. Dayton, O. McCook Field, U. S. Army.
WAI. Marshall, Mo. 360 meters. Kelly-Vawter WAIT, Marshall, Mo. 360 meters. Kelly-Vawter Jewelry Co.
WAJU, Yankton, S. D. 360 meters. Yankton College. WBAA, W. Lafayette, Ind. 360 meters. 100 ml. Purdue University. Irregular schedule.
WBAD, Minneapolis, Minn. 360 meters. Sterling Elec.

WBAF, Moorestown, N. J. 360 meters. Fred M. Mid-

WBAF, Moorestown, N. J. 360 meters. Fred M. Middleton.

WBAH, Minneapolia, Minn. 360 meters. 200 mi. The Dayton Co. Daily ex Sun, 1-1:30 pm, 3-3:30, 5-5:30, 9:30-10. Sat. 11-11:30 am. Wed, 8-10 pm. Central WBAN, Paterson, N. J. Wireless Phone Corp. Slogan, "The Silk City of America." 244 meters. 200 mi. Wireless Phone Corporation. Daily ex Sun, 9-11:30 am. 12:30-5:30 pm. Sat morn, only. Sun, 10-12 am. 2-5 pm, 7:30-10:30. Eastern.

WBAD. Decatur, Ill. 360 meters. 100 ml. Jamea Millikin Univ. University activities. No definite schedule. Central.

WBAP, Fort Worth, Tex. 476 meters. 1,500 mi. Fort Worth Star-Telegram. Club, "Radio Truth League," Daily ex Sun, 9-9:15 am, 11-11:30, 12-12:15 pm, 1-1:15, 2-2:15, 3-3:30, 4-4:15. markets; 5, 6:30, 7:30, baseball results: 9:30, sporta, news, road reports. Sat, 7-7:30 pm, bible lesson. Sun, 11 am-12:15 pm, oburch; 5, 6:30, 7:30, baseball. Central.

WBAU, Hamilton, O. 258 meters. Republican Pub. Co. Temporarily diacontinued.

WBAV, Columbus, O. 390 meters. 500 mi. The Ernor

WBAV, Columbus, O. 390 meters. 500 mi. The Ernor Hopkins Co. Slogan, "We Broadcast a Variety." Daily ex Sun. 12:30-1 pm. Mon, 7-9 pm. Central.

WBAW, Marietta, O. 246 meters. Marietta College.
Temporarily discontinued.
WBAX, Wilkes-Barre, Pa. 360 meters, 200 mi. John
H. Stenger, Jr. Three nights of week, not regular.
WBAY, New York, N. Y. 492 meters. 1,500 mi. A.
T. & T. Co. Experimental purposes only.

WBBA, Newark, O. 240 meters. Newark Radio Lab. WBBC, Sterling, Ill. 229 meters. Sterling Radio Equip-

WBBD, Reading, Pa. 224 meters. Barbey Battery

WBL, Anthony, Kana 261 meters. 200 mi. T & H Radio Co. Mon, Wed, Sat, 8-9 pm, concert, lecture, Sun, 10 am, church aervice, Central.

WBS, Newark, N. J. 360 meters. 200 ml. D. W. May, Inc. Daily ex Sun 11-12 am, music; 1-2:15 pm, reports; 2:15-2:30 pm, music, reports. Tues, Thurs, Sat. 7:30-9:30 pm, program. Sun. 9-10:30 am, sacred music; 1-3 pm, program. Eastern.

WBT, Charlotte, N. C. 360 meters. 1,200 ml. Southern Radio Corp. Slogan, "Queen City of the South." Daily ex Sun, 11 am, 8 pm, weather, markets. Tues, 8:30 pm, music. Fri, 11 pm, entertainment. Sun, 8 pm, church services. Eastern.

WBU, Chicago, Ill. 286 meters. 100 mi. City of Chicago. Daily ex Sun, 10:15-10:30 am, 11:45-12 m, 4:15-4:30 pm, police reports. Mon, Wed, Fri, 3:30 pm, 7:30, speeches. Central Daylight Saving.

WBZ, Springfield, Mass. 337 meters. 1,000 mi. Weatinghouse Elec. & Mfg. Co. Daily ex Sun, 7:30 pm, children's hour; 7:45, markets, weather, lecture; 8-9, concert. Mon, Wed, Fri, 6-7 pm, concert. Sun, 8 pm, church service. Eastern.

WCAC, Fort Smith, Ark. 360 meters. John Fink Jewelry Co. Tests Only.

wCAC, Fort Simil, Al., 300 meters. John Find Sew-elry Co. Tests only. WCAD, Canton, N. Y. 280 meters. 300 mi. St. Lawrence Univ. No regular schedule. Eastern. WCAE, Pittsburgh, Pa. 462 meters. Kaufman & Baer WCAF, Rodgers, Mich. 360 meters. Michigan Lime-

WCAF, Rodgers, Mich. 360 meters. Michigan Limestone & Chem. Co.

WCAG, New Orleans, La. 268 meters. 200 mi. Clyde R. Randall. Mon. Thurs, 8-9 pm. concert. Central. WCAH, Columbus, O. 286 meters. 500 mi. Entrekin Elec. Co. Slogan, "The Heart of Ohio." Daily ex Sun, 11:30-12:30 am, music, news. Tues, 7-9 pm, concert. Sun, 10-12:30, church service. Central Daylight Savings.

WCAJ, Univ. Place, Nebr. 360 meters. 150 mi. Nebr. Wesleyan Univ. Daily, 10:30 am, weather. Tues, 8 pm, Children's Hour. Thurs, 8 pm, music, lectures, Central.

Central.

WCAK, Houston, Tex. 360 meters. 100 ml. Alfred P. Daniel. Slogan, "Where Eighteen Railroads Meet the Sea." Daily ex Sun, 7-7:30 pm, music. Wed, 8-9 pm, concert. Sun, 3-4 pm, features. Central.

WCAL, Northfield, Minn. 360 meters, 500 mi. Dept. of Physics, St. Olaf College, No definite schedule.

WCAM, Villanova, Pa. 360 meters. Villanova College.
WCAD, Baltimore, Md. 360 meters. 100 mi. Sanders
& Stayman Co. Daily ex Sun, 12-1 pm. Mon, Wed,
8-9 pm. Eastern.

WCAP, Washington, D. C. 469 meters. Chesapeake & Potomac Tel. Co. WCAR, San Antonio, Tex. 360 meters. 1,500 mi. Alamo Radio Elec. Co. Mon, Thurs, Sat, 8:30-9:30 pm. concert. Central.

pm, concert. Central.

WCAS, Minneapolis, Minn. 360 meters. 500 ml. Wm.
H. Dunwoody Industrial Inst. Slogan "From the
Flour City of the World." Mon, 9:30-11 pm, music,
lectures. Mon, Wed, Thurs, Fri, 6:30-7 pm, code
instruction. Central.

WCAT, Rapid City, S. D. 240 meters. 300 mi. S. D.
State School of Mines. Daily ex Sun, 9:30 am, 12:30
pm, 3 pm, weather, reports. Wed, 7:15 pm, concert.
Mountain.

WCAL Philadelphia Re. 286 meters. 500 mi. Dur

WCAU, Philadelphia, Pa. 286 meters. 500 mi. Durham & Co. Daily 11:45 am. Tues, Fri, 7:30-8 pm, concert. Sun, 10:55 am, church services. Eastern Daylight Saving. WCAV, Little Rock, Ark. 360 meters. J. C. Dlce Elec.

WCAY, Burlington, Vt. 360 meters. Univ. of Vt. WCAY, Milwaukee, Wis, 261 meters. 500 mi. Kesselman-O'Driscoll Music House. Daily ex Sun, 11 am, reports. Mon, Tues, Thur, Fri, 8:30-9:30 pm, music. Tues, 10:30-11:30 pm, dance music. Sun, 7:30-9 pm, church services. Central.

WCBA, Allentown, Pa. 280 meters. Chas. W. Haimbach. Wed, Sat, 2-12 pm. Sun, 2-4 pm, 8-10. Eastern. WCBB, Greenville, O. 240 meters. K. & K. Radio

WCBB, Greenville, O. 240 meters. K. & K. Radio Supply Co.

WCBD, Zion, Ill. 345 meters. 1,500 mi. Wilbur Glen Voliva. Slogan. "Where God Rules, Man Prospers." Mon, Fri, 3-10 pm, concert. Wed, Fri, 2:30-3:45 pm, concert. Sun, 9-9:45 am, Bible school; 2:30-5:30 pm, church services. Central daylight saving.

WCE, Minneapolis, Minn. 360 meters. Findley Elec. Co.

WCK, St. Louis, Mo. 360 meters. 50 mi. Stix, Baer & Fuller. Daily, 12-12:30 pm, 3-4. Mon, Wed, Fri, 6:45-8 pm, concert, lecture. Central.

WCM, Austin, Tex. 360 meters. Univ. of Tex.

WCX, Detroit, Mich. 517 meters. 1,000 mi. The Detroit Free Press. Slogan, "The Call of the Motor City." Club, "Red Apple Club." Daily ex Sun, 2 pm, news; 2:15, stock reports; 2:50, weather, markets; 4:15, 4:30, 4:50, 6:15, markets, music. Daily ex Sat, 8:30-10 pm, week starting Dec. 11 and alternate weeks thereafter, concert, Tues, 10-12 pm, Club, Sun, 10:30 pm, 7:15 pm, church aervices. Central.

WDAD, Lindsborg, Kans. 360 meters. 200 mi. Wm, Louis Harrison. Tues, Thurs, Fri, 9:30 pm, entertainment, weather. Sun, 3:30 pm, vesper aervices. Central.

WDAD, Lindsborg, Kans. 360 msters. 500 mi. Tampa

Central.

WDAE, Tampa, Fla. 360 msters. 500 ml. Tampa
Daily Times. Wed, Fri. 8-10 pm, music, lecture.

Eastern.

WDAF, Kansas City, Mo. 411 msters. 2,000 mi.
Kansas City Star. Club, "Nighthawks." Daily ex
Sun, 3:30-4:30 pm, music; 6-7, educational bedtime
story, etc.; 11:45 pm-1 am, Nightbawk Frolic. Mon,
Wed, Fri, 8-10 pm, concert. Sun, 4-5 pm, music.
Central.

WDAG, Amarillo, Tex. 263 meters. J. Laurance Martin. Tues, Thurs, 8-9:30 pm, music. Central. WDAH, El Paso, Tex. 360 metera. Trinity Methodist Church South. Wed, Thurs, Sun, 7:30-8:30 pm.

Mountain.

WDAI, Syracuse, N. Y. 246 meters. 200 ml. Hughes Radio Corp. Daily ex Sun, 12 m, reports. Eastern.

WDAI, College Park, Ga. 258 meters. 2,000 ml. A. & W. P. B. R. Co. Daily, 7:30-8:30 pm, 10:30-11:30 pm, concert. Wed, 10:30-11:30 pm, only. Central.

WDAK, Hartford, Conn. 261 meters. 150 ml. The Courant. Sat, 8 pm, concert. Eastern.

WDAL, Jacksonville, Fla. 360 meters. 250 ml. Florida. Times Union. Dally, 11 am, weather; 4-4:30 pm, music; 8-9, entertainment; 9:30, reports. Eastern.

WDAO, Dallas, Tex., 360 meters. 300 ml. Automotive.

music; 8-9, entertainment; 9:30, reports. Eastern.
WDAO, Dallas, Tex., 360 meters. 300 mi. Automotive
Elec. Co. Daily, 1-1:30 pm, 7:15-8. Central.
WDAP, Chicago, Ill. 360 meters. 2,000 ml. Drake
Hotel. Daily ex Sun, every half hour from 9:30 am
to 1:30 pm, quotations, reports; 6 pm, news. Tues,
Thurs, Sat, 10 pm, concert. Sun, 9 pm, 10, concert.
Central Daylight Saving.
WDAR, Philadelphia, Pa. 395 msters. Lit Bros. Club,
"Good Morning Glory." Daily ex Sun, 12-12:55 pm,
music; 2-3 pm, 4:30-6, music, talks; 7:30-8 pm,
Dream Daddy. Wed, 8-11 pm, entertainment. Fri,
8-10:50, entertainment; 1 am, Club. Eastern Daylight
Saving. Saving.

Saving.

WDAS, Worcester, Mass. 360 meters. Samuel A, Walte WDAU, New Bedford, Mass. 360 meters. 500 ml. A. H. Smith. Mon. Wed, Fri, 12:15-12:50 pm. industrial reports; 7:45-10 pm. music. Sun. 11 am-12:30 pm, 7-8 pm, church aervices. Eastern Daylight Saving. WDAX, Centerville, Iowa. 268 meters. 500 ml. First Nat'l Bank. Daily ex Sun. 11:30 am, reports, news. Mon. Thur, 7:30-9 pm, concert. Central. WDAY, Fargo. N. D. 244 meters. 300 ml. Fargo Radio Electric Co. Slogan, "The Biggest Little City in the World." Daily ex Sun. 9:30 am, weather, 6 pm, baseball. Tues, Thurs, Sat, 7:30-8:30 pm, concert. Sun. 10:30 am, church services. Central. WDBC, Lancaster, Pa. 258 meters. Kirk Johnson & Co., Inc.

WDBF, Youngstown, O. 261 meters. Robert G. Phil-

lips.

WDM, Washington, D. C. 360 meters. 50 ml. Church of the Covenant. Sun, 11 am, church aervice; 8 pm, church service. Eastern.

WDT, New York City, N. Y. 405 meters. Ship Owners Radio Service. Daily ex Sun, 12-1 pm, concert. Wed, 7-7:50 pm, concert. Fri, 11-12 pm, concert. Eastern Daylight Saving.

WDZ, Tuscola, Ill. 278 meters. 100 ml. James L. Buah. Daily ex Sun, every half hour, 8:30 am-12:15 pm, Chicago Board of Trade quotations. Central. WEAA, Flint, Mich. 230 meters. 200 mi. Fallain & Lathrop. Slogan, "The Vehicle City." No definite schedule.

WEAB, Fort Dodge, Ia. 360 meters. 600 ml. Standard

schedule,
WEAB, Fort Dodge, Ia. 360 meters. 600 ml. Standard
Radio Equip. Co. Daily ex Sun, markets every 30
min. from 8:40 am-12:20 pm; 5:15 pm, 7-8 music.
9:45, weather. Sun, 10:30 am, 7:30 pm, church
aervices. Central.
WEAD, Atwood, Kan. 268 meters. N. W. Kansas
Radio Supply Co. Temporarily discontinued.
WEAE, Blackaburg, Va. 360 meters. Polytechnic Inst.

WEAF, New York City, N. Y. 492 meters. 1,500 mi.
A. T. & T. Co. Slogan, "The Voice to the Millions." Tues, Wed, Thurs, Fri, 11-12 am, 4:30-5:30 pm, 7:30-10. Sun, 3:30-4:30 pm, 7:30-10. Eastern Daylight Saving.

WHAD, Milwaukee, Wis, 280 meters, 1,000 mi, Marquette Univ. Wed, 7:30-8:30 pm, music, entertainment. Central.

WHAG, Cincinnati, O. 222 meters, 100 mi, Univ. of Cincinnati, No definite achedule.

nons." Tues, wed, Thurs, Fri, 11-12 am, 4:30-5:30 pm, 7:30-10. Sun, 3:30-4:30 pm, 7:30-10. Eastern Daylight Saving,

WEAG, Edgewood, R. I. 231 meters. Nicholas-Hine-line-Bassett Lab.

WEAH, Wichita, Kan. 244 meters, 500 mi. Wichita Board of Trade. Daily ex Sun, 8:40 am, 9, 10, 11, 12 pm, 1, reports. Wed, Sat, 8 pm, concert. Every third Sun, 8 pm, concert. Central.

WEAI, Ithaca, N. Y. 286 meters. Cornell Univ. WEAI, Ithaca, N. Y. 286 meters. Univ. of S. D. Temporarily discontinued.

WEAK, St. Joseph, Mo. 360 meters. 100 mi. Julius B. Abercrombie. Daily ex Sun, 5:15-6 pm. Central. WEAM, North Plainfield, N. J. 252 metera. 75 mi. Burough of N. Plainfield. Daily, 7:30-8 pm, music, police news, etc. Eastern.

WEAN. Providence, R. 1. 273 meters. 50 mi. The Shepard Stores. Daily ex Sun, Mon, 12-1 pm, 4-5, 6-7, music, weather, concerts. Tues, Thurs, 8:15-10, concert. Wed, Sat, 7-8 pm, concert. Sun, 10:45-11:30 am, 7:30-8:45-pm, church service. Eastern Daylight Savung.

vieg.

WEAD, Columbus, O. 360 meters. 500 ml. Ohio State Univ. Daily ex Sun, 1:30 pm, 4, reports, music. Thurs, 7-9 pm, lecture, concert. Eastern.

WEAP, Mobile, Ala. 360 meters. 50 ml. Mobile Radio Co. Daily ex Sun, 12 m. reports; 4-5 pm, music. Daily ex Sun, Mon, 7:45-8:45 pm, music. Sun, 3-3:30 pm, church service. First Mon of each month, 11 pm-1 am, concert. Central.

WEAR, Baltimore, Md. 360 meters. 200 ml. News & American Pub. Co. Daily ex Sun, 6:30-7, weather, music, news. Tues, Thurs, 7:30-9:30 pm. Eastern.

WEAS, Washington, D. C. 360 meters. 200 ml. The Hecht Co. Daily ex Sun, 3-4 pm. Wed, Fri, 7-8 pm. Eastern.

WEAU, Sioux City, Ia. 360 meters. 300 ml. Davidson Bros. Co. Slogan, "The Heart of the Corn Belt." Daily ex Sun, 9 am, 10, 11, 1 pm, 5, markets, news. Mon, Wed, Fri, 8-9 pm, concert. Sun 7-9 pm. Central.

Central.

Central.

WEAY. Houston, Tex. 360 meters. 1.500 mi. Will Horwitz (1ris Theater.) Slogan, "Where All the Oceans Meet All the Railroads." Daily ex Sun, 11 am, dinner hints, news; 12 m, music; 12:57-1 pm, time; 2:30 pm, music; 6 pm, news. Wed, Fri, 8-10 pm, concert. Sun, 11 am, 8 pm, church aervices; 9 pm, concert. Central.

WEB, St. Louis, Mo. 360 meters. 800 ml. The Benwood Co., Inc. Tues, 9-10:30 pm, Wed, 8-9:30 pm, Sat, 7:30-9 pm, 11 pm-1 am. Central.

WEV, Houston, Tex. 360 meters. 500 ml. Hurlburt-Still Elec. Co. Daily ex Sun, 10 am, 5:30 pm, weather, roads. Tues, Thur. 8 pm, concert. Central.

WEW, St. Louis, Mo. 261 meters. 200 ml. St. Louis Univ. Daily ex Sun, 9 am, 10, 2, 5 pm, reports. Central.

Univ. Daily ex Sun, 9 am, 10, 2, 5 pm, reports. Central.

WFAA, Dallas, Tex. 476 meters. 1,500 mi, Dallas News and Dallas Journal. Slogan, "Working For All Alike." Daily. 10:30 am, reports; 12:30-1 pm, addreas; 2:30, 3:30, 4:30, 5:30, reports, news, baseball: 6:15-7, bedtime story, baseball: 8:30-9:30, concert, weather (silent Wed). Tues, Sat, 11-12 pm, music. Sun, 2:30-3:30 pm, bible class; 6:45-7 pm, baseball: 9:30-11 pm, music. Central.

WFAB, Syracuse, N. Y. 234 meters. 100 mi. C. F. Woese, No definite schedule.

WFAF, Poughkeepsie, N. Y. 273 meters. H. C. Spratley Radio Co. Temporarily discontinued.

WFAH, Port Artbur, Tex. 360 meters, 100 mi. Elec. Supply Co. Tues, Thurs, 10-11 pm, concert. Central.

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

Co.
WFAM, St. Cloud, Minn. 360 meters. 100 mi. Granite City Elec. Co. Daily ex Sun, 3:30-4 pm, markets. Mon, Wed, 7:30-9 pm, entertainment. Central.
WFAN, Hutchinson, Minn. 360 meters. 300 mi. Hutchinson Elec. Service Co. Slogan. "The Gateway to the Ten Thousand Lakes of Minn." Daily, 11:57-12:20, time, weather. Tues, Wed, 8:30 pm, concert. Sun, 2:30 pm. Central.
WFAQ, Cameron, Mo. 360 meters. 300 mi. Cameron Radio Co. and Mo. Wesleyan College.
WFAT, Sloux Falls, S. D. 360 meters. 500 mi. Daily Argus Leader. Daily ex Sun, 9:15 am, 11:15, 12:30 pm, 1:30, reports, music; 7:30, baseball, music. Central.
WFAV, Lincoln, Nebr. 360 meters. 300 mi. Univ. of Nebr. Slogan, "The Home of the Cornhuskers." Daily ex Sun, 10 am, 12:40 pm, weather. Thurs, 8 pm, concert. Central.
WFI, Philadelphia. Pn. 395 meters. 1.000 mi. Straw-

Daily ex Sun, 10 am, 12:40 pm, weather. Thurs, 8 pm, concert. Central.
WFI, Philadelphia, Pa. 395 meters. 1.000 mi. Strawbridge & Clothier. Daily ex Sat. Sun, 10 am, reports; 1 pm, news; 2 music; 3-4:30, concert; 7-7:30 cbildren's hour. Tues, Thurs, 8 pm, concert. Wed, 10:30 pm, dance music. Sun, 9:30 pm, organ recital, alternating 10:30 am, 7:30, church aervices. Eastern Daylight Saving.
WGAF, Tulsa, Okla. 360 meters. Goller Radio Service.
WGAL, Lancaster, Pa. 248 meters. 35 mi. Lancaster Elec. Supply & Construction Co. Slogan, "Garden Spot of U. S. A." Mon, Wed, Fri, 7:30-9 pm, concert, lecture. Sun, 3-3:30 pm, church service. Eastern.

cert, lecture, Sun, 3-3:30 pm, Eastern.

WGAN, Penaacola, Fla, 360 meters, Cecil E. Lloyd.

WGAQ, Shreveport, La, 360 meters, 500 mi. Glenwood Radio Corp. Daily ex Sun, 5:30-6 pm, 8, music, Sun, 11 am, 7:30 pm, church service. Central, WGAR, Fort Smith, Ark, 360 meters. Southwest

Radio Corp. Daily ex Sun, 5:30-6 pm, 8, music. Sun, 11 am, 7:30 pm, church service. Central. WGAR, Fort Smith. Ark. 360 meters. Southwest America.
WGAU, Wooster, O. 226 meters. Marcus G. Limb. WGAW, Altoona, Pa, 261 meters. 300 ml. Ernest C. Albright. Slogan, "The home of the world's largest railroad shops." Tues, Wed, 9-11 pm, music. Sun, 9-10:30 pm, music. Eastern.
WGAY, Madiaon, Wis. 360 meters. 100 ml. North Western Radio Co. Daily ex Sun, 10 am, weather; 4:30, news. Mon, Thurs, 8:30 pm, concert. Sun, 3 pm, music. Central.
WGAZ, South Bend, Ind. 360 meters. 200 ml. South Bend Tribune. Daily ex Sun, 9-9:30 am, household hints, menus; 5-5:30 pm, music. Tues, Thurs, Sat, 7-8 pm, music. Central.
WGF, Des Moines, Iowa. 360 meters. Register and Tribune. Slogan, "The Convention City." Tues, Frl, 7:30 pm, entertainment. Sat, 10 pm, muaic. Sun, 5 pm, chnrch service. Central.
WGI, Medford Hillside, Mass. 360 meters. 500 ml. Am. Radio & Research Corp. Slogan, "Amrad, the Voice of the Air." Daily, 5-6:45 pm, Children's Hour, reports, codes. Daily ex Sun, Mon, 8:30 pm, concert. Tues, Frl, 3 pm, Amrad Women'a Club. Sun, 4-5 pm, 8:30, church services; 9, concert. Eastern Daylight Saving.
WGL, Philadelphia, Pa. 360 meters. 2,000 ml. Thes. F. J. Howlett. Irregular schedule.
WGM, Atlanta, Ga. 429 meters. 1,500 ml. The Atlanta Constitution. Daily ex Sun and Wed, 6-7 pm, orchestra concert: 9:30-10:30 pm, music. Sun, 3:30-4:30 pm, organ rectal; 9:30-10:30 pm, music. Wed. 12-1 am, concert. Central.
WGR, Buffalo, N. Y. 319 meters. 1,000 ml. Federal Tel. & Telg. Co. Slogan, "The City of Opportunity." Daily ex Sun, 2:30, 3:30, 5, music, reports; Mon, Wed, Frl, 8:10 pm, concert. Sun, 3 pm, vesper services. Eastern Daylight Saving.
WGV, New Orleans, La. 350 meters. 400 ml. Interatate Elec. Co. Slogan, "Where the Mighty Misaiss and content and the state Elec. Co. Slogan, "Where the Mighty Misaiss and cont

Daylight Saving.

WGV, New Orleans, La. 350 meters. 400 mi. Interatate Elec. Co. Slogan, "Where the Mighty Misaissippi Makes a Crescent Near the Gulf." Mon. Wed, Sat, 8-9 pm, 12-1, music, talks. Sat, 7:30-8:30 pm. Central.

WGY, Schenectady, N. Y. 380 meters. 1,000 mi. General Elec. Co. Daily ex Sun, 11:30-12 m, 5, reports, time, sports. Mon, Tues, Thur, Fri, 1-1:30 pm, 7:45, concert. Fri, 10:30 pm, special. Sun, 9:30 am, 6:30 pm, church service. Eastern.

WHA, Madison, Wis. 360 meters, 1,000 mi. Univ. of Wis. Daily ex Sun, 11:59-12 m, time aignals, weather, Mon. Wed, Fri, 7:30 pm, lectures, news, agriograms, Central.

Central.

WHAA, Iowa City, Ia. 263 meters. 200 ml. Univ. of Iowa. No regular achedule. Central.

WHAB, Galveston, Tex. 360 meters. 500 ml. Clark W. Thompson Co. Slogan, "The Gateway to the Southwest and Treasure Island of America." Dally ex Sun. 9:45 am, 11, 3:30 pm, 5, reports, music, newa. Tues, Frl. 8 pm, entertainment. Sun, 11 am, 7:30 pm, church service. Central.

WHAC, Waterloo, Ia. 360 meters. 150 ml. Cole Bros. Elec. Co. Daily, 6 pm, news, sports, Mon. Wed, Frl. 9:30 pm, concert. Sun, 11 am, church aervices. Central.

Cincinnati. No definite achedule.

WHAH, Joplin, Mo. 360 meters. Hafer Supply Co.

WHAI, Davenport, Ia. 360 meters. 30 mi. Radio Equip. & Mfg. Co. Temporarily diacontinued.

WHAK, Clarksburg., W. Va. 360 meters. Roberts Hdwe. Co. 50 mi. No definite schedule.

WHAL, Lansing, Mich. 248 meters. 200 mi. The Capital News. Daily ex Sun, 12:30 pm, 2:55, 4:30. Mon. Wed, Fri, 7:45 pm. Sat, 12 midnlght. Sun, 2:30 pm. Central.

WHAM, Rochester, N. Y. 360 meters. Univ. of Rochester.

WHAP, Decatur, 111. 360 meters, 100 mi. Otto & Kuhns. No definite acbedule,
WHAQ, Washington, D. C. 242 meters, 75 mi.
Semmea Motor Co.
bile upkeep, music.
Eastern.
WHAP, Atlantia Cit.

bile upkeep, music. Eastern.

WHAR; Atlantic City, N. J. 231 meters. Paramount
Radio & Elect. Co.

WHAS, Louisville, Ky. 400 meters, 1,500 mi. Courier
Journal and Louisville Times Co. Daily ex Sun, 4-5
pm, 7:30-9. Sun, 9:57-10:45 am, 4-5 pm, church service. Mon night, silent. Central.

WHAV, Wilmington, Del. 360 meters. 200 mi. Wilmington Elec. Spec. Co. Slogan, "The First Broadcasting Station of the First City of the State." No
definite achedule.

WHAY, Huntington, Ind. 360 meters, 75 mi. Hunt-

casting Station of the First City of the State." No definite achedule.

WHAY, Huntington, Ind. 360 meters, 75 mi. Huntington Pub. Co. Dally ex Sun, 12 m-12:30, weather, 3 pm, music; 6 pm, markets, news, weather, sports, Mon, Wed, Frl, 8 pm, concert. Sun, 3 pm, sermon; 4 pm, concert. Central.

WHAZ, Troy, N. Y. 380 meters, 2,000 mi. Rensselaer Polytechnic Inat. Slogan, "Transcontinental and International Broadcasting Staion Located at the Oldest School of Engineering." Club, R. P. I. Mon, 9-10:30 pm, music. Transcontinental second Monday of each month, 12-1:30 am, music. Eastern.

WHB, Kansas City, Mo. 411 meters, 1,000 mi. Sweeney Auto & Electric School. Slogan, "Heart of America." Daily ex Sun, 8:25 am, 9:25, 10:25, 11:25, 12:25 pm, 3, reports. Tues, Thurs, Sun, 8-10 pm, concert. Central.

WHD, Morgantown, W. Va. W. Va. University. Tem-

concert. Central.

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

WHK. Cleveland, O. 360 meters. 300 ml. Warren R. Cox. Daily ex Sun. 8:30-9 am, test; 1:30 pm, 4-4:30, music; 6-6:30, news, music. Wed, Sun, 8-9:55 pm. sermon, concert. Eastern.

WHN. Brooklyn, N. Y. 360 meters. 250 mi. Associated Broadcasters, Inc. Slogan. Station of the Sunrise Trail.' Daily ex Sun, 9:30-11 am, 12-1 pm, 2:15-3:15, 3:45-5:30. Mon, Wed. Sat. 7:30-12 pm. Tues, Thurs, Fri, 9:30-12:00 pm. Sun, 9:30-10:30 am, 3-6 pm, 9:30-12 pm. Eastern.

WIAB. Rockford, Ill. 252 meters. 50 mi. Joslyn Automobile Co. Tues, Fri, 7:30-8:30 pm. music. Mon. Thurs, 8-9 pm. Sun, 12-1 pm, church services. Central.

WIAC, Galveston, Tex. 360 meters. 200 mi. Galveston

Mon. Thurs, 8-9 pm. Sun, 12-1 pm, church services: Central.

WIAC, Galveston, Tex. 360 meters. 200 mi. Galveston Tribune. Daily ex Sun, 12:35 pm, reports. Tuea, Sat, evening concert. Central.

WIAD, Ocean City, N. J. 254 meters. 200 mi. Ocean City Yacht Club. Fri, Sat, Sun, 8-12 pm. Eastern, WIAF, New Orleans, La. 234 meters. 300 mi. G. A. DeCortin. Tues, 8-9:30 pm. Sun, 10-11:30 am, church services. Central.

WIAH, Newton, Ia. 360 meters. 200 mi. Continental Radio & Mfg. Co. Daily 12:30-1 pm, music, news. Sun, 10:45-12 m, church services, Central.

WIAI, Springfield, Mo. 253 meters. 300 mi. Heer Stores Co. Daily ex Sun, 10:30-11 am, reports, news, weather. Tues, Thurs, 7:30-8:45 pm. Sat, 6:15-7:15 pm, music, entertainment. Central.

WIAJ, Neenah, Wisc. 360 meters. Fox River Valley Radio Supply Co.

WIAK, Omaha, Neb, 278 meters. 300 mi. Dally Journal-Stockman. Daily ex Sun, 7:45 am, 9:10, 10:20, 12 m, 1:30 pm, 3:50, markets, weather. Central.

WIAD, Milwaukee, Wis. 360 meters, 200 mi. School of Engineering. Slogan, 'In the Land of the Sky Blue Water.' Mon, Tues, Thur, Fri, 10-10:30 am, 11:30-12 m, music, news; 5-6 pm, news; 7-7:30, music. Central.

WIAQ. Marion, Ind, 226 meters. Chronicle Pub. Co.

Central
WIAQ. Marion, Ind. 226 meters. Chronicle Pub. Co.
WIAR, Paducah, Ky. 360 meters. 150 mi. Paducah
Evening Sun. Slogan, "Howdy Folks, This is WIAR,
a real Live Wiar." Daily ex Sat, Sun, 7-8 pm, concert, lecture, etc. Central.
WIAS, Burlington, Ia. 360 meters. 400 mi. Hawk-Eye
Home Elec. Co. Slogan, "Burlington, On The
Mississippi." Tues, Thurs, 8-9 pm, concert. Central.
WIAT, Tarkio, Mo. 360 meters. Leon T. Noel.
WIAU, Le Mars, Ia. 360 meters. Am. Trust & Savings Bank.

wiAU, Le Mars, 12. 500 meters. Am, 1703t & Savings Bank.
WiAY, Washington, D. C. 224 meters. 200 mi. Woodward & Lothrop. Daily ex Sun, 10-11 am, 2-3 pm, music. Tuea, Fri, 6:45 pm, reports. Mon, Sat, 8-10 pm, concert. Eastern.
WIL, Washington, D. C. 360 meters. 100 mi. Continental Elec. Supply Co. Daily 5:30-7 pm. music, antartainment. Eastern.

will, Washington, D. C. 360 meters. 100 ml. Lintential Elec. Supply Co. Daily 5:30-7 pm.. music, entertainment. Eastern
WIP, Philadelphia, Pa. 509 meters. 2,000 ml. Gimbel Bros. Slogan, "Watch Its Progress." Daily ex Sun, 1-2 pm, 3-4:30, 6-6:45, music; 7-7:30 pm, bedtime atories. Tues, Thurs, 8-10 pm, concert. Tues, Sat, 10:10-12 pm, concert. Sun, 11 am, church aervices, starting June 3, every alternate week; fill in weeks, 4:30 pm, concert. Eastern Daylight Saving.
WJAB, Lincoln, Nebr. 360 meters. 800 ml. Am. Elec. Co. Mon, Thurs, 9:30-10:15 pm, music, special. Sun, 8-9 pm, church services. Central.
WJAD, Waco, Tex. 360 meters. 500 ml. Jackson's Radio Engineering Lab. Daily ex Sun, 4-4:30 pm, news, music. Mon, Frl, 8-9, concert. Sun, 11-12 am, church service. Central.
WJAF, Muncie, Ind. 200 ml. Muncie Press and Smith Elec. Co. Daily ex Sun, 3:30-4 pm, news, music. Mon, Wed, Frl, 7-3 pm; Sat, 6-7 pm, music. Sun, 10-12 am, 2-3:30 pm, church aervices. Central.
WJAG, Norfolk, Nebr. 360 meters. 150 ml. Norfolk Daily News. Daily ex Sun, 12:15 pm, 5, 5:30, reports. Central.
WJAK, Stockdale. O. 360 meters. 250 ml. White

Daily News. Daily ex Sun, 12:15 pm, 5, 5:30, reports. Central.

WJAK, Stockdale, O. 360 meters. 250 ml. White Radio Lab. Slogan, "WJAK, of the Buckeye State." Mon, Thurs, 11 am, 4 pm, news, music. Thurs, 9-10:30 pm, dance music. Sat, 4 pm, bible lesson. Sun. 2-2:45 pm, church service. Central.

WJAM, Cedar Rapids, Ia. 268 meters. 50 ml. D. M. Perham. Slogan, "Cereal City of the World." Daily ex Sun, 9 am, 10:30, 12:15, markets, reports. Tues, Wed. Fri, 7:15 pm, music. Sun, 2:45 pm, music. Central.

WJAN, Peoria, III. 280 meters. 300 ml. Peoria Star. Slogan, "The Grandview City of Illinois." Daily ex Sun, 9:15 am, 10:30, 1:30 pm, markets, weather agriograms; 5:30, aports. Tues, 9:15-10:45 pm, concert. Central.

Central.

WIAP. Duluth, Minn. 360 meters. 200 ml. Kelley
Duluth Co. Mon, Thurs, 8-9:30 pm, music. Mon,
Thurs, Sat, 10:30-12 midnight. Sun. 11-12 m. pipe
organ, 12-1 pm, 7:30-9 pm, church service. Central.

WIAQ, Topeka, Kan. 360 meters. 200 ml. Capper
Publications. Schedule not regular. Central.

WIAP Providence P. J. 360 meters. 600 ml. The entral.

Publications. Schedule not regular. Central.

WIAR, Providence, R. I. 360 meters. 600 mi. The Outlet Co. Slogan, "The Gateway of Southern New England." Daily ex Sun, 10-11 am, 1-2:30 pm, 5-6. Mon, Tues, Thurs, 7-8 pm. Fri, 8-10 pm, concert. Eastern Daylight Saving.

WIAS, Pittsburgh, Pa. 360 meters. 150 mi. Pittsburgh Radio Supply House. Daily ex Sun, 11:30-12 m, 2:30-3 pm. Mon, Wed, Fri, 7:30-9 pm. Eastern. WIAT, Marshall, Mb. 360 meters. 100 mi. Kelley-Vawter Jewelry Co. Daily ex Sun, 5:15-5:45 pm. concert. Central.

WIAX, Cleveland, O. 390 meters. 1,000 mi. Union Trust Co. Slogan, "The Wave From Lake Erie." Daily ex Sat pm and Sun, 9-9:45 am, 10-10:45, 2-2:45 pm, 3-3:45, mualc, financial reports, news. Tues, 7:30-9:30 pm; Thurs, 8:15-10:30 pm, entertainment Eastern.

Eastern.

WJAZ, Chicago, Ill. 448 meters. 1,500 mi, Zenith-Edgewater Beach (Chicago Radio Lab.) Daily ex.
Sun, 10 pm-2 am, music, entertainment. Sun, 5-3
pm, concert. Central Daylight Saving.
(The third part of the station schedules will appear

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ADVANCE PROGRAMS

(Continued from page 7)

(Continued from page 7)

WFAA (Central, 476), 8:30-9:30 P. M., Tell Me This Orchestra: Dramatic Club program.

WFI (Eastern, Daylight Saving, 395), 1:30 P. M., Dinner music, Meyer Daris Rellevue Stratford Concert Orchestra: 3:00, Flano and song recital; 6:30, Dinner music, Meyer Daris Bellevue Stratford Concert Orchestra: 8:00, Short talks and song recital, F. Lewis Dunham on the Estey Reed Organ; 7:00 P. M., "Bits of Wisdom," George Brinton Recital, F. Lewis Dunham on the Stey Reed Organ; 7:00 P. M., "Bits of Wisdom," George Brinton Beale, prominent newspaper editor; Mrs. Pat and the Law" by the Amrad Players, given through courtesy of Walter Baker & Company, publishers of Boston.

WGR (Eastern, 0aylight Saving, 319), 11:45 A. M., Weather forecast for Lakes Frie and Ontario marine and aristion interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, Chicaco Board of Trade. New York Stock Exchange: 6:30-7:00. George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news. Boy Scout Radiograms, Employment Bulletin; 11:45, Weather.

WGY (Eastern, 380), 7:45 P. M., Musical Program, Rogers Whitmore, violinist; Ellsworth Page, Earl Rice, accompanist; "Theodore Von der Blick, trumpeter; Violin solos, "Chanson Meditation," "Spanish Serenade," Rogers Whitmore, Earl Rice, accompanist; Bass solo, "Song of the Turnkey," Ellsworth Page, Earl Rice, accompanist; "The Secret." Theodore Von der Blick, trumpet solo; Address, "Forest Fires Put the Wreck in Recreation," by Willis Baker; Violin solos, "Tambourin Chinois," "The Rosary," Rogers Whitmore; "Then Let Me Rest," Ellsworth Page, bass solo; "Columbia Polika," Theo. Von der Blick, trumpet solo; Address, "Forest Fires Put the Wreck in Recreation," by Willis Baker; "Theodore Von der Blick, trumpet solo; "On Wings of Song," "Trom the Canebrake," Rogers Whitmore, Violinist, WhAS (Cantral, 400) 4-5 P. M., Concert hy the Mary Anderson Theatre orchestra. Everete Tyron, director, WLW (Eastern, 309), 4:00, Selections,

visit.

W00 (Eastern, Daylight Saving, 509), 11:00-11:30 A.

M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M.,

Lancheon music, Wanamaker Tea Room Orchestra 4:45-5:00, Organ recital, Mary E. Vogt; 7:30, Sport results and police reports.

WW1 (Eastern, 517), 12:05 P. M., Concert, Detroit News Orchestra; 3:00 P. M., Concert, Schmeman's band; 7:00 Concert, Detroit News orchestra and Schmeman's band.

Friday, August 24

CFCA (Eastern, Daylight Saving, 400), 8:00-9:00 P.

M., Overture, "The Magic Finte," Star Concert Orchestra: "Sea-Fever," Frederick Manning, haritone; chestra: "Sea-Fever," Frederick Manning, haritone; cutte," Star Concert Orchestra: "Sylvia," Frederick Manning, baritone: "Beautiful Spring," Star Concert Orchestra; "Caprice Viennois," Harry Adaskin, violinist; "The Wreck of Julia," Frederick Manning, baritone, "In the Tavern," Star Concert Orchestra.

KHJ (Pacific, 395), 12:30-1:15 P. M., Concert: 2:30-3:30 Matinee musicale; 6:45-7:00, Children's program, Marshall Stedman and pupils; 7:00-7:30, Organ recital, Methodist Episcopal Church, Arthur Blakeley, organist; 8:50-10:20, De Lure program, featuring Masonic Glee Club of Long Beach, Calif.; Bedford Finney, haritone.

Masonic Glee Club of Long Beach, Calif.; Bedford Finney, haritone.

KDKA (Eastern, 365), 5:15 P. M., Dinner concert, Grand Symphony orchestra; 6:45, Children's Period; 7:20, Concert, The Call Trio, June Call, violinist, Rev Call, violinist, Edith Hall, pianist, "Under the Double Eagle." 'Melody in F." 'Amorosa Mazurka," 'March Militaire." 'Minuet in G." 'La Paloma," 'In Antumn," 'Memories of the South." KSO (Central, 546), 8:00 P. M. Musical program.

KGW (Pacific, 492), 8:00-8:15 P. M., Vocal Solo, Lola Kernan, soprano, Ruth Heinrich, accompanist; 8:15-9:00, George Olsen and his orchestra; 10:00-11:00. Dance Music, George Olsen and his orchestra; 10:00-11:00. KYW (Central, Oaylight Saving, 345), 5:50 P. M., Children's bedtime story; 10:00-11:30, Musical program.

Kyw (Central, Oaylight Saving, 345), 5:50 P. M., Children's bedtime story; 10:00-11:30, Musical program.

WBZ (Eastern, 337), 5:30 P. M., Dinner concert, WBZ trio, "I Lombardi," "Marionette." "Beve d' Amour." "Butterfly Dance," "Serenade," "In a Canoe," "Song of the Volga Boatmen," "Elsa's Dream," "Bon Vivant," "Romantique"; 6:30, Bedtime Story for Children; 7:00, Concert, James Morton, tenor, George Bradley O'Connell, pianist and accompanist, assisted by WBZ trio.

WOAR (Eastern, Daylight Saving, 395, 12:00-12:54 P. M., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra, Feri Sarkozi, director; 2:00-3:00, Dinner music, Arcadia Cafe Concert Orchestra; 7:39-8:00, Bedtime stories, Dream Daddy; 8:00-12:00, Special Stanley Theater features; Dance music, Arcadla Cafe Dance Orchestra.

WOT (Eastern, Daylight Saving, 405), 12:00-12:00 P. M., Recital, Vincent Soragba, violinist; Songs, Marie Palermo, assisted by G. Forraror; Cello solos; 11:00-12:00, Orchestra concert; Harry Arcts and Al Beiler, in their latest song hits; Jack Smith, planologue.

WFAA (Central, 476), 8:30-9:30 P. M., Piano program, Leland Johnson, player and composer.

WFI (Eastern, Oaylight Saving, 395), 1:20 P. M., Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:00, Song recital; 4:00, Short talk and musical program; 6:30, Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00-7:30, Children'e half hour, Stories by Cousin Sue.

WGI (Eastern, 360), 12:00 Noon, Organ Becital, E. Lewis Dunham on the Estey Reed Organ; 5:00, Children'e half hour, Stories by Cousin Sue.

WGI (Eastern, 0aylight Saving, 319), 1:45 A. M., Weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30 P. M., George Albert Bouchard, organist; 7:00-845, Digest of the day's news, road reports; 9:00-11:35, Tokio Dance Orchestra; 11:45, Weather, Song, Mrs. George Gretser, Soprano, Mrs. Louis Bask, accompanist; "Hungarian Rhapsody," Master Adelbert Purga, violinist (thirteen) and of the story of the pa

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seprane: "Melody," Master Adelbert Purga, violinist;
"Macushla" Irequest, "For You Alone." It
Herbert Massey, tenor; "Robin, Robin, Sing Me a
Song," Mrs. George Gritser, soprane: "Rond,
Capriccloso," Daniel W, Murphy, pianist; 10:30,
Musical program, "Valse Arabesque," Irene Nettles,
pianist: "Ouvre tes yeux hleus," "Lesais tu,"
Alexander Bouchard, tenor, Earl Rice accompanist:
"Return March," Petro Della Ratta, Accordion solo;
"Such a Little Fellow," Irene Nettles, sortano;
"Memories," Alexander Bouchard, tenor; "Polka de
Concert," Irene Nettles, planist, "Mazurka," Fletro
Della Ratta, Accordion solo; "A Winter Lullaby,"
"Obstination," Alexander Bouchard, tenor, Earl
Rice, accompanist; Melley from "Wildflower," Irene
Nettles, planist,
WHAS (Central, 400), 4:00-5:00 P. M., Concert by
the Mary Anderson Theatre orchestra; Ollie Jones,
conductor; 7:30-9:00, Concert, given by Helen Elchenherger, planist, Mary Ernest Poore, violinist, Howard
Koch, violinist,
WP (Fastern, Davilott Saving, 509), 3:00 P. M.. oprano: "Melody." Master Adelbert Purga, violinist;

conductor; 7:30-9:00. Concert, given by Helen Elchenherrer, pianist, Mary Ernest Poore, violinist, Howard Koch, violinist, Mary Ernest Mary Sol), 3:00 P. M., Musical selections, WIP Instrumental trio; 6:45, "Radio Bas hall Dope," by Monte Cross, old time players; 7:00, Redtline stories, Uncle WIP, WLW (Eastern, 309), 8:00-10:00 P. M., Program arranged especially for the inaugural parade of the Cincinnati Fall Festival; Alchie Norcity orchestra; General Protestant orphanage hand.

WOC (Central, 484), 12:00 noon, Chimes concert; 5:45 P. M., Chimes concert; 6:30, Sandman's visit.

WOO (Eastern, Oaylight Saving, 509), 11:00-11:30 A.
M., Organ recital, Mary E. Vost; 12:00-12:55 P. M., Luncheon music, Wanamaker Tea Room Orchestra; 4:45-5:00, Organ recital, Mary E. Vost; 7:30, Sport results and police reports; 7:45, Dinner music, Hotel Adelphia Roof Garden, A. Candelori, director; 8:30 Address; 8:45, Dance music, Hotel Adelphia Roof Garden Orchestra; Ray Miller director; 11:10, Continuation of Dance Music.

WWI (Eastern, 517), 12:05 P. M., Concert, Detroit News orchestra; 3:00, Concert, Schimeman's hand; 7:00, Concert, Detroit News orchestra and Schimenan's Ban 1.

Saturday, August 25

CFCA (Eastern Oaylight Saving, 400), 8:00-9:00 P. M., Overture, "Phedre." Star Concert Orchestra; "I'm a Sunbeam at Morn," Elleen Law, contralto; "Spanish Dances," Star Concert Orchestra; "Air," Jacques Sterin, cello solo; "Serenade." Star Concert Orchestra; "The Sandman," Elleen Law, contralto; "Somewhere a Voice Is Calling," Star Concert Orchestra; "Orientale," Jacques Sterin, cello solo; "Kathleen Mavourneen," Elleen Law, contralto; Serenade "Espagnole," Star Concert Orchestra.

KGW (Pacific, 492), 3:34-4:00 P. M., Children's programme, 10:00-11:00, Dance music, George Olsen and his Orchestra.

gramme. 10:00-11:00, Dance must,
his Orchestra.
KSD (Central, 546), 8:00 P. M., Post Dispatch Milk
and Ice Fund Benefit performance at Orpheum

and Ice Fund Benefit performance at Orpheum theater.

KPO (Pacific, 423), 8:00-12:00 P. M., Music, Art Weidner's Dance Orchestra.

KYW (Central, Daylight Saving, 345), 5:50 P. M., Children's bedtime story: 7:00-7:58, Musical program, courtesy W. W. Kimhall Co.: Cope Harvey's College Inn Orchestra: 8:05, 'Under the Evening Lamp." furnished hy the Yonth's Companion.

PWX (Inter-colonial, 400), Paquita Elias, soprano.

WBZ (Eastern, 337), 6:00 P. M., Dinner concert. Hotel Kimball trio: 6:30, Bedtime story for children.

WDT (Eastern, 0aylight Saving, 405), 12:00-1:00 P. M., Orchestra selections; 'Man, Man, Don't Do That to Me." 'Gulf Coast Blues,' Trixie Smith; 'Farwell Blues,' "Gulf Coast Blues," Trixie Smith; 'Farwell Blues,' "Gulf Coast Blues," Trixie Smith; 'Farwell Blues,' "Jolasses," Thomas Waller, pianist; 'Where the Sacramento River Flows,'' 'If Winter Comes,' 'Pickles,' Duke Ellington, Vocalion Record artist and orchestra: 'Don't Let Me Find You Here When I Get Back,' Joe DeLisle, einger: Boland Irving, pianist: 'Stop Messin' with My Man,' 'Cotton Belt Blnes,' Rosa Henderson, singer: Fletcher Henderson, pianist: 'Laughing Crying Blues,'' "Taint Nobody's Business,' Lena Wilson, Victor artist: Porter Grainger, pianist: 'My Own,' 'Mose.' 'Papa, Watch Your Step.'' Duke Ellington and crchestra.

WFAA (Central, 476), 8:30-9:30 P. M., Concert of old-time music, Marie H. Bolack, pianist: Charles M. Comert, violinist.

WGI (Eastern, 360), 7:30 P. M., Concert of old-time music, Arrie H. Bolack, pianist; Mrs. John F. Camera, accompanist

WGR (Eastern, Oaylight Saving, 319), 11:45 A. M.,

Camera, tenor; Armand Arma, plaust; Mrs. John F. Camera, accompanist
WGR (Eastern, Oaylight Saving, 319), 11:45 A. M.,
Weather forecast for Lakes Erie and Ontario marine
and aviation interests; 12:30-12:30 P. M., George
Albert Bonchard, organist; 12:35-3:30, Produce and
live stock market reports, New York Stock Exchange,
Chicago Board of Trade; 6:30-7:00, George Albert
Bouchard, organist; 7:00-8:45, Digest of the day's
news; 11:45, Weather.
WHAS (Central, 400), 4:00-5:00 P. M., Concert by the
Mary Anderson Theater Orchestra; Ollie Jones, conductor; 7:30-9:00, Concert by the Courier-Journal
Quartette.
WOC (Central, 484), 12:00 Near Chimson Chicago

Quartette.
WOC (Central, 484), 12:00 Noon, Chimes concert; 5:45
P. M., Chimes concert; 6:30, Sandman's visit; 9:3010:30, Dance program, P. S. C. Orchestra.
WWJ (Eastern, 517), 12:05 P. M., Concert, Detroit
News Orcestra; 3:00, Concert, Schmeman's Band; 7:30,
Concert, Schmeman's Band.

Sunday, August 26

KHJ (Pacific, 395), 10:00 A. M., Sacred service; 10:30, Organ recital, First Methodist Episcopal Church,

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New York

Arthur Blakeley, organist: 7.00-7:30 P. M., Organ recital, First Methodist Episcopal Church, Arthur

rectal, First Methodist Episcopal Church, Arthur Blakeley, crganist.

WFAA (Central, 476), 2:30-3:30 P. M., Bible class. Dr. William M. Anderson, half hour atudy, half bour song: 9:30-10:00, Choristers and soloists from Oak Cliff Presbyterian Church; 10:50-11:00, Concert. Sherly Lee Alley and orchestra.

WG1 (Eastern, 360), 4:00 P. M., Twilight program, "Adventure Hour," conducted by the Youth's Companion; Concert program, Edison Laboratory Phonograph; Stories, Arturo; 8:30, Musicale, Catherine Chisholm, planist and teacher.

WGR (Eastern, Oaylight 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; 3:00, Vesper service; 6:30-7:00, George Albert Bouchard, organist; 11:45, Weather.

Westher.

WGY (Eastern, 380), 9:30 A. M., Service from First Methodist Episcopal Church, Schenectady, N. Y.: Organ Prelude, "Song of Sorrow." Mirs. Albert Kinum: "How Firm a Foundation." Hymn; Apostle's Creed; Prayer: Response: Lord's Prayer: "O Master, Let Me Walk With Thee," Mayfred Spooner, contraito; Psaiter: Gloria Patri; Scripture Reading; Offertory, "The Penitent," Fred Heacox: Doxology; "Faith of Our Fathers," Hymn; Sermon, hy Dr. F. P. Corson, Elmhurst Community Church; "Come Thou Almighty King," Hymn; Benediction: "O Sanctiselma," Mrs. Albert Kinum, Organ Postlude. WHAS (Central, 400), 9:57 A. M., Organ msic: 10:50, Church services under the auspices of the Central Christian Church, Rev. Dr. Albert Nichols, pastor; 4:00-5:00, Concert, under the auspices of Alice Monroe.

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

Monday, August 27

KPO (Pacific, 423), 8:00-10:00 P. M., Organ recital, Gladys Salishury; Music, Stanislaus Bem's Orchestra. WOAR (Eastern, Oaylight Saving, 395), 12:00-12:54 P. M., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra, Feri Sarkozi, director; 4:30-5:55, "Affairs of the Heart," Betsy Logan; musical program; 7:30-8:00, Bedtime stories, Dream Daddy.

WFI (Eastern, Oaylight Saving, 395), 1:00 P. M., Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 3:45, Short talks; Song and piano recital; 6:30, Dinner music, Meyer Davis Bellevue Stratford Concert Orchestra; 7:00-7:30, Children's half hour, Stories by Consin Sue.

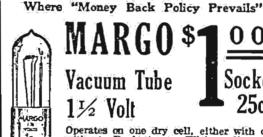
WGR (Eastern, Daylight Saving, 319), 11:45 A. M., Weather forecast for Lakes Erie and Ontario marine and aviation interests; 12:00-12:30, George Albert Bouchard, organist; 12:35-3:30, Produce and live stock market reports, New York Stock Exchange, Chicago Board of Trade; 6:30-7:00, George Albert Bouchard, organist; 7:00-8:45, Digest of the day's news; 9:20-11:45, Concert; 11:45, Weather.

WGY (Eastern, 380), 7:45 P. M., Concert program, "A Chip of the Old Block," S. Robert Curtis, haritone; "Dedication," Mildred Swart, planist; "The Shoogy Shoo," Ada Webster, soprano; "Molly Ochone," S. Robert Curtis, haritone; "Dedication," Mildred Swart, planist; "The Shoogy Shoo," Ada Webster, soprano; "Molly Ochone," S. Robert Curtis, haritone; "Sorgano; Address, "Mosquitoes and Their Control," Bussell W. Gies; "I Knuw a Littie Girl," "Cradle Song," Ada Webster, soprano; "Through Enchanting Meadows," Mildred Swart, planist; "Oh, for a Breath o' the Moorlands," S. Robert Curtis, baritone.

WHAS (Central, 400), 4:00-5:00 P. M., Concert by the Mary Anderson Theater Or:2-stra: Ollie Jones, conductor.

WIP (Eastern, Daylight Saving, 509), 3:00 P. M., Artist recital; 6:45, "Radio Baseball Depe" by Monte Cross, old-time player; 7:00-7:30, Bedtime stories. Uncle Wip
WLW (Eastern, Oaylight Saving, 509), 11:00-11:30 A. M., Organ recital, Mary E. Vogt; 12:00-12:55 P. M., Luncheon music, Wan

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chestra; 4:45-5:50, Organ recital, Mary E. Vogt: 7:30, Sport results and police reports; 7:45, Dinner music, Hotel Adelphia Roof Gardon Orchestra; 8:30, Popular selections, WOO Orchestra; Robert Golden, director; 9:30, Organ recital.

Amplifiers Liven WMAF Dead Spots

But Millionaire's Loud Speakers Are Silenced by Neighbor's Protest as to Noise

NEW BEDFORD, MASS .- Colonel Edward H. R. Green is to establish soon on his estate at Round Hills the Radio school with free tuition, announced some time ago in an article in Radio Digest. A large electrical manufacturer has assured Colonel Green that he will take care of every graduate of the school, as the demand for Radio experts is growing constantly.

Colonel Green's new 500-watt broadcasting station, WMAF, is now working; it is broadcasting simultaneously to New England fans the full program of WEAF, New York, nightly by telephone line relay. Amplify Over Dead Spots

In analyzing the use of the five special telephone lines to convey the program to WMAF it was found that at various intervals between New York and South Dartmouth, Mass., where the station is, there were "dead spots" across which the current refused to flow unaided. After consultation by an engineer speech ampllfiers were inserted in the lines at these point. The concerts as now broadcast were the result.

Temporarily the huge loud speakers in the tower at Round Hills are silent, owing to the complaint of a summer resident at Nonquitt that they disturbed him. But as soon as a way can be found to prevent the sounds from being carried to the little colony, they will be in operation again.

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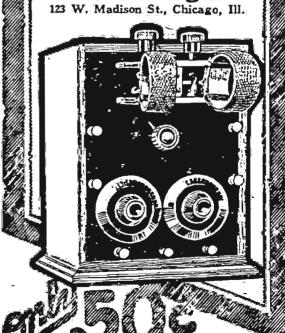
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Description of apparatus and accessories and details of tuning. CABINET DIMENSIONS

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Radio Digest



Radio Diges

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No. 7

Lectures Alone Not Satisfying

It Takes Real Music to Hold the Attention of the Fan HE navy department, which has been broadcasting concerts from NAA, has declared its intention of discontinuing them and using the government equip-ment only for lectures, "because more persons will listen to the lectures than to the concerts."

Perhaps their assertion is correct but if it is it certainly does not apply to all localities. Lectures are right when sandwiched with good musical programs but a steady diet of lectures soon palls the appetite of the ordinary Radiophan.

New Field for Radio

Arctic Explorers Find Air Communication of Benefit

HE use of Radio for arctic work is new and un-I tried; the results of the plan of communication, designed jointly by Captain MacMillan and officers of the American Radio Relay League, are expected to pave the way for future expeditions under vastly improved circumstances as to the morale of the explorers and the advancement of science.

Should some sudden emergeucy overtake the exploring party and their rescue brought about, then the weeks spent in preparation, the painstaking care in which Radio equipment was assembled, will not have been in vain and Radio will have proved its value in

the new field.

Freak Effects in Reception

Localities Seem to Suffer from Jumps in Waves

IT is a widely known fact that some places are very unsatisfactory for Radio transmission and reception. The range of a broadcasting station may be many hundreds of miles, yet within fifty miles are localities over which the radiated electro-magnetic waves seem literally to hop, coming down at points farther along. At the same spot, however, over which waves from one station skip, waves from more distant stations may readily be picked up.

These conditions give rise to much speculation as to the cause. The characteristics of the land, whether hilly or flat, wooded or cleared, moist or dry, over which these waves have passed are thought by many Radiophans to be conditions which contribute to freak

effects.

Let the Knocker Be Knocked

Nothing Gained by Kicking About Something Free

OME of the Radio broadcasters are complaining about inappreciative audiences and about the number of "knocks." Few persons realize the pains to which the broadcasters go to furnish amusement free

It is impossible to satisfy such a vast audience as that of Radio. The impulsive or enthusiastic listener is always ready either to register a "kick" or a "boost" as he is touched by this or that part of a program. While you may not like a certain portion sent from a certain station that is no sign others have the same dislike. A little patience will carry you further and help the broadcasting station to arrange a program that will suit the greater part of a Radio audience.

Managers of broadcasting stations should not take "knocks" from impulsive individuals seriously, nor take them as a standard by means of which to judge others of the audience. There are many satisfied listeners who never think of sending in a "boost"; these are the persons who really benefit by the euter-

tainment. "Knockers" must remember that it is an expensive matter to maintain these stations. One of the great broadcasting stations employs fifty-six persons. Vacuum tubes used in these stations cost even at wholesale almost one hundred dollars and they have a habit of burning out even faster than the smaller tubes do.

RADIO INDI-GEST

Which Goes for Many Other "Records"

MY FRIEND SPANISH SOLO BILKINS I HEARD WAS BRAGGING WAS THE ABOUT THE TOREADOR SONG WONDERFUL FROM CARMEN." LONG DISTANCE "HAH HAH, HEH HEH," RECEPTION I CHUCKLED HE HAD HAD LAST NIGHT. PUNCTURING HIS HOPES. SAID HE, WHY, I EVEN "THAT SONG HEARD CUBA. WAS FROM I KNOW STATION PDQ IT WAS CUBA RIGHT HERE BECAUSE THE IN THE CITY." G00 G00.

An Electromagnetic Cerebellum, as 'Twere

Dear Indi: 'Sno use, they've all got it—Radio on the brain. Witness the following between Ma and me: "Wire you in-su-late?"

"Been out with my Gal-ena."

"Did you have a quarrel with Maggie Ohms?" "No. She had a date with Reggie Eneration."

And so the moon turned pale. MIKE ROFARADS.

A-B-C Lessons for Indigest Beginners Chapter X-J Also Stands for Jay Walker BY GOSH

IS for the Jumble That you hear on busy nights, When you're tunin' broad as Broadway, And static blinks the lights.

And So the Limerick Contest Starts

Dear O. M. Indi: Three weeks ago you introduced Mike and Izzy and assured us that they would play a minor part in the game of Radio confusion. Then to make good your word you never mentioned them since. I can't forget their happy dissatisfied look as they seem to fail to get the drift of what wasn't going on, so I want to suggest something.

You know limericks, don't you? (No; who Izzy?-Indi.) Then why not exact a prize of anything from a microfarad to a milhenry from the Radio squab who writes the worst limerick about Mike and Izzy. Disposition of the prizes is to be left to your indiscretion, but would suggest that they be exchanged for a last year's bird's nest, which may be used for a housing on a leaky variometer.

To start the ball on the downward curve, here's my lim-

erick; who can do worse?

Two monks, one Mike and one Izzy, With wire and sundries got bizzy. They built up a loop, Put spaghet in the soup-Er somethin' which made 'em both dizzy.

Or you might reject this one for the benefit of those who don't want to read hefty stuff:

Friend Izzy he built up a circuit, And Mike tried his durndest to workit. He tuned in for "BLAH" With never a flaw. Now there isn't a job but he'll shirkit.

Have some misguided individual write a limerick every week for several years. Besides being filling for the column it may inspire some Radioninny to discover a new ultra extraordinary superfluity which will revolutionize the shape of the modern binding post. Nobody reads the dope, so I believe you will be doing yourself a favor by accepting a prize from the worst limerick offered. One peck of marks sent herewith as pay for my suggestion. Please announce through BLAH, the Walla Walla broadcasting station, that you got my letter and tell the kinfolks that we will hold an ice cream social for the benefit of our Limerick Club Friday of next year. Yours on 360 meters.

> Lying below is Allocious DeMarving, Who listened so long He died by starving.

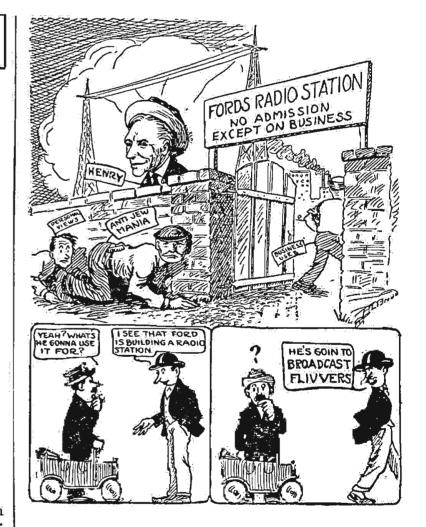
My Radio

The hours I spent with thee, dear heart, Are fraught with joy & bliss, altho' At times I'd like to kick apart My Radio, My Radio.

Each word a shriek, each song a blare. But still I tune and tune in vain I listen in unto the end, and there You screech again.

"B" batteries and ampliphone Oh, tuning coil that makes me cross I wish that I could cure your static groan But you're a loss, sweetheart, a total loss. H. C. GUMP.

"Blame those new cuff buttons you bought for me," muttered Paw. "I can't get 'em to work at all," he grunted. And then he wondered why the family laughed when he rolled back his coat sleeves to show two beautiful nickel-plated binding posts.



Condensed

By DIELECTRIC

When the telephone and telegraph wires were overloaded with news of President Harding's sudden death, Radio again served in its unique capacity. News of this character spreads rapidly by whatever medium it be carried, but isolated farms, lumber camps, ships at sea, for example, knew the sad tidings far in advance of such time as pre-Radio days would have enabled. It is said that Dr. Harding was apprised of his son's demise by a neighbor who received word from a broadcasting station. Events of almost immediate occurrence may be known by many thousands in this day of Radio transmissiou.

The widely known broadcasting station in Atlanta, Ga., WGM, has found a new feature to present to its many listeners in that state. Sessions of the local legislature are being sent out as a regular part of the programs, so that all debates ou all subjects may be followed and campaign speeches may be checked with what the voter has learned first-hand of the candidate's stand on measures passed or defeated. A better informed citizenry should result.

When those six convicts escaped from their enforced lodging in the city of Philadelphia they might not have considered the unseen agency which carried news of their leaving to cities, towns and even farm houses all along the way. Station WOO broadcast information respecting suspects who had "borrowed" a boat in Maryland to go cruising. Chances of escape from capture are very slim indeed with so many folks informed quickly over a large territory.

It is pretty generally admitted that daytime reception of broadcasting does not compare favorably with night reception. Yet a recent test made by Station WDAP showed very little difference between them. Instead of the three hundred mile rarge, the station was found to have a daytime transmission range of twice that. The test proved a power amplifier transmitter to be the most efficient. It is the pursuance of these practical tests which greatly aid progress.

Except for a violin in the hands of a youthful studeut, I know of no sound produced on a musical instrument so distracting as the harsh piano tones carried by so many broadcasting transmitters. We have WGY to thauk for making it possible to hear piano music in our headsets and loudspeakers "true to life." Engineers at that station have succeeded in producing a device to catch overtones and the natural singing quality of the instrument, and to give to the lower notes of a piano their true value when heard through a

The proposed action of the marine bureau of Japan to equip fishing ships with Radio apparatus for use in case of accident to the ships or to report a catch has been tried by other nations and found valuable. This "plaything" is coming near to being a necessity in many business transactions; that fact is borne out almost daily. There is already a sizable list of practical areas. tical uses.

Now our friend Howard Thurston is broadcasting again on the subject of interplanetary gossiping. He is duly recorded as predicting that "unearthly" forces will soon hobnob with us without the expensive aid of professional mediums. Well, I for one, prefer to sec all efforts directed toward improving the sending and receiving of Radiophony, economizing in code usages, application of Radio to ship movements and the like before we wander so far afield for new thrills.

First Steps for Beginners in Radio

Chapter XIV, Part I—Headsets and Loud Speakers

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

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

Chapter XIV, Part Il-Headsets and Loud Speakers. Chapter XV-Filament Batteries.

Chapter XVI-Plate Batteries. Chapter XVII - Using Alternating Current on Tuhes.

Chapter XVIII-Testing Radio Instru-

Chapter XIX-Locating Trouble in the

Chapter XX-Useful Information and Formulas.

EW Radiophans realize the importance of the headset in the operation Radio set. The headset is one of the most important links in the chain between the original sounds striking the microphone at the broadcasting station and the reproduction of those sounds miles away. When one considers that their function is to convert the changing electric currents, picked up with difficulty and nurtured through stages of amplification, into audible sounds, their importance may be more easily recognized. Furthermore a poor headset will cut down the range of set hundreds of miles; many DX records are made or marred in the headset.

Perhaps the common use of wire telephones has led many to neglect the headset, thinking it but a compact telephone receiver that will keep on working perfectly indefinitely and will stand careless handling without harm. True, a Radio receiver is just a telephone receiver but a good headset is a refined scientific instrument and should be treated as such. A well designed Radio receiver will give an audible sound on a current of .00000000016 amperes. To convert such a minute current into sound demands the best of materials and workmanship in the instrument in the first place and the instrument demands consideration and care to retain its efficiency.

When one unscrews the cap from a Radio receiver and sees but two tiny coils of wire and a few pieces of steel they may well wonder where all the scientific instrument idea comes from, for it all seems so simple. But behind that simplicity lies a long story of research and experiment

The Theory of the Receiver

Briefly the theory of the telephone or Radio receiver is as follows: a thin metal diaphragm is rigidly mounted a fraction of an inch away from a pair of pole pieces. These pole pieces are made of soft iron but are magnetized by one or more permanent magnets mounted in the shell. Around the pole pieces are wound many turns of fine copper wire. The diaphragm is normally under tension from magnetism in the pole pieces. When a current flowing around the windings changes in value the magnetic pull on the diaphragm will be varied and the diaphragm will vibrate,

giving rise to sounds. Simple in theory but the details demand attention. The iron in the pole pieces must be of the softest grade so that the magnetism will change rapidly



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

My W. D. II Circuit is especially designed for use with the "Pickle" 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.

with every order.

Elther 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.

certain exact thickness for it must vibrate to the high notes of the violin and respond as well to the cello. A tiny dent or the least bend in the diaphragm will give risc sensitive to one frequency than another. The distance betwen the pole pieces themselves and between the pole pieces and diaphragm are of great importance. All these factors must be taken care of to assure proper operation.

Resistance of the Receiver

Now we come to the important part, namely, the resistance. There is a mistaken idea that the resistance determines the sensitiveness of a receiver. A 3000 ohm phone is not more sensitive than a 200 ohm phone because it has a higher resistance but solely because it has more turns of wire on the pole pieces.

In designing electromagnets the practice is to make the thickness of the winding twice the width of the pole piece. The size of coil in the receiver then is fixed by the size of the pole pieces used. The pull of an electromagnet depends on the ampere turns, that is, the number of turns multiplied by the amperes flowing in the coil. Therefore the more turns we can get into a given space the greater the magnetic flux. In order to get sufficient turns on the pole of a receiver the manufacturers use very fine wire, for that reason the resistance of a Radio receiver is

However, another factor enters the use of receivers with tubes. It is a well known law in electrical practice that the impedance of the output circuit of any device should equal the impedance of the device itself. Therefore the impedance of the receivers should equal the plate impedance of the tube. Impedance as we have learned is the resistance offered to the flow of alternating currents by an inductance as well as the direct current resistance. Therefore the impedance of a 2200 ohm phone for instance is 22,000 ohms on an alternating current of 800 cycles. For higher frequencies the impedance is still greater; it varies with the frequency. In order to meet the above conditions it is common practice to design receivers and transformers with an impedance equal to the plate impedance of the tubes with which they are to be used.

Resistance Does Not Affect Sensitiveness Realizing then that resistance has little to do with sensitiveness we will consider the important factors in the purchase and care of Radio receivers. The best guide is the reputation of the manufacturer. A cheap 'phone is seldom worth all it costs; so don't hesitate to pay a little more for the best. See that the cases are carefully made, all threads well machined and the caps fit snug and tight, that the diaphragms are perfectly flat and rest on smooth edges of the shell, that the coils



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 B-METAL burns out. Made of the famous ever-grady B-Metal. Sold by all live dealers or can be ordered from

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POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

/32 THICK 1/24 PER SO. INCH 16" THICK 34 PER SO INCH 3/32" THICK IC PER SO INCH 1/8" THICK 1/2 PER SQ. INCH 3/16" THICK 2¢ PER SQ INCH 1/4 " THICK 2/20 PER SO INCH 3/8" THICK 40 PER SQ INCH 1/2" THICK 5 1/4° PER SQ INCH

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with the least change in the current in have been protected by a covering and causes the tinsel to break. In time loose the colls. The dlaphragm must be of a the permanent magnets will support the diaphragm on edge. If they fail to hold the diaphragm they are weak and should not be accepted. The simple test for a Radio receiver is to place a piece of paper to distortion or make the telephone more moistened with the tongue between a nickel and a penny and to touch the 'phone tips to the coins. The current generated by this simple battery should give a click in the phones. If no sound is heard they are useless for Radio work.

Care of Receivers

Having purchased 'phones let us take good care of them so they may give long and satisfactory service. Handle them carefully and do not knock or jar them excessively. Vibration will weaken the magnetism in the permanent magnets and reduce the sensitiveness of the receivers. Do not test the 'phones by connecting the cord tips with a B battery, for strong currents in the wrong direction tend to demagnetize the magnets. Since the pole pieces are kept magnetized, a current in one direction in the windings will assist the permanent magnets but a strong current in the opposite direction tends to reduce the magnetic effect and demagnetize the magnets. For this reason the receivers are fitted with marked cords, the cord with the red thread being connected to the positive 'phone terminal. The current in the plate circuit will then tend to help the permanent magnets and the 'phones will retain their sensitiveness. With crystal detectors this is not important, the 'phones may be connected either way.

Should it be necessary to remove the diaphragm at any time do so by sliding it off carefully. Do not attempt to lift it with the finger nails for it will be bent and the efficiency of the instrument reduced. In replacing the diaphragm slide it into place to prevent bending it.

The 'phones should not be pulled around by the cords. The conductors are made from tinsel; excessive pulling or twisting

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LINCOLN RADIO CORP. 224 North Wells Street, CHICAGO, ILL.

contacts will develop that cause annoying sounds by reason of the current being made and broken with each movement of the cord.

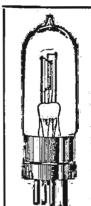
Single 'Phones for Loud Speakers

Many fans make a practice of using a headsct as a loud speaker by mounting it in a horn. The heavy currents they are called upon to handle will often render them unfit for DX work desplte the ruggedness of the receiver under ordinary conditions. It is better practice to reserve the headset for long distance reception; for loud local reception, make use of a single receiver similar to the Baldwin mounted in a horn. To reduce the amount of current in the headset use is made of jacks but one should be careful in wiring in the jacks to see that the same spring in all the jacks is positive and that the cord with the red thread is so connected into the plug that it will make contact with the positive spring when the plug is inserted in the jack.

When putting the receivers away do not throw them into a box or drawer with other objects that may strike the diaphragm and dent it and then expect the 'phone to

(TO BE CONTINUED)

The French steamship line plans to equip all its passenger ships sailing out of New York with Radio receivers and amplifiers for the reception of broadcast programs.



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Complete parts, including two mounted Coil Mountings. Only standard advertised parts used. Complete...... \$11.45

2 STEP AMPLIFIER Completely assembled, ready to use \$11.95

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

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ACME PHONES

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208 page complete Radio catalogue free with orders of \$5.00 on request.

Otherwise prepaid for 25 cents.

SETS

Some Ideas for the Amateur Workman

Homemade Devices for Use in Receiving Sets

Many amateurs who construct their own sets readily appreciate, no doubt, the kinks constantly appearing in publication. The author presents here a group of his own ideas which he hopes will prove beneficial to the Radio fraternity,

WORKSHOP KINKS? EARN A DOLLAR—

HERE 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

"Economy" is the watchword of the amateur with the small purse; for the reader who may be under such circumstances Figure 1 shows a kink which at some time may prove valuable. If you have a dial that is stripped or that is broken so that it is useless you can easily make a neat scale from it by cutting it with a jig saw, and drilling as shown by the dotted lines in the illustration.

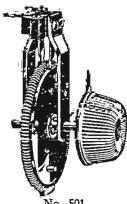
Vernier variable condensers have become quite popular because of the fine adjustment which they make possible. In many instances, good condenser adjustments are worth remembering. We have a dial to indicate the position of the condenser itself, but what about the vernier, which is quite important. A simple remedy for the situation is to mount a pointer on the vernier knob, using the dial as a scale. It is true that the dial is not always in the same position but this will not prevent your keeping a record of good adjustments. For example, the illustration (Figure 2) shows the con-denser adjustment as 50 degrees, and the vernier as 80 degrees.

To solder taps on switch points in some cases is quite difficult, although it insures a good connection. A small Fahnstock binding post will be found quite useful in such cases, for connections. By mounting one in back of each tap (as shown in Figure 3), the work in wiring is much simplified, and secure connections can be made, eliminating the solder.

Figure 4 shows a compact, back-mounted inductance switch. The knob of the switch projects through a slot cut in the panel, and the top of the switch is numbered, in conjunction with the taps. The switch and the switch points are mounted on a piece of hard rubber, supported by a bracket. This saves panel space, and presents a neat appearance.

Honeycomb and other inductance coils are quite awkward when mounted on the front of the panel. Though there are many ways of back mounting these coils very few are

Kellogg Radio Equipment for Better Results



Rheostats

The Kellogg rheostats are simple in design, having but one movable part. The resistance wire is carried on a rotor of high grade insulating material

and the contact arms are so placed that a slight movement brings in the one-half turn of the wire, giving a vernier effect.

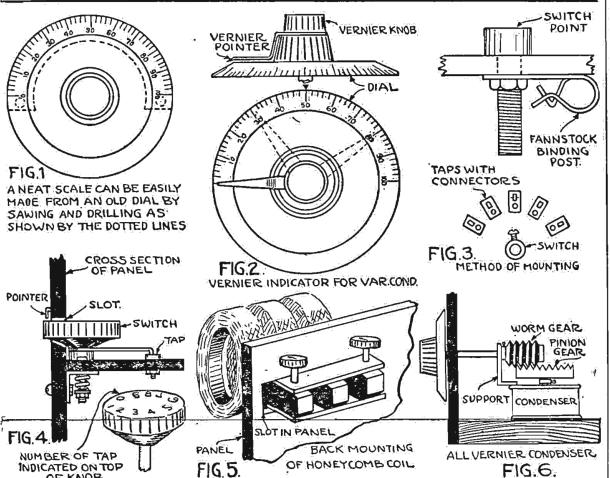
The knob is shaped and corrugated to fit the fingers, making possible the slightest movement.

No. 501 Rheostat, 6 ohms.....\$1.50 No. 502 Rheostat, 25 ohms..... 1.50 No. 46045 Rheostat Rotor, 25

KELLOGG SWITCHBOARD S SUPPLY COMPANY

> 1066 W. Adams Street Chicago, Illinois

SIX SHORT CUTS ON HOME SETS



Soldering Brass and Copper

brass are to be soldered, only rosin should

be used. Any paste or liquid will inevita-

bly corrode the metals; it is difficult to

remove all the paste after the joint is

made. For this reason, use only rosin-

core solder wire. This is a tube of solder

filled with rosin; and no cleaning is neces-

Concerning Rebuilt Phones

the permanent magnets if no attention is

paid to the direction in which the cur-

Rebuilt headphones lose magnetism in

sary afterward.

For all Radio work, when copper and

satisfactory. The standard mounting can be easily changed to back mounting, as shown in Figure 5. A slot is cut in the panel, and the mounting is reversed, allowing the coils to be inserted through the slot. Small arrows engraved on the knobs, indicate the position of the coils.

OF KNOB.

There is no need of discarding the old condenser if you want a vernier condenser, for it can be changed quite easily at small cost. Figure 6 shows the simple arrangement. A pinion gear is mounted on the condenser shaft, and a worm gear on a shaft which is controlled by a dial. The ratio of the gears makes accurate vernier adjustment possible. This method can also be applied to variometers or variocouplers.-Carl Masson, Jamaica Plain, Mass.

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

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 ever 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 Volutsia, Wichita, Kan.



How to Plan and Make Your Fixed Condensers

Radiophans are divided into many classes. Some are familiar with all of the various electrical stunts while others are not versed in the solution of mathematical formulae. This article is to give some information to the latter class.

For example: It is desired to make a fixed condenser of a capacity of .00025 mfd. using tinfoil for plates and mica as a dielectric. What should the area of each tinfoil plate be and how many will be required?

The capacity of this "problem" condenser is small and only two plates will be required, separated by one piece of mica, In this case C equals the capacity desired which is .00025 mfd. T equals the thickness of the dielectric in decimal parts of an inch, which is .01 and K equals the dielectric constant for mica which without further explanation may be taken as 6.

 $C T \times 10^{10}$ The Area= or, substituting,

2248 K

 $.00025 \times .01 \times 10,000,000,000$

=2 sq. in. 2248×6

Taking the square root of 2 square inches gives 1.41421 inches. Therefore, two plates will be required, each plate measuring 11/2 inches (approximately) on each side. Remember this the lapping

The plates are placed between two pieces of formica 1/8 in thick with the mica be-(Continued on page 14)

Erla Reflex Transformers

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



Five Tube Neutrodyne Receiving Circuit

Part I—The Circuit and List of Parts

By H. J. Marx

under United States Patent No. 1450080, nected direct to the grid and negative audio stages only. No connections are

Since the announcement of the development of the Hazeltine Neutrodyne
Circuit, patented March 27, 1923, when on the other side the loop is conout entirely, leaving no dead end connections out entirely, leaving no dead end connections.

The illustrations, to be tions as is sometimes the case.

Jacks are used in the first and second and assembly of these parts.

need be run to the front of the set.

The Circuit

the proper operation of this type of circuit.

In addition these transformers, called

neutroformers, are of the air core type.

They consist of the transformer windings

on tubes, mounted on the proper variable

ZOBEL-STEIN LABORATORIES

A potentiometer, added for grid control of the detector tube, was found to be of considerable advantage, especially when using different tubes for the detector. In using 201-A tubes neither a straight positive, nor negative grid return connection gave best results, but the potentiometer was the means of adjusting to the best operating point.

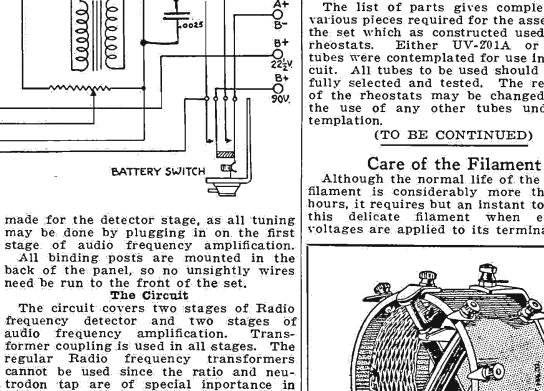
The two jacks are of the filament control type; when the rheostat adjustments have been made they need not be altered except to account for variations in battery

The audio frequency transformers were of a small compact type, taking up a minimum amount of space. In spite of the apparently large panel there was but little surplus room and the panel layout required considerable study to avoid inter-

List of Parts

The list of parts gives completely the various pieces required for the assembly of the set which as constructed used 20-ohm rheostats. Either UV-201A or C-301A tubes were contemplated for use in the circuit. All tubes to be used should be carefully selected and tested. The resistance of the rheostats may be changed to suit the use of any other tubes under con-

Although the normal life of the average filament is considerably more than 1000 hours, it requires but an instant to destroy this delicate filament when excessive voltages are applied to its terminals.



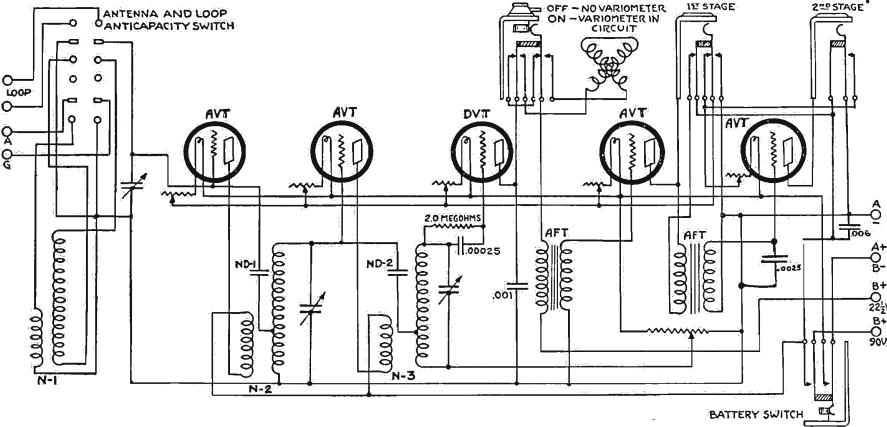


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every Radiophan has been itching to try filament with the condenser of the neutro- made for the detector stage, as all tuning lt. It was possible to give circuit dia- former shunted across it. If the lever is may be done by plugging in on the first lt. It was possible to give circuit diagrams, but real constructional data of a tested circuit and set were not available. Rather than furnish details blindly in an effort to supply the demand, time was taken to construct and assemble carefully a set of this type. The final tests having been completed, and the operation of the circuit giving thorough satisfaction, it is now presented to the fans with the knowledge that if instructions and details are carefully followed there will be no difficulty in operation.

It would be well to say here that the efficiency of operation depends much on the quality of apparatus, carefulness and accuracy of construction, and the experience of the operator. Until the approximate dial settings for various wavelengths are determined, tuning is difficult. Each stage of Radio frequency must be tuned to the proper wavelength; as these adjustments are rather critical, no reception will be had until each step is tuned in. There is no long whistle to inform you of a carrier wave; reception has a habit of slamming in on you so suddenly that it makes the ears sing for a while. The volume is more than sufficient; the clarity of tone is exceptionally good and, once the tuning knack is acquired, distance appears to be unlimited. But let it be said again—all these points are only the rethe selection of apparatus.

Special Circuit Peatures

From the flood of requests for neutrodyne circuit details, a number of special features in popular demand were selected and incorporated in the circuit. Such features may be omitted by the constructor if they are not desired.

Some wanted a loop antenna circuit; others wanted to use their outdoor antennae; many wanted to use both. For this reason the circuit calls for four binding posts, two for antenna and ground and two for loop aerial connections. An anti-capacity switch connects the an-

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in the center or neutral position all aerial and ground connections are open. A battery switch has been added. This

LIST OF PARTS

1-Main Panel 7\%"x23\\4"x3/16" 1-Suh Panel 8"x9"x3/16"

3-Neutroformers

2—Neutrodons 5—Rheostats 20 Ohms

2-Panel Mount Sockets

3—Base Mount Sockets

1—Anti-Capacity Switch, 12 terminals
1—Jack Type Battery Switch, double circuit
1—Jack Type Switch, 6 spring
1—Filament Control Jack, 5 spring
1—Filament Control Jack, 3 spring
2—Audio Fraguency Transformers

2—Audio Frequency Transformers
1—Variometer

8—Binding Posts 1—Grid Leak, 2 megohms 1—Grid Condenser, .00025 mfd.

1—Fixed Condenser, .001 mfd. 1—Fixed Condenser, .0025 mfd. 1—Fixed Condenser, .006 mfd.

1—Potentiometer, 200 ohms 4—Dials ¼", Hole 3" Diameter 50 ft. Square Bus Bar Wire

switch opens and closes both the A and B battery circuits.

A variometer has been added in the plate circuit of the detector tube. This may be cut out by means of the variometer switch. ward of great care in construction and It will be noticed that this switch cuts it



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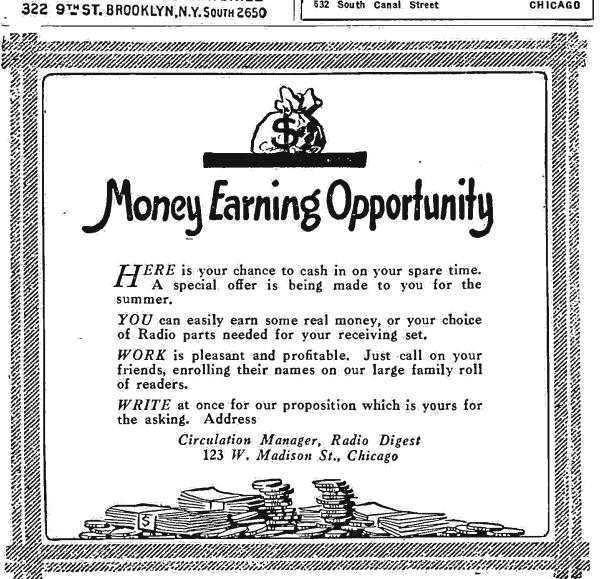
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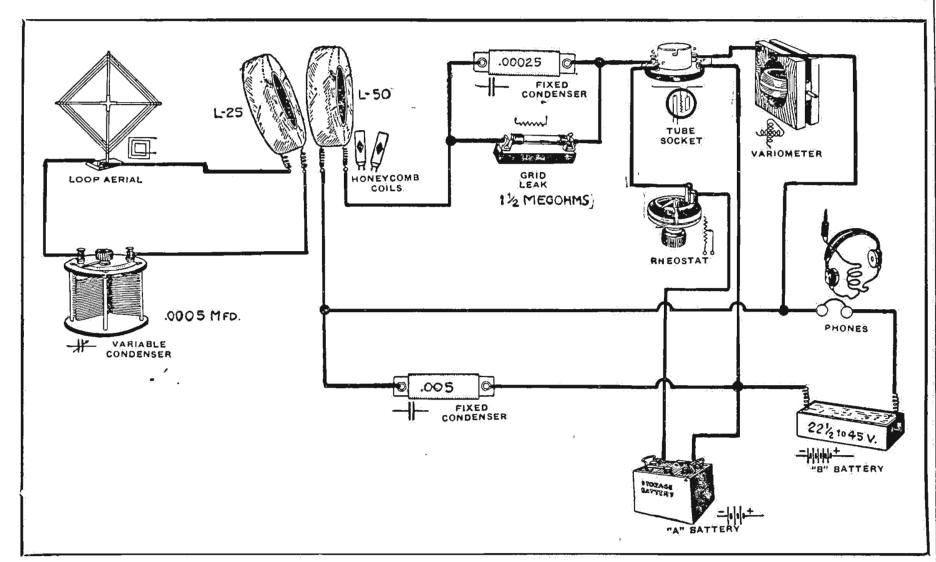
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ERE is a simplex circuit somewhat adapted either to loop or the outdoor give very efficient results. aerial. Tuning is taken care of by means of the honeycomb coils and the variable condenser. The variometer in the plate circuit controls regeneration. For variations in wave length other coil values may be substituted.

similar to the Flewelling. It is well cheap as to construction expense. It will

The plate battery voltage is dependent on the type of tubes used, and is best ascertained by test under operation. Any of the dry cell tubes can be used if desired, substituting the proper rheostats and dry cells as necessary. An improvement on the variable condenser.

The circuit is simple to operate and this circuit would consist of the addition of another .0005 mfd. variable condenser connected across the secondary honeycomb coil for closer tuning.

> When an outdoor antenna is used the aerial is connected to the coil and the ground to the rotating plate terminal of

CONDENSER MAKING

(Continued from page 12)

tween makes a very accurate grid condenser. It makes no difference if the mica is a little larger in area than the tinfoil. Copper foil can be substituted for the tinfoil. German silver may be used if it is 32 inch thick, but the dielectric must be .01 thick.

Second Example

Another example: What capacity would a condenser have using 7 sheets of mica 2% inches square and .01 inch thick and having 8 tinfoil plates 2½ inches square? Wherein 6 = K = dielectric constant, 21/2 \times 2½ = A = area of one plate, and N = number of tinfoil plates = 8.

Capacity =
$$\frac{2248 \text{ K A (N-1)}}{\text{T } 10^{40}}$$

or substituting;

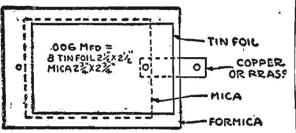
 $2248 \times 6 \times 2.5 \times 2.5 \times (8-1)$

Capacity =- $.01 \times 10,000,000,000$

the number of plates required for a given ordinary fan. condenser. The formulae then reads:

 $N = \frac{C \ T \ 10^{10}}{2248 \ K \ A} + 1$

In the example previously considered, capacity = .006 mfd. Thickness of the mica = .01 inch. Dielectric constant = 6. Area of tinfoil plates = 2½ by 2½, or 6.25 square inches. Everything but the



number of plates is known. Then with N = the number of tinfoil plates we get by substituting:

 $.006 \times .01 \times 10,000,000,000$ -+1=8 tinfoil

 $2248 \times 6 \times 6.25$

plates. This means 7 separating mica plates, and =.0059 mfd. or approximately .006 mfd. with one on top and bottom the total num-This means that such a condenser has ber reaches 9. The exact value of a conan approximate capacity of .006 mfd. The denser can be only determined by measurformulae, the use of which has just been ing the value of the completed condenser, explained, may also be transposed to find but this is out of the question with the

I The formula for figuring the .006 mfd.

condenser is used when the condenser consists of more than two plates. Third Example

Example Three: Using same size tinfoil, 21/2 by 21/2 inches, and mica .01 inch thick measuring 2 3/4 by 2 3/4 inch. Problem: To make a condenser of .004 mfd. capacity, how many plates are needed?

Substituting: $.004 \times .01 \times 10,000,000,000$

+1 = 6 tinfoil

 $2248 \times 6 \times 6.25$ plates approximately.

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.0002		.003	
.00025		.004	
.0003		.005	
.00035	35	.006	75
.0005		.008	
.0006		.01	
.0008	40	.015	1.50
.001	40	.015	2.00
0015		025	2.50

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13 23	Plate Plate	Variable, value \$1.75\$1.05 Variable, value 2.50
23	Plate	Vernier, value \$5.50

	ring indu					-25
Single c	ircuit Jack	. list	65c	 		.30
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	high fini					.25
						.65
Filament	rheostat,	0 On	ms	 • • • • • • •	•••	
Filament	rheostat,	20 oh	ms	 		-80
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Reviews of Books

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. Pack-

er 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 suc-

cessfully. Price, \$1.50.

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One reason for the problem of a condenser of .006 mfd. capacity is that this condenser has been in great demand in the Flewelling set. Using the foregoing formula you can work out any size condenser you desire to make.

The illustration shows a condenser actually constructed by the foregoing formula. The formica is 1/8 by 3 by 3 1/4 inches. Two small holes are drilled through both pieces of formica with the idea of fitting the mica sheets between the two bolts inserted therein. The dotted lines indicate the limits of the mica. Switch posts may be used for the bolts as the formica is not thick enough for countersinking the holes for the heads of the posts, it is recommended that a small wooden washer or fiber piece be countersunk through which the head of the posts will pass. This is to be placed on the outside of each end of the formica and serves to keep the metal free from surrounding objects.

No glue should be used on the mica. The tinfoil is arranged so that each end is somewhat longer than the active condenser area, thus affording a contact with the posts. A piece of old inner tube from an automobile tire is laid on the completed condenser affording a means of uniform compression.



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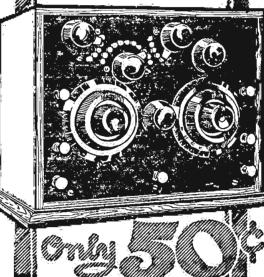
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Questions and Answers

Reinartz Wave Length

(4175) OEW, Lonoke, Arkansas.

Will you please advise how to raise the wave length of a standard Relnartz hookup fromm about 500 meters to 600? The set has the usual coil with two condensers, one 23 and one 13 plate. I tried a coll with 75 turns but it would not oscillate at all. I took this coil out and tried another with about 45 turns but it still does not oscillate.

A.—The circuit may be loaded to accomplish a new allocation of wave lengths by Inserting a 25-turn honeycomb coil in the antenna and secondary circuits re-This will not affect the spectively. oscillation of the circuit and will tune to about 600 meters wave length.

Wave Length on Flewelling (4158) AIA, Austin, Minn.

In the circuit detailed in your pamphlet on the Flewelling circuit I take it that the honeycomb coils of 50 and 75 turns are approximately correct for the reception of the wave lengths used in Radiophone broadcasting up to this time.

What other coils and combinations should I have available in order to receive on the new wave lengths allotted these

What coils should be used to receive the 200 meter waves of the amateur telegraph senders?

What coils should be used to receive the code sent by ships?

What coils to receive Arlington time? What coils to receive transatlantic code?

A .- Honeycomb coils of 75 and 100 turns should be used for primary and tickler, respectively, on wave lengths up to 650

meters. For reception of amateur transmission, coils of 25 and 50 turns are indicated. For transmission from ships the 75 and

100 turn coils will serve. It is advised that a super-regenerative circuit loses its effectiveness entirely on any wave length more than 800 meters, so that Arlington time signals could not be received. By elimination of the super feature and the use of the circuit as a straight regenerative it may be possible This will make a core 11/4 inches square, to receive this station by employing coils of 600 and 200 turns.

It is doubtful if the transatlantic code could be accomplished with the circuit should be connected with the plate of under discussion.

Super Heterodyne

(4217) GW, Berwyn, Ill. Can I use the UV-199 tube, with the super heterodyne receiver for the Radio frequency, and UV-201-A for the audio frequency, with good results? Please give me the most effective combination of tubes for this set. I now have one storage A battery, and would not care to purchase another one. Therefore, I wish to use the same storage battery to light all tubes. Could I use dry cells to light the UV-199 tubes, and use the large battery to light

the others, in the same set? Please send me the super-heterodyne circuit using three Radio and two audio frequency, transformer coupled amplifiers, one describing all the necessary parts. Also I would like your opinion as to the best make of variocoupler, Radio and audio etc... that be most effective in this circuit.

A.—The UV-199 and UV-201A tubes can be used, as suggested, but we are recommending a better combination in that of UV-201 for Radio frequency amplifier and detector and UV-201A for oscillator and audio frequency amplifiers. The same battery can be used on all tubes.

We are unable to comply with your request for a diagram of this circuit other than as it appears in February 24th issue of Radio Digest, which can be secured for ten cents, should you fail to have it at hand.

We are advising further that any standard impedance coupling of the Radio frequency will prove more effective than transformer coupling. For audio fre-



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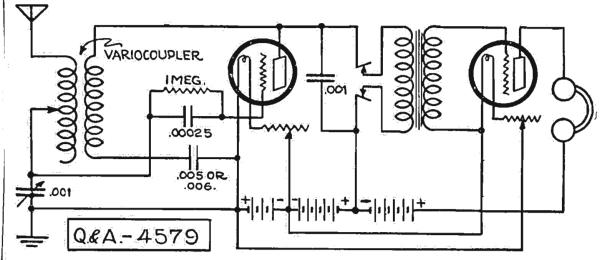
At All Good Dealers AMSCO PRODUCTS, INC. Broome & Lafayette Sts., New York City quency any standard transformer of rug-| sults but to have the wire attached kills ged construction will serve,

RD-86 (4579) EGB, Mount Vernon, O.

Digest of June 23, 1923. I would like to gets so loud it drowns the voice. Would

the sct.

This set is noisy and after I pick up the carrier wave and begin to get the voice I have made a RD-86 as given in Radio loud enough to hear the tearing noise also put on a 1-step audio frequency amplifier. changing the number of turns on the 75



plification?

A.—Complying with your request, we are presenting a diagram of RD-86 with one stage of audio frequency.

Transformer Core (3678) AJG, Wichita, Kans.

Seeing your diagram of a rectifier for charging storage batteries in your issue of April 21, I would like to know the exact dimensions of the iron core, and other details. This is taken from Q&A 2956.

A .- Answering your inquiry with reference to a rectifier for a battery charger as described in the April 21 issue of the Radio Digest, we suggest that the core be made of silicon steel .018 thick, which may be obtained in any sheet metal shop. About ten pounds will be needed. To make the core, cut 170 pieces 5 34 by 1 1/4 inches and 170 pieces 2 3/4 by 1 1/4 inches. inside dimensions 4½ by 1½ inches. The A battery in the diagram shows the polarity reversed. The negative side tube.

High Antenna Capacity

due to the location of the 23-plate condenser? I find that when the aerial wire is brought close to the antenna terminal so as to give a coupling effect, or if a fixed

(4229) PEH, Dunsmore, Fla. Why is it my Flewelling circuit will not

work when the aerial is connected? Is it condenser is in series I can get some re-

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Will you give me a hookup for this am- turn tickler coil help or will the change I am making, that is, putting on a Pudlin leak and condenser and a mica .006 instead of a paper condenser help?

In my other set with the tapped coupler I get results on the regenerative side but get nothing on the super. I had to bank wind the rotor to get 100 turns, is this correct? I can think of nothing to change except the paper .006 condenser for a mica as above.

In the first set (see diagram) how should a ground be connected if I want to insert a two point switch in the tickler circuit to make a straight regenerative circuit? A .- Referring to the Flewelling circuit,

we are of the opinion that the difficulty encountered is due to too high an antenna capacity, which may be overcome by the employment of an eleven-plate antenna series condenser.

It will probably not be necessary after attention is given to the above detail to change the size of the honeycomb coil. however, the use of a good variable grid leak and a .006 mica condenser will be of great help.

Bankwinding on the rotor to accomplish the required number of turns will be all

Storage Battery Charging

(1195) EC, Ozawkie, Kas.

l have a 32 volt farm lighting plant. Please tell me whether if I connect my storage battery with it, will it charge too fast? The dynamo is rated at 40 volts and 15 ampere hours. My storage battery is a 90 ampere hour battery and charges at the rate of 8 amperes. If the charge is too fast please tell me how I can charge it with my plant.

A.—A storage battery can be charged from a thirty-two volt lighting plant merely by connecting the positive side of the 32 volts to the positive side of the storage battery and the negative side of the storage battery to a resistance, such as an electric iron, a heater or bank of lights, the other side of the resistance to the negative side of the 32 volts system. The resistance prevents the storage battery from charging too rapidly. Resistance may be varied so that the desired charging rate may be used.

Directional Effects

Changing the direction of the antenna may increase the signal strength. If it is built like a T, the ends should point toward the station that the operator desires most to hear. If it is like an inverted L, the elbow where the flat top and the lead-in wire join should point toward the sending station for the loudest results.

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