

How to Build Neutrodyne; What Is Wave Trap

Radio Digest

EVERY WEEK

Illustrated

TEN CENTS

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

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SATURDAY, FEBRUARY 2, 1924

No. 4

ZR1 TAKES SET TO POLE

"CAL" RADIOS "GO" TO START CRUISE

LAUNCHES LINER ON ITS TRIP 'ROUND WORLD

Gives Signal from Potomac River to Vessel at San Francisco

SAN FRANCISCO.—A recent bon voyage celebration here at dusk was interrupted when President Calvin Coolidge, undeterred by a gale and the coldest weather of the season, aboard the president's yacht, Mayflower, on the Potomac river some 3,000 miles away, stepped into the Radio room and pressed a key which flashed a signal that sent the liner President Harrison from its moorings here on the first round-the-world passenger and freight service under the American flag.

The signal arrived as Lieut.-Com. John Philip Sousa, naval reserve, was leading his famous band of 100 musicians.

Coolidge Presses Button

It was 8 o'clock, Washington time, when the pressure of the president's finger sent a flash to the wire station at Rocky Point, Long Island, which relayed it across the continent to Marshall station, California. The latter station transmitted the flash to the President Harrison's Radio which was connected in such a way as to blow the steam whistle of the liner, the signal for departure.

Rear Admiral Edward Simpson congratulated R. Stanley Dollar, representing the Dollar Steamship company, which has opened the service with seven ships purchased from the U. S. shipping board.



RADIO TO AID BIG ZEPPELIN ON LONG TRIP

Four Sea, Air Expeditions Ready to Penetrate Arctic and Solve Ether Mysteries

U. S. Would Annex Lands

WASHINGTON.—By way of sea and air the most noted scientists of an earth with a hoide of listeners in, having combined to learn further the mysteries of the ether, are ready now, after ten years of effort, for the final step toward the penetration of the seeming veil which bars the paths of Radio from the North pole southward to the haunts of men.

Thus barrenly is told the story, the grim, wild tale, of the labors of man, ascended from the worm, who, having subdued land and sea, now seeks to conquer the world above even unto the heavens.

Will Unravel Mystery of Ether

But few of the millions of humans crawling under the firmament understand or appreciate, it is said, the portent of the four expeditions, two by sea, two by air, whose mission is to unravel one of the

(Continued on page 5)

You may have heard Alma Rubens speaking from WOR the other day on the work in connection with the new movie "Blood and Gold" to be produced by the Distinctive Pictures Corporation. How do you like to look at her?



Above we introduce pretty Irene Delroy, who distinguished herself as a member of the cast of the "Greenwich Village Follies." She is not unknown to Radiophans, at least not to those who listened in to WHN early last month.



This lovely young lady is Miss Louise Lovely, the star of the photoplay "The Old Nest." She is fond of children and entertained them not long ago from WOC, Davenport, Iowa, with the story of Santa Claus. You can see she, too, enjoys reading it.

CODE HAMS CROSS PACIFIC TWO WAYS

JAPAN AND TACOMA ARE IN COMMUNICATION

Radio Message from Fan in Tokio Reaches to Mother in Illinois

TACOMA.—An unknown American Radio operator in Tokio, Japan, recently sent a Radio message to his mother in Cambridge, Ill., through the amateur Radio station, THG, in Tacoma, operated by Charles York, marking the first two-way short wave communication across the Pacific ocean. With only a fleeting contact, barely allowing time for the message to come through, York had considerable difficulty in distinguishing the foreign operator's call, JUPU.

First Feat of Kind

While the signals of amateur transmitters in the United States have been reported by ship operators in remote sections of the Pacific, and as far as the island of Ceylon in the Indian ocean, this incident is the first in which an amateur has worked in both directions across the 4,760-mile stretch of ocean. The message was delivered by way of the American Radio Relay League traffic system.

The contact hardly had been made and the message copied when communication was interrupted by heavy interference. It was about 1 a. m. when York heard a station with pure CW calling on 200 meters, signing with the unfamiliar Japanese call. For a brief interval signals were good at both stations.

Record of 7HG High

The station operated by York is situated on one of the highest hills in the surrounding country. He has done much long distance work, his best previous two-way record being to communicate with Canadian amateur station IAC situated in Nova Scotia. He has also worked 6CEU in Hawaii and amateurs in every Radio district in the United States with the exception of those in the second and fourth.

His antenna is supported by a 65-foot pole at the free end and a 40-foot pole at the lead-in end. It is a six-wire flat top 50 feet long with a counterpoise directly underneath. The transmitter uses the Hartley circuit with two Telefunken D. R. P. tubes.

LISTENING IN FROM WAY UP NORTH

By Vera Brady Shipman

FORTY below the thermometer on the north side of the house registers to-night. Brrrr, it's winter. Snow is packed, no fresh snowfall for three days, roads are broken, deep ruts mark the way. A traveled path to the barn, another to the poultry house, another to the feed room. These three and no more. Banked up for the winter, you say? That's way up North. The Lake glistens in the crescent moonlight. Deer tracks in the snow today as we skied for the mail. That's up North.

If only I were in fair Italy I would respond to WBAP at Fort Worth who announces an Italian aria and requests those listening in from Italy to answer at once. I just tuned in on Calgary, Alberta, whose orchestra is telling that "I Will Take You Home with Me." (This is so sudden!)

"Pale Hands" hath a tenor from the same station. There's another St. Louis station on the air and a woman announcer too. She announces "Stix, Baer and Fuller department store" and an accordion solo. Heard WOR, Newark, Monday night as Carl Akeley was telling about Africa. Mary Vogt was playing "Stars and Stripes Forever" on the Wanamaker organ from WOO, Philadelphia. Fort Worth announces an invitation to a dance at Mineral Wells, Texas, where they will dance to music by the Kansas City Night Hawks. Believe I could manage that, too.

"How about it, professor, are you ready? Let's go."

KYV broadcast the McVickers theater midnight concert on the pipe organ Wednesday night and I tuned in on MacDowell's "Wild Rose." The melodious Duncan Sisters singing at a Chicago theater sent their best numbers on the air. It makes one want to see the show to hear them sing "Remembering" and "I Never Had a Mammy."

I tuned in on a second Los Angeles station the other night, KHJ, the Times, acknowledging a reception at Springfield, Ohio. It's worth tuning them in just to hear "Marcheta" as they play it.

A banquet is on out there and some old-timer plays every thing from "Hiawatha" to "Three O'clock in the Morning" on a harmonica, mid cheers and shouts. There's "Marcheta" again from Kansas City.

Atlanta gave a request program lately, everything from La Paloma to Missouri waltz. They announced the opening of WSBF of Georgia Tech. Wonder if that's my old friend WGM reincarnated?

MUSIC GUIDES THIS CARTOONIST'S HAND

PHILADELPHIA.—Music which is supposed to charm the savage breast, to soothe and to soften, really makes keener the mind, eye and hand of Owen S. Young, cartoonist of Germantown, suburb of Philadelphia. Young said, a few days ago, that while at work he heard, by means of his one-tube set, Aberdeen, Scotland, and London, and that the music from these and other stations bettered his work.

WMAQ and KYV each gave us five minutes of Coué tonight. I couldn't catch the announcement but recognized the very foreign voice, as he said "Day by day, in every way," as the little druggist's of Nancy.

The second annual banquet of the Izaak Walton league Tuesday sent out the principal address of Judge K. M. Landis through WDAP. That league appeals to me here in the north woods for it sponsors everything that stands for nature conservation. Cleveland, WTAM, on the air tonight, with a closing orchestra number, asking fans how they liked it. Theater music from KSD, St. Louis. Davenport Sunday afternoon in an organ recital.

The wind is whistling and the windows are frosted. My dog stretches out on the bearskin rug before the fire which is burning low.

The Los Angeles KFI chimes are signing off—way out West—and I from the way up North answer "Good night."

CARRY FIGHT FOR RIGHTS TO WHITE

New York Publishers Trying to Get on Air with News Reports

NEW YORK.—Publishers of this city trying to get on the air have appealed for aid from Congressman G. C. White of Maine.

Following his return from conferences in New York in regard to his pending bill, White seemed disposed to introduce features in the new bill which would enable publishers to erect transmitting and receiving stations with which to handle news by Radio.

There seems to be a monopoly, they said, which practically prevented them from opening Radio news stations.

Business Men of Denver Offer Hand to Stations

DENVER.—In an effort to insure better Radio programs broadcast by KFEL and KLZ of Denver, Radio men here and business interests are co-operating with the broadcasters.

The Civic and Commercial association has voluntarily formed a branch to be known as the Radio committee whose duties in general will be to promote the interests of Radio. Sub-committees have also been appointed to represent the various business clubs of the city; these working with the central committee will assist the broadcasters in procuring the best talent.

AIRPHONES AID IN CANAL ZONE WAR

HELPS MANEUVER SHIPS, SPOT GUN FIRE

Uncle Sam Determines Possibilities of Radio Equipment in Territory

WASHINGTON.—A "battle" raged recently off the Atlantic entrance to the Panama canal. If you listened in you might have picked up code press reports from the great naval Radio station at Balboa, giving details of the simulated conflict between the "Black" enemy fleet and the "Blue" defensive force now engaged. If you did not tune in, you at least read of the successful efforts of the Black fleet in the Atlantic to keep the Blue Pacific fleet from coming through the canal to join the Blue Atlantic force and defend the Gatun locks.

Radio Canal Defender

Military and naval experts believed the joint maneuvers, which lasted a week, would have material effect in determining the future land defenses of the United States canal zone. The war game was played not alone for practice but to learn how well our fleets and land defenses can protect the zone in actual war.

It is believed that Radio will play a material part in any form of future warfare in the region. It was an important aid in the maneuvers, particularly in bringing the Blue forces together, in spotting gunfire when contact with the enemy fleet was obtained and in communication between sea and land forces as well as with their air auxiliaries.

U. S. Proud of Canal Zone Station

Uncle Sam is proud of his Radio equipment in the canal zone, particularly of the gigantic 100-kw., CW arc transmitter about midway in the zone, on the hills near Darien, but operated by remote control from Balboa, the control plant. NBA, as the Balboa station is recorded in Radio call books, is no newcomer. It is a real "old timer," having been established next after NAA, at Arlington, the navy's first high powered station. From the aerial, mounted on three 600-foot towers, spaced 900—feet apart to eliminate absorption losses, the station at Darien transmits over 1,800 miles to Radio central in the navy building, Washington, directly. It is over this circuit that official dispatches and many press reports were received from the recent "battle front."

How Canal Station Functions

Essentially, however, the station was not established to handle commercial or press traffic. It bridges the distance to the national capital for another purpose. It provides a vital circuit for official communication between governmental officials and military and naval officers. Auxiliary Radio sets make possible instantaneous communication between the Atlantic and Pacific canal terminals, ships and aircraft of the navy on opposite coasts, as well as with gulf ports, Porto Rico and the West Indies. A dead spot makes communication with Californian stations difficult. In time of war naval officers say the blockading or capture of the Panama waterway would be one of the primary objects of the enemy. In such an event Radio would be the one available agency for effectually co-ordinating the activities of all the canal defenses.

The listed range is 3,000 miles but the messages sent from the big set reach Constantinople, Southern Australia, and Montevideo.

ROUSED BY "FRYING NOISES," FANS ACT

St. Louis Listeners-In Organize to Advance Art of Airwave Reception

ST. LOUIS.—Radio fans living in St. Louis county, Mo., adjacent to the city of St. Louis, who have chafed at "frying noises" and other interference to the reception of music, speeches and bedtime stories over their "hook-ups" organized the Missouri Radio Listeners' association.

The chief object of the new organization, it was said, is to advance "the art, advantages and pleasure of Radio reception."

About 50 Radio fans are charter members of the association. Mayor Julius Nolte of Clayton, who called the meeting, was elected president.

Objects Are Outlined

"The object of the association," Nolte said, "is to further the interest and properly protect those who have Radio receiving sets, to determine the source and abate unauthorized and illegal interference, to assist the constituted officers in the enforcement of all Radio laws and regulations, to make suggestions and recommendations with a view to equitable and remedial legislation and to advance the art, advantages and pleasure of Radio reception."

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Looking Ahead

The Reflex Neutrodyne, the Ultimate in Reflex and Neutrodyne Circuits, is the set H. J. Marx will tell you how to build, beginning next issue. The problem and its possibilities will be discussed. Think of the clear, distortionless reception of the economical reflex set, combined with the marvelous selectivity of Hazeltine's Neutrodyne!

Wave Traps Are but Radio Frequency Filters—according to the engineers who govern what you shall call such things—but whether a spade is a spade or not, wave traps DO work. More about them next week.

Trouble Shooting and Set Operation. Two more standard receivers will be described next week. Like the feature? Thought you would.

Your Seven Tube Super Heterodyne will be first class and work right if the instructions of H. J. Marx are followed. The hook-up and condenser suggestions will be given next issue.

A Few Alterations on the Original Wizard Miloplex—The Mystery Man says they're worth knowing. Yes, next week.

Thompson's "Radio for Everybody" Covers a Lot of Ground, but the ground is covered well. Next week he'll tell the rest of the story about loud speakers.

The Green Circuit Is a Little Different from other regenerative sets, and has some advantages. The instructions for its making end next issue.

Lighthouse Keepers Had a Special Set Designed for Them by U. S. Government technicians. How to build it is told in a short series beginning next issue.

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U. S. SHIPS UPSET DISTANCE RECORDS

SHIPPING BOARD VESSELS MAKE NEW MARKS

Boat's Officer, at Sea, Converses with His Chief in Washington Office

WASHINGTON.—Shipping board vessels established a new long-distance Radio record in both the Atlantic and Pacific during the last year, according to a recent statement of the board. Successful communication was maintained between Bremerhaven, Germany, and Bar Harbor, Maine, and between shipping board vessels off the coast of China and San Francisco. The transmission and reception of messages over such long distances have proved very valuable in many ways, it was said, especially because of the economy effected by eliminating cable tolls and the expeditious handling of communications.

Long Distances Achieved

The maximum distance for reception was approximately 16,000 miles, for transmission 7,000 miles. While on a cruise around the world, the Radio operator on board the steamship East Wind kept in almost daily contact with NSS, the navy's high power station at Annapolis, until almost midway across the Indian ocean. As the ship approached the station from the west the signals faded out completely, until the ship was in the Pacific ocean. While in the Indian ocean Stations NPM, Honolulu, NPL, San Diego, and NZR, Porto Rico, were heard by the East Wind.

Pioneer work in providing Radio telephone equipment for marine purposes was undertaken by the board with the result that the master of the steamship America carried on a conversation with the chairman of the board in his office in Washington while the vessel was more than 100 miles from shore. A Radio telephone set was also installed aboard the Leviathan, but the necessary facilities for Radiophone communication at shore stations was so expensive and the maintenance was so high that it was deemed inadvisable to operate Radiophone shore stations until a larger number of vessels are equipped with the devices.

Long Distance Pickup Tested

To pick up press dispatches and official messages from the naval high powered stations along the United States coasts, while two ships were in Brazilian and Argentine ports, the steamship Pan-America and the steamship American Legion were equipped with amplifiers developed by the naval Radio laboratory and the United States bureau of standards. A similar amplifier was set up in the shipping board's receiving station in London which was also equipped with a naval barrage receiver used especially for long-distance reception. The new receiver has made it possible to copy the Annapolis broadcast every day in London without error for several weeks at a stretch.

Largest Dance Class Hears Arthur Murray

Twenty-One Stations Broadcasting Lessons of Expert

NEWARK, N. J.—Arthur Murray, noted dance master, has been engaged to broadcast his eleventh lesson on social dancing and deportment from Station WOR here to the largest dancing class ever assembled.

His instructions are broadcast by twenty other large stations throughout the country.

Broadcasters Drop 15

WASHINGTON.—Recent recapitulation of Radio broadcasters showed that there were 534 stations listed by the department of commerce, 15 less than on December 1, 1923. Only 12 new stations went on the air during that month; 34 passed out of existence.

THREE SHUT-INS GIVE GREETINGS TO WTAM

CLEVELAND.—Three prisoners sent greetings recently to Station WTAM, Willard. Storage Battery company, here. Two were confined to their homes because of illness; the other was in a penitentiary. One of the letters from the sick was from Hartford, Conn. The missive was disinfected because the writer was the mother of a girl stricken by scarlet fever.

HECK—RADIO SPOILS THE KIDS' VACATION

FORT WORTH.—More than ever does the schoolfeller need a friend, according to recent tales of woe to Station WBAP, Star-Telegram, this city, from Ovilla, near Palmer, Texas. The Ovilla school board was hard put to find a teacher. Somebody told WBAP which immediately broadcast Ovilla's dilemma. A woman teacher phoned her application and was accepted.

HER VOICE ENTHRALLS MILLIONS



Irene Pavloska, operatic star, is known to millions of Radiophans from coast to coast. Not alone has her singing been heard by listeners in tuning in on the performance of the Chicago Civic Opera Company broadcast by Westinghouse Station KYW for the past three years and Station WMAQ, the Chicago Daily News, last year, but Miss Pavloska has microphoned the thrills of her golden throat at many other prominent stations over the country. Her latest individual appearance was at WJAZ, the Zenith-Edgewater Beach Hotel station, Chicago.

Brazilian Electrical Trade Fair

WASHINGTON.—Business in small Radio apparatus lines continues fair, although the demand for heavier electrical

goods is declining, according to Assistant Trade Commissioner Bernard H. Noll, of Rio de Janeiro. Competition continues to be strong, that of Italy being on the increase.

BROADCAST OVER PORTABLE PICKUP

CARRIES PROGRAMS TO HOME STATION

Relay Instrument Can Be Transported to Center of Action—Uses Low Wave Length

SCHENECTADY, N. Y.—A short wave Radio transmitting set which may be transported to church services, concerts, dramatic performances or lectures has been introduced as part of the broadcasting equipment of Station WGY, General Electric company, here.

The set is a Radio relay which conveys the program to the broadcasting station. It cannot be tuned in by the ordinary Radio receiving set.

Low Wave Doesn't Interfere

The set is conveyed to the place from which the broadcasting is to be done. Wire connection is established between the microphone or pick-up in the hall or church and the transmitter of the portable set outside. The wave length is too low to interfere with the usual receiving sets or broadcasting stations; it is so low that there can be no interruption from spark transmitters by amateurs.

By means of a sensitive receiving set near Station WGY, speech or music is picked up, amplified and conveyed to the main transmitting equipment of WGY, from which it is put on the air on the licensed wave length of the station, 350 meters.

Prior to the introduction of the Radio relay it was customary for WGY to connect church and Radio station by wires. This required considerable preparatory work. Because of the time involved in making the necessary installations programs which might have been instructive or enjoyable had to be omitted.

The small transmitting set, mounted in a covered truck, may thus be taken to hall, theater or church, where in a short time the installation will be ready for service.

System Doesn't Hurt Tone

Re-broadcasting does not affect the quality of music or speech. WGY has made frequent use of Radio relay methods. Listeners were at no time aware that a Radio transmitting set working on a low wave length had supplanted the wire link in the system.

There is another, even more important use for the small transmitting set in Radio relay. In the relay now in common use at WGY, the small station is used to feed into the larger transmitting set through the introduction of a receiving set between the Radio links. It is possible that the future will see many of these small transmitting sets scattered about the country, used to re-radiate on lower wave lengths, concerts received on a sensitive receiver from any one of a half dozen main stations, for the benefit of listeners with crystal sets or short distance receivers.

FARMER SURVEY FINDS HALF BOAST OUTFITS

Fifty Percent Use Homemade Receiving Sets

WASHINGTON, D. C.—The importance of Radio in the production and marketing of agricultural products is emphasized in a special survey of the work of about 1,200 representative farmers, just completed by the department of agriculture. More than fifty percent of the 1,200 farmers replying reported that they owned tube sets employing three or more tubes; approximately fifty percent of the farmers reporting have homemade sets ranging from simple crystal detectors to tube sets.

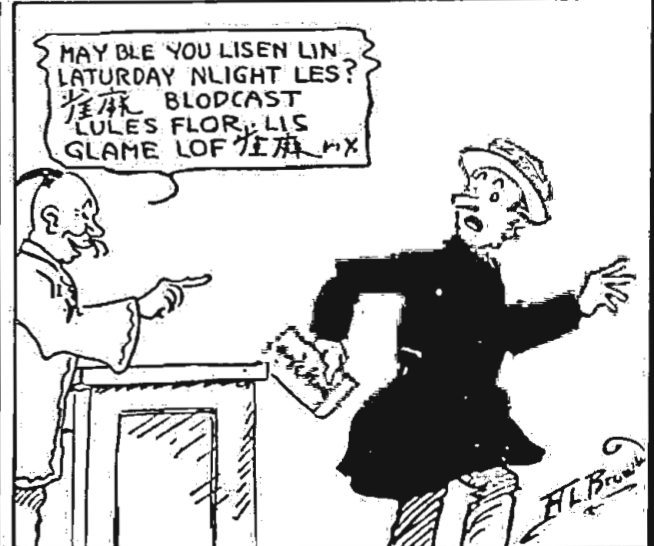
New Station in Africa

WASHINGTON.—Completion of a large broadcasting station at Johannesburg, South Africa, will be accomplished soon, according to Consul G. K. Donald, of that city.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Found, a Universal Washer



BRITAIN IS VICTIM OF RADIO MADNESS

RECEIVING SETS SOLD AT 50 CENTS EACH

Powerful New Relay Station Going Up to Meet Public Demand

LONDON.—Great Britain has become Radio mad. The recent successive triumphs in "getting" Canada and the United States and other distant countries have given enormous impetus to the sale of receiving sets, some varieties of which are being sold for as little as 50 cents.

To meet the British public's demands for further dissemination of wireless programs the British Broadcasting company is erecting another powerful wireless relay station at Plymouth, which, with the transmitting plants at London, Birmingham, Manchester, Glasgow, Edinburgh, Aberdeen, Cardiff and Bournemouth, will link the British Isles.

Expect Sensational Achievements

During the last few weeks South Africa, India, New Zealand and Mesopotamia have been heard distinctly. British public expects that this year will bring more sensational achievements in Radio science.

It is anticipated that, as continental and transatlantic transmission improves, the relay system applied by the British Broadcasting company will enable listeners in here to make a tour of the world in a night, to hear in the course of an hour or two concerts in New York, Vienna, Prague, Rome, Berlin, Paris and Moscow.

Messages from United States

So much success attended the recent experiments of British Radio engineers in talking across the ocean that a great part of Great Britain now sits up all night trying to establish wireless contact with United States stations.

With a five-tube set messages from New York have been received on the loud speaker in London, Manchester, Bradford and other British cities.

Harold D. Hayes, of San Francisco, has been assigned to Seattle as assistant Radio inspector.

PRESIDENT OF CUBA BELIEVES IN RADIO



President Alfredo Zayas of the Republic of Cuba, is a firm believer in the Radiophone and frequently delivers messages to his people via the Radio. He is pictured above making an address from his office, which was relayed through Station PWX of the Cuban Telephone Company at Havana. Int. Newsreel Photo

PUBLISHER RAPS BAR ON SONG HITS

HOLDS CONCERNS WILL SOON SEE ERROR

H. C. Weasner Says Broadcasts Have Boosted Sale of His Productions

By Lloyd S. Graham

BUFFALO.—Instead of cheapening song "hits," instead of reducing the volume of his sales, Radio has had the opposite effect, according to H. C. Weasner, head of the independent music publishing firm of that name in this city. "The day is not far distant," he said recently, "in which the big music publishers will see that they have made a serious mistake in their policy of repression. Some of them are beginning to see it now. Theatrical producers were first to see the error, but many of them are still bound by the publishers. The recent report in Radio Digest concerning the broadcasting arrangement effected by the Columbia Phonograph company is significant."

That Weasner applies his own opinions is shown by the fact many of the song compositions he controls have been broadcast. One of these was "Just a Faded Flower," recently transmitted by Station WGR. The song, which was sung by Weasner, pleased the director of Station WGY so much that he asked Weasner for a copy and for some especial scores.

PICK LOS ANGELES FOR COMING SHOW

Exposition to Open Feb. 5 for Six Days—Floor Space Nearly Sold Out

LOS ANGELES.—Efforts of the Chamber of Commerce of this city, of the Los Angeles division of the music trades' association and of other elements, have resulted in the selection of the City of the Angels for the next Radio exposition. The show is to open on Feb. 5 and close on Feb. 11. It will be staged in the Biltmore hotel by the American Radio Exposition company of which Frank Hitchcock, formerly postmaster-general, is president.

More than 90 percent of the floor space already has been sold, according to the managers of the exposition. Among the exhibitors will be the Western Electric company which will display its \$10,000 loud speaking public address system. Famed Radio scientists and noted men and women of motion pictures are to feature the program.

Washington Show March 19

WASHINGTON.—The first annual Radio show for this city will be held March 19 to 26, inclusive, in Convention hall. The Radio Merchants' Association of this city is to be in charge.

WASHINGTON.—Inauguration of the Barcelona General and Electrical Exposition has been fixed by a royal decree for October 12, 1926. The exposition will close on July 1, 1927.

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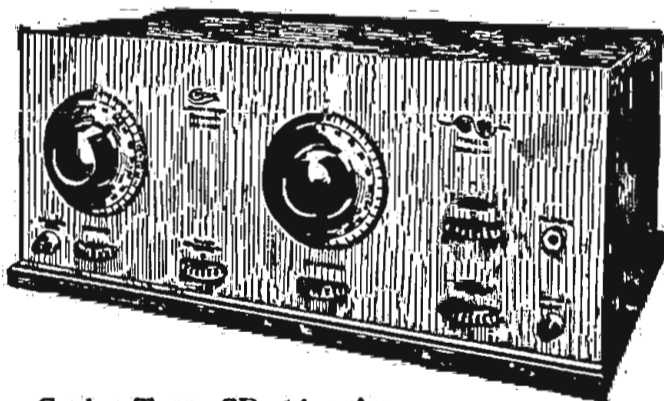
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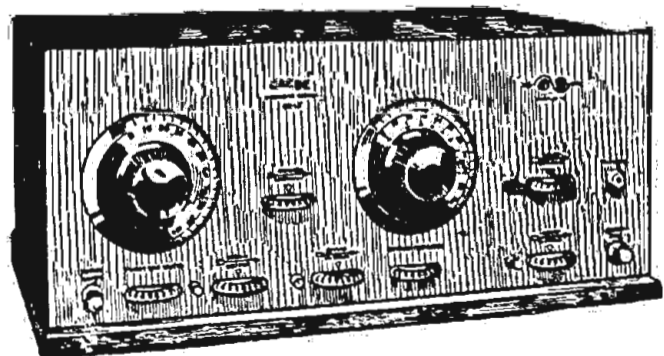
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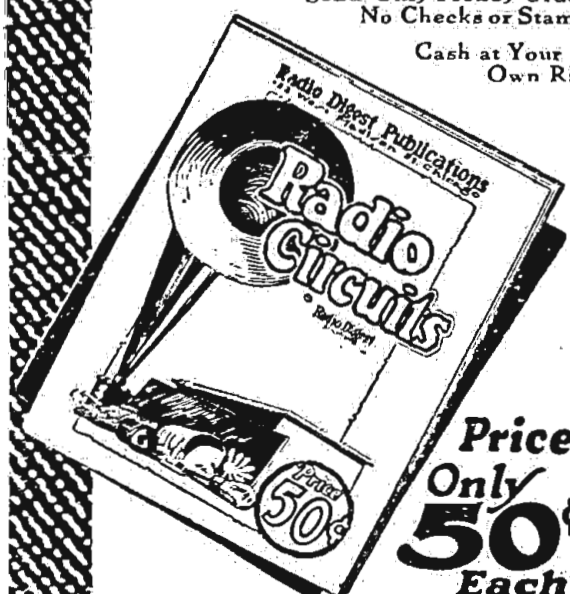
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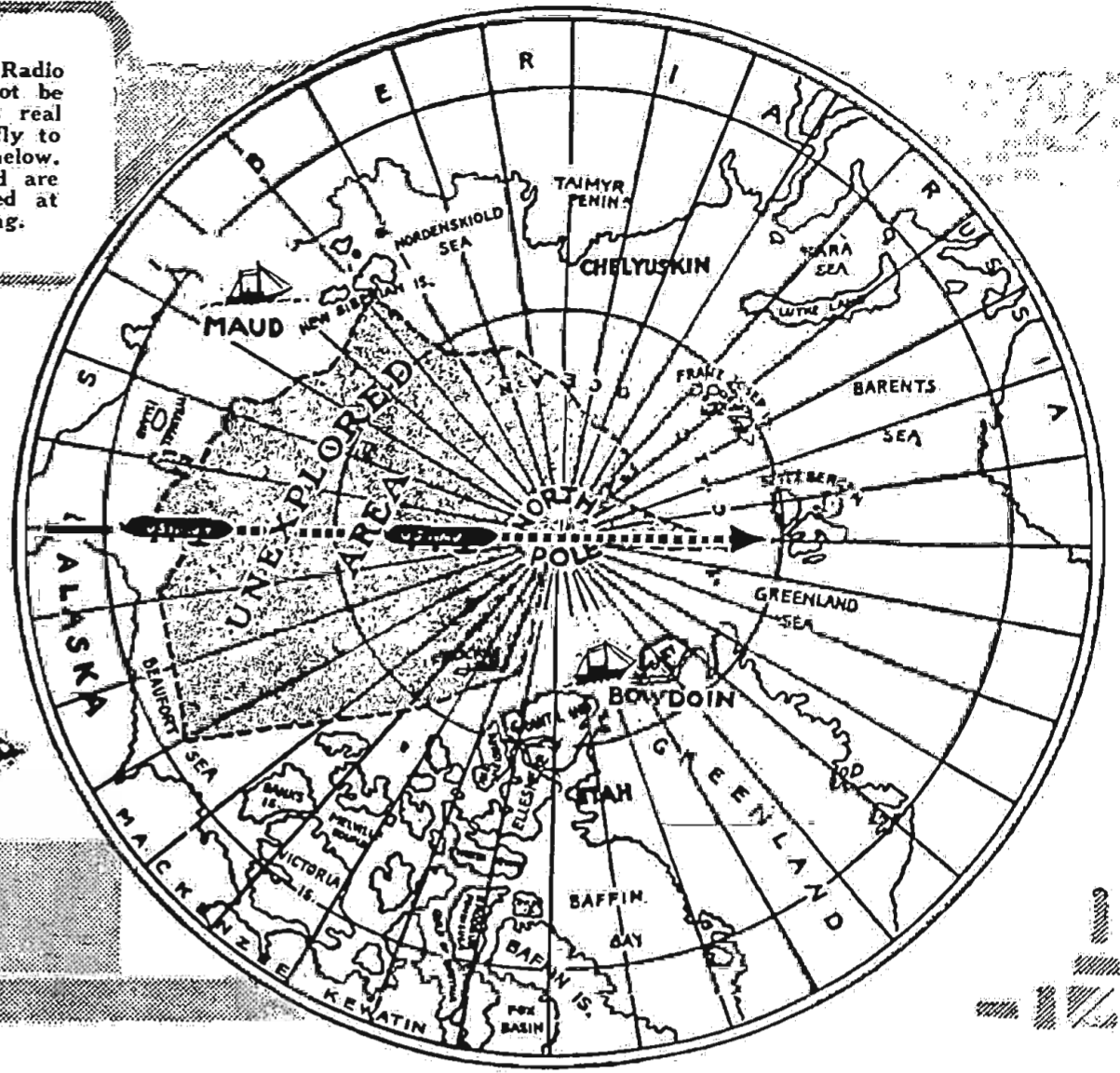
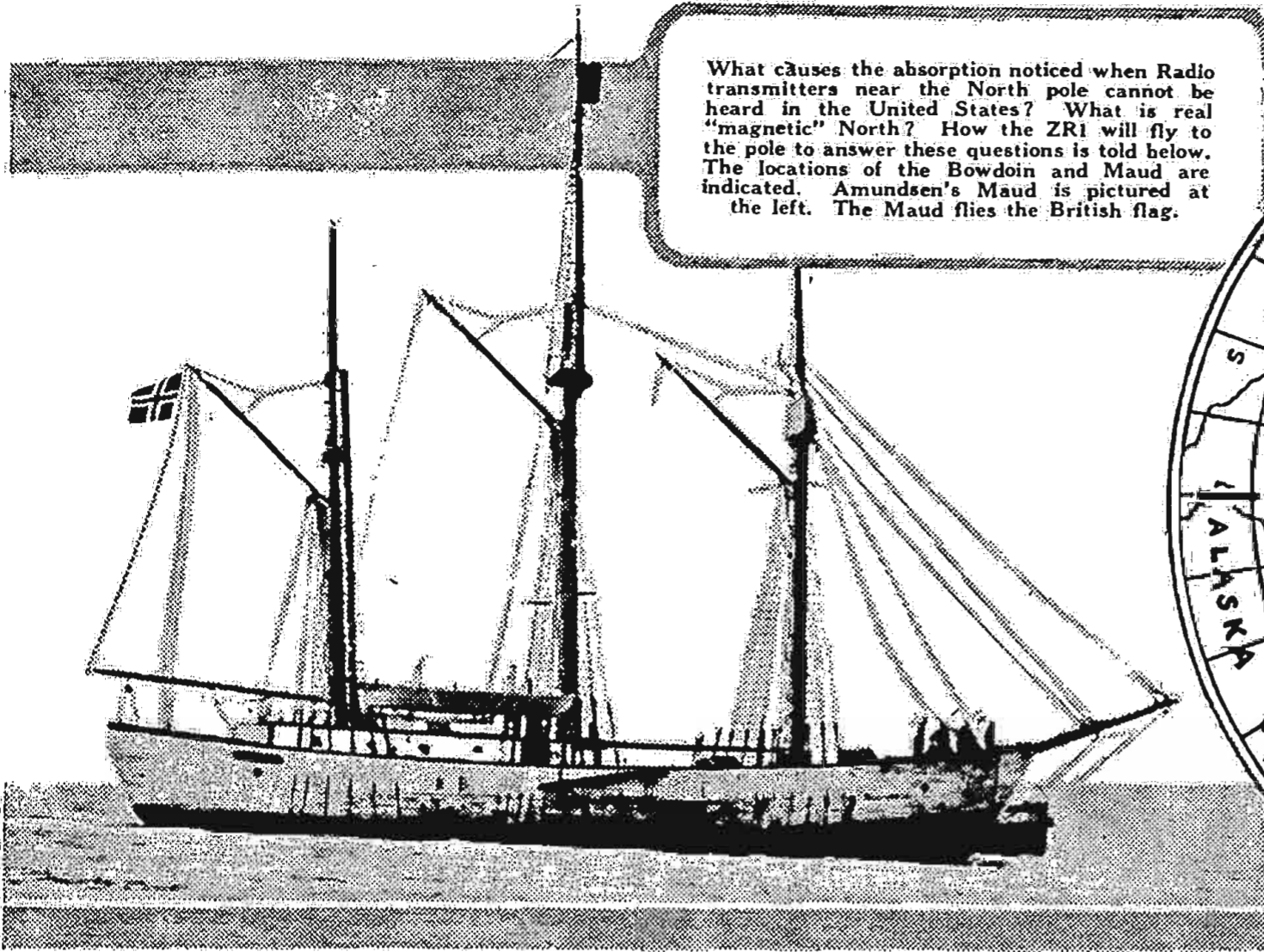


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(Continued from page 1)

deepest riddles of the electromagnetic wave. Two of these expeditions, by sea, are already on what appears to be the way toward solution. The others, by air, will be ready, it is expected, to soar northward this Spring so as to greet Boreas this summer in his habitat, the North pole.

The two marine parties are those aboard the Maud and the Bowdoin. The two proposed aerial groups are those who are to proceed on the naval cruiser ZR1, known popularly as the Shenandoah, and those who are to be led by Captain Robert A. Bartlett who commanded Peary's ships, those of the Crocker relief project and the ship Karluk. The Shenandoah is a dirigible, the largest of its kind. It was made by the Germans. The other flier is to be an airplane.

Maud Is British; Bowdoin, American

The Maud is financed by British adventurers in science. The Bowdoin sports the Stars and Stripes, flung to the breeze by Donald MacMillan, noted Arctic explorer. Captain Roald Amundsen, discoverer of the South pole, circumnavigator of the Arctic archipelago and explorer of the North magnetic field, commands the Maud. The United States frankly seeks to annex what land may be at the North pole.

Far to the north, beyond Canada, beyond Victoria island, beyond Baffin bay and Iceland, deep in the floes and the hummocks, lie the Maud and the Bowdoin. The former, which started on its fact-finding trip in July, 1922, is fast in the ice north of Siberia, not so far from the northmost coast of Alaska. For 18 months or more the Maud has crept north and eastward, at times free in the open water; at times captive in frigid fields. The Bowdoin, whose quest of knowledge began midway in 1923, is prisoned by ice in Refuge Harbor, North Greenland, not so far south from Spitzbergen. Both ships, now in the six months' night of the North, await the six months' day to continue their voyages.

What Explorers Will Reveal

Each vessel is equipped with men and devices competent to wrest from Radio why it will and why it will not speed here and there; why it carries the code signals of the Maud to Europe; why it at times silences the calls both of the Maud and the Bowdoin to the United States; why Radio flashing through space at the rate of 186,000 miles a second is obstructed by an apparently "dead spot" of vast area this side of the North pole.

These and other momentous queries are to be answered by the four exploring units. These hitherto inexplicable phenomena, including that of the Aurora Borealis, are to be studied so that the children of men in the centuries to come may be at ease. The ways of science are hard. Fancy has no place therein. It was in part to

set at rest the various theories as to the vagaries of Radio that these four expeditions were organized; it was to make of Radio a true science, to remove from it doubt and speculation and thus enable its wider use.

Arctic Radio Phenomena Puzzle Scientists

When the Maud, in the shadow of Europe, was able to signal stations on the continent but was unable to communicate with those of the western hemisphere, scientists began to ponder. Twice daily for more than a year and a half the Maud has made known her position and the condition of crew and ship. But to this country she was and is mute.

The most delicate receiving devices of the United States navy and those of commercial and scientific factors tried to tune in on the Maud. But they failed. None has as yet been able to tell why this was and is so. None has been able to say why the Bowdoin is only sure when it talks by code with Jack Barnsley's station on Prince Rupert island, off British Columbia, and is practically silent to all others. These and other situations await clearance by any or all of the four parties of inquiry.

Compilation of Data Solves Nothing

The greatest savants were attracted to the questions. Here was that which defied the vaunted mind of man. Observation and analysis resulted in the compilation of data by such experts as Thomas A. Edison, Hiram Maxim, Professor H. A. Todd of Amherst college, and Captain Bartlett. The department of research in terrestrial magnetism of Carnegie institute and the United States coast and geodetic survey have sought the answers. Scientists of Canada also were active as were those of Europe but all they learned was—almost nothing. Hence the four ships, two sea and two air, the millions of listeners in the world over and the enlistment of wise men and of Radiophans everywhere in a grand, universal contest to know why Radio doesn't behave at the top of the world.

It was Edison who suggested an international scientific and "lay" observation. The Aerial League of America, pioneer in such projects, undertook to furnish the necessary data and to record and publish the results obtained.

Aerial League Begins Systematic Checkup

In short the main purposes of the cosmic quest is—to learn by means of the universal "checkup," during a period of twelve months, beginning with the birth of 1924, the effect of daylight, twilight and darkness, ice, water, verdure, various atmospheric conditions and geologic formations on Radio, as may be shown by the army of amateur and professional experimenters.

This hunt for facts is now a part of the lives of Radio and other students the world over. They listen daily for signals from the Bowdoin and the Maud. Their

conclusions or experiences are recorded and sent to the offices in New York city of the Aerial League of America (280 Madison avenue) where these data are collated, interpreted and indexed by the world's greatest authorities. The work is furthered by Radio clubs and other organizations under every flag. In this way the mysterious aversion of Radio for those lands which lie south of the North pole may be corrected. Those who take part in this search are also recording all other Radio calls, noting especially their direction and the atmospheric conditions. The information thus obtained may

form a basis for computation as to what strength of signal is necessary for communication between certain places at various seasons under varying atmospheric conditions at different times of day or night, thus reducing if not eliminating confusion and waste of effort in relation to the deficient or surplus power of Radiotelegraph and broadcasting stations.

The international research seeks too to find and map all the "dead spots" over the earth, to learn what causes them and how they may be overcome. The investigation embraces not only the "dead spots" (Continued on page 6)

THE De Forest name has been in the forefront of radio research for twenty-three years. De Forest invented the three-electrode vacuum tube which makes present-day radio possible. The sets and parts made today by the De Forest Company are worthy of the De Forest name.

DE FOREST RADIO TEL. & TEL. CO.
Dept. R. D. 6 JERSEY CITY, N. J.



ZR1 TO EXPLORE ARCTIC

(Continued from page 5)

of the Arctic but those of New York, New Jersey, Massachusetts, Maryland, Pennsylvania, Ohio, Alaska, England, France, over certain areas in the Pacific and Indian oceans, over Africa, Australia and South America.

Round-the-World Flight by British Also?

Another phase of the search is—does Radio travel as readily the hydro and lithospheres of the earth as it does its atmosphere, that is, the water and ground as well as the air? Still another phase is that in which the crew of an airship is to chart Radiomagnetic conditions on a proposed round-the-world flight, thereby completing the collection of data begun by the Aerial League of America in 1914 and furthered by its pathfinding expedition in 1919.

As a result of the latter expedition committees were established at all places of importance in relation to the scientific inquiry within a circle around the globe from 10° north to 60° north. The path thus described was selected recently by the United States army. The British now propose a similar flight.

Prize Awards for Research Work

The question as to whether Radio signals are transmitted around the earth by wave or oscillation or by means of a concentric conductive layer around the globe, may be answered by the myriad amateur investigators. For their reward, other than the satisfaction which comes from work well done, the Aerial League of America offers during the first period which ends February 5, 1924, five cash prizes of \$20 and as many of its diplomas of merit to those who submit the best reports. Prizes will be offered monthly this year.

A publication in New York city offers five prizes of \$20 each to the first five experimenters who tune in on the Maud.

The Maud's call, which has been kept secret, will be revealed to those who apply in person or by mail with serious intent to the officers of the Aerial League of America.

League Offers Magnetic Test Sets

To further the formation of district committees for the supervision and conduct of local "checkups" and monthly experiments the league offers to each of the first 50 of such committees of ten members or more a Radiomagnetic experimenter's set prepared especially by a committee of experts to supply the equipment needed for the monthly tests, in addition to the receiving sets and direction finders required for the "checkup."

Each of the sets includes two compasses, two powerful magnets, one solid bar mag-

net, a separable bar magnet, ten floating magnetic needles, six steel balls, a model globe with removable magnetic poles, a neutral lodestone and iron filings. The league urges applications for membership in the district committees.

Add to Shenandoah Radio Equipment

Despite the terrifying experiences to which the crew of the Shenandoah recently were subjected in the form of a 75-mile gale which tore the air cruiser from its moorings and tossed it like a bubble for hours, despite the damage to the prow of the craft, it will take its allotted part in the Radio research at the North pole. Its Radio equipment which has a radius of 300 miles is to be supplanted by one whose range will be 1,000 miles, thus enabling the operators to communicate with three proposed United States naval portable stations in the Arctic or with the Maud or the Bowdoin or the Bartlett aircraft, or with land stations in Iceland, Greenland, Spitzbergen and Russia. The proposed new equipment of the ZR1 is to include two transmitting sets, two receiving sets and a Radio compass. The new transmitter has two two-kilowatt tubes having an input of four kilowatts and an output of two kilowatts.

ZR1 Names Point Barrow Prime Base

The Shenandoah is to establish its prime or main base at Point Barrow, Alaska, 1,117 miles south of the North pole. It will be equipped with an auxiliary medium-range telegraph and telegraph contrivance for communication with ground stations or mooring crews. The after part of the control car will house the Radio apparatus. The call of the airship is NERK.

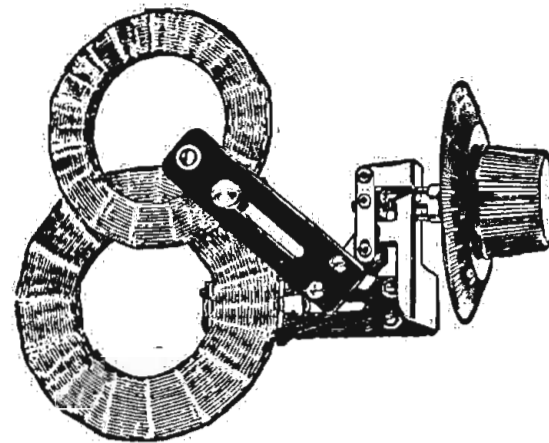
Those in charge of the proposed expedition plan the establishment of bases on two ships each of which will be fitted with a mooring mast and Radio communicative devices. One of the base ships may be stationed at Point Barrow, the other at Spitzbergen. Two portable Radio compass stations may be erected as far north as physically possible.

Radio Compass to Prove Pole Reached

With the two ships, this will give the Shenandoah five Radio compass stations with which to check her position, even if she fails to pick up permanent Radio stations.

Radio will enable the United States navy to check the position of the airship and, if the pole is reached, to prove such achievement conclusively by cross bearings made aboard the ZR1. Her positions could be rechecked later by northern stations with Radio compasses.

This precludes the falsification of a position. It is a new feature made possible by Radio in polar exploration.

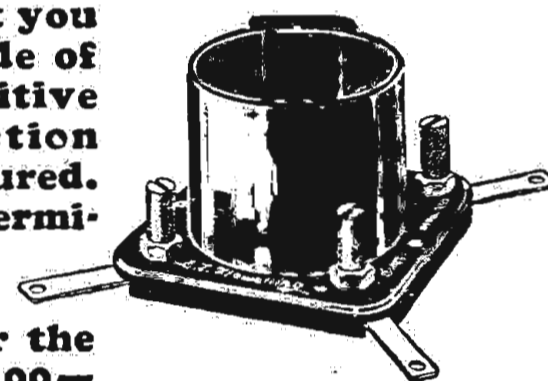


The Flewelling Tuner is several steps ahead of all others. The construction and design is such that the highest efficiency is obtained. Price \$8.00—at your dealer's or direct.

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PARTS**

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The Flewelling Socket is the original "won't jar loose" socket. When you see it you will appreciate it. Made of high test bakelite. Positive side "wiping" connection with tube terminals assured. Low capacity between terminals makes it ideal in any circuit. Well worth the few cents extra for the results it gives. Price \$1.00—at your dealer's or direct.



Complete Your Radio Outfit

Bring Out the Best in Your Receiving Set with a Bristol



TRADE MARK
AUDIOPHONE
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LOUDSPEAKER



IT TOOK six years to develop and perfect the Audiophone. That is more time than the average person cares to spend on a Loud Speaker for his receiving set.

But here it is, all ready for you to use by simply connecting to the set.

No auxiliary batteries are necessary.

The tone is big, full, and rich, and without that scratchy, tinny noise so often heard in receiving. It can easily be heard all through the house, so

that your own family and friends can enjoy it with you.

The finish is a beautiful, dull gold bronze.

Made in Three Sizes

- Senior AudiophonePrice \$32.50
- Junior AudiophonePrice 22.50
- Baby AudiophonePrice 12.50

When signals are not sufficiently loud to give good results with the loud speaker, Bristol One-Stage Power Amplifier is recommended to build up the power so that it can be heard even in a large hall.Price \$25.00

Ask for Bulletin Nos. 3006 and AY-3011

THE BRISTOL COMPANY, Waterbury, Conn.

EUROPEAN POLITICS SEE RADIO'S VALUE

ACCEPTED AS TOOL, NOT SPORT, OF KINGS

Downing Street Considers New Means of Broadcasting Edicts—Political Speeches Barred

LONDON.—In Radio, Europe has found not so much the sport of kings as the tool by means of which they now are making known their edicts.

Radio is under consideration by the ministry of England as a medium in which the opinions or mandates of Downing street and the nation's premiers may be cast through the air to the farthest land under the Union Jack. And the king of England may soon use Radio to make public his views of empire. But the use of Radio to disseminate the king's speech from the throne has been banned by the cabinet.

The latest of the many forecasts as to what Radio may accomplish in the near future came recently from Lord Burnham, who not long ago considered the question of broadcasting at the direction of the postmaster-general.

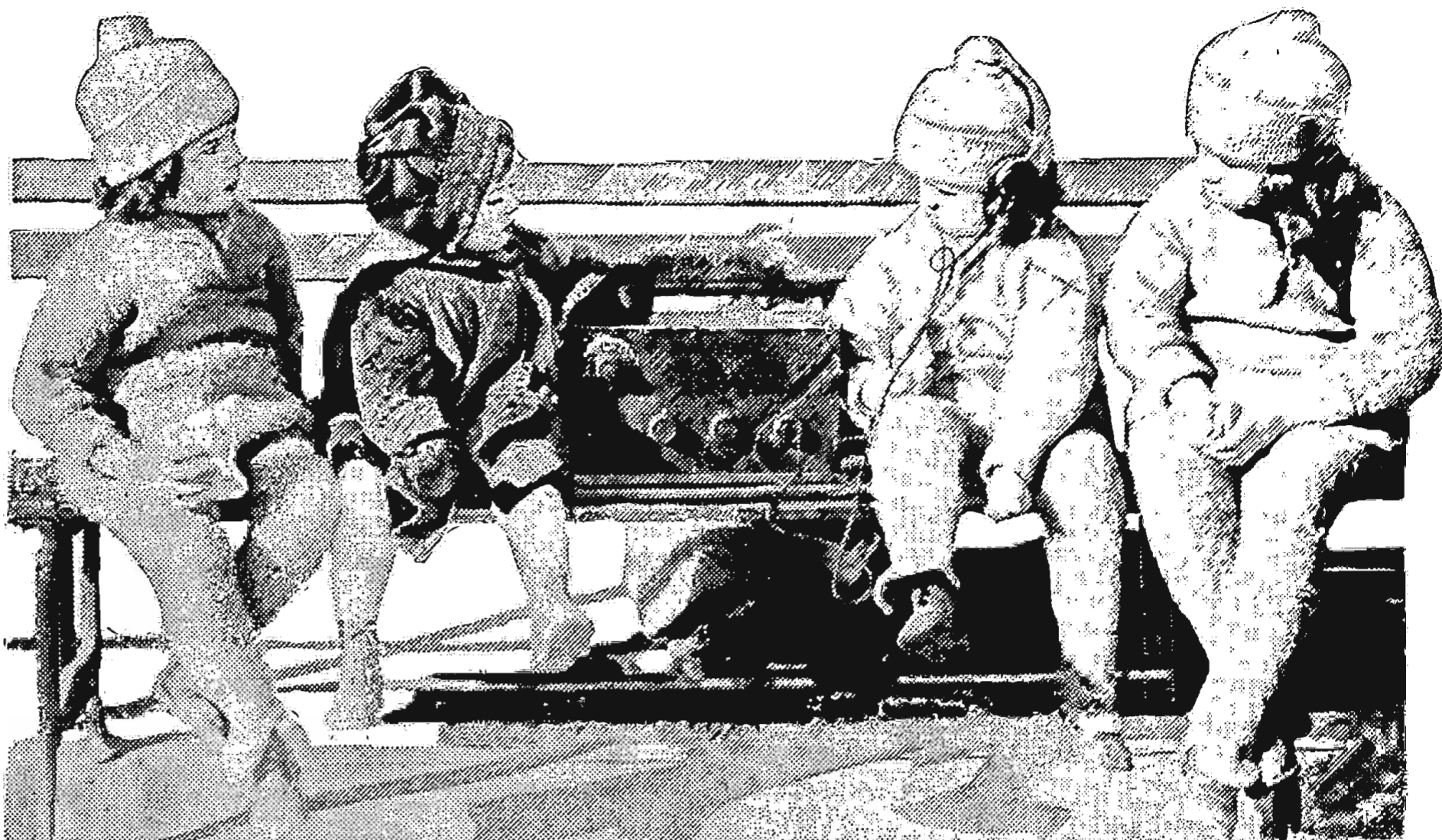
Imperial conferences, at which the empire's premiers gather in London to discuss weighty matters, may be held some day through the air, Lord Burnham prophesied; the members of far-away parliaments may listen in when the prime minister of England wants to deliver an important speech.

King Favors Radio Speech

A broadcasting company's engineers which lately surveyed the chamber of the House of Lords reported that the arrangements for sending the king's speech by Radio were quite feasible. Moreover, it is said that his Majesty himself had no objections. But the cabinet ruled that as the address actually would be a political declaration by a political party and as the government, which controls all Radio activity in this country, had already banned the use of the Radio telephone for political utterances, it would not be desirable to establish a precedent.

The Societa Annonima Italo Radio per Servizi Radioelettrici has formed in Italy to develop Radio, with 7,000,000 lire capital.

GARDEN VARIETY OF RADIO BECOMING COMMON



Governesses for present day society youngsters have a doubly enjoyable time, for the portable Radio set adds to their own as well as to their charges' pleasure. The portable set is easily carried and set up. Little Patricia O'Niell, two years of age, spends the bright winter days in Central Park, amusing herself and her friends with her Radio. Left to right in the picture are Eugena Rayneri, Patricia O'Niell, and Margaret and Rosa Rayneri.

Int. Newsreel Photo

Scouts Direct Night's Doings at WJZ Plant

Everything Under Boys' Control Part of Campaign

NEW YORK.—As a feature of the Boy Scouts' campaign in Greater New York for the enlistment of 1,000 more men to serve as scoutmasters for 30,000 applicants for membership in the organiza-

tion, a patrol of nine scouts directed the program a few evenings ago of Station WJZ, Radio Corporation of America, in this city. It was the first time in Radio history that Boy Scouts had taken charge of the "output" of a broadcasting station.

Every phase of operation, announcing, handling of control panels, regulation of amplifiers and modulators, even the reception and escorting of those who took part in the program, was undertaken by the patrol. Herbert Swanson of Brooklyn, winner of the tri-state signaling championship, at 16 years of age considered an expert telegraph operator, was the announcer.

1155 Notes Praise Blind Boy's Music Played at WOC

DAVENPORT, Ia.—So sweet were the strains of a blind youth broadcast recently by Station WOC, Palmer School of Chiropractic, this city, that listeners in throughout the middle west were impelled to write congratulatory letters numbering 650. Postal cards, bearing similar messages, numbering 505, were also received.

Bulgaria is to have a new 800,000 lei station for international communication.

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\$7.00
2200 OHMS

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FUNCTIONS OF A WAVE TRAP

WHEN a receiving set is located near a powerful broadcasting station, you are able to hear that station over a considerable range of the dial. This can best be described by referring to that analogy so often used of a pond of water after a pebble has been thrown into it.

Waves radiate from the center of disturbance. At some little distance from this center the waves are regular and travel smoothly but right near where the stone struck the water, and particularly if it was a large one, you will notice a large number of irregular splashes. Any device designed to be affected by the regular waves would also be troubled by these irregular splashes or waves as you may call them. It is the same thing in Radio and the problem is to so arrange matters that these irregular splashes can be deflected or so handled as not to interfere.

In your Radio set you desire to pick up the tune or, as before said, the regular wave and weed out the irregular oscillations. This may be done in several ways by devices called traps or filters.

Wave Trap is a Filter Circuit

A wave trap is a filter circuit so arranged and connected that it tends to offer a very low resistance path to the wave that is not wanted, while the tuner dial is set to offer an easy path for the desired wave which, therefore, passes through your receiver and is registered. Therefore, this circuit must be connected in such a manner that it can be tuned to the undesired wave and also so that the energy so picked up by-passes the receiving apparatus.

Always make sure that there is no coupling between the set and the wave trap. To prevent this keep the trap several feet away from the receiving apparatus.

How to Test Wave Trap

Wait until a local station begins operating and then try to tune in another station. That means you have set your dial at the point where the desired station can be heard, but it is being interfered with by the local station. Now adjust the variable condenser of the wave trap until the interference has been reduced to a minimum, at the same time readjusting your receiving set so that the desired station comes in as strong as it is possible to make it. A little practice will soon enable you to obtain sharp tuning.

Now a wave trap is not one hundred percent perfect but it is believed that for the amount of money invested and the simplicity of this arrangement, the results are worth while. This device depends upon low losses in the filter, particularly in the condenser. Great care should be taken to make sure the variable condenser used is a "low loss" condenser. There are several good types on the market.

This device will drain unwanted frequencies off the antenna, but it will not weed out unwanted frequencies from the receiving circuit itself. The receiver should be well shielded in order to prevent it from picking up any considerable amount of energy without antenna connection.

WJZ Pays Homage to Ben Franklin's Memory

Honor Man Who Drew Lightning from Skies

NEW YORK.—New York city was the center recently of the homage paid to the memory of Benjamin Franklin on his birthday anniversary. Station WJZ broadcast the leading events of the program.

Exercises sponsored by the Sons of the American Revolution were held in the aldermanic chambers, city hall, here and were broadcast by WJZ. The station also broadcast the banquet in the Hotel Astor under the auspices of the International Benjamin Franklin society, during which speeches were delivered by James M. Beck, solicitor-general of the United States; George H. Carter, public printer of the United States, and Grover A. Whalan, commissioner of plants and structures of the city of New York.

Particularly fitting was the broadcasting of the exercises. Benjamin Franklin was first to draw electricity from the skies. What Franklin's kite and key were to the world a century ago, Radio reception is to the world today—the opening of new vistas of investigation and progress. This was the gist of testimonials from President Coolidge, Postmaster-General New, Secretary of State Hughes and Secretary of the Navy Denby.

Radio exports for eight months have totaled \$2,200,000.

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Quality Merchandise at Low Prices

All Orders Mailed Promptly. Parcel Post Prepaid on \$5.00 or Over.
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We Are Responsible Folks, Money Promptly and Cheerfully Refunded If You Are Not Satisfied

Brings in Everything NEUTRODYNE All Standard Parts

3 Rheostats, 30 ohms.....\$2.00 1 Rheostat, 6 ohms......90 3 Air Core R. F. Transformers, mounted on condensers, and 2 balancing condensers.....20.00 1 Potentiometer, 600 ohms.....1.85 3 Jacks.....2.70 1 Condenser......40 1 Grid Leak......65	5 Sockets.....\$5.00 2 Transformers.....9.50 9 Readem Binding Posts......85 1 7x26 Mahogany Panel.....3.64 4 Bezels......80 3 Dials.....4.50 1 Baseboard......50 24 ft. Square Brass Bus Wire......60 Total \$53.89
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ONLY \$45.50
With Blue Prints FREE

Panel drilled, all parts mounted on panel and baseboard ready for wiring **Only \$48.50**

The above Neutrodyne Complete with all the following parts:

5 Genuine DX Tron Tubes.....\$25.00 1 110 Ampere Storage Battery.....18.00 1 DeLuxe Homecharger.....18.00 1 Genuine Baldwin Headset.....12.00 1 Complete Aerial Equipment.....1.50	1 45 Volt B Battery.....\$ 5.50 2 22½ Volt B Battery.....6.00 \$96.00 1 Fultone Loud Speaker.....9.50 TOTAL.....\$95.50
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The above parts and equipment complete would cost you \$144.00!
Our Price \$125.00

WAVE TRAP

You can now enjoy the comfort of selecting any station that you desire by hooking up one of our METRO Wave Traps with your Set. Mounted in Mahogany Cabinet with the highest grade material. Regular List Price \$7.50.
Our Price.....

ONLY \$6.50

Complete Parts - MILOPLEX - Cabinet FREE

1 .0005 Variable Condenser, Vernier.....\$6.00 1 Estru Variometer.....5.00 1 .00025 Variable Condenser.....2.00 1 Variable Grid Leak......75 1 .00025 Mica Fixed Condenser......40 2 .002 Phone Condensers......80 3 3½-Inch Dials, each 75.....2.25 1 Potentiometer, 1650 ohms.....2.20 1 Rheostat.....1.00	1 Socket Bakelite Base.....\$0.90 1 Bakelite Panel, 9x14x½.....2.50 1 WD-12 Tube.....6.50 1 B Battery, large, 22½ volt.....3.00 3 Dry Cells.....1.35 12 ft. sq. brass Bus wire......30 1 Set Readem Binding Posts......75 TOTAL.....\$35.70
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ONLY \$28.50
Blue print FREE only with order for complete parts

Complete Parts for a Two Step Amplifier

1 Panel 7x9x½".....\$1.26 2 Webster's 4-1 Transformers.....9.50 2 30 Ohm Rheostats.....2.00 2 Sockets.....2.00 2 Double Circuit Jacks.....1.80 1 Set Readem Engraved Binding Posts......75 1 Baseboard......75 1 Cabinet Mahogany Finish.....3.50	LIST—\$21.06 OUR PRICE \$16.50
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The above mentioned parts will include any Ohm Rheostat and All American Transformers if desired.

CRYSTAL Set Complete with Phones, Aerial, Lead Wire, Insulators, and Ground Clamp.....\$8.50

Above Set alone, without Aerial Equipment or Phones.....\$2.50

Just arrived, 25,000 Pr. of High Grade nationally known METRO Phones, Regular List Price \$6.00, at the Low Price of.....\$3.89
ALL GUARANTEED

BIG SALE TUBES Type 201-A—WD12 Detector and WD12 Amplifier.....\$3.75

Genuine DX Tron will make your Neutrodyne or any other Amplifier Unit give the maximum volume and less distortion than any other Tube on the market. Price.....\$3.75

<p>Complete Parts RD 99 Long Distance Receiving Set (See Radio Digest, September 29th issue)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> 3 Bakelite Base Sockets.....\$2.25 3 Rheostats.....3.00 2 A. F. Transformers.....8.00 2 Double Circuit Jacks.....1.80 1 Open Circuit Jack......75 1 Estru Variometer.....5.00 1 Variable Grid Leak and Condenser.....1.00 1 .005 Fixed Condenser......75 1 75-turn Honeycomb Coil, mounted.....1.20 1 Single Coil Mounting......50 1 Set Readem Binding Posts......75 1 Panel Bakelite, 7x16x½.....2.25 1 Cabinet, 7x16x8, fire mahogany finish.....6.00 Our price complete with panel drawing and blue print, ONLY.....\$30.25 </td> <td style="width: 50%; vertical-align: bottom;"> TOTAL \$39.25 </td> </tr> </table> <p style="text-align: center; margin-top: 5px;">CABINETS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> 9x14x8, mahogany finish.....\$3.25 7x9x8, mahogany finish.....2.75 7x21x8, mahogany finish.....3.50 </td> <td style="width: 50%; vertical-align: bottom;"> MUST SEND POSTAGE 3-Cell Mounting, geared.....\$4.50 3-Coil Mounting (Crown).....3.85 Radfon Panels, black or mahogany—all standard sizes, 1½c per square inch..... \$3.00 Electric Soldering Iron, guaranteed.....\$2.65 Spaghetti, yellow or black, 36 inches.....\$ 10 Tait Dials, 3 inch.....\$.90 Tait Dials, 4 inch.....1.30 1 Special Voltmeter, from 0 to 50 volts, for your A and B Batteries.....\$1.19 </td> </tr> </table> <p style="text-align: center; margin-top: 5px;">PHONES</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> Double Phone Cord.....\$ 1.00 Genuine Baldwin Type C Unit.....6.00 Genuine Baldwin Type C Double.....12.00 Loud Speaker Cord, 10 ft., 4 tips, our price.....1.00 12 Point Inductance Switch.....\$.80 Twin Inductance Switch.....1.65 Tubular Grid Leaks, any size......30 </td> <td style="width: 50%;"> Tubular Variable Grid Leaks.....\$0.55 Single Rubber Phonograph Attachments......35 Double Phonograph "X" Attachments......89 Switch Levers Tapered Knobs......19 180° Variometer, Bakelite, Rotor and Stator wound with Green Silk Wire.....2.69 180° Variometer, Bakelite, Rotor and Stator wound with Green Silk Wire.....2.69 Hydroimeters......69 </td> </tr> </table>	3 Bakelite Base Sockets.....\$2.25 3 Rheostats.....3.00 2 A. F. Transformers.....8.00 2 Double Circuit Jacks.....1.80 1 Open Circuit Jack......75 1 Estru Variometer.....5.00 1 Variable Grid Leak and Condenser.....1.00 1 .005 Fixed Condenser......75 1 75-turn Honeycomb Coil, mounted.....1.20 1 Single Coil Mounting......50 1 Set Readem Binding Posts......75 1 Panel Bakelite, 7x16x½.....2.25 1 Cabinet, 7x16x8, fire mahogany finish.....6.00 Our price complete with panel drawing and blue print, ONLY.....\$30.25	TOTAL \$39.25	9x14x8, mahogany finish.....\$3.25 7x9x8, mahogany finish.....2.75 7x21x8, mahogany finish.....3.50	MUST SEND POSTAGE 3-Cell Mounting, geared.....\$4.50 3-Coil Mounting (Crown).....3.85 Radfon Panels, black or mahogany—all standard sizes, 1½c per square inch..... \$3.00 Electric Soldering Iron, guaranteed.....\$2.65 Spaghetti, yellow or black, 36 inches.....\$ 10 Tait Dials, 3 inch.....\$.90 Tait Dials, 4 inch.....1.30 1 Special Voltmeter, from 0 to 50 volts, for your A and B Batteries.....\$1.19	Double Phone Cord.....\$ 1.00 Genuine Baldwin Type C Unit.....6.00 Genuine Baldwin Type C Double.....12.00 Loud Speaker Cord, 10 ft., 4 tips, our price.....1.00 12 Point Inductance Switch.....\$.80 Twin Inductance Switch.....1.65 Tubular Grid Leaks, any size......30	Tubular Variable Grid Leaks.....\$0.55 Single Rubber Phonograph Attachments......35 Double Phonograph "X" Attachments......89 Switch Levers Tapered Knobs......19 180° Variometer, Bakelite, Rotor and Stator wound with Green Silk Wire.....2.69 180° Variometer, Bakelite, Rotor and Stator wound with Green Silk Wire.....2.69 Hydroimeters......69	<p style="text-align: center; margin-top: 5px;">RHEOSTATS AND SOCKETS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> MARVEL Rheostat, 6 ohms.....\$.55 MARVEL Rheostat, 20, 25 and 30 ohms......45 MARVEL Rheostat, 40 ohms......55 MARVEL Rheostat, 50 ohms......65 Potentiometer, 200 ohms......75 Potentiometer, 400 ohms......75 Potentiometer, 1,850 ohms.....2.00 Standard Sockets, bakelite base, \$1.25......75 Na Aid Sockets, 35c; 3 for.....1.00 All-American Audio Transformers, 1-4 or 1-10.....3.85 Webster Audio Transformers, 1-4 or 1-8.....3.39 </td> <td style="width: 50%; vertical-align: bottom;"> VARIOMETERS Moulded Variometer.....\$5.00 Estru Split Variometer.....\$4.39 Variometer, All Circuits.....5.50 Readem Binding Posts, Set composed of 1 antenna, 1 ground, 1 A Battery +, 1 A Battery -, 2 tele-phones, 1 B Battery +, 1 B Battery.....5.75 Phone Plugs.....\$.39 Knock-down Loop Aerial, Special......95 UV-199 Adapter......69 UV-199 Socket......69 WD-11 Socket......69 </td> </tr> </table> <p style="text-align: center; margin-top: 5px;">VARIABLE CONDENSERS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> Variable Condenser, .0005 (Same as 23 plate).....\$1.95 Variable Condenser with Vernier, .0005 (Same as 23 plate).....3.45 Variable Condenser, .001 (Same as 45 plate).....2.35 Variable Condenser, with Vernier .001.....3.95 Variable Condenser, .00025.....1.75 </td> <td style="width: 50%; vertical-align: bottom;"> H. 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No. 302.....4.25 </td> <td style="width: 50%; vertical-align: bottom;"> List Our Price \$1.39 1.69 2.19 List Our Price \$4.39 3.49 Enclose 20c postage on all Large B Batteries, enclose 10c postage on Small B Batteries. </td> </tr> </table>	MARVEL Rheostat, 6 ohms.....\$.55 MARVEL Rheostat, 20, 25 and 30 ohms......45 MARVEL Rheostat, 40 ohms......55 MARVEL Rheostat, 50 ohms......65 Potentiometer, 200 ohms......75 Potentiometer, 400 ohms......75 Potentiometer, 1,850 ohms.....2.00 Standard Sockets, bakelite base, \$1.25......75 Na Aid Sockets, 35c; 3 for.....1.00 All-American Audio Transformers, 1-4 or 1-10.....3.85 Webster Audio Transformers, 1-4 or 1-8.....3.39	VARIOMETERS Moulded Variometer.....\$5.00 Estru Split Variometer.....\$4.39 Variometer, All Circuits.....5.50 Readem Binding Posts, Set composed of 1 antenna, 1 ground, 1 A Battery +, 1 A Battery -, 2 tele-phones, 1 B Battery +, 1 B Battery.....5.75 Phone Plugs.....\$.39 Knock-down Loop Aerial, Special......95 UV-199 Adapter......69 UV-199 Socket......69 WD-11 Socket......69	Variable Condenser, .0005 (Same as 23 plate).....\$1.95 Variable Condenser with Vernier, .0005 (Same as 23 plate).....3.45 Variable Condenser, .001 (Same as 45 plate).....2.35 Variable Condenser, with Vernier .001.....3.95 Variable Condenser, .00025.....1.75	H. 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WHAT IS IT WE CALL "STATIC"?

Why Thunderstorm "Knocks" Register Parallel Effects Hundreds of Miles Apart—The Three Forms of Lightning and How They Discharge—Why Meteorological Conditions Should Be Investigated in Locating Radio Station Sites—The Ideal Receiving Station—Benefits of Higher Altitudes.

By Dr. A. Meissner—Part III

Editor's Note.—The author of this important series is chief engineer for one of the world's largest Radio communication companies, the Telefunken Company of Germany. He has been a leader in the science since Marconi sent his first message across the English Channel. Dr. Meissner promises to upset a few time honored theories. Now read—

BESIDES other noises, at times there are heard in receivers very intensive characteristic "knocks." These, it has been found, may be ascribed with reasonable certainty to distant thunderstorms. They are often felt at the same time at places hundreds of miles apart, and have been registered simultaneously by photographic recorders. Their origin has been located at the same point by three or more co-operating Radio compass stations. Thus it has afterwards been definitely established that thunder conditions actually prevailed at that locality and at that time. Figure 6 gives two records taken at the same time at two places about 350 miles apart. The records show clearly that almost all the disturbances occurred simultaneously. They are different mainly in magnitude. Evidently, also, the distances from the two points to the source of disturbance were not equal.



Dr. A. Meissner.

Effects of Distant Thunderstorms
Systematic observations in this respect have been made in England lately. Three plants with directional receiving outfits and recording apparatus made simultaneous observations during a period of several months. Of 300 observed disturbances, 45 were absolutely referable to lightning discharge, mostly—it was in the summer—in England, but in many cases on the European continent or in Africa. Thus, for instance, the three stations agreed in

indicating a thunderstorm in Sicily (about 1,800 miles distant) and another at Naples. All thunderstorms in Holland (about 700 miles) were also registered and located in agreement.

Disturbances from lightning discharges are particularly disagreeable in Radio reception because they are of such great intensity, because they affect all wave lengths alike and because they are of comparatively long duration, since several lightning strokes usually follow in rapid succession. The duration of a discharge varies between .00005 and .2 second.

Nature of Thunderstorms

Thunderstorms are quite similar to those neutralization phenomena described earlier. Here, too, it is simply discharges between inversion strata, although on a much larger scale. Cold and warm air come in contact in enormous masses, penetrate and mix with each other in vortices, giving rise to immense accumulations of electricity, like a gigantic static machine driven by an equally gigantic windmill. These masses of electricity finally become so large that visible discharges occur between clouds or between some cloud and the earth. In these discharges we have to do with a flow of more than 10,000 amperes and the power represented is more than 400 times that of our largest transmitting stations. The duration of the discharge also is longer than that in visible neutralization previously referred to. The lightning spark is usually from 1 to 1 1/4 miles long, and comes, as a rule, from cloud strata at an elevation of 1,500 to 2,000 meters (about 4,500 to 6,500 feet) where the temperature is zero centigrade (+32° F.) and condensation and friction are at a maximum. At this elevation we must consider the large friction surface of our static machine located.

Thundercloud Compared to Antenna

Now, a cloud surface discharges through a lightning stroke. How large this surface may be, is, of course, impossible to state. But the minimum radius of such a surface can scarcely be less than one to two kilometers (.62 to 1.25 miles). We may, therefore, compare the lightning to an antenna 2,000 meters high, with a lead-in of the same length and a radius of about 2,000 meter. The natural period of such an antenna is easily calculated. It is usually six to eight times the greatest length dimension. That is in this case the height (2,000 meters) plus the distance from its center to the periphery (2,000 meters). The oscillation is therefore $6 \times 4 = 24$ kilometers. This means, that, if the lightning had a conductive antenna (for instance, a metal wire) it would oscillate with a wave length of 24,000 meters in a natural period of 12,000 cycles per second. But after the first discharge the path of its flow disappears behind it, so that it is only the initial oscillation that propagates itself and no further impulses. This first impulse only remains and lasts accordingly $1/2 \times 1/20,000$ second, or perhaps a little longer as parts of the lightning path may remain for some time.

Forms of Lightning

There are, in general, three forms of lightning. The most common is a short discharge lasting less than .0001 second, No. 1 of Figure 7. The form represented in No. 2 of Figure 7 is also

of rather frequent occurrence. Several, often as many as five, discharges follow one another in rapid succession. The interval between successive discharges can be determined without difficulty. It is necessary only to take a photographic picture of the lightning while moving the camera or unwinding the film with a uniform known speed. Thus the lapse of time between the individual discharges has been measured. The whole disturbance lasted .56 second, the shortest time between two discharges was .03 seconds,

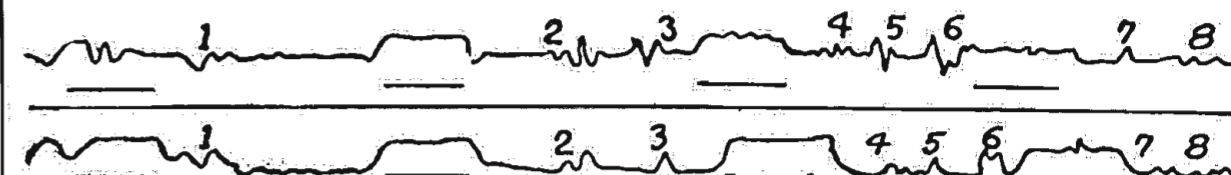


Figure 6.

there were in all five discharges. A third form of discharge is shown in No. 3 of Figure 7. Here the lightning goes from the earth to the cloud, or in the opposite direction of the discharges represented in 1 and 2.

Conclusions

The conclusions with respect to Radio reception we may draw from the preceding considerations can be stated as follows:

Everywhere, we are distinctly, though in an obscure manner, dependent on the weather.

Although we have a certain freedom of

choice in locating our receiving stations, we should not definitely select a site until after a careful and comprehensive examination into the meteorological conditions prevailing at that site. Next, we must find out where thunderstorms occur most often, and to this end the weather maps available in almost all countries will give excellent service. The central meteorological stations, corresponding to the U. S. Weather Bureau, have also collected much valuable material on the subject. Further it is necessary to discover

where the winds and air strata are most uniform and stable.

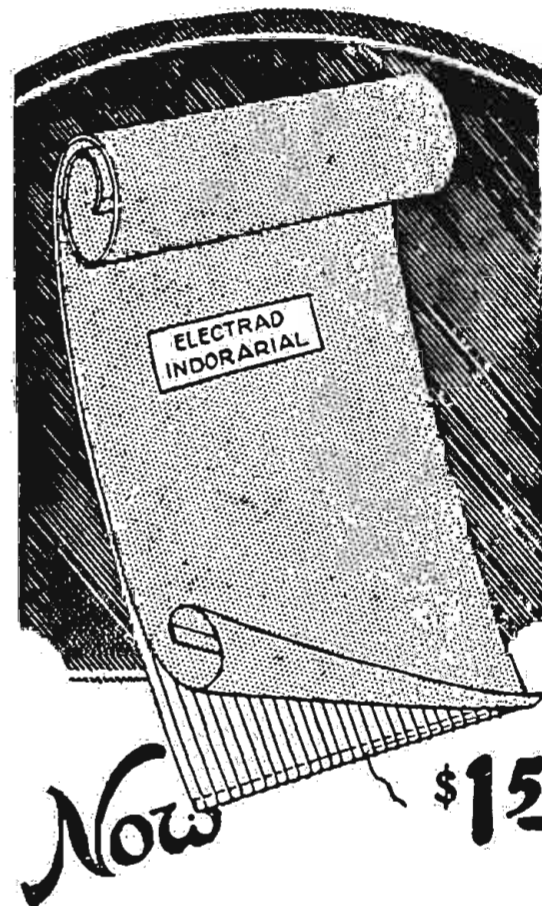
Where Summer Reception Is Best

The best receiving station is always the one above which the atmospheric strata, the wind conditions, the temperature and the humidity are most nearly normal at all times. Therefore, locations near the sea coast or large lakes are the most advantageous, for large bodies of water always cause a uniform stratification in the air above them. The strata are parallel to the earth's surface and are not compressed and mixed with each other. In

(Continued on page 10)

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OPERATING AND TROUBLE SHOOTING

For the Owner of a



Type D 10 Receiver

THE ability of the Radio set to eliminate interference is dependent upon the particular form of circuit used to construct and interlink the parts of the receiver between antenna and detector. In the D 10 this circuit is a notably sharp one and is further assisted by the directional property of the loop which is such that it will cut off stations at right angles

detector. Its reproduction is more nearly perfect than that obtained from any other known form of detector. The "pep" of the loud speaker, or volume of sound emitted by the loud speaker, depends upon the audible frequency amplifier located between the detector and loud speaker. In the D 10 this audible frequency amplifier comprises three series of strengthening of the detected audible frequency power through as many audions before its output is fed into the loud speaker. Three stages of audio frequency amplification is sufficient to produce an excess, in reserve, of the power to operate a loud speaking device to a comfortable room volume. The saving of two tubes is accomplished by using the second and third audions in the set as amplifiers simultaneously for both the Radio and the audible frequency waves.

Installation of Batteries

Before connecting batteries, be sure that all tubes are removed from sockets. The cabinet of D 10 has a compartment underneath for B batteries, or for dry cells

"OPERATING and Trouble Shooting" is a Radio Digest feature whose purpose is to study the late models of various standard receiving sets and to show the newly initiated broadcast listener, who has purchased such a set, how he can operate it to get the best there is in it and how he can overcome minor difficulties which may be causing some trouble. On pages 11, 12 and 13 this week the De Forest D 10 and Radiodyne WC 10 are described. Radiophans with other kinds of sets will also find these articles worth reading, particularly the notes on trouble finding.

DV-2 tubes operate on a 6-volt battery with three to six B batteries (70 to 120 volts) furnishing the plate power. These tubes use a total filament current of 1 ampere, so their operation on dry cells is not economical, and a storage battery should be used for the filament supply. The plate current consumed by four DV-2 tubes in this set will be approximately 20 milliamperes at 90-volt B battery. Large size B batteries should be used, as the life of the small size is short. The batteries should be connected to the four binding posts on rear shelf.

Loop Instructions

To set up loop, cut string and open up to full size. Remove the knurled nuts from screws on loop center and place the center piece under the four sticks. Force each stick over the two screws until each stick has been properly mounted in place. Screw knurled nuts on tight to hold sticks firmly against center piece. Place loop through hole in top of cabinet and thence into jack which is directly below on subpanel.

A switch is provided on center of loop or coil antenna to cut out six turns for reception of high frequency (short wave lengths, 1,350 to 750 kilocycles, 222 to 400 meters). Turn switch down to left to make contact with lower contact point, using the Radio frequency transformer combination 4-3-1.

For reception of low frequency (high wave length, 750 to 500 kilocycles, 400 to 600 meters), turn switch to right making contact on upper contact point. Using Radio frequency transformer, combination 1-2-3, switch may be used in either position for covering a broad band of wave lengths.

Radio Frequency Instructions

Radio frequency transformer sockets are numbered 1, 2 and 3, which are located behind the tube sockets.

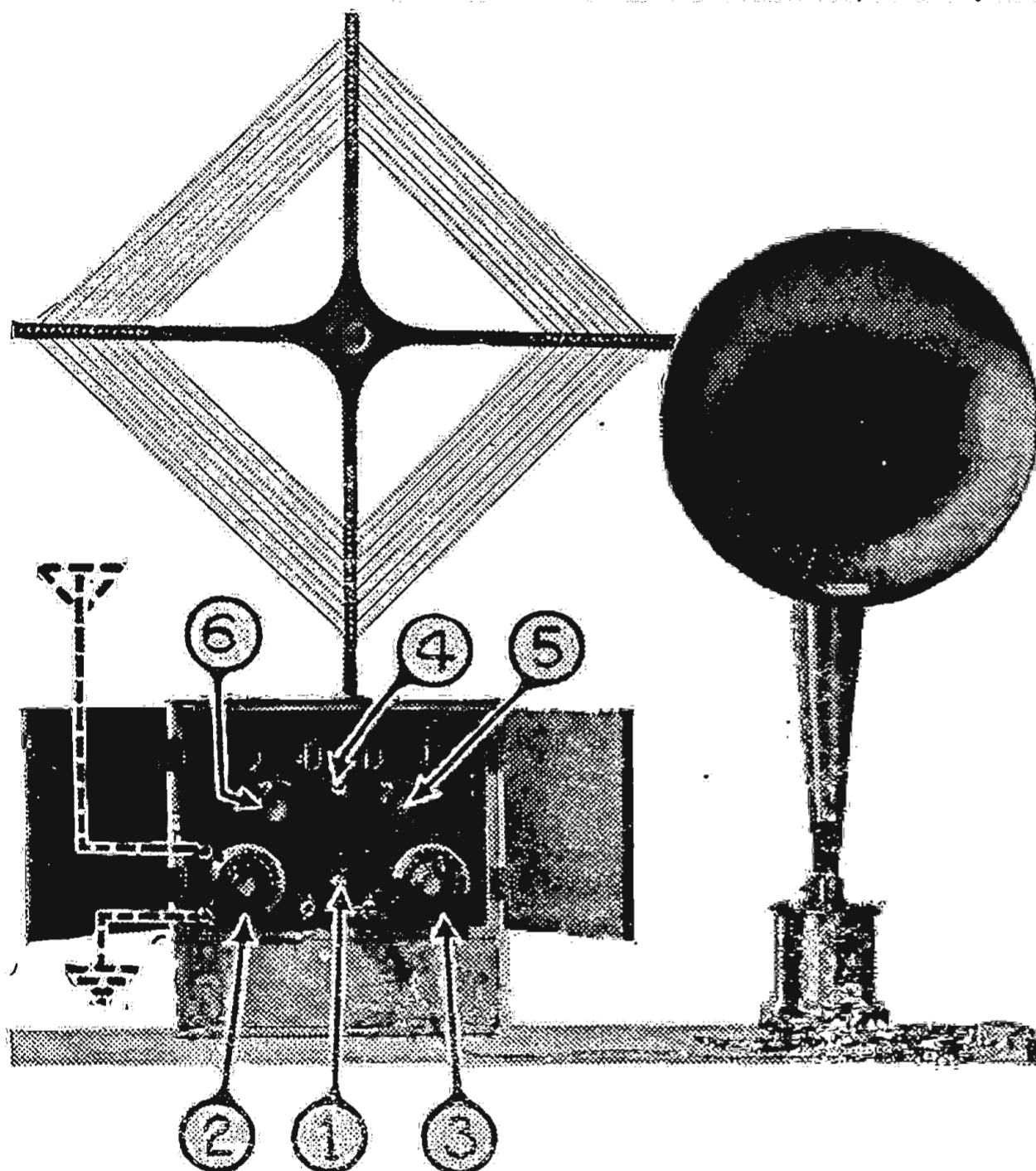
When using transformer combination 4-3-1, place number 4 transformer in socket marked number 1; number 3 transformer in socket marked number 2 and number 1 transformer in socket marked number 3.

Kilocycles	Wave Length	Transformer Position		
		1	2	3
1,350-750	222-400	4	3	1
1,000-600	300-500	1	2	3
750-500	400-600	3	5	2

Operation

1. Connect A and B batteries as directed and check connections carefully for, if batteries are not connected properly, set will not operate and may be damaged.
2. Be sure that filament switch number 1 is in.
3. Plug loop in its socket all the way.
4. Plug transformers number 1, 2 and 3 in their sockets.
5. Insert tubes in sockets by pressing down and turning slightly to the right.
6. Turn rheostat number 6 about half-way on to right.
7. Pull out filament switch No. 1.
8. Turn rheostat 6 to right slowly. Tubes should burn dimly. If A and B batteries are reversed, tubes may be burnt.

(Continued on page 12)



to, its plane. The portion of a Radio receiver that determines its sensitivity or ability to receive distant stations is the Radio amplifier located between the antenna and detector. In the D 10 this amplifier comprises three series of strengthening of the Radio pulses through as many audions, providing in this way an enormous Radio amplification. In the D 10 the detector is a crystal type. It detects with a complete absence of local noises that occur in the audion used as a

and B batteries when used as a portable set.

When D 10 is used as a portable set De Forest DV-3 or DV-1 tubes should be employed. These tubes require a 4 to 4.5-volt battery and will draw a total of .3 ampere so that three dry cells in series can be used to furnish the filament current. Three intermediate-size B batteries will furnish the required plate power. All batteries can be put in lower compartment as shown.

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OPERATING AND TROUBLE SHOOTING

(Continued from page 11)

out, so if tubes light up brilliantly turn rheostat off quickly and check connections.

9. Plug phones into jack 3. If batteries are connected properly a click will be heard.

10. Rotate potentiometer knob 5 to left until a hiss or squeal is heard and then slightly to right.

11. With vernier dial 3 set at 50 rotate condenser dial 2 to the wave length desired.

12. An easy way to pick up a station is to turn potentiometer 5 to left beyond the critical point, and rotate the condenser dial 2. The carrier wave of a station will be heard as a high frequency whistle. Adjust the dial so it is on the peak of the high frequency whistle, then turn potentiometer 5 slowly to the right until the high frequency whistle or beat note is lost and signal of the station is heard.

13. Rotate loop to direction of station desired to give maximum signal.

14. Push loud speaker plug into jack 4 and pull out phone plug from 3. This lights tube 4 and connects the loud speaker to the last amplifier tube. The rheostat and potentiometer 6 and 5 may have to be turned slightly to the right to give the best results.

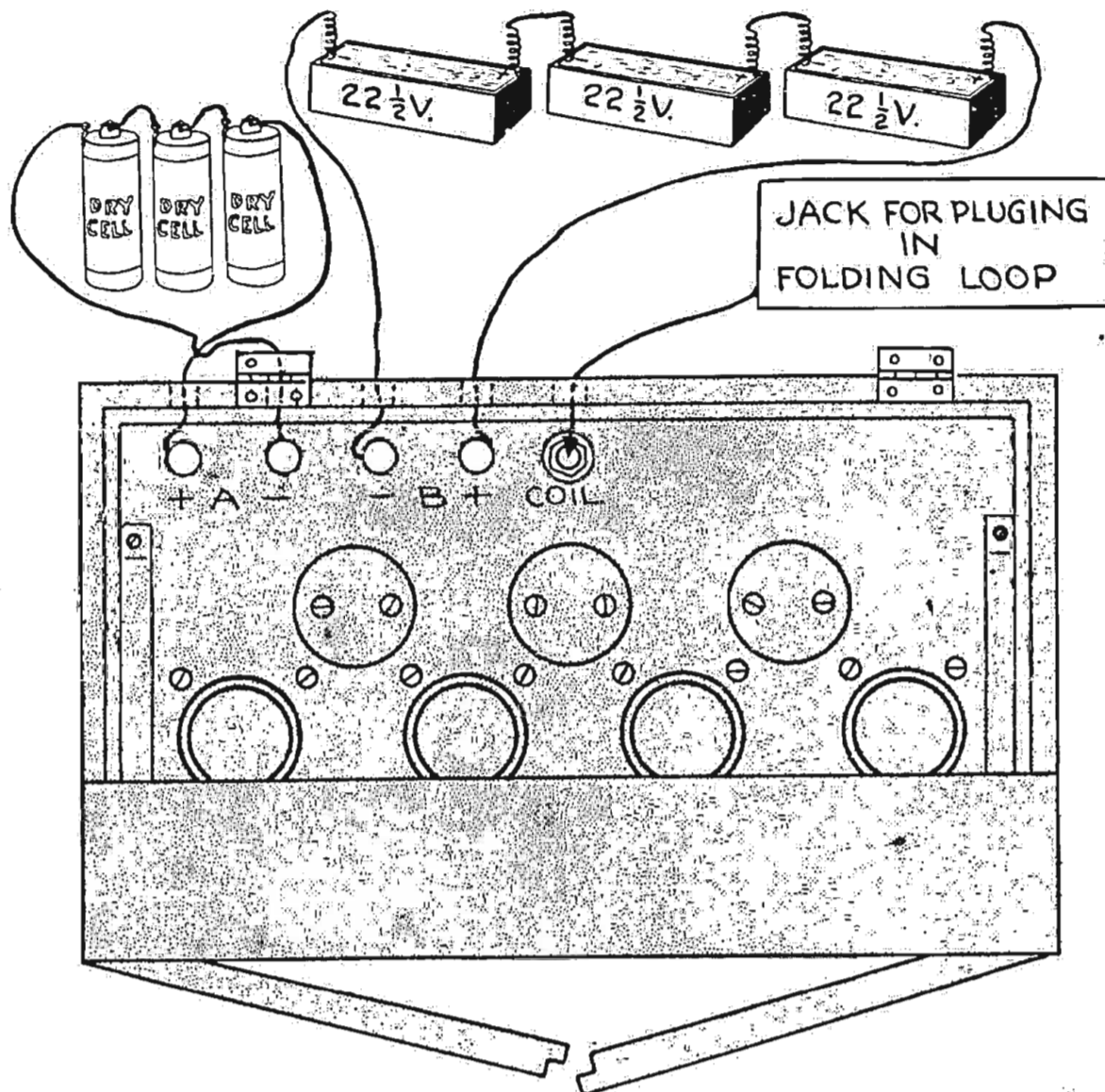
Antenna and Ground

If an antenna is to be used, connect a wire, 25 to 40 feet long, to post marked ANT. on front of panel. The antenna may be used with or without the loop.

A ground wire connected to a water or steam pipe with a good ground clamp may be fastened to ground post, either with antenna or with loop alone. It sometimes gives an increase in signal strength when using loop alone.

Caution

Do not turn filament rheostat too far to right. To do so will destroy activity of tubes. Keep the filament rheostat as far to the left as possible without diminishing signal strength. Do your tuning with the condensers and not with the filament rheostat. Tubes should always be handled carefully. The DV-2 is fairly rugged but nevertheless will not stand abuse. DV-3 is very fragile, because of the fine filament wire, and must be handled with the greatest care. Never leave tubes in sockets while inspecting, repairing or altering any part of set. One slip of the



tool may burn out all four tubes. Failure to read instructions may prove costly. Clean contacts on tubes, bases and socket springs occasionally. Also it may be necessary to bend socket springs up with a wooden pencil.

Adjust detector contact 4 lightly on a sensitive spot and do not change it unless necessary. Do not touch crystal with fingers. It may be necessary to cut off end of cat whisker with scissors.

Reception on loop is possible in all loca-

tions and in all types of buildings, but better results are obtained in frame, stucco and brick buildings than in steel and concrete buildings. Steel absorbs electromagnetic waves and deflects them from their regular course. Daylight also retards electromagnetic waves, and the best results are at night and in winter.

Do not use B batteries after they have discharged below 17 volts per unit of 22.5 volts, voltage to be measured with set on. Low voltage makes set noisy.

Effective and Actual Heights of Antennas

Apparently the height makes very little difference to most Radiophans. A high antenna will pick up more Radio frequency energy than a low one, but the high antenna, besides being able to pick up fainter and weaker signals, collects static which interferes with reception, so that too high an antenna should be avoided.

It is the effective height of an antenna that counts and not always the height above the ground. If an antenna is 10 feet above a grounded tin roof, the effective height would be 10 feet and not the 50 or 60 feet from the earth.

The antenna has a marked influence on the selectivity of the receiving set and the possibilities in this direction must be taken into account. If the antenna were erected in an open space clear of any obstruction, the problem would be completely simple, but, as it is, we usually have to make the best of conditions as we find them. The element of the antenna which determines its ability to pick up or give off signals is termed its effective height. This does not mean the height from the ground to the topmost point, but is the average height from the ground terminal to the center of its exposed area.

For an antenna consisting only of a straight vertical wire the effective height is approximately two-thirds of its actual height; while for an antenna having a large flat top structure the effective height is very nearly the actual height. The only purpose of the flat top element of a receiving antenna is to give greater effective height for a given actual height.

Tips About Tubes

Certain types of vacuum tubes used as detectors will give rise to noises which sound very much like static unless the filament battery voltage is adjusted to the proper value. It is desirable with all tubes to examine the contact pins in their base occasionally, to make sure that these have not corroded. In cases where the tips have been tipped with solder, corrosion or oxidation may take place. Clean the pins with very fine sandpaper.

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SUPERTRON TUBES Type 201A uses 6 volts, type WD 12 uses 1 1/2 volts. Excellent as detector or amplifier. Draws 1/2 amp. Dcillate in all circuits. 1 FDR \$6.49. 2 For 6.50	"B" BATTERIES 22 1/2 Variable Reg. \$1.75..\$1.29 Reg. 2.65.. 1.99 Reg. 3.00.. 2.19 45 Variable Reg. \$3.50..\$2.99 Reg. 4.00.. 3.49 Reg. 5.50.. 5.49 2 FOR 1c MORE	PLUGS Torpedo or Flat, easy adjustment for phone cords. High finish. Perfect contact. Reg. \$1.25. 1 FOR 69c. 2 For 70c	JACKS Single or Double Heavy Springs—German Silver Contacts. Nickel finish. Reg. 90c. 1 FOR 59c. 2 For 60c	TUBE PROTECTORS Impossible to blow your tubes if you attach these to end of socket for 1/4 or 1 amp. tubes. 1 FOR 49c. 2 For 50c	AERIAL WIRE 7 Strand Tinned copper wire gives excellent results on DX work. Reg. \$1.00. 100 ft. 99c. 200 For 1.00	KRDNE PHONES 2200 Ohms Standard Make. Remarkable Clearness and volume. Can be used with horn. Reg. \$6.50. 1 FDR \$5.89. 2Prs. For 5.90
LIGHTNING ARRESTERS Approved by Underwriters. You need these for your set. 1 FOR 89c. 2 For 90c	VARIABLE CONDENSERS Moulded and plates, sturdy construction. Perfect alignment between plates. 11 Plate...\$1.79 23 Plate... 2.09 43 Plate... 2.69 2 FOR 1c MORE	DIALS DeForest Type Remarkable value. Knurled knob with heavy brass bushing. 1/4 and 3/8 shafts. 2 1/2 inch...39c 3 inch...44c 4 inch...54c 4 inch...74c 2 FOR 1c MORE	D. L. COILS 35-50-75-100 Just the size for Three Circuit. 1 FOR 69c 2 For 70c	TRANSFORMERS Audio Frequency well known standard make. Ratio 4-1. Reg. \$5.50. 1 FOR \$5.49. 2 For 5.50	HYDROMETERS Very Accurate. Packed in wooden moisture proof box. Reg. 75c. 1 FOR 59c. 2 For 60c	NEUTRODYNE No set has ever made the hit with the Radio fan that the Neutrodyne has. The reason is obvious—the Neutrodyne brings in the distant stations without squeals and without distortion. These are GENUINE NEUTRODYNE PARTS licensed under HAZEL-TINE PATENTS. Beware of unlicensed parts! 3 Workriteformers (Wound on Bakelite with silk wire) 1 7x24 panel 2 Workrite Neutrodens 5 Brunswick Sockets 2 Shacton Rheostats 2 Star Transformers 1 Single Closed Jack 1 Single Filament Jack 2 .006 Westinghouse Fixed 1 .0025 Mica with Grid Leak 3 Shacton Dials 3 23 pl. Brunswick Variables Look over this list of parts. Compare it with others. Then you will realize what a special price this is— \$25.97
VERNIER CONTROL For any Dial. Makes a Vernier out of any make condenser. Very efficient. Reg. 75c. 1 FOR 49c 2 For 50c	SWITCH LEVERS Adjustable Arm. Fada Type Knob. Heavy Nickel plated arm and collar. Reg. 40c. 1 FOR 29c. 2 For 30c	VARIABLE GRID LEAK Panel Type. Needed for proper results. No solder needed. 1 FOR 79c. 2 For 80c	MOULDED VARIOMETER A remarkable buy. Green silk wire, pig tail contacts. Can be split. Heavy windings. Reg. \$6.00. 1 FOR \$5.49. 2 For 5.50	RHEOSTATS Any Resistance. Fada Type with tapered knob and secure wire. 6 ohms...49c 30 ohms...59c 2 FOR 1c MORE	VARIO-COUPPLERS 180 Degree Wound on Genuine Bakelite tubing with green silk wire. Reaches 600 meters. Reg. \$3.00. 1 FDR \$3.89. 2 For 3.90	
SDCKETS Well made in detail. Extra heavy phosphor bronze contacts. Binding post nuts. Metal top...49c All Moulded. 59c Wiping Contact...69c 2 FOR 1c MORE	Vernier Condenser with Dial A beautiful moulded end instrument with tapered dial and knob. Precision made. Delicate adjustment. 11 Plate...\$4.49 23 Plate... 4.99 43 Plate... 5.50 2 FOR 1c MORE	LITZ WIRE Most Efficient A double silk covered wire with 37 strands of No. 38 wire, each strand annealed. Wonderful for Coils, Loops, etc. 1 FT. FDR 4c. 2 For 5c	GOLD BUS BAR Most Efficient. Allows high frequency currents least resistance. Used in finest sets. Reg. 15c. 1 FOR 15c. 2 For 16c	POTENTIOMETER Complete with knob and dial. 200 or 400 ohms. The most remarkable buy you ever made. 1 FOR 69c 2 For 70c	VERNIER RHEOSTATS The famous TECD complete with bakelite dial. Needed for your detector tube. 1 FDR 89c. 2 For 90c	

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Set includes all parts, drilled panel, phones, tube, batteries, aerial equipment, etc. Great for D.X.....**\$15 00**

OPERATING AND TROUBLE SHOOTING

For the Owner of a

Radiodyne WC 10 Receiver

CONNECT plus and minus of storage battery to plus and minus posts marked FIL.-BAT. on rear panel. Next connect B batteries in series as shown. The negative end of this string of batteries connects to post marked -. The other end goes to post marked + AMP. The middle post +D connects to

PARTS NEEDED

- Six C-301A Amplifier Tubes (see heading "Other Types of Tubes," below).
- Three 22½ Volt B Batteries.
- One Loud Speaker.
- One 6-Volt Storage Battery.
- 12 Feet Flexible Twisted Lamp Cord, Size Number 18.
- 20 or 30 Feet Insulated Wire (Lamp Cord may be used).

the 22½-volt mark of the middle B battery. Post G is connected to a grounded pipe such as a water pipe, gas pipe or outside pipe driven into the ground. Post A is connected to the 20 or 30-foot flexible wire (insulated) which should be strung in one direction as near as possible. It may also be put into the walls of a house or strung up behind the picture moulding. A small outside antenna may be used if desired, but the sharpness of the Radiodyne will not be as great.

Have knobs 4, 5 and 6 at zero when placing tubes in sockets. Insert telephone

good signal strength. Never sacrifice the efficiency of the Radiodyne by not having tubes bright enough. Primary (1) and secondary (2) dials must be tuned very accurately (.01 inch is not too sharp). Signals which are too loud may be cut down with knob 6 or 5, but never with 4. The compensator 3 enables the operator to keep the desired wave lengths on the primary dial regardless of the size or type of antenna used. For instance, if with compensator 3 set at 4, station XYZ comes in at 7 on primary dial 1,

tubes are used in the first three left-hand sockets. The Radiodyne will probably be silent if knob 4 or secondary dial 2 are advanced too far or if compensator 3 is too low.

General Instructions

Change B batteries every fourth month. Have wires from storage battery not over 6 or 7 feet long.

Always keep battery fully charged to secure maximum voltage.

All battery terminals should be clean, bright and tight.

Be sure tube prongs are making good contact with springs in sockets.

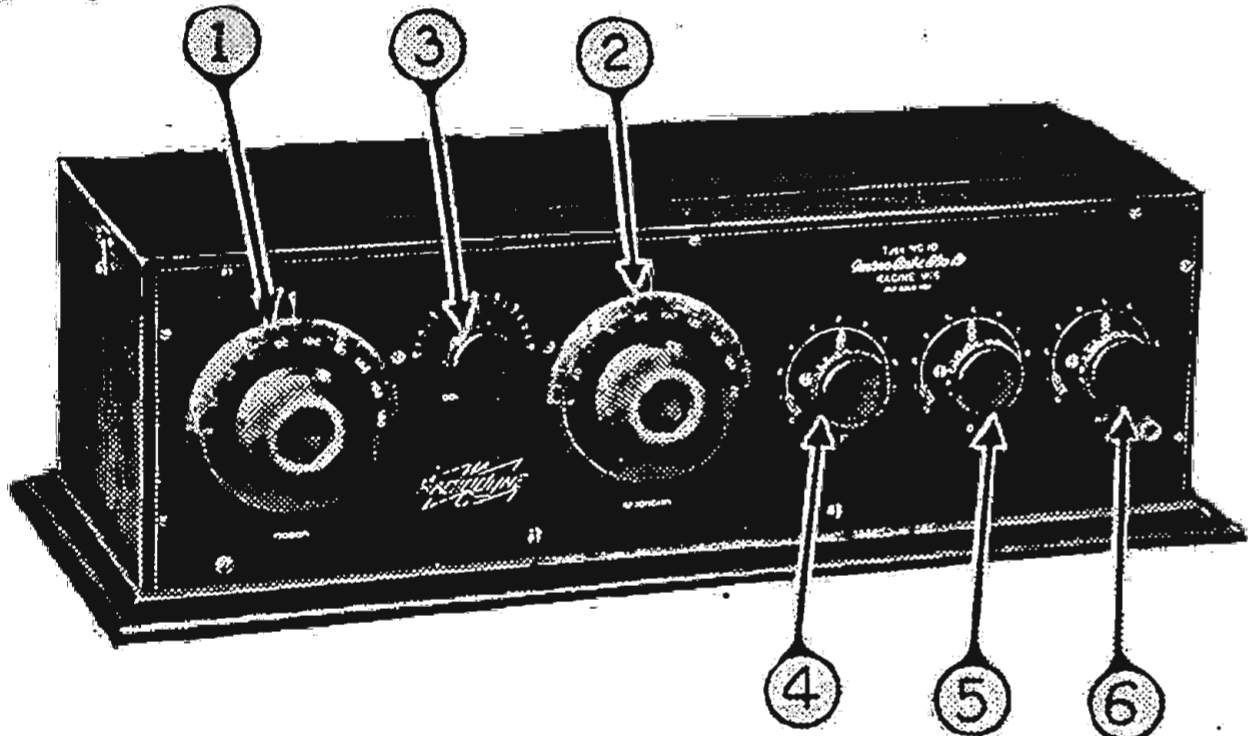
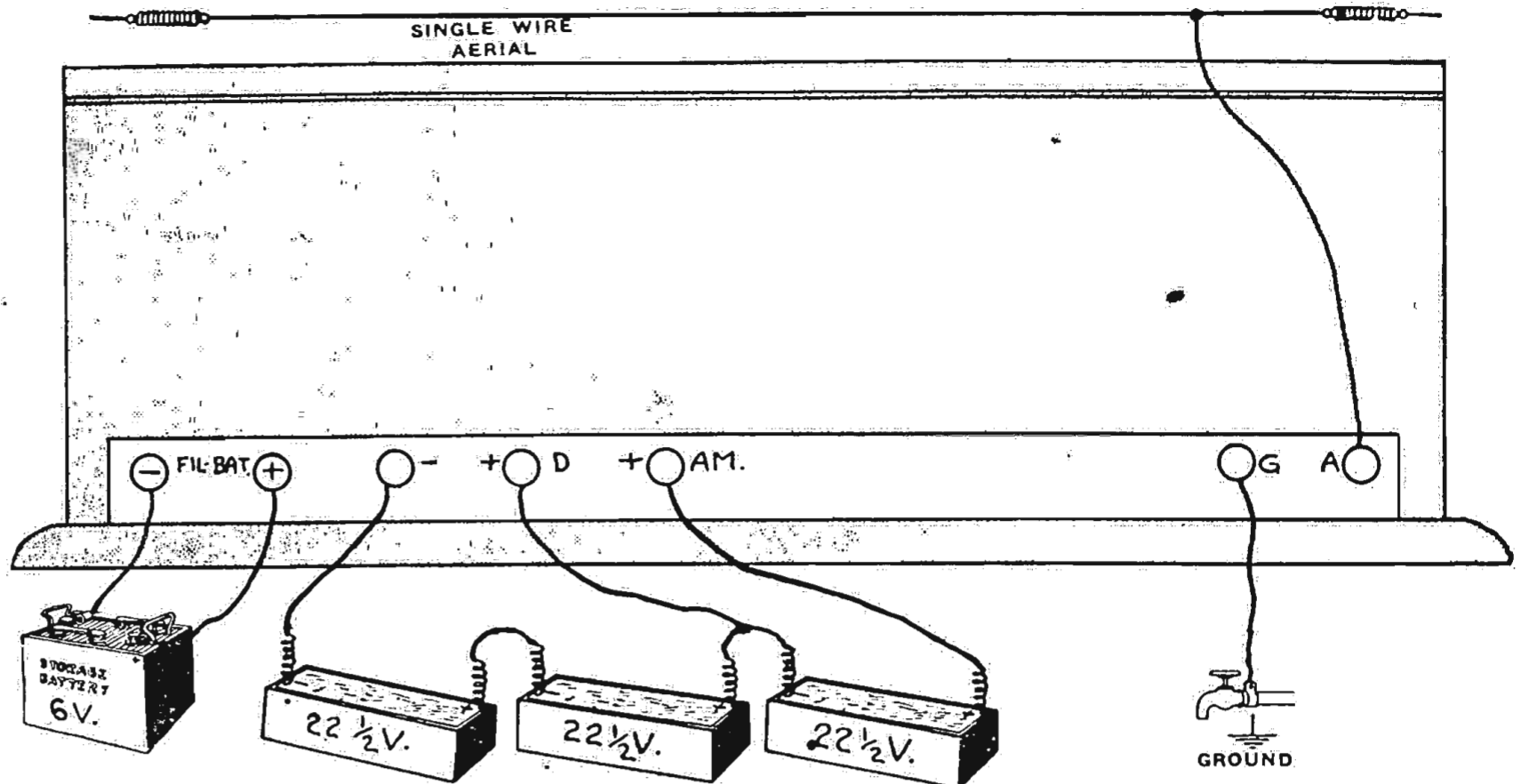
Ducons, super-antennas or antennae may be used if desired. (Light socket aerial.)

Other Types of Tubes

If UV-199 or C-299 dry-cell tubes are used do not attempt to use 6 volts of filament battery. If 6-volt battery only

is available, then use only two cells of same, which is 4 volts. The approximate position of rheostats is then as follows: Knob 4 at 8 to 8½, knob 5 at 1, knob 6 at 7 or 8. With these small dry-cell tubes it is best to use 6 dry cells in two groups. Each group should have three cells connected in series and the two groups should then be connected in multiple or parallel so that not over 4½ volts will result. The position of the rheostats is then approximately knob 4 at 8, knob 5 at 0 to ½, and 6 at 7½. A C-300 or UV-200 detector tube may be used when 6-volt storage battery supplies current. Rheostat 5 should then be used at 10. Also, post on rear panel marked +D should be connected to the 18-volt tap of the first battery on the negative end of the string.

An ideal tube combination is as follows: Starting from left, De Forest DV-6A, C-301A, C-301A, DV-6A, C-301A, C-301A.



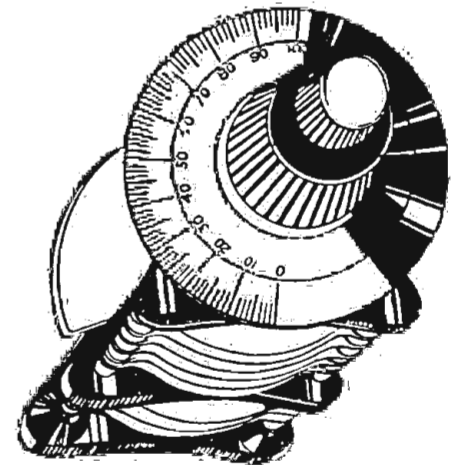
plug in jack at right of Radiodyne. Put knob 4 at 10, knob 5 at 8, and knob 6 at 9. Then put compensator 3 at point .5. With secondary dial 2 at zero, tune in station with primary dial 1 and increase secondary 2 until maximum strength is reached. Remember that the three knobs 4, 5 and 6 control the brightness of the tubes and should therefore be kept as low as possible at all times consistent with

then, to make this same station come in at say 30 or 40, compensator 3 should be lowered to about point 3 or 3½. Again if station KDKA (326 meters) comes in at 8 on primary 1 with compensator at 4, then, to get WSAI (309 meters), compensator 3 should be slightly reduced to, say, point 2½. Once compensator is properly set, it will need little attention unless some entirely different types of

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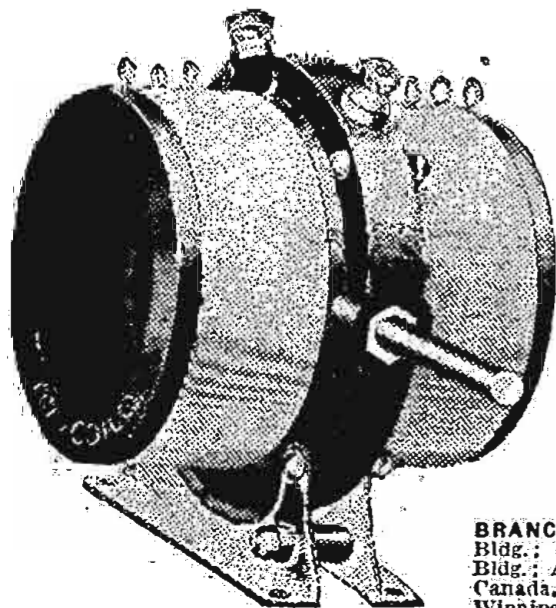
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AN EVENING AT HOME WITH THE LISTENER IN
(SEE INSTRUCTIONS FOR USE BELOW)

Station and City	Met.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
CFCN, Calgary, Alta.	440	12:00-1:00	Silent	11:00-2:00	Silent	Silent	11:00-1:00	Silent
CKAC, Montreal, Que.	430	Silent	6:00-10:30	Silent	6:00-10:30	Silent	6:00-10:30	3:30-4:30
CYB, Mexico City, Mex.	425	Silent	8:00-9:30	Silent	8:30-10:30	Silent	8:00-9:30	Silent
CYL, Mexico City, Mex.	500	Silent	9:30-11:00	Silent	Silent	9:30-11:00	Silent	Silent
KDKA, E. Pittsburgh, Pa.	326	5:00-9:00	5:00-11:30	5:00-9:00	5:00-11:30	5:00-9:00	5:00-9:00	6:30-7:30
KDZE, Seattle, Wash.	455	10:30-12:30	Silent	10:30-12:30	Silent	10:30-12:30	Silent	Silent
KFAE, Pullman, Wash.	330	9:30-11:00	Silent	9:30-11:00	Silent	9:30-11:00	Silent	Silent
KFAE, Denver, Colo.	360	9:00-10:00	9:00-10:00	Silent	8:30-9:00	9:00-10:00	9:00-10:00	Silent
KF, Los Angeles, Calif.	469	12:00-1:00	8:45-1:00	8:45-2:00	8:45-1:00	8:45-2:00	8:45-2:00	8:45-1:00
KGW, Portland, Ore.	492	9:30-12:30	9:30-1:00	9:30-1:00	9:30-1:00	9:30-2:00	9:30-1:00	8:00-10:00
KHJ, Los Angeles, Calif.	395	8:45-2:00	8:45-2:00	8:45-2:00	8:45-2:00	8:45-2:00	8:45-2:00	10:00-12:00
KLY, Oakland, Calif.	509	Silent	10:00-12:00	10:00-12:00	10:00-12:00	10:00-12:00	Silent	Silent
KPO, San Francisco, Calif.	423	10:00-1:00	10:00-1:00	10:00-12:00	10:00-1:00	Silent	10:00-2:00	10:30-12:00
KSD, St. Louis, Mo.	546	8:30-1:00	8:00-1:00	8:00-1:00	8:00-10:30	Silent	7:15-9:00	9:00-10:00
KYW, Chicago, Ill.	536	Silent	8:00-9:30	8:00-9:30	8:00-12:30	8:00-9:30	8:00-9:30	6:30-8:00
NAA, Radio, Va.	435	5:45-7:20	6:05-7:20	6:25-7:40	5:45-7:40	7:05-7:40	Silent	Silent
PWX, Havana, Cuba	400	Silent	Silent	7:30-10:00	Silent	Silent	7:30-10:00	Silent
WBAP, Fort Worth, Texas	476	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:30-10:45	7:00-7:30	5:00-6:00
WBAP, Columbus, O.	390	8:00-10:00	Silent	Silent	Silent	8:00-10:00	Silent	4:00-5:00
WBZ, Springfield, Mass.	357	6:00-9:00	6:30-9:00	5:00-11:00	6:30-8:00	5:00-11:00	6:30-8:00	5:45-8:30
WCAE, Pittsburgh, Pa.	462	7:30-8:30	7:30-8:30	7:30-8:30	7:30-8:30	7:30-8:30	7:30-8:30	5:30-6:30
WCAP, Washington, D. C.	469	Silent	6:30-9:00	Silent	6:30-9:00	Silent	6:30-9:00	6:20-9:00
WCBD, Zion, Ill.	345	8:00-10:00	Silent	Silent	Silent	8:00-10:00	Silent	2:30-5:30
WCX, Detroit, Mich.	517	7:30-9:00	7:30-11:00	7:30-9:00	7:30-9:00	7:30-9:00	Silent	6:15-7:15
WDAF, Kansas City, Mo.	411	8:00-1:00	11:45-1:00	8:00-1:00	11:45-1:00	8:00-1:00	11:45-1:00	Silent
WDAP, Chicago, Ill.	300	Silent	7:00-1:00	7:00-1:00	7:00-1:00	7:00-1:00	7:00-1:00	9:15-11:15
WDAR, Philadelphia, Pa.	395	6:30-9:55	6:30-7:00	6:30-10:00	6:30-7:00	6:30-12:00	6:30-7:00	1:00-3:00
WEAF, New York, N. Y.	492	6:30-9:00	6:30-9:00	6:30-9:00	6:00-11:00	6:30-9:00	6:30-11:00	6:20-9:00
WFAB, Dallas, Tex.	476	8:30-9:30	8:30-12:00	Silent	8:30-9:30	8:30-9:30	8:30-12:00	6:00-11:00
WFI, Philadelphia, Pa.	395	5:30-6:00	5:30-8:00	5:30-6:30	5:30-8:00	5:30-6:30	5:30-8:00	6:30-7:30
WGI, Medford, Mass.	360	Silent	6:05-7:30	6:30-8:00	6:00-7:30	6:30-8:00	6:30-8:00	7:30-10:00
WGR, Buffalo, N. Y.	319	5:30-11:00	5:30-7:45	5:30-11:00	5:30-7:45	5:30-11:00	5:30-7:45	2:00-4:00
WGY, Schenectady, N. Y.	350	6:45-9:00	6:45-9:00	Silent	6:45-9:00	6:45-10:30	8:30-9:30	6:30-7:30
WHA, Madison, Wis.	360	7:30-8:30	Silent	7:30-8:30	Silent	7:30-8:30	Silent	Silent
WHAS, Louisville, Ky.	400	Silent	7:30-9:00	7:30-9:00	7:30-9:00	7:30-9:00	7:30-9:00	4:00-5:00
WHAZ, Troy, N. Y.	350	8:00-9:30	Silent	Silent	Silent	Silent	Silent	Silent
WHB, Kansas City, Mo.	411	7:00-7:45	7:00-10:00	7:00-7:45	7:00-10:00	7:00-7:45	7:00-7:45	8:00-10:00
WHK, Cleveland, O.	283	5:00-5:30	5:00-5:30	5:00-5:30	5:00-5:30	5:00-10:00	5:00-5:30	7:00-8:30
WHN, New York, N. Y.	360	6:30-11:00	6:30-11:00	6:30-11:00	6:30-11:00	6:30-11:00	6:30-11:00	8:30-11:00
WIP, Philadelphia, Pa.	509	5:00-6:30	5:00-11:00	5:00-6:30	5:00-10:00	5:00-6:30	5:00-11:00	8:30-11:00
WJAR, Providence, R. I.	360	Silent	6:00-7:00	6:00-11:00	Silent	6:00-9:00	Silent	Silent
WJAX, Cleveland, O.	390	Silent	6:30-8:30	Silent	7:00-9:30	Silent	Silent	Silent
WJAZ, Chicago, Ill.	448	Silent	10:00-2:00	10:00-2:00	10:00-2:00	10:00-2:00	10:00-2:00	6:00-9:00
WJY, New York, N. Y.	405	Silent	6:30-10:30	Silent	6:30-10:30	6:30-10:30	Silent	5:00-5:30
WJZ, New York, N. Y.	455	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:30	6:00-10:30	6:00-9:30
WKAQ, San Juan, P. R.	460	Silent	7:00-8:30	Silent	Silent	7:00-8:30	Silent	Silent
WLAC, Minn.-St. Paul.	317	Silent	Silent	9:15-10:45	Silent	9:15-10:45	9:15-12:30	7:45-9:15
WLW, Cincinnati, O.	309	10:00-12:00	10:00-12:00	8:00-10:00	10:00-12:00	Silent	Silent	Silent
WMAQ, Chicago, Ill.	448	Silent	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	7:00-10:00	Silent
WMC, Memphis, Tenn.	500	8:30-9:30	8:30-12:00	Silent	8:30-9:30	8:30-12:00	8:30-9:30	Silent
WNCB, Boston, Mass.	278	5:00-9:00	7:00-9:00	5:00-9:00	7:00-9:00	5:00-9:00	8:00-9:00	6:30-8:30
WOAI, San Antonio, Texas	385	Silent	9:30-10:30	Silent	7:30-8:30	Silent	Silent	9:30-10:30
WOAW, Omaha, Neb.	526	6:00-11:00	6:00-11:00	Silent	6:00-11:00	6:30-11:00	6:00-11:00	9:00-11:00
WOC, Davenport, Ia.	484	8:00-9:00	Silent	8:00-11:00	8:00-9:00	8:00-9:00	9:00-10:00	7:00-11:00
WOO, Philadelphia, Pa.	509	6:30-10:00	Silent	6:30-10:00	Silent	6:30-1:00	Silent	Silent
WOR, Newark, N. J.	405	5:15-10:00	5:15-6:30	5:15-10:00	5:15-6:30	5:15-10:00	5:15-10:00	Silent
WOS, Jefferson City, Mo.	441	8:00-9:30	Silent	8:00-9:30	Silent	8:00-9:30	Silent	7:30-8:30
WRC, Washington, D. C.	469	7:00-9:00	Silent	7:00-9:00	Silent	7:00-9:00	Silent	Silent
WRM, Urbana, Ill.	360	Silent	7:00-9:30	Silent	8:30-9:30	Silent	Silent	Silent
WSAI, Cincinnati, O.	309	Silent	8:00-10:00	Silent	8:00-10:00	Silent	10:00-12:00	Silent
WSB, Atlanta, Ga.	429	8:00-12:00	8:00-12:00	10:45-12:00	8:00-12:00	8:00-12:00	8:00-12:00	7:30-9:15
WSB, Birmingham, Ala.	360	Silent	8:00-9:00	Silent	8:00-9:00	Silent	Silent	8:00-9:00
WTAM, Cleveland, O.	390	Silent	Silent	7:00-9:30	Silent	Silent	8:00-10:00	Silent
WWJ, Detroit, Mich.	517	7:30-9:00	7:30-9:00	7:30-9:00	7:30-11:00	7:30-9:00	Silent	4:00-5:00

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. This table includes only the evening broadcasts, and on Sunday, the late afternoon program.

GREB-WILSON FIGHT TAKES AIR AT WJY

Entire "Scrap" Given to Radio Boxing Fans

NEW YORK.—Radio fight fans recently enjoyed one of the best "scraps" of the season when Station WJY of this city broadcast a description of Johnny Wilson's attempt to wrest his middleweight championship from Harry Greb in Madison Square garden.

Wilson won the title from Mike O'Dowd and kept it through an unusual series of trials and tribulations until Harry Greb took it away from him in a hard battle at the Polo Grounds last summer. Greb won again, this time on a decision. The fight ran fifteen rounds.

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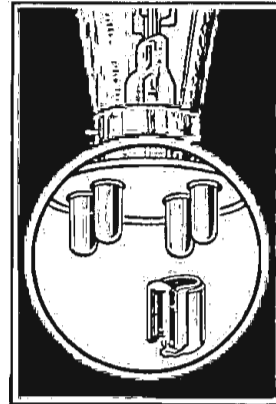
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Argentine Radio Demand Grows
WASHINGTON.—Interest in Radio is active and increasing, according to late reports from Trade Commissioner Brady at Buenos Aires. The "estancias" in the country districts are asking for longer-range types of receiving sets to enable them to listen in on the broadcasting from Buenos Aires and Montevideo. A steady growth in the demand for Radio

apparatus is expected to follow the extension, which is in progress, of the present broadcasting facilities.

Hear William J. Bryan

NEW YORK.—Radio listeners heard recently a famous figure in national politics when Station WJZ of this city broadcast the speech on "The Campaign of 1924" by William Jennings Bryan.

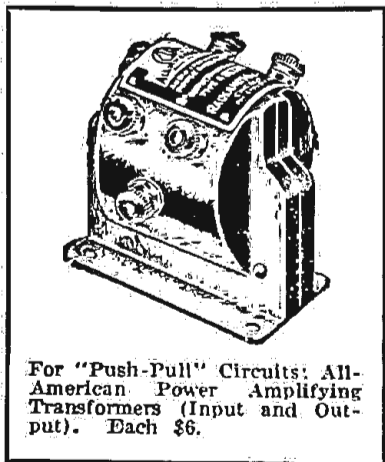
Thrills from Radio

No. 11 of a Series Featuring Experiences of "ALL-AMERICAN" Users

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By H. E. Hodder, Cook, Minnesota

"With a regenerative receiver, using All-American Transformers, a popular circuit and one stage of A. F., we have had the following DX stations on a Magnavox with good volume: WEA, New York; WSB, Atlanta; PWK, Havana (Cuba is about 2,000 miles from here); CWK, Tinnucu, Cuba; KHJ and KFI, Los Angeles; Dallas and Ft. Worth — also all stations of lesser distance.



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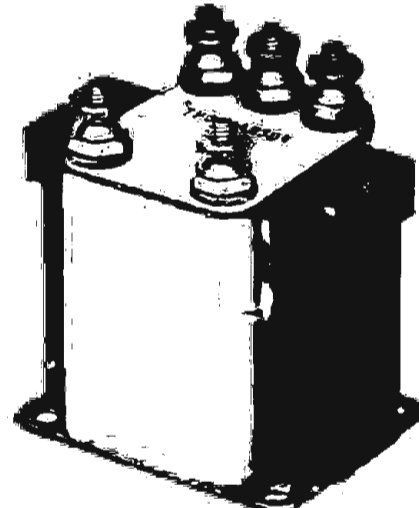
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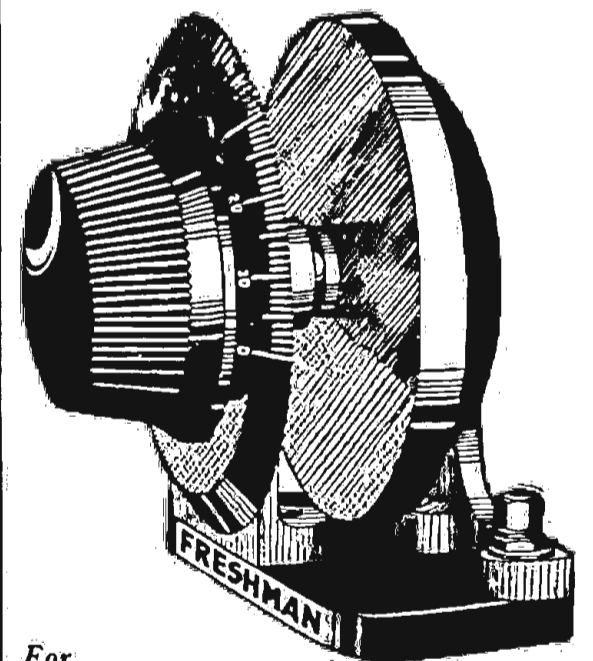
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106 SEVENTH AVE. NEW YORK

FEATURES ON THE AIR THIS WEEK

Tuesday, January 29

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 6:15 p. m., Dinner concert, Fort Pitt Hotel Orchestra; 7:15, Address by a representative of the American Committee for the Relief of German Children; 7:30, "Preserving Your Teeth," Dr. Bruce P. Rial; 7:45, Children's period; 8:15, "Resolution," one of the virtues of Benjamin Franklin, Dr. John Ray Ewers; 8:30, Concert, Byron King School of Oratory, Wilda Smith, soprano; Pauline Richtmire, Carol Poling, Mabel Ferrine, readers; One Act Play, "The Obstinate Family"; 11:30, Special Late Evening Concert.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., Pacific University-V. S. C. Basketball game.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Vocal concert; 10:00-11:00, Instrumental concert.

KFKX, Hastings, Neb. (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Talk, Jeannette P. Cramer; 7:45, Talk for farmers, Oregon Agri. College Extension Service.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Program presenting Dorothy Blaney, pianist, pupil of Levine; 2:30-3:30, Matinee Musicale, presenting Dorothy Blaney, pianist, pupil of Levine; 6:45-7:30, Children's program, by Harry James Beardsley, baritone; The "Sandman" will visit the studio; 8:00-10:00, Program by the California Girls' Quartet, Salvatore Tomaso, mandolinist and banjoist, and Elaine Tomaso, pianist; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-10:00 p. m., Program, Exchange Club of San Jose, Louis

Headliners of the Week

IF YOU would like to hear a thrilling tale that is true listen in to J. M. Hardenbergh, Managing Editor of the New York City News Association, when he tells how the troops came home after the Armistice. He will broadcast from WJZ Tuesday.

Wednesday WLW presents the Ohio String Quartet. They will give the post-luminous quartet by Schubert, "Death and the Maiden." Between the numbers, Miss Whitney will tell the story of this great work. WOS will give another evening of old time tunes in barn dance music. These programs have been well applauded.

Thursday parents should tune in for WGI. Every Thursday a special story is broadcast for them. This week the title of the story is "A Modern Mary Antin," read by Alfred Whitman. WJZ presents an enigma on this same evening in Ayy LaSkere. You will think you are listening to a woman, but here is a secret, this person is one of the most skill-

ful female impersonators in the world.

Miss Rachel M. Kelsey, instructor in English at the University of Wisconsin, will give readings from literature Friday, from WJIA. You might also test your memory on this same evening by listening in to the Music Memory Contest conducted by Mrs. Max W. Oberndorfer at WMAQ. Let us continue south and hear the lecture-recital by Sir Paul Duke on "Russian Music Before and After the Revolution," at WMC.

If you've never heard the Westinghouse band tune in Saturday for KDKA. They promise an exceptionally good classic concert.

Sunday tune in for either WCAP or WEAJ and listen to the program from the Capitol Theater, New York City. These are very popular programs.

Monday, KPO will feature a whole accordion club. One accordion is enough in an apartment building. Tune in to see what a club of accordions can do to a loud speaker. —THE PROGRAM LADY.

ale "While You Dine" by Halsey Miller and his orchestra; 8:30-6:45, Man in the Moon Stories; 7:00-7:15, "Music While You Dine."

WJL, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 9:45, "Ironing Day," Fred Bshaw, pianist; 3:00, Detroit News Orchestra; 8:30, Detroit News Orchestra; Marcus Kellerman, vocalist.

Wednesday, January 30

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Concert, Broadway's Orchestra; 6:30, Dinner concert, Pittsburgh Athletic Association Orchestra; 7:45, Children's period; 8:15, "A Day at the Famous Balls of Vichy," Grayce Druitt Latus, Travel Editor; 8:30, Concert.

KFAE, Pullman, Wash. (Pacific, 330), 7:30 p. m., Diet for the Rural Home, Lella Wall Hunt; "Fruit Diseases Treated in Winter," George L. Zundel; Mandolin and Guitar Duets, Dorothy Gilbert, Rex Turner; Talk on the New Books, Alice L. Webb, editor general publications.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Detective stories presented by Detective Nick Harris; 10:00-11:00, Concert features presented by the Hollywoodland Community Orchestra.

KFKX, Hastings, Neb. (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Children's program, violin music; pupils of Helen Harper; 8:00, Concert, Columbia Theater All-Artist Orchestra.



Above is Harriette Murton, a gifted coloratura soprano. Tune in KPO on February 4, and convince yourself.

Martha Gomph is the artist who charms her audience during the program of tea time music broadcast by Station WGR, Federal Telephone and Telegraph company, Buffalo, at four o'clock every afternoon, except Sunday.

O'Neal, director; 10:00-11:00, E. Max Bradfield's versatile band.

KSD, St. Louis, Mo. (Central, 546), 8:00 p. m., Studio program, Temple Quartet; 11:30, Helene Helweg, soprano; Arthur Spiegelberg, baritone; Clifford Heitmeier, tenor; Charles Biachi, pianist.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. A. J. Peterson; 2:35 p. m., Studio program; 6:50, Children's bedtime story; 7:00-7:30, Dinner music, Clyde Doerr's Orchestra; Joska DeBabary's Orchestra; 8:01-8:28, Program, American Farm Bureau Federation; "Manufacturing Output Compared with Agricultural Output," Nat C. Murray; F. M. Simpson; 8:30-9:30, Musical program, Hinshaw Conservatory of Music.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, 350-voice; 9:30-10:45, Will Foster, organist.

WEA, Springfield, Mass. (Eastern, 337), 7:00 p. m., Farmers' period—"1924 Orchard Campaign," Prof. F. E. Cole; 7:30, Bedtime story for the kiddies; "The Art of Investment," Donald McClench; 8:00, One hour of Vaudeville, Harold Kelly and Tom McNally; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WCAP, Washington, D. C. (Eastern, 469), 7:30-10:00 p. m., Joint program with WEAJ, N. Y. C., concert of music and short talks on subjects of national interest.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Edith Kuhra K. C. A. C. Orchestra; 6:00-7:00, Piano tuning-in number on the Duo-Art; Address, E. O. Moffatt, fourth of a series of travelogues; Address, J. Frank Smith; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 11:45-1:00 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Esther Whittington, soprano; Charles Garrett, saxophonist; Frederick W. Agard, tenor; Bob Cougle, accompanist; Rosemary Hughes, soprano; Jack Chapman's Orchestra.

WDAR, Philadelphia (Eastern, 395), 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; 7:50, Theatrical review, Arnold Abbott.

WEAF, New York, N. Y. (Eastern, 492), 11:20-11:30 a. m., Board of Education; 11:35-11:40, Adele Woodward on Motion Pictures; 11:50-12:00, American Agriculturist; 4:00-4:30 p. m., Joseph M. White, tenor; 4:30-5:00, Lucile Nadler, pianist; 5:00-5:30, The Airship Fairy Stories for Children; 7:30-7:40, Thornton Fisher Sport Talk; 7:40-8:00, John Allen Spooner, tenor; 8:00-8:10, American Surety Co.; 8:10-8:30, Charlotte Lund and N. Val Verey—Talk on opera; 8:30-8:45, Dr. Frank Calcott; 9:00-9:15, National Carbon Co.; 9:15-9:30, Ethel B. McKay, sopr.; 9:30-9:45, Columbia Phonograph Co.; 9:45-10:15, American Legion Night.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Address, Sarah Talley, pianist; Alex Kennedy, tenor; Miss Davis, soprano; 11:00-12:00, Orchestra recital, Circolo Theater.

Barton Bachmann, young American pianist, recently returned from a successful concert tour in Europe. Fans may hear him play by tuning in KYW on Saturday, February 2.

WFI, Philadelphia (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 3:00, Harold A. Simonds, baritone; 6:30, Bedtime stories, Cousin Sue; 6:30, Mayer Davis Bellevue Stratford Concert Orchestra; 8:00, Talk on Crystals, Warren N. Foote, of Foote Mineral Company; 8:10, Piotr Wlzia, Polish baritone; Edna Hanle and Alice Rowe, clarinet soloists; 8:30, Banking Talk, Edmund Williams; 9:00, Orpheus Plectrum Orchestra, H. Fenton Cook, director.

WGI, Medford Hillside, Mass. (Eastern, 360), 3:00 p. m., Amrad Women's Club Program; Descriptive Musicale, Chickering & Son's Company; 3:45, "Tuesday Tea Talk," David McGregor Cheney; 6:30, Meeting of the Big Brother Amrad Club; 7:00, Evening program: "Africa from Cape Town to the Congo," A. S. Flint; Concert, Standish Male Quartet.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Katherine Stang, violinist; 6:30-7:30, Vincent Lopez, Hotel Statler Orchestra; 7:30, Digest of the day's news.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "The Art of Making Introductions," Mrs. Albert Kinnun; 6:30, Dinner music, String Trio of Ben Eyck; Edward A. Rice, violinist; Ernest Burleigh, cellist; Leo Kilwey, violinist; Esther F. Wesberg, reader; Clarence Roberts, flutist; Fred Ferrey, oboe player; Peter Schmidt, clarinetist; John B. Taylor, bassoon player.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra, Walter Davidson, conductor; Strand Theater Orchestra, Harry S. Currie, conductor; Alamo Theater organ; 7:30-9:00, Out of Town Student Night, Violet M. Cole, director; Reading: An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360), 3:45-4:15 p. m., Bob Schaefer and His Georgia Five; 9:30-9:45, Hickey's Society Orch.; 9:45-10:00, Vivian Marlowe, soprano; 10:00-10:15, Hon. Milton W. Sutton of Natl. Security League; 10:15-11:15, Shapiro Bernstein Music Co.; 11:15-12:00, Noccia's Society Jazz Orchestra of Hudson County.

WIP, Philadelphia (Eastern, 509), 1:00 p. m., organ recital, Karl Bonawitz; 6:05, Dick Regan and his WIP Symphony Orchestra; 8:00, First radio play of the Plays and Players of Philadelphia; 10:10, Ted Weems and Record Making Orchestra from L'Algon Cafe; Charlie Kerr and orchestra from St. James Hotel.

WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m., Bed-time story by E. G. Johnson; 7:45, Concert program arranged by the Cleveland News-Leader; Popular dance numbers, Everett Tryon's Orchestra and solo and specialty numbers by popular entertainers.

WJZ, Chicago, Ill. (Central, 427), 10:00 p. m. to 2:30 a. m., Lucille O'Brien, soprano; James White, tenor; Banjo James, Banjo and tenor mandolinist; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., "Investment," R. D. Wyckoff; 7:45, Etiquette talk,

Doubleday Page Company; 7:55, Edna Fields, soprano; 8:15, "Broadcasting Broadway," Bertha Brainard; 8:30, Edna Fields, soprano; 8:45, Sport talk, Ed Hughes; 9:00, "Faust," Grand Opera Society of New York, Jiepha Bamer Wood, conductor.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Afternoon Auditorium concert; Lecture on the Natural Beauties of Yellowstone National Park, Dr. Charles A. Payne; 4:00, Harper's Bazaar Fashion; 4:15, Julia Cahill, soprano; 4:30, "Impersonations," Louise Lorimer; 5:00, Dance program, Original Memphis Five; 7:00, "The Small Depositor and His Bank," Major B. Foster; 7:15, Supper music, Paul Specht and his Alamo Hotel Orchestra; 8:15, Estay organ recital; 9:00, "Building Habits in Children," Dr. Charles E. Benson; 10:00, "How the Boys Came Back," newspaper story, J. E. Hardenbergh; 10:30, Dance program, Hotel Astor Orchestra.

WLAG, Minneapolis-St. Paul (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15 a. m., Household hints; 11:35-12:00 m., Surprise program; 2:00-2:30 p. m., Woman's Club—"The Street Trades Law," Judge E. F. Walts for the League of Woman Voters; 2:40-4:00, Daylight concert; 4:00-4:30, WLAG Players; 5:30-6:00, Children's stories, Antonette Zwingsl; 6:00-6:15, Smoker—"Habits of Fish," W. C. Vogt; 6:15-7:00, George Osborn's Minneapolis Athletic Club Orchestra; 7:30-8:15, Farm lectures—"Liquid Fuel," A. E. Anderson; "Biscuits and Honey," Mary Dillon Foster; Radio drama by Calumet Players, Mrs. Lucia Miller Armstrong, Jeannette Knispel, George Knispel, Art Whittbecker, Mary Isobel Fisher.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Topics of Interest to Women; 10:00, Murray Horton Dance Orchestra; Barnes Masonic Club Quartet; John H. Lamy, trombonist.

WMAQ, Chicago, Ill. (Central, 447.5), 2:35 p. m., Concert, Lyon & Healy recital hall; 4:30, Pupils, Glenn Dillard Gunn School of Music; 7:00, Talk, American Chemical Society; 7:30, Christian Endeavor program; 8:30, WMAQ Orchestra; 9:15, University of Chicago Glee Club.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Co-operative Club of Memphis; 11:00, Midnight frolic.

WOAW, Omaha, Neb. (Central, 526), 6:30 p. m., Dinner program, Carl Lamp's Orchestra; 9:00, Concert Seventeenth U. S. Infantry Band, Herman Webel, bandmaster, auspices U. S. National Bank.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Diphtheria," A. G. Hinrichs; 5:45, Chimes.

WOO, Philadelphia (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra, Robert E. Golden, director; 4:45 p. m., Organ recital, Mary E. Vogt.

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Rita Barrios, Mexican Natl. Opera Co.; 2:45-3:00, Bula C. Blauvelt, pianist-composer; 3:30-3:45, Rita Barrios; 3:45-4:00, Bula C. Blauvelt; 6:15-6:30, "Mu-

Harry Linden, director; 9:00, Alexander Hamilton Institute Business Talk, James Albert; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program presenting Mary Ellen Hughes, 12 years; Helen Edwina Hughes, 8 years, singers; Dick Winslow, juvenile reporter; Winona E. Johnson, 11 stories, and "Uncle John John"; 8:00-10:00, Program presented by Filmland Trio; Dr. Mars Baumgardt, lecturer; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-9:00 p. m., "My Boy and Yours," W. T. Elzinga; Vallejo artists program; 9:00-10:00, E. Max Bradfield's Palace Hotel Dance Orchestra.

KSD, St. Louis, Mo. (Central, 546), 7:00 p. m., Program, Abergh's Concert Ensemble, Arne Arnesen, violinist; 11:00, Hotel Statler dance music, Rodemich's Orchestra.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-8:58, Musical program, Hearst Music Publishers; 7:00-7:30, Dinner concert, Clyde Doerr's Orchestra, Joska DeBabary's Orchestra; 9:05, Reviews of the latest books, Llewellyn Jones; 10:00-2:00 a. m., Midnight revue.

PWX, Havana, Cuba (Eastern, 400), 8:30 p. m., Concert, Municipal Band, selections from the Opera and popular Cuban airs.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Fort Worth artists; 9:30-10:45, Texas Hotel Orchestra, George Freeman's Sooner Serenaders.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintet; 7:30, Bedtime story for the kiddies; 11:00, Program of Chamber music, WBZ Quintet.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Johnnie Campbell's Kansas City Club Orchestra; 6:00-7:00, Piano tuning-in number on the Duo-Art; Address, Speaker on "Cancer Week"; Address, Speaker from Swift & Co.; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Classical concert, program arranged, Ernest P. Maurin; 11:45-1:00 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra.

WDAP, Chicago, Ill. (Central, 360), 10:00 p. m., Program, Chicago Conservatory of Music, Gertrude Grosscup Perkins, director; Jack Chapman's Orchestra.

WDAR, Philadelphia (Eastern, 395), 11:45 a. m., Daily Almanac; 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; 7:41, Stanley Theater's Symphony Orchestra, Joseph Pasternack, director; 8:00, Fery Sarkozl and Arcadia Cafe Orchestra; 9:34, Stanley Theater Symphony Orchestra; 10:10, Howard Lanin's Dance Orchestra.

WEAF, New York, N. Y. (Eastern, 492), 11:20-11:35 a. m., Columbia University; 11:35-11:50, N. Y. Tuberculosis Assn.; 11:50-12:00, American Agriculturist; 12:00-12:15 p. m., Chapel Services; 4:00-4:30, Robert Evans, tenor; 4:30-4:45, Geo. E. Schoettler, pianist; 4:45-5:30, Elmer Grosso Orchestra; 7:00-7:30, United Synagogue of America; 7:30-7:40, Thornton Fisher Sport Talk; 7:50-8:00, American Agriculturist; 8:00-8:10, National Assn. Dyers & Cleaners; 8:18-8:30, Eli-

(Continued on page 16)

BROADCAST STARS KEEP ETHER

Where to Hear Concerts

IF YOU prefer musical programs, by looking up the program for the following stations on the days given, you can hear music most anywhere in the United States:

Tuesday: KDKA, KFI, KHJ, KPO, KSD, KYW, WBAP, WDAF, WDAF, WDAF, WFAA, WGY, WHN, WJAX, WJAZ, WJZ, WLAG, WLW, WMAQ, WMC, WOAW, WOC, WWJ.

Wednesday: KDKA, KFI, KGW, KHJ, KPO, KSD, KYW, PWX, WBAP, WBZ, WDAF, WDAF, WDAF, WFAA, WHAS, WHN, WJAX, WJZ, WLAG, WLW, WMAQ, WMC, WOAW, WOC, WWJ.

Thursday: KDKA, KFI, KHJ, KPO, KSD, KYW, WBAP, WBZ, WDAF, WDAF, WDAF, WFAA, WHAS, WHN, WJAX, WJAZ, WJZ, WLAG, WLW, WMAQ, WMC, WOAW, WOC, WWJ.

Friday: KDKA, KFI, KHJ, KGW, KYW, WBAP, WBZ, WDAF, WDAF, WDAF, WFAA, WGY, WHAS, WHN, WJAZ, WJZ, WLAG, WMAQ, WOC, WOR.

Saturday: KFI, KHJ, KPO, KYW, WBZ, WDAF, WDAF, WDAF, WFAA, WHAS, WHK, WHN, WJAZ, WJZ, WLAG, WOC, WOR.

Sunday: KPO, KYW, WDAF, WDAF, WDAF, WFAA, WHAS, WHK, WHN, WJAZ, WJZ, WLAG, WOC, WWJ.

Monday: KPO, WDAF, WDAF, WHN, WLAG, WOR.

—THE PROGRAM LADY.

Wednesday, January 30

(Continued from page 15)

zabeth Spencer, sopr., 8:30-10:20, Philharmonic Concert from Carnegie Hall.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., Musical program, Red-Head Girl, song, pianologue and piano solo.

WFI, Philadelphia (Eastern, 395), 1:30 p. m., Meyer Davis Bellevue Stratford Orchestra; 6:30, Bedtime stories, Cousin Sue; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra.

WGI, Medford Hills, Mass. (Eastern, 360), 6:30 p. m., Meeting of the Big Brother Amrad Club; 6:50, Message to Camp Fire Girls, Charles W. Casson, "Big Smoke"; 7:20, "Science Up to Date," Scientific American; 7:30, Evening program, Program, Concert Company, F. Chester Madara; 8:00, "Aviation," Harry D. Copeland; 9:00, Concert Company.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Katherine Stang, violinist; 6:30 and 11:30, Vincent Lopez Hotel Stadler Orchestra; 7:30, Digest of the day's news; 8:45, Address, "One Best Way to Do Work," Frank B. Gilbreth, consulting engineer; 9:00, Concert, mixed program, direction of J. P. Quinn.

WGY, Schenectady, N. Y. (Eastern, 380), 6:30 p. m., "Adventure Story," Youth's Companion.

WHA, Madison, Wisconsin (Central, 360), 7:30 p. m., "Social Life of the University Student," Dean F. Louise Nardin, Dean of Women.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra, Harry S. Currie, conductor; Selections, Walnut Theater Orchestra; 7:30-9:00, Concert, auspices, Mme. Cara Sapin; Reading: An Interesting Historical Episode.

WHN, New York, N. Y. (Eastern, 360), 4:00-4:15 p. m., Victor Wilbur, baritone; 7:15-8:15, Clover Garden's Orchestra; 8:15-8:30, Richard Douglas, tenor; 8:30-8:45, Arthur Howland in talk; 8:45-9:00, Murray O'Neill, baritone; 10:15-11:15, M. Witmark Black & White Series.

WIP, Philadelphia (Eastern, 509), 6:05 p. m., Dinner music, Jimmy Campbell and his Little Club Orchestra; 7:00, Uncle Wip's bedtime stories.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m. to 2:00 a. m., Program, John Loring Cook Studios, Oriole Orchestra; 12:00 midnight, Weekly Bowdoin program for Dr. Donald B. MacMillan, Arctic explorer.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Peggie McGraw, soprano; 4:00, "The Home Beautiful," Dorothy Ethel Walsh; 4:30, Tea concert, Hotel Commodore Orchestra; 7:00, Runaway Kid, a Shadowland Story, Florence Smith Vincent; 7:30, Dance program, Irving Selzer; 8:30, "The Book Department," Hon. John Delaney; 8:45, Hanna Von Volkenborn, pianist; 9:15, "Natural Ways in Which Children Learn," Dr. Margaret E. Noonan; 9:30, Dance program, Maxwell House Coffee Band; 10:00, Results of the Millrose Athletic Association Meet, Major J. Andrew White; 10:15, Dance program, Maxwell House Coffee Band; 10:45, James F. Nash, tenor; 11:15, Results of the Millrose Athletic Association Meet.

WLAG, Minneapolis-St. Paul (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household hints; 11:35-12:00 p. m., Surprise program; 2:00-2:30 p. m., Woman's Club—"Operating a Furnace Economically," E. N. Jane; 2:40-4:00, Daylight concert; 4:00-4:30, Story reading—"The Phantom Rickshaw" (Kipling), Mildred Simons; 5:30-6:00, Children's stories, Mrs. Robert Carroll; 6:00-6:30, "Mah Jones" (2), Selma James; 7:30-8:15, Farm lectures—"Making a Household Servant of Your Alarm Clock," W. S. Ashby; 8:15-9:30, Business message; 9:30-10:45, Studio concert, Laurette Bietz Lunde, soprano; Elsa Henke, accompanist; George Klass, violin; John Jack Beck, accompanist.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Special program for Shut-Outs, Wurlitzer Concert Company; 8:00, Entertainment of the National Lumber Exporters Association; Mary Elizabeth Green, soprano; Everett Marshall, baritone; Heiman Weinstein, violinist; Thome Prewitt Williams, pianist; 8:50, "Some Interesting Facts About Milk," E. M. Meyer; 9:00, Ohio String Quartet, "Death and the Maiden," story told by Estelle Whitney.

WMAQ, Chicago, Ill. (Central, 447.5), 1:00 p. m., Speeches, Chicago Assn. of Commerce; 4:30, Pupils of Cosmopolitan School of Music; First radio lesson in French M. Houser; 7:00, Georgene Faulkner, the Story Lady, stories for children; 7:30, Weekly lecture from Northwestern University; 8:30, WMAQ Orchestra; 9:15, Corydon Smith Banjo Club.

WOC, Davenport, Iowa (Central, 484), 12:30 m., Chimes; 3:30 p. m., "The Human Filtration," R. G. Maybach; 6:30, Sandman's visit; 7:00, "Care of the Troop Sow and Her Litter," Rudolph Koch; 8:30, Musical program, Erwin Swindell, director; Program, First Baptist Church Orchestra of Moline; 10:00, Grace Harper, soprano; Marguerite Hlnke, soprano; Gertrude Wiggin, alto; Bess Meerdink, alto; Josephine Sperlin, whistler; Mrs. Ernest Moore, pianist.

WOO, Philadelphia (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 p. m., Wanamaker Crystal Tea Room Orchestra; 4:45 p. m., Organ recital, Mary E. Vogt; 7:30, Hotel Adelphi Orchestra; 8:45, WOO Orchestra, Robert E. Golden, director; 10:10, Organ recital, Mary E. Vogt.

WOR, Newark, N. J. (Eastern, 405), 2:30-3:00 p. m., Gotham Entertainers of New York; 3:30-4:00, Gotham Entertainers of New York; 6:30-6:50, Ernie Krickett and his orchestra; 6:50-7:00, Mr. Sonn, "Radio for Layman"; 8:00-8:15, Marshall Stillman Movement; 8:15-8:30, Marguerite Waltz Trio; 8:30-9:00, Arthur Murray Dance Lessons; 9:30-9:45, Talk by Lew R. Palmer, Conservation Engineer, Equitable Life Assurance Society, on "Safety"; 10:00-10:15, Marguerite Waltz Trio; 10:15-11:00, Program under the direction of R. Emerson Yorke of New York.

WOS, Jefferson City, Mo. (Central, 440.9), 8:00 p. m.,

Barn dance music by the Old Time String Trio, Louis Barton, first fiddler; George Schrimph, bass fiddler; Bryan Williams, guitarist.

WTAM, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Orchestral numbers by WTAM Orchestra; Vocal solo by Dick Finnegan, the boy soprano; Chrandell Agrmdershot, accompanist; Violin solo, Ben Silverberg; Clara Sharp, accompanist; Vocal solo, Mrs. H. A. Davies, lady baritone; Thelma Verter, accompanist; Cello solo, Alice Flayhaver; Mildred Kelley, accompanist; Soprano solo, Mrs. M. J. Sweeney; Mrs. E. P. Monaghan, accompanist; Cello solo, Max Schmitt; Dramatic reading, Mr. L. W. Zimmerman, accompanied by WTAM Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 12:00 m., Jean Goldkette's Orchestra; 8:30, Detroit News Orchestra; Herbert Blythe, baritone.

Thursday, January 31

KOKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Concert, Daughters' Orchestra; 6:15, Dinner concert, Fort Pitt Hotel Orchestra; 7:30, Weekly Chat with the Farmers, Frank E. Mullen; 7:45, Children's period; 8:30, Concert, KDKA Little Symphony Orchestra; Mrs. Alton Barick Davis, contralto; P. V. Petraitis, baritone; Charles Muldowney, pianist; 11:30, Late evening concert.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Opera story and concert by local Y. M. C. A.; 10:00-11:00, Program of dance numbers.

KFKX, Hastings, Neb. (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Woman's story program, installment of "The Midlander," Booth Tarkington; 8:00, Reading from "Huck Finn," A. Fergus Reddie; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert; 2:30-3:30, Matinee Musical; 4:40, Live stock and vegetable reports; 6:45-7:30, Children's program presented through courtesy of Marshall Steadman Studio; 8:00-10:00, Program presented through courtesy of the Pasadena, Calif., Realty Board; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 6:00-7:00 p. m., Dinner concert, George Lipschultz and Music Masters from the Loews' Warfield Theater; Marie Wallam, soloist; 8:00-9:00, G. Herold Montague Schulteis, organist; 9:00-10:00, Eleanor Clarke Boyie, soprano; Eugene Knotts, accompanist; Ray Johns, bass; Charles Greenwood, accompanist; "Community Chest," Robert N. Lynch; 10:00-11:00, Palace Hotel Dance Orchestra.

KSO, St. Louis, Mo. (Central, 546), 8:00 p. m., Broadcasting concert, St. Louis Symphony Orchestra, Rudolph Ganz, conductor.

KW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-8:20, Musical program, Louis Pupillo, violinist; Gladys Phillips, accompanist; Eiconora Koskiewicz, pianist; 9:15, Program, National Live Stock and Meat Board; Speaker, Gudrun Carlson.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert by the old time fiddlers of Burleson; 9:30-10:45, Concert, Masonic Home Orchestra.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., "Preparation of Federal Income Tax Returns," Thomas McCarty; 7:30, Bedtime story for the kiddies; Farmers' period—Letter from the New England Homestead; 8:15, Organ recital, Arthur H. Turner.

WCAF, Washington, O. C. (Eastern, 469), 7:15-9:45 p. m., Concert, Orchestra; 10:00-12:00, Dance music, Meyer Davis' Le Paradis Band.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., D. J. Haley's Dance and Concert Orchestra; 6:00-7:00, Piano tuning, number on the Duo-Art; Address, Speaker from the William Jewell College; Speaker on "Cancer Week"; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 11:45-1:00 a. m., Nighthawk Frolic, "The Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra; Pipe organ recital, Norma Manning.

WOAF, Chicago, Ill. (Central, 360), 10:00 p. m., Program, Alexander Nykutin; Jack Chapman's Orchestra.

WDAF, Philadelphia (Eastern, 395), 11:45 a. m., Daily Almanac; 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00 p. m., Edna Elstone, pianist; concert, Arcadia Cafe Orchestra; 7:30, Dream Daddy's bedtime stories.

WEAF, New York, N. Y. (Eastern, 492), 11:50-12:00 a. m., American Agriculturist; 4:00-4:30 p. m., Charlotte Nader, violinist; 4:30-5:00, Manhattan Male Quartet; 7:00-7:30, N. Y. Federation Churches; 7:30-7:40, Thornton Fisher; 7:40-8:20, Mr. and Mrs. R. Huntington Woodman; 8:20-8:30, Bank of America; 8:40-8:50, Olive Oil Assn.; 9:00-9:30, Minnie Well, pianist; 9:30-9:45, Columbia Phonograph Co.; 9:45-10:55, Program following dinner by Y. M. H. A.; 11:00-12:00, Vincent Lopez Orchestra.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., "Helping the Boys," O. Sam Cummins; 8:30-9:30, Musical program, entertainers from Waxahachie, Texas.

WFI, Philadelphia (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 6:00, Bedtime stories, Cousin Sue; 6:30, Meyer Davis Bellevue Stratford Concert Orchestra; 8:30, "Centennial of Jefferson Medical College," Dr. Hobart A. Hare; Inter-scholastic Radio Association meeting, Germantown and Swarthmore high schools.

WGI, Medford Hills, Mass. (Eastern, 360), 6:30 p. m., Meeting of the Big Brother Amrad Club; 7:00, Evening program: "Stories for Parents," "A Modern Mary Antin," Alfred Whitman; Musical Comedy "Kicko," American Mutual Athletic Association.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gomph, harpist; Katherine Stang, violinist; 6:30-7:30, Vincent Lopez Hotel Stadler Orchestra; 7:30, Digest of the day's news; Boy Scout Radiogram, Employment bulletin, story from "The



At the left, Rockwell Stephens, auto editor of the Chicago Daily News, who on January 31 will give an automobile talk from WMAQ.

At 8:15 evening broadcast throughout the benefit Helen Bieda reports rece associations

American Boy" magazine; 9:45, Speeches at the annual dinner of the Canadian Lumberman's Association.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., Billboards vs. Scenery, Mrs. Edward P. Pressey; 6:30, Dinner music, Romano's Orchestra; 7:45, "Dulcify," George S. Kaufman; A Few Moments with New Books, L. L. Hopkins; WGY Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater Orchestra; "Just Among Home Folks"; Strand Theater Orchestra; Selections, Alamo Theater organ; 7:30-9:00, Concert, auspices Esther Barth; Mrs. Charles Scavo, soprano; Arthur J. Dreisbock, bass; Four-minute digest of International Sunday School lesson for Sunday, February 3, Rev. Dr. Ira R. Law; Four-minute Radio Forum talk.

WHN, New York, N. Y. (Eastern, 360), 2:15-3:15 p. m., Shapiro Bernstein Music Co.; 3:45-5:15, Oreste and His Pekin Orchestra; 9:15-10:15, Lou Gold's Wigwam Club Orchestra; 10:30-11:00, Melo Club Dance Orchestra; 11:15-12:00, John C. Smith and His Orchestra.

WIP, Philadelphia (Eastern, 509), 6:05 p. m., Dinner music, Dick Regan and his WIP Symphony Orchestra; 7:00, Uncle Wip's bedtime stories; 11:15, Special theatrical program from Cafe L'Aiglon; Ted Weems and his Record Making Orchestra.

WJAX, Cleveland, Ohio (Eastern, 390), 8:00 p. m., Concert program by the Oberlin Conservatory Trio; Popular dance program by the Vernon-Owens Hotel Winton Orchestra.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m. to 2:00 a. m., Nellie Gordon, violinist; Jean Kirby, violinist; Leslie Blasius, pianist; B. E. Noegbhour, pianist; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., Freda Williams, soprano; Croighton Allen, accompanist; 8:15, "Bridge," Wilbur C. Whitehead; 8:30, Paul Specht and his Alamo Hotel Orchestra.

WJZ, New York, N. Y. (Eastern, 455), 5:00 p. m., Ary La Skere, noted Double Voice Entertainer; 7:00, "Jack Rabbit Stories," David Cory; 7:30, New York University Radio Extension; 8:15, Evening Organ Recital, Dr. Alexander Russell; 9:00, Anne Lewis Pierce of the New York Tribune Institute; 9:15, Erna Korn, contralto; Hedy Spelter, pianist; 10:15, Jimmy Moore's popular program; 10:30, Dance program, Hotel Commodore Orchestra.

WLAG, Minneapolis-St. Paul (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household hints; 11:35 a. m. to 12:00 p. m., Surprise program; 2:00-2:30 p. m., Woman's Club—"Electricity and Its Uses in the Home," H. Dahl; Weekly dancing lesson, Tess Cooperman; 4:00-4:30, Story reading, "Abu Lincoln's First Circus" (Babcock), by Mildred Simons; 5:30-6:00, Children's stories, Eleanor Poehler; 6:00-6:15, Weekly talk on dogs, Dr. J. S. Dick, Jr.; 6:15-7:00, George Osborn's Minneapolis Athletic Club Orchestra; 7:30-8:15, Farm lectures, "What Will Congress Do to the Railroads?"—M. L. Countryman.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Adelaide Apfel, pianist; 10:00, Cincinnati Conservatory Trio, H. Borjes, violinist; Arthur Dowen, cellist; Thome P. Williams, pianist; 10:30, Cincinnati Zither Quartet; 11:00, Lella Lemar's Ladies' Dance Orchestra.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Illinois Federation of Women's Clubs; 7:00, Weekly talk to Boy Scouts; Financial talk, Roy Munger; Talk, Rockwell R. Stephens, Auto Editor of the Daily News; First of a series of lessons in golf; B. A. Andrews; 7:30, Axel Christensen; 8:30, WMAQ Orchestra; 9:15, St. Paul Trio.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Chisca Hotel Philharmonic Orchestra.

WOAW, Omaha, Neb. (Central, 526), 6:00 p. m., Every Child's Story Hour, Grace Sorenson, editor; 6:30, Dinner program, Hugo Hoyt's Orchestra; Talk on Modern Tendencies in Dance Music, Hugo Heyn; 9:00, Elks' Night; Elks' Band; Remarks, John H. Killian; Henry Cox, violinist; John McCrary, vocalist; "Our New Building," Judge E. C. Page; Loretta Scheibel, vocalist; Recitation, Charles R. Docherty; "Bachelorhood vs. 1924 Leap Year," T. B. Dysart; "New Members," H. W. Johnson; "Social and Community Welfare Work of Omaha Lodge No. 39," Dr. M. J. Ford; "The 11 O'Clock Toast," A. V. Heckman.

WOO, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Chimes; 3:30 p. m., "Anatomy of the Eye," Karl G. Stephens; 5:45, Chimes; 6:30, Sandman's visit; 8:00, F. S. C. Orchestra, Gerald M. Barrow, director; V. B. Roche, baritone.

WOO, Philadelphia (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 p. m., Wanamaker Crystal Tea Room Orchestra; 4:45 p. m., Organ recital, Mary E. Vogt.

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Paula Nodine, pianist; 3:30-3:45, Paula Nodine; 6:00-6:30, "Music While You Dine"—Vermont Theater, Montclair, N. J., Presents "Walle Feidkant," Allan Moran and Carl Good, two pianos; 6:30-7:30, Tom Cooper and his Country Club Orchestra.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 3:00 p. m., Detroit News Orchestra; H. Lacey, baritone; 10:00, Dance music, Jean Goldkette's Orchestra; 11:00, Detroit News Orchestra.

Friday, February 1

KDKA, E. Pittsburgh, Pa. (Eastern, 326), 12:10 p. m., Concert, Broudy's Orchestra; 6:15, Organ recital, Lucile Hale, organist; 7:15, Radio Boy Scout Meet-

ing; 7:45, Children's period; 8:15, Sunday School Lesson, Dr. R. L. Lanning; 8:30, Concert, St. Andrew's Lutheran Quartet, Ada Corey, Aufmanner, soprano; Eleanor Olive Edstrom, contralto; Robert Reed, tenor; Fred Wallis, baritone; Lucille Gregg Fulton, accompanist; Mrs. Howard A. Noble, violinist; Margaret Gregg, pianist.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Concert by Harry Baisden's Venice (Calif.) Ballroom Orchestra; 10:00-11:00, Vocal and instrumental concert.

KFKX, Hastings, Neb. (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Lecture, Margery Smith; 8:00, Accordion solos, John Sylvester; 8:15, Dance music, George Olsen's Metropolitan Orchestra; 9:00, University of Oregon extension lectures; 10:30, Hoot Owls with Pantagra frolic.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert, auspices, Mrs. M. J. Sweeney; 2:30-3:30, Matinee Musical presented by courtesy of Barker Brothers; 6:30-7:00, Children's program presented by Barker Brothers; silver-sheet juvenile; 7:00-7:30, Organ recital from First Methodist St. Episcopal Church, Arthur Blakeley, organist; 8:00-10:00, program arranged by Vera Leavitt Owen, soprano; George Campbell, cellist; Beverly Bayne and Francis Bushman, actors; 10:00-12:00, Art Hickman's Orchestra.

KW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 8:00-2:00 p. m., Midnight Revue; Clyde Doerr's Orchestra; "Topsy and Eva," the Duncan sisters, Nana Bryant, prima donna; DeBabary's Orchestra; W. Remington Welch, organist.

WBAP, Fort Worth, Texas (Central, 476), 7:30-8:30 p. m., Concert, Texas Christian University, Prof. H. D. Guellick; 9:30-10:45, Concert, Butcher School of Hawaiian Music.

WBZ, Springfield, Mass. (Eastern, 337), 6:00 p. m., Dinner concert, WBZ Quintet; 7:00, "When the Haystack Turned Bottom Up," a dramatized story; 7:30, Bedtime story for the kiddies; Current Book Review, R. A. MacDonald of the Court Square Book Store; Bedtime story for grown-ups, Orison S. Marden; 11:00, Chamber music, WBZ Quintet; Helen Mosher, soprano.

WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., Leo B. Davis "Radio" Orchestra; 6:00-7:00, Piano tuning-in number on the Duo-Art; Address, Speaker from the Kansas City Children's bureau; Address, Speaker on "Cancer Week"; Children's story and information period; Fritz Hanlein's Trianon Ensemble; 8:00-9:15, Novelty Night—"The Merry Old Chief" and the Coon-Sanders Novelty-Singing Orchestra.

WOAF, Chicago, Ill. (Central, 360), 10:00 p. m., William Benson, tenor; Evelyn Nelson, accompanist; Cambridge Sisters; George R. Hill, Jr., baritone.

WOAR, Philadelphia (Eastern, 395), 11:45 a. m., Daily Almanac; 12:00 m., Organ recital, Stanley Theater; dinner music, Arcadia Cafe Concert Orchestra; 2:00, Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; 10:10, Special Morning Glory Club Program; dance music, Howard Lanin's Arcadia Cafe Orchestra; songs, Harry Glyn.

WEAF, New York, N. Y. (Eastern, 492), 11:15-11:30 a. m., Country Life; 11:30-11:45, Musical America; 11:50-12:00, American Agriculturist; 4:00-4:30 p. m., Carl T. Saul, pianist; 4:30-5:00, Mary Van Doren, sopr.; 5:00-5:30, Fairy Stories by Susanna Myers; 7:30-7:40, Thornton Fisher; 7:50-8:00, Battery Talk; 8:00-8:30, Billy Jones and Ernest Har; 8:30-9:00, World Mutual Co.; 9:00-10:00, Astor Coffee Orchestra; 10:00-10:30, Mrs. Edith Mills, contralto.

WFAA, Dallas, Texas (Central, 476), 12:30-1:00 p. m., "What Israel Learned at Sinai," Dr. Robert S. Hyer; 8:30-9:30, Annual dance of employees of A. Harris & Co., Jack Gardner's Orchestra.

WFI, Philadelphia, Pa. (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 6:00, Bedtime stories, Cousin Sue; 6:30, Meyer Davis Bellevue Stratford Orchestra.

WGI, Medford Hills, Mass. (Eastern, 360), 3:00 p. m., Amrad Women's Club Program; "New England Toast Campaign," Dorothy H. Goodwin; Afternoon Musicals, Brunswick Console playing Brunswick Records; 3:30, Dorothy Dean; Council of Girl Scouts; 6:30, Meeting of the Big Brother Amrad Club; 7:30, Evening program: Selected verse, Charles L. H. Wagner, Radio Poet; Red Cross Talk, Henry Copley Green; 7:45, Concert, George F. S. Pearce, violinist;

MERRY WITH VARIED PROGRAMS

The right and left are with "Topsy and Eva," at the Selwyn Theater, Mrs. Maxwell Hall Elliott will broadcast WYW, February 7 from 7 to 8. She gave an introductory program on the same station.

The gentleman to the right is Jerry Sullivan, popular song writer and entertainer. He may be heard every Saturday night from WDAP. You shouldn't miss him.



at WDAP conditions West for ets. Miss pares the from state ts them.

8:15, Concert, Christian Endeavor Society, Mr. Blair, director.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gompf, harpist; Katherine Stanz, violinist; 7:30, Vincent Lopez Hotel Stadler Orchestra; 7:30, Digest of the day's news; 9:00, Concert, mixed program, W. T. Grant Company, direction of Howard Hartell.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "What Fashion Decrees in Sport Wear," Paul A. Brown; 6:30, Children's program; 7:45, Nevin program; Address: "The Mellon Tax Plan," Judge McKenzie Moss; WGY Orchestra; Ernest Burleigh, cellist; Edward Rice, violinist; Leo Kliwew, violinist; Ernest Burleigh, cellist; Ollie G. Yattru, pianist; 10:30, "The Bo's'n's Bride," WGY Light Opera Co.

WHA, Madison, Wis. (Central, 360), 7:30 p. m., Readings from Literature, Rachel M. Kelsey, Instructor in English, Extension Division.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; "Just Among Home Folks"; Walnut Theater Orchestra; 7:30-9:00, One hour concert, Louisville Synchronists, Donald Colebourn, director; Paul Phelps, pianist; Robert Myers, trumpeter; Murray Moore, banjoist; James Wilder, drummer; Selections: Barney Rapp and his orchestra; Reading: An Interesting Historical Episode.

WHK, Cleveland, Ohio (Eastern, 283), 9:00 p. m., Concert program arranged by the Cleveland Radio Dealers' Association. Dance music by Thompson's Novelty Dance Orchestra; Stephen Thompson, pianist and director; Vocal solos by favorite artists.

WHN, New York, N. Y. (Eastern, 360), 4:30-5:00 p. m., Versatile Trio; 5:15-5:30, Jack Fox's Melody Belles; 9:30-10:15, Paramount Dance Orchestra, John E. Teichner, director; 10:15-10:30, Vivian Marlowe, soprano; 10:30-11:15, Whitehouse Review; 11:15-12:00, Lou Hattorf and His Windless Dance Orchestra.

WIP, Philadelphia, Pa. (Eastern, 509), 6:05 p. m., Jordan-Lewis Dance Orchestra, direction Bob Lewis; 7:00, Uncle Wip's bedtime stories.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m., 2:00 a. m., Program, Ted Brown Music Company; Oriole Orchestra.

WJY, New York, N. Y. (Eastern, 405), 7:30 p. m., "Income Taxes," Frank Shevitz; 8:00, "The Work of the New York Assembly," E. M. Julius Borg; 8:15, Rebecca Beam, contralto; 9:00, Law Enforcement Dinner, auspices of the Citizen's Committee of One Thousand, Speeches, Warren Stone, Dr. Harry Emerson Fosdick, Senator Carter Glass; 10:30, Popular program, Breen and Tobias.

WJZ, New York, N. Y. (Eastern, 455), 12:15 p. m., Noon hour of music, Brick Presbyterian Church; 3:00, Leo Riggs, organist; 4:00, May Schlegler, soprano; 5:00, "The Larger Aspect of World Affairs," International Interpreter; 7:00, Burr McIntosh, the Cheerful Philosopher; 7:40, Fred Janicka, violinist; 8:30, Vivian Burnett, tenor; Mrs. Burnett, soprano; 9:00, "The Place of Toys in Education," Dr. Margaret E. Noonan; 9:15, Band of Hoboken Lodge No. 74, B. E. O. E., James Knox, director; 10:30, Dance program, Paul Specht and his Alamo Hotel Orchestra.

WLAG, Minneapolis-St. Paul (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household Hints; 11:35 a. m.-12 m., Surprise Program; 2:30 p. m., Woman's Club, Talk to be arranged by Community Fund; 2:40-4, Daylight concert; 4:45, Story reading, "The Wrong Man," (Fannie Heaslip Lead), Mildred Simons; 5:30-6:00, Children's stories, Ellen Nye; 6:00-6:30, "Reminiscences of Sport," Billy B. Hoke; 7:30-8:15, Farm Lectures—"Rebuilding Our Jerusalem," James A. King; Short talk, E. C. Simmons; 9:15-9:30, Business Message; 9:30-10:45, "Casey Revue" and Schlecta Saxophone Band.

WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m., Half hour lecture recital.

WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m., Chevrolet Motor Club Glee; 7:00, Weekly Wide Awake Club, program, Mrs. F. M. Ford; 7:30, Music Memory Contest, Mrs. M. E. Oberdorfer; 8:30, WMAQ Orchestra; 9:15, Program, Cosmopolitan School of Music.

WMC, Memphis, Tenn. (Central, 500), 8:00 p. m., A lecture-recital on "Russian Music before and after the Revolution," Sir Paul Dukas of London, Eng.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Water Purification," C. A.

Russell; 5:45, Chimes; 6:30, Sandman's visit; 7:30, Sunday School lesson, Dr. Frank Willard; 8:00, Program, Jackson School Orchestra, Mrs. A. C. Springborn, director.

WOO, Philadelphia, Pa. (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra; 4:45 p. m., Organ recital, Mary E. Vogt; 7:30, Hotel Adelphia Concert Orchestra; 8:30, Fox Theater orchestra, Erno Rapee, director; 9:30, Organ recital, Mary E. Vogt; 10:10, Dance music, Hotel Adelphia.

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Mrs. Harry Jacoby, contralto; 2:45-3:00, Clara Anwell, harpist of Bklyn.; 3:30-3:45, Mrs. Harry Jacoby; 3:45-4:00, Clara Anwell; 6:15-6:30, Arthur Flaier, 1-string violin; 6:30-6:45, Man in the Moon Stories; 7:00-7:30, International Four (Male Quartet).

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 12:00 m., Dance music, Jean Goldkette's Orchestra; 3:00 p. m., Detroit News Orchestra; 8:30, Detroit News Orchestra, Anne Campbell, Detroit News Post; C. Bruce Myers, baritone.

Saturday, February 2

KOKA, E. Pittsburgh, Pa. (Eastern, 326), 1:30 p. m., Daugherty's Orchestra; 6:15, Dinner concert, Westinghouse Band; 7:45, Dreamtime Lady in Storyland; 8:15, "The Consumer's Dollar," Paul D. Converse; 8:30, Concert, Westinghouse Band, T. J. Vastine, conductor; Charles LeSueur, tenor.

KFI, Los Angeles, Calif. (Pacific, 469), 6:45-7:30 p. m., Bedtime story and concert; 8:00-9:00, Special vocal and instrumental concert program; 10:00-11:00, Dance music.

KFKX, Hastings, Neb. (Central, 283), Rebroadcasts program of KDKA.

KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., Children's program, story by Aunt Nell; 10:00, Dance music, George Olsen's Metropolitan Orchestra.

KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., Concert, 2:30-3:30, Matinee Musicale; 6:45-7:30, Children's program; 8:00-10:00, Program presenting Tilda Rohr, contralto; Gertrude Ehrlich, pianist-composer; Isobel Nave, pianist; Mrs. Harold E. Lanfair, violinist; Fred M. Mitchell, "Uncle Josh" and N. E. Brown, Electrical Engineer, who will speak; 10:00-12:00, Art Hickman's Orchestra.

KPO, San Francisco, Calif. (Pacific, 423), 8:00-12:00 midnight, KPO Trio will sing popular songs.

KSD, St. Louis, Mo. (Central, 546), 7:00 p. m., Orchestra concert, organ recital, vocal and instrumental specialties, Missouri Theater.

KYW, Chicago, Ill. (Central, 536), 11:35 a. m., Table talk, Mrs. Anna J. Peterson; 6:50 p. m., Children's bedtime story; 7:00-7:30, Dinner concert, Clyde Doerr's Orchestra; Joska DeBarbary's Orchestra; 8:00-8:58, Musical program, Janet Abernethy, soprano; Barton Bachmann, pianist; Indiana Male Quartette; 10:00-2:00 a. m., Midnight revue.

WAP, Fort Worth, Texas (Central, 476), 7:00-7:30 p. m., Review of the Interdenominational Sunday School lesson and Radio Bible Class, Mrs. W. F. Barnum.

WBZ, Springfield, Mass. (Eastern, 337), 7:00 p. m., Dinner concert, Hotel Kimball Trio; 7:30, Bedtime story for the Kiddies; "Bringing the World to America," Our World Magazine; 8:00, Hazel R. Kimball, soprano; George C. Vieb, pianist; 9:00, Bedtime story for grown-ups, Orison S. Marden.

WOAF, Kansas City, Mo. (Central, 411), 5:30-4:20 p. m., Riley-Ehrhar Orchestra; 6:00-7:00, Piano tuning-in Quartet on the Duo-Art; 7:00-7:30, Program of Music and Speeches; 11:15-12:00, Vincent Lopez Orchestra, courtesy Gimbel Bros.

WFAA, Dallas, Tex. (Central, 476), 12:30-1:00 p. m., Address, Dr. E. D. Shurter; 8:30-9:30, Baylor University Founder's Day program, commemorating the seventy-ninth anniversary; 11:00-12:00, Musical recital, E. W. Pfaffenberger, singer.

WFI, Philadelphia (Eastern, 395), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 6:00, Bedtime stories, Cousin Sue; 6:30, Meyer Davis Bellevue Stratford Orchestra; 8:00, Talk, Dr. Ellis; Recital, Conley Concert Company; Address, J. Henry Scattergood.

WGI, Medford Hillside, Mass. (Eastern, 360), 6:30 p. m., Meeting of the Big Brother Amrad Club; 7:30, Evening program: New England Business Problems, Arthur R. Curnick; Arthur Murray's course in Ball Room Dancing, lesson No. 9; Musicale.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m.,

Where to Hear Talks

TALKS, instructive, serious, humorous and even frivolous are broadcast daily and below are listed the stations to dial. Please note the Golf and French lessons beginning this week at WMAQ and the "Mah Jongg" lessons from WLAG.

Tuesday: KDKA, KGW, KYW, WLAG, WFAA, WHN, WJZ, WLAG, WOC.

Wednesday: KDKA, KFAE, KYW, WFAA, WHN, WJZ, WLAG, WMAQ, WOR.

Thursday: KDKA, KYW, WFAA, WHN, WJZ, WLAG, WOAW, WOC.

Friday: KDKA, KGW, WFAA, WGY, WHN, WJZ, WLAG, WOC.

Saturday: WFAA, WFAA, WJZ, WLAG, WOC.

Monday: WLAG, WOC, WOR.

—THE PROGRAM LADY.

George Albert Bouchard, organist; 6:30, Vincent Lopez Hotel Stadler Orchestra; 7:30, Digest of the day's news.

WGY, Schenectady, N. Y. (Eastern, 380), 9:30 p. m., Dance music, Jack Symonds' Orchestra.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Walnut Theater; "Just Among Home Folks"; Strand Theater Orchestra; Selections, Alamo Theater organ; 7:30-9:00, Hazel McClellan, soprano; Lorraine Bartlett, accompanist; Guitar and mandolin duets, Billy Hinkle and Jean Kohlhepp; Alvin L. Marcus, saxophonist; Hazel Sebott, accompanist; Reading: Mary Frances Golden.

WHN, New York, N. Y. (Eastern, 360), 5:00-5:30 p. m., Bill May's Orchestra, W. F. May, leader; 9:45-10:00, Richard Douglas, tenor.

WIP, Philadelphia (Eastern, 509), 1:00 p. m., Organ recital, Karl Bonawitz; 3:00, Popular program, courtesy of Paul Whitman, Philadelphia; 6:05, Greenwich Village Polite Serenaders; 7:00, Uncle Wip's bedtime stories; 8:00, Felscher's Symphony Club recital; 10:15, Ted Weems and his Record Making Orchestra; Charlie Kerr and Orchestra from St. James Hotel.

WJAZ, Chicago, Ill. (Central, 447.7), 10:00 p. m., 2:00 a. m., J. Morrison Laskey, pianist; Helen Monlavy, violinist; Henry Johnson, tenor; Oriole Orchestra.

WJZ, New York, N. Y. (Eastern, 455), 3:00 p. m., Dance program, Jasper's Orchestra; 3:30, Mildred Kazel, soprano; Eleanor Shaw, accompanist; 4:00, Tea concert, Hotel Belmont Stringed Ensemble, Harry Lerner, leader; 5:00, Mrs. Ruth B. Addis, soprano; Mrs. Marion Gellan, soprano; 7:00, "Uncle Wiggly Stories," Howard Grlis; 8:00, Anna Sheffeld, soprano; 8:15, Helen Fogel, pianist; 8:40, "Tapping the Ether," Dr. Alfred N. Goldsmith; 10:30, Harold Stern and his Hotel Majestic Orchestra.

WLAG, Minneapolis-St. Paul (Central, 417), 9:30-9:45 a. m., Announcements; 10:45-11:15, Household Hints; 11:35-12 m., Weekly meeting of the "Postcard Club"; 2:00-2:30 p. m., Woman's Club; 2:40-4:00, Rosa Burnett, soprano; Mordkin Boy's Orchestra; 4:00-4:30, Story reading, "The Pickup Job" (Frances Gilchrist Wood); Mildred Simons; 5:00-5:30, Weekly Radio lecture, Ray R. Sweet, chief engineer, WLAG; 5:30-6:00, Children's hour, Weekly meeting Children's Radio Health and Toothbrush Club of America, Dr. E. W. Popper, presiding; 8:00-6:30, Sport talks; 7:30-8:15, Business lectures; 9:15-10:15, Studio program; 10:15-12:30, Dance program, George Osborn's Minneapolis Athletic Club Orchestra, assisted by Mae Saltmarsh, trombone, and I. S. Mack, tenor.

WMAQ, Chicago, Ill. (Central, 447.5), 8:00 p. m., Lyon & Healy Program; 9:00, Balaban and Katz Chicago Theater revue.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Program, Park Avenue Masonic Lodge, B. T. Dawkins, director.

WOC, Davenport, Iowa (Central, 484), 12:00 m., Chimes; 3:30 p. m., "Science and the Transfusion of Blood," C. C. Hall; 5:45, Chimes; 6:30, Sandman's visit; 9:00, Orchestra program, P. S. C. Orchestra, V. B. Roche, baritone.

WOO, Philadelphia (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Wanamaker Crystal Tea Room Orchestra; 4:45 p. m., Organ recital, Mary E. Vogt.

WR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Talk on "Bermuda," Mr. Wales; 6:30-7:00, "Music While You Dine," Zumbler Trio of New York; 7:15-7:30, Fred J. Bendel, Sporting Editor; 8:00-9:00, Gene Ingraham and His Hotel Benick Orchestra; 9:00-9:15, Joint recital by Anna Hamlin, soprano and Imogene Peary, pianist; 9:40-9:50, Two-piano recital by Frances and Elizabeth Adelman, young American artists, courtesy management Henry Rose; 9:50-10:00, Belle Bart, astrologist; 10:00-10:10, Two-piano recital by Frances and Elizabeth Adelman; 10:10-10:30, Joint recital by Anna Hamlin and Imogene Peary; 10:30-10:40, Belle Bart; 10:40-11:00, Recital by Frances and Elizabeth Adelman.

WTAM, Cleveland, Ohio (Eastern, 390), 9:00 p. m., Regular Saturday Evening Dance Program by the WTAM Orchestra; solo and special features by favorite artists.

WWJ, Detroit, Mich. (Eastern, 517), 9:30 a. m., "Tonight's Dinner," Woman's Editor; 3:00 p. m., Detroit News Orchestra.

Monday, February 4

KPO, San Francisco, Calif. (Pacific, 423), 5:30-6:00 p. m., Children's half-hour; Stories for children, taken from the Book of Knowledge; 8:00-9:00, G. Herold Montague Schultze, organist; 9:00-9:30, Harriet Murton, soprano; Alexander Gray, Russian baritone from Grande Russian Opera Company; Accordion Club, Dr. Hueck, director; "Community Chest," Milton H. Esberg; 10:00-11:00, E. Max Bradfield's versatile band.

WOAR, Philadelphia (Eastern, 395), 11:45 a. m., Daily Almanac; 12:00 m., Organ recital, Stanley Theater; Dinner music, Arcadia Cafe Concert Orchestra; 2:00 p. m., Arcadia Cafe Concert Orchestra; 7:30, Dream Daddy's bedtime stories; 10:10, Howard Lamin's Arcadia Cafe Dance Orchestra.

WEAF, New York, N. Y. (Eastern, 492), 7:30-7:40 p. m., Thornton Fisher; 7:50-8:00, Peoples Trust Co.; 8:00-8:20, Hoxie N. Fairchild; 8:20-9:10, National Carbon Trio; 9:10-9:20, Carolyn Finney Springer, contralto; 9:20-11:00, Special Musical Program.

WFI, Philadelphia (Eastern, 509), 1:00 p. m., Meyer Davis Bellevue Stratford Orchestra; 3:00, Loretta Kerk, pianist; 6:00, Bedtime stories, Cousin Sue; 6:30, Meyer Davis Bellevue Stratford Orchestra.

WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m., George Albert Bouchard, organist; 4:00, Tea time music, Martha Gompf, harpist; Katherine Stanz, violinist; 7:30, Vincent Lopez Hotel Stadler Orchestra; 7:30, Digest of the day's news; 9:00, Concert, mixed program, direction of G. Renner; 10:00, Concert, Kewanee quartette, vocal.

WGY, Schenectady, N. Y. (Eastern, 380), 2:00 p. m., "Seasonable Food for Health," Edith Sarver; 7:45, Male quartet, H. Desmond, 1st tenor; S. Shepard, 2nd tenor; A. E. Van Patten, baritone; W. A. Anderson, bass; Frank Bentz, violinist; Musical reading, "The Gypsy Trail," Helen Gross, Bessie Kimber, accompanist; George Lauterborn, pianist.

WHAS, Louisville, Ky. (Central, 400), 4:00-5:00 p. m., Strand Theater Orchestra; Walnut Theater Orchestra.

WHAZ, Troy, N. Y. (Eastern, 380), 9:00 p. m., Minstrel Show, auspices Troy Council, United Commercial Travelers of America; Program, popular dance music, Art Thompson and his orchestra.

WHN, New York, N. Y. (Eastern, 360), 7:30-8:00 p. m., Sau Lannin's Roseland Orchestra; 8:45-9:45 Broadway Melodies; 10:00-10:45, "Harmonious Orchestra."

WIP, Philadelphia (Eastern, 509), 6:05 p. m., Dinner music, Ches West's Orchestra; 7:00, Uncle Wip's bedtime stories.

WLAG, Minneapolis-St. Paul (Central, 417), 5:30-6:00 p. m., Children's stories, Tess Coperman; 6:00-6:15, P. M. News, organist; Vincent Lopez Hotel Stadler Orchestra; 7:30, Digest of the day's news; 9:00, Concert, mixed program, direction of G. Renner; 10:00, Concert, Kewanee quartette, vocal.

WLW, Cincinnati, Ohio (Central, 309), 8:00 p. m., Program, Walnut Hills Congregational Church Choir, Clara Y. Woodside, director; Louis Ehrrott, violinist; 9:00, Crosley Theatrical Review; Roger Hill and his orchestra.

WMC, Memphis, Tenn. (Central, 500), 8:30 p. m., Concert, Hotel Gayoso Concert Orchestra, Prof. Gaspar Pappalardo.

WOC, Davenport, Ia. (Central, 484), 12:00 m., Chimes; 3:30 p. m., Educational lecture; 5:45, Chimes; 6:30, Children's hour; 7:00, Educational lecture; 8:00, Musical program, Erwin Swindell, director.

WOO, Philadelphia (Eastern, 509), 11:00 a. m., Organ recital, Mary E. Vogt; 12:00 m., Crystal Tea Room Orchestra; 4:45 p. m., Organ recital, Mary E. Vogt; 7:30, Hotel Adelphia Concert Orchestra; 9:15, Erno Rapee and Orchestra from Fox Theater; 10:10, Organ recital, Mary E. Vogt.

WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m., Mrs. T. Walter Foree, soprano; 4:45, Mrs. T. Walter Foree; 8:00-8:15, Mr. McCosker, "Current Motion Pictures"; 8:15-8:30, May Wright Davis, contralto; 8:30-8:45, Mr. Steinke; 8:45-9:00, May Wright Davis; 9:00-9:15, Puden & Puden, Expert Accountants; 9:15-9:45, Mme. Davies.

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speaker; 4:00-5:00,
 ocal concert, Walther
 Paul R. Kopp,
 n. 380), 11:00 a. m.,
 Church, Rev. Charles
 ert D. Angell, D.D.
 0), 9:57 a. m., Organ
 burth Avenue Presby-
 e W. Welch, pastor;
 a. Newton G. Craw-
 shafer Herrick, con-
 sponor; Peter Schlicht,
 ert, auspices of Han-
 eam, Clifford Wilson,
 nura Hess, soprano;
 nce Gilliland, tenor;
 he Elchler, accompa-
 Devotion and Prayer,
 ish Kreigh.
 283), 8:00 p. m.,
 ssical music by the
 ten Silverberg, violin;
 Solo numbers by
 160), 3:00-4:30 p. m.,
 00-5:30, W. H. N.
 11:00 a. m., Church
 v. Floyd W. Tomp-
 town Y. M. C. A.
 ri Bonawitz; Frank
 s orchestra.
 7), 6:00-9:30 p. m.,
 Oriole Orchestra.
 entral, 417), 10:30
 estminster Presbyte-
 per Service, House of
 15, Evening service
 ist; 9:30-10:45, Or-
 309), 9:30 a. m.,
 of Sunday School
 ook Concern; 11:00,
 Dr. Frank Steven-
 9:00 a. m., Chimes;
 rgan; 8:00, Church
 Erwin Swindell,
 11:00 a. m., Serv-
 5:00 p. m., De-
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3:00-6:00
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 baritone
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 3:00-7:40
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 p. m.,
 7:45,
 Shepard,
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 ar dance

ful Philosopher; 7:40, Fred Euzicka, violinist; 8:30,
 Vivian Burnett, tenor; Mrs. Burnett, soprano; 9:00,
 "The Place of Toys in Education," Dr. Margaret E.
 Noonan; 9:15, Band of Hoboken Lodge No. 74, B. P.
 O. E., James Knox, director; 10:30, Dance program,
 Paul Specht and his Alamao Hotel Orchestra.
 WLAG, Minneapolis-St. Paul (Central, 417), 9:30-9:45
 a. m., Announcements; 10:45-11:15, Household Hints,
 11:35 a. m.-12 m., Surprise Program; 2:30 p. m.,
 Woman's Club, Talk to be arranged by Community
 Fund; 2:40-4, Daylight concert; 4-4:30, Story read-
 ing, "The Wrong Man" (Fannie Heaslip Lea), Mil-
 dred Simons; 5:30-6:00, Children's stories, Ellen Nye;
 6:00-6:30, "Reminiscences of Sport," Billy B. Hoke;
 7:30-8:15, Farm Lectures—"Rebuilding Our Jerusalem,"
 James A. King; Short talk, E. C. Simmons; 9:15-9:30,
 Business Message; 9:30-10:45, "Casey Revue" and
 Schlecta Saxophone Band.
 WLW, Cincinnati, Ohio (Central, 309), 4:00 p. m.,
 Half hour lecture recital.
 WMAQ, Chicago, Ill. (Central, 447.5), 4:30 p. m.,
 Chevrolet Motor Club Game; 7:00, Weekly "Wide
 Awake Club," program, Mrs. F. M. Ford; 7:30, Music
 Memory Contest, Mrs. Marx E. Oberndorfer; 8:30,
 WMAQ Orchestra; 9:15, Program, Cosmopolitan
 School of Music.
 WMC, Memphis, Tenn. (Central, 500), 8:00 p. m.,
 A lecture-recital on "Russian Music before and after
 the Revolution," Sir Paul Dukas of London, Eng.
 WOC, Davenport, Iowa (Central, 484), 12:00 m.,
 Chimes; 3:30 p. m., "Water Purification," C. A.

ington.
 WDAF, Chicago, Ill. (Central, 360), 10:00 p. m., Har-
 mony Girls, Bob Brown and his Ukelele, Betty Holmes,
 Jerry Sullivan, Fred Rose, Jack Chapman's Orchestra.
 WDAR, Philadelphia (Eastern, 395), 12:00 m., Organ
 recital, Stanley Theater, dinner music, Arcadia Cafe
 Concert Orchestra; piano solos, Edna Finestone; 2:00-
 3:00 p. m., Concert, Arcadia Cafe Concert Orchestra;
 7:30, Dream Daddy's bedtime stories.
 WEA, New York, N. Y. (Eastern, 492), 1:45-3:30
 p. m., After luncheon speeches Foreign Policy Assn.;
 4:00-5:00, Carolinians Orchestra; 5:00-5:30, Gladys
 Spicer Mosher, lyric sopr.; 7:30-8:30, American Chicle
 Quartet and Trio; 8:30-11:00, Program of Music and
 Speeches; 11:15-12:00, Vincent Lopez Orchestra, cour-
 tesy Gimbel Bros.
 WFAA, Dallas, Tex. (Central, 476), 12:30-1:00 p. m.,
 Address, Dr. E. D. Shurter; 8:30-9:30, Baylor Uni-
 versity Founder's Day program, commemorating the
 seventy-ninth anniversary; 11:00-12:00, Musical recital,
 E. W. Pfaffenberger, singer.
 WFI, Philadelphia (Eastern, 395), 1:00 p. m., Meyer
 Davis Bellevue Stratford Orchestra; 6:00, Bedtime
 stories, Cousin Sue; 6:30, Meyer Davis Bellevue Strat-
 ford Orchestra; 8:00, Talk, Dr. Ellis; Recital, Conley
 Concert Company; Address, J. Henry Scattergood.
 WGI, Medford Hillside, Mass. (Eastern, 360), 6:30
 p. m., Meeting of the Big Brother Amrad Club; 7:30,
 Evening program: New England Business Problems,
 Arthur R. Curnick; Arthur Murray's course in
 Ball Room Dancing, lesson No. 9; Musicals.
 WGR, Buffalo, N. Y. (Eastern, 319), 12:30-1:00 p. m.,

tral Church Service, Dr. F. P. Shannon, pastor; 6:30
 p. m., Excerpts from the New Testament, an American
 Translation, by Prof. E. J. Goodspeed, William Ziegler
 Nourse; 7:00, Chicago, Sunday Evening Club, Dr.
 Arthur T. Holmes.
 WDAP, Chicago, Ill. (Central, 360), 9:15 p. m., Drake
 Concert Ensemble and soloists.
 WDAR, Philadelphia (Eastern, 492), 2:45-3:45 p. m.,
 Concert, Arcadia Cafe Concert Orchestra, Feri Sarkozl,
 director.
 WEA, New York, N. Y. (Eastern, 492), 2:45-3:45
 p. m., New York Federation of Churches program;
 3:45-5:00, Dr. S. Parkes Cadman; 7:30-9:00, Capitol
 Theater Symphony Orchestra and Staffs; 9:00-10:00,
 Skinner Organ Recital.
 WFAA, Dallas, Tex. (Central, 476), 6:00-7:00 p. m.,
 Radio Bible class, Dr. William M. Anderson, Jr.;
 9:30-10:00, "Prophecy and Christianity," Rev. Glenn L.
 Sneed; 10:00-11:00, Musical recital, Jack A. Davis,
 pianist.
 WFI, Philadelphia (Eastern, 395), 4:30 p. m., Services,
 Arthur C. James and quartette, St. Andrew's M. E.
 Church; 7:30, Church services, Arch street Presbyterian
 Church.
 WGI, Medford Hillside, Mass. (Eastern, 360), 4:00 p. m.,
 Twilight program: "Adventure Hour," Youth's Com-
 panion; Musicals, E. F. Orne and Friends; 8:30,
 Evening program: Talk on "World Unity," auspices
 of the Greater Boston Federation of Churches; Eve-
 ning's Musicals.
 WGR, Buffalo, N. Y. (Eastern, 319), 3:00 p. m.,
 Vesper service, the Rev. L. E. H. Smith, Ontario Street

music, Ches West's Orchestra; 7:00, Uncle Wip's
 bedtime stories.
 WLAG, Minneapolis-St. Paul (Central, 417), 5:30-6:00
 p. m., Children's stories, Tess Cooperman; 6:00-6:15,
 "The Week's Events, also Sport Review, George Ed-
 monds; 6:15-7:00, George Osborn's Minneapolis Athletic
 Club Orchestra; 7:30-8:15, Farm Lectures.
 WLW, Cincinnati, Ohio (Central, 309), 8:00 p. m.,
 Program, Walnut Hills Congregational Church Choir,
 Clara Y. Woodside, director; Louis Ehrigott, violinist;
 9:00, Crosley Theatrical Review; Roger Hill and his
 orchestra.
 WMC, Memphis, Tenn. (Central, 500), 8:30 p. m. Con-
 cert, Hotel Gayoso Concert Orchestra, Prof. Gasper
 Pappalardo.
 WOC, Davenport, Ia. (Central, 484), 12:00 m., Chimes;
 3:30 p. m., Educational lecture; 5:45, Chimes; 6:30,
 Children's hour; 7:00, Educational lecture; 8:00, Mu-
 sical program, Erwin Swindell, director.
 WOO, Philadelphia (Eastern, 509), 11:00 a. m., Organ
 recital, Mary E. Vogt; 12:00 m., Crystal Tea Room
 Orchestra; 4:45 p. m., Organ recital, Mary E. Vogt;
 7:30, Hotel Adelphia Concert Orchestra; 9:15, Erno
 Rapee and Orchestra from Fox Theater; 10:10, Organ
 Recital, Mary E. Vogt.
 WOR, Newark, N. J. (Eastern, 405), 2:30-2:45 p. m.,
 Mrs. T. Walter Foree, soprano; 3:30-3:45, Mrs. T.
 Walter Foree; 8:00-8:15, Mr. McCosker, "Current
 Motion Pictures"; 8:15-8:30, May Wright Davis,
 contralto; 8:30-8:45, Mr. Stenke; 8:45-9:00, May
 Wright Davis; 9:00-9:15, Puden & Puden, Expert
 Accountants; 9:15-9:45, Mme. Davies.

Radiophone Broadcasting Stations

Corrected Every Week—Part IV

State, City, Call	State, City, Call	State, City, Call	State, City, Call	State, City, Call	State, City, Call									
Alabama: Auburn, WMAV Birmingham, WSY Mobile, WEAP Montgomery, WKAN	Carthage, WCAZ Chicago, KYW, WAAF, WDAF, WJAZ, WMAQ, WSAH, WSAX Decatur, WBAO, WHAP Eglin, WTAS Galesburg, WRAM Joliet, WVAE Lake Forest, WABA Mattoon, WQAL, WTAN Oak Park, WTAY Peoria, WJAN, WQAX Rockford, KFLY, WIAB Streator, WTAX Tuscola, WJZ Urbana, WRM Zion, WCB D	Massachusetts: Boston, WNAC, WTAT Dartmouth, WMAF Fall River, WSAK, WTAB Lowell, WQAS Mattapoisett, WBBG Medford, Hillside, WGI New Bedford, WDAU Springfield, WBZ Worcester, WABK, WDAS	Lambertville, WTAZ Newark, WJAM, WABS, WBS, WOR, WLAZ N. Plainfield, WEAM Paterson, WBAN Trenton, WMAL, WOAX, WWAB	Butler, WBR Easton, WMLP East Pittsburgh, KDKA Erie, WQAV Grove City, WSAJ Harrisburg, WARE, WBAK Haverford, WBAQ Johnstown, WTAC Lancaster, WDBC, WGAL McKeesport, WTK Parkersburg, WQAA Philadelphia, WFLA, WGL, WCAU, WIDR, WFL, WBY, WCAU, WIP, WNAT, WOO, WWAD Pittsburgh, KQV, WCAE, WJAS Reading, WBBD, WRAV Scranton, WQAN, WRAY State College, WPAB Villanova, WCAM Washington, WABT Wilkes-Barre, WBAX	Bellingham, KDZR Everett, KFBL Lacey, KGY Neah Bay, KPHH Pullman, KFAE Seattle, KDZE, KFHR, KFII, KFJC, KHQ, KJR, KTW Spokane, KFTO Tacoma, BEL, KFBC, KGB, KMO Walla Walla, KFCF Wenatchee, KDZL, KZV Yakima, KFIQ									
Arizona: Phoenix, KDIW, KFAD, KFCE Tucson, KFDD	Indiana: Anderson, WABC Brookville, WSAL Greencastle, WLAX Greentown, WJAK Indianapolis, WBBI La Porte, WRAF Marion, WIAQ Mishawaka, WQAO Muncie, WJAF South Bend, WABJ, WGAZ West Lafayette, WBAA	Michigan: Ann Arbor, WCBC Berrien Springs, KFGZ Dearborn, WVI Detroit, KOP, WCX, WWJ East Lansing, WKAR Flint, WEA Houghton, KFMW, WWOA Kalamazoo, WQAP, WLAQ Menominee, KFLB Mt. Clemens, WABX Port Huron, WBBH Rogers, WHT Saginaw, WABM	New Mexico: Albuquerque, KFLL Roswell, KFMZ State College, KOB	Philadelphia, WFLA, WGL, WCAU, WIDR, WFL, WBY, WCAU, WIP, WNAT, WOO, WWAD Pittsburgh, KQV, WCAE, WJAS Reading, WBBD, WRAV Scranton, WQAN, WRAY State College, WPAB Villanova, WCAM Washington, WABT Wilkes-Barre, WBAX	West Virginia: Charleston, WPAZ Clarksburg, WHAK									
Arkansas: Conway, KFKQ Fayetteville, KFDV, KFMQ Fort Smith, WCAC Little Rock, KFLQ, WCAV	Iowa: Ames, WOI Atlantic, KFLZ Boone, KFGQ Burlington, WIAS Cedar Falls, KFJX Cedar Rapids, KFLP, WJAM, WKAA Davenport, WOC Dexter, KFJV Fort Dodge, KFEE, KFJY Gladbrook, KFJK Iowa City, WHAA Lamoni, KFFV Le Mars, KFVY, WIAU Marshalltown, KFJB Ottumwa, KFIL Sigourney, WOAD Sioux City, KFMR, WEAU Waterloo, WRAN	Minnesota: Duluth, KFMS Hutchinson, WGAN Minnesota, KFDZ, KFEX, KFMT WBAH, WCAZ, WLAG, WLB Moorhead, WPAU Northfield, KFMX, WCAL St. Cloud, WFAM St. Paul, AV7	New York: Albany, WNY Buffalo, WGR Canandaigua, WSAW Canton, WCAD Cazenovia, WMAC Ithaca, WEAJ Lockport, WMAK New York, WBAJ, WEAJ, WEN, WJX, WJY, WJZ, WJAW, WQAO Port Chester, WSAJ Poughkeepsie, WFAF Rochester, WABO, WHAM Schenectady, WGY, WBL, Syracuse, WBBE, WPAJ, WLAH, WVAN	Rhode Island: Cranston, WKAP East Providence, WKAD Providence, WEAN, WJAR, WRAH, WSAD, WTAG	Wisconsin: Beloit, WKAW Fond du Lac, KFIZ Kenosha, WQAR La Crosse, WABN Madison, WQAY, WHA Milwaukee, WCAY WHAJ, WIAO Neenah, WIAJ Oshkosh, WTAQ Sisht, WAB St. Croix Falls, WRAL Waupaca, WPAH									
California: Bakersfield, KDZB Berkeley, KRE El Monte, KUY Fresno, KMJ Hollywood, KFAR Long Beach, KFMY, KSS Los Angeles, KDZE, KFI, KFNC, KHJ, KJS, KNY, KXK, KUS Modesto, KND Oakland, KGO, KLS, KLN, KZM Richmond, KFCM Sacramento, KFBB San Diego, KDPT, KDYM, KFBC San Francisco, KFDS, KPO, KSL, KLU San Jose, KQW San Luis Obispo, KFBE Santa Ana, KFAW Santa Barbara, KFJH Stanford Univ., KFGH Stockton, KJQ, KWG Venice, KFAV	Kansas: Anthony, WBL Hutchinson, KFHX Iola, KFID Louisburg, KFIL Manhattan, WTG Marion, WRAD Milford, KFEB Parsons, WQAJ Topeka, WJAG, WPAM Towanda, KFJV Wichita, WEAH	Mississippi: Coldwater, KFNG	North Carolina: Asheville, WFAJ Charlotte, WBT	South Carolina: Charleston, WNAQ, WQAH Clemson College, WSAC Greenville, WQAV	Wyoming: Douglas, KFEV Laramie, KFBU									
Colorado: Boulder, KFAJ Colorado Springs, KFCK, KFFQ, KFFZ Denver, AA3, KDZQ, KFAP, KFEL, KFEL, KFLE, KLFZ Greeley, KFJD, KFKA Gunnison, KPBA Lakeside, KFEB Trinidad, KFBS	Kentucky: Lexington, WQAH Louisville, WHAS, WLAP	Missouri: Butler, WNAR Cameron, WEAQ Cape Girardeau, WSAB Columbia, WAAN Independence, KFXX, WPAQ Jefferson City, WOS Joplin, WHAH Kansas City, WDAF, WHB, WMAJ, WQO Marshall, WJAT St. Joseph, KFHD St. Louis, KFEE, KFEB, KFGL, KSD, WCK, WEB, WEW, WMAY, WRAO Springfield, WIAI Webster Groves, WOAL	North Dakota: Fargo, KFLY, WDAY, WPAK Grand Forks, KFJM	Tennessee: Knoxville, WABV, WNAV Lawrenceburg, WOAN Memphis, WMC Nashville, WABV	Idaho: Boise, KFAU, KFDD, KFFB Kellogg, KFEY Moscow, KFAV	Louisiana: Alexandria, KFFY Baton Rouge, KFBC Franklinton, KFED New Orleans, WAB, WAAC, WABZ, WCAJ, WGV, WIAF, WTAE, WWL Shreveport, KFDD, KFHF, WQAG	Ohio: Canton, AOS Cincinnati, WAAD, WHAG, WLW, WSAI Cleveland, KDPM, WHK, WJAX, WTAM Columbus, WBAV, WCAH, WEOA, WMAN, WPAL Dayton, AWS, WABD Dover, WABP Granville, WJD Hamilton, WHK Lima, WQAC Newark, WBBB New Lebanon, WPG Pomeroy, WSAZ Sandusky, WABH, WQAF Springfield, WNAJ Toledo, WABE, WTAL Wooster, WABW Yellow Springs, WRAV	Utah: Ogden, KFCE Salt Lake City, KDYL, KFLH, KZN	Texas: Abilene, WQAO Amarillo, WQAG, WQAC Austin, WCM, WNAS College Station, WTAW Dallas, KFEE, WDAO, WFAA, WRR El Paso, WDAH, WPAT Fort Worth, KFJZ, WBAP Galveston, KFLX, WHAB, WIAC Houston, KFCV, WCAK, WEAY, WEV, WRAA Orange, KFEX Plainview, WSAJ Port Arthur, WFAH San Antonio, AS6, WCAR, WQAI San Benito, KFPU San Marcos, KFMU Tyler, WQAF Waco, WJAD, WLAJ, WWAC Wichita Falls, WKAF	Vermont: Bellows Falls, WLAJ Springfield, WQAE				
Connecticut: Hartford, WDAK New Haven, WPAJ Storrs, WABL Waterbury, WQAD	Maine: Bangor, WABI Houlton, WLAN Portland, WTAJ	Montana: Billings, KFCH Bozeman, KFDO Butte, KFVY, KFLL Havre, KFEB Missoula, KFVY Stevensville, KFJR	Oklahoma: Bristow, KFJK Chickasha, KFQD Oklahoma City, KFJF, WKY Norman, WNAJ Okmulgee, WFAC Tulsa, WGAF, WLAL	Virginia: Arlington, NAA Blacksburg, WEAJ Fortress Monroe, WNAV Norfolk, WTAR	Florida: Jacksonville, WABG Miami, WQAM Pensacola, WGAN, WLAJ St. Petersburg, WSAG Tampa, WDAE	Nebraska: Fremont, WQAE Hastings, KFEX Lincoln, KFDD, WFAV, WJAB, WMAH Norfolk, WJAG Oak, KFQO Omaha, KFCE, KFEX, WAAV, WIAK, WNAL, WQAW Tecumseh, WTAU University Place, WCAJ Utica, KFQV York, KFDB	Oregon: Astoria, KFJI Arlington, KFGL Baker, KFDA Corvallis, KFDD Hillsboro, KFPO Hood River, KFHB, KQP Medford, KFAY Pendleton, KFEE Portland, KDYO, KFEC, KFIF, KGG, KGN, KGW Salem, KFCD	Washington: Aberdeen, KNT	Georgia: Atlanta, WBBF, WSB Gainesville, WKAY Macon, WMAZ	New Hampshire: Laconia, WKAV	New Jersey: Atlantic City, WEAR Camden, WABU, WVAJ Gloucester City, WRAX	Pennsylvania: Allentown, WCA, WSAJ Altoona, WGAJ	Wisconsin: Beloit, WKAW Fond du Lac, KFIZ Kenosha, WQAR La Crosse, WABN Madison, WQAY, WHA Milwaukee, WCAY WHAJ, WIAO Neenah, WIAJ Oshkosh, WTAQ Sisht, WAB St. Croix Falls, WRAL Waupaca, WPAH	Mexico: Mexico City, CYB, CYL

PART IV—STATION DATA

(The following schedules complete the alphabetical station data list, Part III of which was given last week.)

WVAO, Houghton, Mich. 244 meters. 250 watts. Mich. College of Mines.

WVJ, Detroit, Mich. 517 meters. 500 watts. The Detroit News. Daily ex Sun. 9:30-9:45 household hints; 9:45-10:25, health talks; 10:25-10:30, weather; 11:55-12, time; 12:05-12:45 pm, music; 3:30-3:35, weather; 3:35-4:15, markets; 5-6, sports, April 22, and every other week, 8:30-10 pm, concert. Sat. night silent. Thurs, 10-12 pm, "midnight special"; Sun, 2 pm, 7:30, church services. Fill in weeks, 7-8:30 pm, concert; Sun, 11 am, 5:30, church services. Eastern.

WVW, New Orleans, La. 280 meters. 100 watts. Loyola Univ.

2BD, Aberdeen, Scot. 495 meters. British Broadcasting Co.

2LO, London, Eng. 363 meters. British Broadcasting Co.

2ZY, Manchester, Eng. 370 meters. British Broadcasting Co.

51T, Birmingham, Eng. 425 meters. British Broadcasting Co.

5NO, Newcastle, Eng. 400 meters. British Broadcasting Co.

5SC, Glasgow, Scot. 415 meters. British Broadcasting Co.

5WA, Cardiff, Wales. 353 meters. British Broadcasting Co.

6BM, Bournemouth, Eng. 385 meters. British Broadcasting Co.

6KW, Tainuacu, Cuba. 332 meters. 100 watts. Frank H. Jones, Slogau. "If You Hear the Koo of the Cuckoo You Are in Tune With Tainuacu." Mon, Tues, Fri, Sun, 9 pm, music. Wed, Thurs, Sat., 6:30 pm, music. Central.

(This completes the alphabetical station data list. Part I, the first installment of the four-part list, will appear next week.)

Selectivity with Use of Homemade Wave Trap

In the ordinary receiving set, all signals picked up by the antenna are free to run through the primary coil of the receiver, some selectivity is obtained by tuning the set to respond to the particular wave length or frequency desired. However, if some particular signal is very strong, it will force the receiver to respond regardless of the tuning. Although there are receivers built that are selective enough to eliminate this troublesome interference, the simplest and most effective means of elimination is to stop these interfering signals before they reach the receiver. In order to do this, we cause all signals to first pass through a simple resonant circuit known as a wave trap; by tuning this circuit to the frequency of the interfering signal, the troublesome energy is absorbed before it reaches the receiving set, whereas all other signals will come through without losing their energy.

In construction, the wave trap is a very simple device, consisting of a coil and a condenser. The condenser should be of the variable type of 23 plates and preferably should have a vernier attachment for fine adjustments. If a larger condenser is available, such as the common 43-plate size, it may be used, but will be harder to adjust properly.

For making the coil procure a round tube of some insulating material such as bakelite, formica or even ordinary cardboard (a round oatmeal box will serve nicely); this tube should be about 3 inches long and from 2 to 5 inches in diameter. If a 3-inch tube is used, wind about 40 turns of number 24 or number 26 insulated wire on it, or if a 4-inch tube is used, wind

on only 30 turns; in other words, the larger tube requires a less number of turns and the smaller tube requires a greater number of turns.

The next step is to connect one terminal of the coil to one terminal of the condenser and also to the antenna. The second terminal of the coil is connected to the second terminal of the condenser and also to the antenna binding post of the receiving set. Your wave trap is now completed and ready for operation.

Possibly you are skeptical regarding the ability of this simple device to eliminate the powerful signals of the nearby stations, but just try it. As you turn your set on, you will hear the nearby station as usual, but start turning the condenser of the wave trap and soon you will come to a point where the signals begin to grow fainter. Continuing carefully from here you will finally reach a point where the signal cannot be heard. Leaving the wave trap condenser at this setting and tuning your receiver as usual for distant stations, you will not be bothered by the local station until the position of the wave trap condenser is again changed.

Long Distance Crystal Set

In the early part of 1922 the writer began to experiment with Radio reception and by the end of the year had some very gratifying results in being able to use a loud speaker on a simple crystal set for local reception—about three miles. Sounds came in strong enough to be heard all over the room.

One evening after WOC had signed off, I sat a while with my headset on, reading the paper, when I heard some music, and presently the announcer with a nasal tone now so familiar, came in saying, "This is KSD, the St. Louis Post-Dispatch." I heard this station until it

signed off for the weather forecast, and then tuned in Louisville, Kentucky.

My list of stations contains the following: KSD, KYW, WBAJ, WDAF, WDAJ, WEAH, WFAA, WGM, WGR, WGY, WHA, WHB, WHAS, WJAZ, WLAG, WLW, WLAS, WMC, WQAW, WOC, WOR, WOS, WSB, WSY, WWJ, WLAT, WOI, WJAX, WOQ, WEY and KDKA.

I consider the results I have had to be very good, especially as I have been able to pick up some of the stations very consistently and without interference.

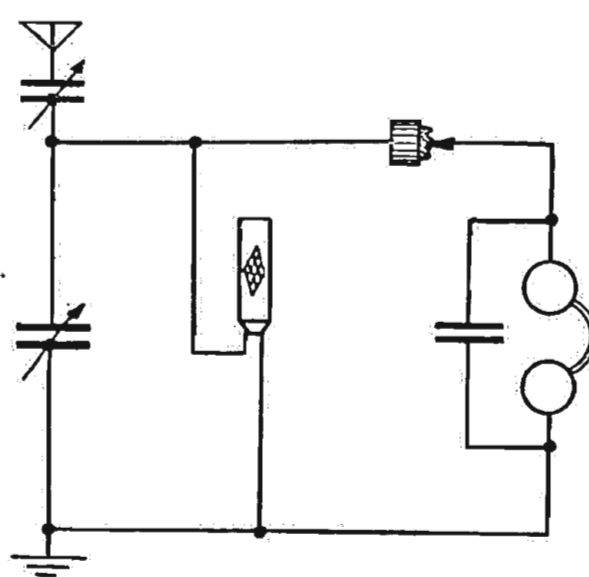
The most remarkable part of it all is that it has been done with a very simple crystal set made at a low cost. Describing the set I shall begin with the antenna of which I have 200 feet stretched between three trees, forming a sharp triangle open at the base, 40 feet above ground. Two lead-ins are used at the base of the triangle. I have tried different antennae and

have found that less than 150 feet is not effective. A straight wire is not so good as one made to form an angle with at least 75 feet on each side. It was found that with a single wire running north and south I received from the north, west and south, but could not reach east. However, as soon as I ran the wire angular toward the northeast, I had no directional difficulties.

I annealed the wire before putting it up and consider this important. Two lead-ins are also important. Antenna and lead-ins should be made of Number 14 braided or stranded wire. The ground runs from the set to a water pipe and is clamped to it to form a good contact. The set itself consists of a primary 43-plate condenser, a tuning condenser of 23 plates, a honeycomb coil of my own make, a .002-mfd. phone condenser and a simple crystal detector with a synthetic crystal.

In operation, the primary condenser is closed and the secondary condenser is used for tuning. A little practice will soon enable the operator to find the proper position for the primary condenser, which will depend upon the length of antenna. It will be noted that there are only two controls, namely, the two condensers. These need not be of the vernier type, although a vernier on the secondary condenser may be helpful. A test buzzer will be of aid in finding a sensitive spot on the crystal unless a fixed detector is used. I do not recommend the use of galena as it seems to lose its sensitiveness in a short time.

The sketch submitted shows the simplicity of the set clearly. It can be mounted on any kind of a panel or in a large cigar box. Any good 3,000-ohm headset may be used. Amplification may be added as desired.—H. W. Amundsen, Moline, Ill.



King Miloplex Writes Article for Ladies Only

Part XVIII—In Which the Better Seven-Eighths Tune In

By the Mystery Man

AND ladies! Yes, this article is positively not for the eyes of "mere man" most certainly not. You know, as Maggie says, "Us girls,"—well, us girls—us wives and sweethearts who are—well you know what I mean. "Before this Raydeo thing came bobbing in, he would occasionally go to the club, so we could have an evening to ourselves—but now he won't stay away from home evenings long enough to let us do a homemade marcel."

Yes, I know he's a pest. Wireless, says he; wireless me eye. Lookit, nothing but wires; why, he's brought so many new names into the house, the children wonder if Daddy is studying Latin.

Oh! yes, I suppose I'm to blame for some of it. Well, supposin' I admit it; I'm ready to apologize by saying: "If I've done or did—no it's done—anything I'm sorry for, I'm glad of it." Now that's settled! Why, most assuredly that's a perfectly good apology. You see, one has to read it twice. The answer is, I'm glad of it; it surely cannot occur again—don't let me keep you up.

Naturally, I'll have to give them just one more circuit, or if you don't mind, then may be two—you know what I mean.

Maggie Is a Myth

And now that we are better acquainted, I'm going to tell you first-hand all about my cook Maggie. Course, y' understand this is only an interview so if I slip and don't tell it just as she dictated it, then blame the printer, but you know really her name hain't (or is it isn't?) Maggie, but that's what I call her and I notice she's drawing a cartload of mail, name or no name. You see, my first sweetie is to blame as she taught me to lisp and Maggie is the only pet name I can say without lisping. Well, she didn't really teach me to lisp, but she lisped and just to prove she was my only, only, I learned to lisp.

Besides we could then understand each other so much better when we talked hog latin. Yes, exactly the same kind you talked when you had pig tails. Course she wasn't Maggie—mercy, no! She was just one of my puppy love girls that's good and fer keeps until a new boy comes to town. And speaking of sweeties and school houses, can you imagine anything more charming than a kid sweetie, or anything more dead and peaceful like than a school house during vacation? Course, I've seen things more deader (or is it deadener?) but I don't remember when or where. And I'm not one of them fellers what's always taxing their memory—it's hard enough to get three chances a day with both feet under the table. Anyway, that's that, and that's how I came to lisp. End of first act.

Her Real Name Revealed

Second act 20 years later. When I came to cash in my soap coupons and trading stamps for a cook, they didn't have one left with a name I could say without lisping, so I took the one offered. Course I had to, as I only had one book, and the first day out we were mooning (j'ever moon?). No! Honest, no? Oh, you did too; may be I saw you—well, anyway, we was mooning and I kind a sweet and low like says: "Listen, kid, what's your real name?" You know up to that time we got along fine, but when I asked her that she acted just like a telephone girl—fact, I thought sure she was a telephone girl, cause she didn't answer. But finally I got a little service—just as little as she could give for a book of stamps—and out came that jewel of a name, the one name in the whole deck I certainly could not say without lisping "Marcellaine." And now I know why some women call their children—mercy, if I ever tried to call her Marcellaine, I'd have to apologize to

Joan of Arc or Pulver Lytton or was it Bobbie Burns that wrote France's national anthem?

But I can say Maggie and make it sound like "The Sweetest Story Ever Told" or long-green's funeral wedding march. Yes sir, or yes, ma'm (who invented that word Yesmam?) that's really her name, but I always will say her folks named her after a sleeping car—let the relatives say what they will. Anyway relatives are only to send Christmas presents to.

Maggie Kicks the Mystery Man

You know, just between us girls, Maggie is really about three days ahead of Mrs. Jiggs as a kidder, and never knew Dinty Moore; in fact she has kidded me so much she's entirely out of lamb language, but to keep in training she is now feeding me aperiodically (aperiodically means without malice or rolling pins) kidney bean salad. Certainly! Never heard of it? Well, it resembles, or looks like, no it resembles wild fish salad. Of course, comparisons, they say, are odious (whatever odious means), but they are both odious. To make it you first take, or purchase, though take is cheaper—so you take a can of kidney beans, first peeling the can from the beans. Then seven eggs—no, we better not take a chance on seven eggs—so cut them out. All right, now: kidney beans, a couple

bunches of celery (the garden kind is best) and three of those teeney-weency, stingy, warty sweet pickles. Alright, use four if you want to, but see that your oven is nice and hot, and slice them. And then you use a jigger of—low do you spell it?—mayonnaise. Set it all in front of the brute and he will think he is dining with the king; if he don't just then he will be reminded of it around midnigt. But really it's a perfectly lovely entree or finish. Mercy, I'm as full of recipes as a face powder factory is of flour, or do face powders grow like potatoes? I know they don't make it in a glue factory cause it don't stay on long enough, or else they—well may be they have a new trunk purse and want to keep trying the lock—you know what I mean.

And here's another secret. Many seem to think I'm the only famished person that wants to eat. Not so, not so, certainly not! Why, certainly it seems to me I wrote you we had a boy; strange, but why write it? From the noise he makes I decided he told the world. He is not only all boy but is also going on twelve and to school when I won't write excuses for him. Mercy, I've written those old familiar words "Dear Teacher" so often she doesn't open the envelopes any more, but obligingly says, "Another! huh! What

(Continued on page 24)

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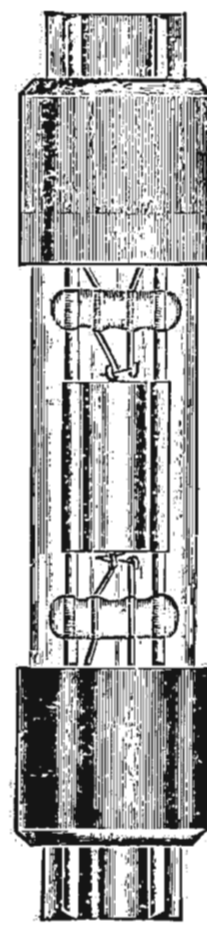
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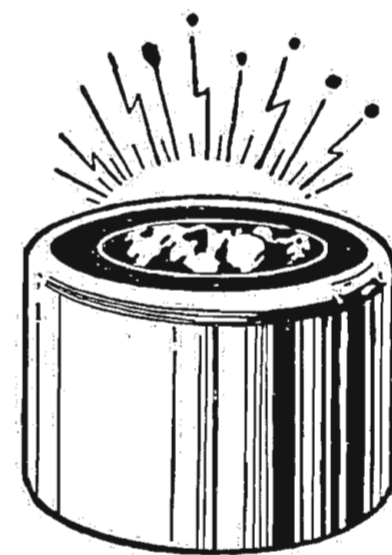
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Science That Makes You Think

You Must Study to Keep Up with Radio

RADIO has done more to make young people think along scientific lines than has any other scientific device. It has impelled thousands of boys to go ahead independently and acquire a better knowledge of electricity and a better notion of the nature and laws of matter than is possessed by the average college graduate. Other inventions may be accepted and made use of mechanically with little thought. Radio somehow arouses the imagination and stimulates thought and experiment.

Sets Used by Farmers

Rural Districts Supplied with Entertainment

A GOOD many farmers throughout this country have become interested in Radio and have invested in equipment to enable them to take advantage of the broadcasting service that constantly is being carried on. To the farmer a Radio set is about in the same class as an automobile in that it is a combination of pleasure and profit, of amusement and utility.

It is quite plain that the Radio is furnishing another agency of entertainment and mental recreation to relieve the dullness of farm life. To be able to tune in and hear music, lectures, sermons and travel talks means less of isolation, more of the sense of contact with the world, and represents an important contribution to the contentment of rural life. It is a good thing that so many farmers are making use of the Radio, and very naturally the number who do so is bound to increase.

Microphone Tests the Nerves

First Appearance Causes Stage Fright

BROADCASTING has developed a new test for the nerves, so say the managers of several Radio broadcasting stations. Stage fright, movie nerves and buck fever are all well-known to the public, but the little microphone, the door to Radioland, has sent terror to the hearts of many seasoned entertainers who have performed before packed houses without a tremor.

Appearing for the first time before the microphone, the artists, almost without exception, ask: "How many people will hear this? What tone of voice shall I use? Do you think I have a good voice for this work?" and many other questions indicating nervousness.

Having performed before the microphone, who is cold and unresponsive, the artists wait impatiently for letters from the invisible fans, whose faces he could not read, to learn whether or not his act "went over." Unless he receives letters of applause, his fever is likely to rise until it becomes dangerous.

Fish for What You Get

No Promises Will Hold Good with a Radio Set

THE newspapers, realizing the popularity of Radio, are eager to print anything concerning it. This is both fortunate and unfortunate. If someone hooks his receiving set to the bedspring and makes it work, the newspapers are very apt to announce that you can do away with an outside antenna. While it is entirely true that bedsprings can be used in some cases as an antenna, it is also true that they will not always work.

Nor is it possible to walk up to a receiving set, press a button and get Atlanta, or press another button and get some other desired point. Yet this is the prevailing idea among the uninitiated. The new listener in will always ask for some specific broadcasting station. The owner of a set may say he had that station last night, but tonight is a different thing. He may be able to get all the others on the list, but the one wanted will not come in. It is possible to get the station wanted at some time, but it is the element of uncertainty of the thing which makes it interesting.

Never sell a set to a person telling him he can get a certain station. Invite prospective buyers to hear a concert over the Radio, not promising any particular one; then they will not be disappointed. One of the joys of owning a set is the fascination of fishing for what you get.

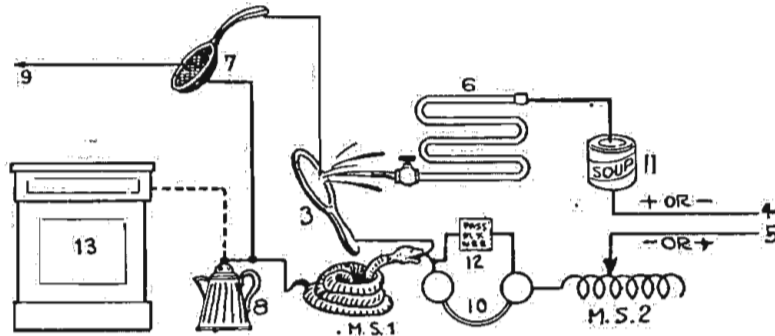
RADIO INDI-GEST

Aha! Stebbins Souper Degenerative Improved

Introducing the Souper Degenerative Reflects
By ANN TENNA

(Enhancing by manifold the untold disadvantages of the notorious Stebbins Souper Degenerative Set, the unknown Radioknut, contributor of the following improvement, which at once immediately converts the S. S. D. set into a souper degenerative reflects circuit, has without a doubt undoubtedly made life much more miserable for man, woman and child-kind. This great (?) Radio expert, having accomplished the first unworthy Radio achievement in 1924, is therefore accorded the position of distinction, the top of our weakly column. Indi signing off. The speaker of the evening, Ann Tenna, will now bore you with the delectable bit of research he (or she?) has researched.)

THIS is my own modification of the popular Stebbins Souper Degenerative Circuit. The first time I used this set the signals came in so strong they blew out all the windows. Parts for this circuit may be purchased at any up to date Pawn Shop, or mailed direct upon receipt of .005 in coin (no stamps).



Key to Diagram

M. S. 1.—In the original hook-up a marcelled coil was specified, but I have found that a coil with a serpentine wave in it gives better results.

M. S. 2.—17.3 mfd. Wavemeter coil.

3.—Mirror, for reflects action. It is important that only the best quality obtainable be employed.

4 and 5.—Connections to 381 ohm D. C. generator with A. C. output.

6.—Variable condenser from a still. Necessary for quiet operation.

7.—Strainer. This is placed in the telephone line to keep out ex-strain-eous noises.

8.—Coffee percolator for grounds.

9.—Connection to rural party line.

10.—Pair D. C. C. Earmuffs.

11.—Campbell Souper Detector.

12.—Pass on D. L. & W. R. R., to by-pass the audio-frequency oscillations from the soup.

13.—Counter for counter poise (optional).

My Radio

(With apologies to, and sung to the tune of "The Rosary")

The bones I spend on the darn thing
Would make a beggar of a king,
I look it over, take each dial apart
My Radio—My Radio!

I gently place the wires where they should go,
Connect them up as the Digest tells me to,
Then sit and wait, my soul in anguish wrung,
Hoping sweet music will soon be sung,
But all I get is Br-r-r-r—I'm stung,
My Radio—My Radio!

Oh memories that grow and grow
From stories Radiophans tell me sure are so,
Pray tell me why, and tell me truly do—
All I can get is Br-r-r-r
My Radio—My Radio!

ANN ONIMUSS.

A Religious Set, We Should Say

Dear Indi: On a recent Tuesday evening I happened to be at the home of a Radio friend of mine. He is very enthusiastic about his set, and had just tuned in a station putting some fine church music on the ether. I commented on the fine church music he was bringing in. He immediately grasped the opportunity of my comment to show the usual superiority of his "crack" set by replying, "Why, that station is so far away that it is only Sunday where it comes from."

Some set he has, eh?

RAY DE OFAN.

A Little of Everything to Maggie

(Clipped from the Toronto Star and re-dedicated.)
Sweet are your lips like burdocks after rain.
Soft is your voice like air brakes on a train.
Tender your eyes like beef steaks onion smothered.
Milk white your hands like mushrooms newly gath' red.

I must admire you; praise you every day.

Lighten your burdens and increase your pay.

Or you'll forsake me; go and leave me flat.

(She is my cook, kind friend—so that is that).

THE EARTHWORM.

Opportunity Pounds at Wisdom's Portals

Dear Indi: Seeing you are a good fellow trying to help everyone, I will ask you to try to help me locate a good school to which I can send my set. I tuned in at 1 a. m. this morning and my set recited a good speech (that is, as good as you can expect from speeches), but it was in Spanish and I don't savvy Spanish.

Now what I want to do is send my set to a good school where it can be taught to "speck Inglis." The school should include in its curriculum Spanish, Mex, French and last but not least, the "Mushmouth" some of the announcers seem inclined to use.

Principals of schools wishing to communicate with the undersigned to quote confidential terms, may do so by writing Indi-Gest, telling him to answer through his newspaper. Tell him to put right over the top of the article "Personal" so curious persons won't read it.

W. N. N.

Gone But Not Forgotten

Dear Indi: It's a cruel world sure. What has happened to our old friend at "Ki, Dee, Ki, Ai, East Pittsburgh?" Can it be that we will never hear him pronounce these words again? Death, where is thy sting? MIKE ROFARADS.



Condensed

By DIELECTRIC

Mention has been made of the Columbia Graphophone Company increasing the demand for their records through—what?—broadcasting! Terrible, isn't it, to disillusion all those wise ones who foresaw the end of the phonographic business on the appearance of Radio broadcasting. We (more dull of comprehension) could see no such dire result to follow this new form of entertaining. But what of the advertised value of presenting your wares before thousands of Radio listeners? Well, it is only necessary to call attention to the several companies presenting musical features from the studios of some of the stations. There is the Astor House orchestra, Lucky Strike orchestra, Wrigley entertainers, Everready amusers, and others, whose names should easily bring to mind nationally known products. Do they seek commercial suicide by broadcasting?

There are always enthusiasts in every sport who attempt Marathon records and now we have entered the era of endurance tests for Radio listeners in. Judging from the experience of the newly made champion in the listener class, a protracted period of logging stations may not produce any great number of real DX calls. Cleve Hoffman, of Elkhart, Ind., claims the world's record for endurance at Radio reception, his record being 28 hours of continuous listening. When not on test, this fan had heard the calls of stations at quite distant points, but during that long period of turning the dials he had caught only one such. This goes to show that in spite of the added improvements to apparatus—both transmitting and receiving—there is still the lure of bringing in the DX stuff, for no one is certain to get them night after night.

I suppose my horns should be pulled in since the listeners' census taken by the Chicago stations a short time ago was made public, showing the largest percentage of listeners preferring "popular" music. My feeble efforts to popularize classical music through reception of symphonic, operatic and chamber music from the great concert halls of the country through broadcasting stations may bear no fruit; but the statement that much can be accomplished in that way cannot be successfully refuted. Another agency for educating the public to the point of appreciation is instanced at Columbus, Ohio, where a Grand Opera club was formed for this very purpose, broadcasted through station WEAO. Certain it is that many more symphony orchestras are being heard from time to time and fewer dials are being turned to bring in other features.

Not long ago I was interested to see an ad appearing in one of our large magazines supposedly appealing to farmers to purchase Radio sets. To the great mass of soil tillers it would be anything but appealing. The set was a good one, description inviting, but the lack of understanding of modern farm conditions as revealed in the text would tend to embitter those who represent the backbone of our country. Incorporated in the annual report to Congress of the Secretary of Agriculture is an estimate of the number of receiving sets now installed on farms, aggregating nearly a quarter of a million. Not only does the farmer of today accept Radio as a necessary supplement to his trade papers, but looks to it for lectures, speeches and music unobtainable in rural districts except as brought through the ether.

There can be no doubt as to the probability of Radio playing a large part in the political campaign which seems already to have taken on an appearance of life. No single audience can ever be so large as that addressed by Radio, and the politicians know this. It should assure a greater number of informed voters, though, of course, not necessarily wiser ones, as men of both parties expound the principles inspiring their party's actions.

How to Make Inexpensive Neutrodyne Receiver

Part II—Panel Layout and Assembly

By H. J. Marx

THE selection of an 8 by 26-inch panel was decided on because of the better and more convenient arrangement of apparatus that was possible. The new fan usually finds considerable difficulty in the compact assembly and

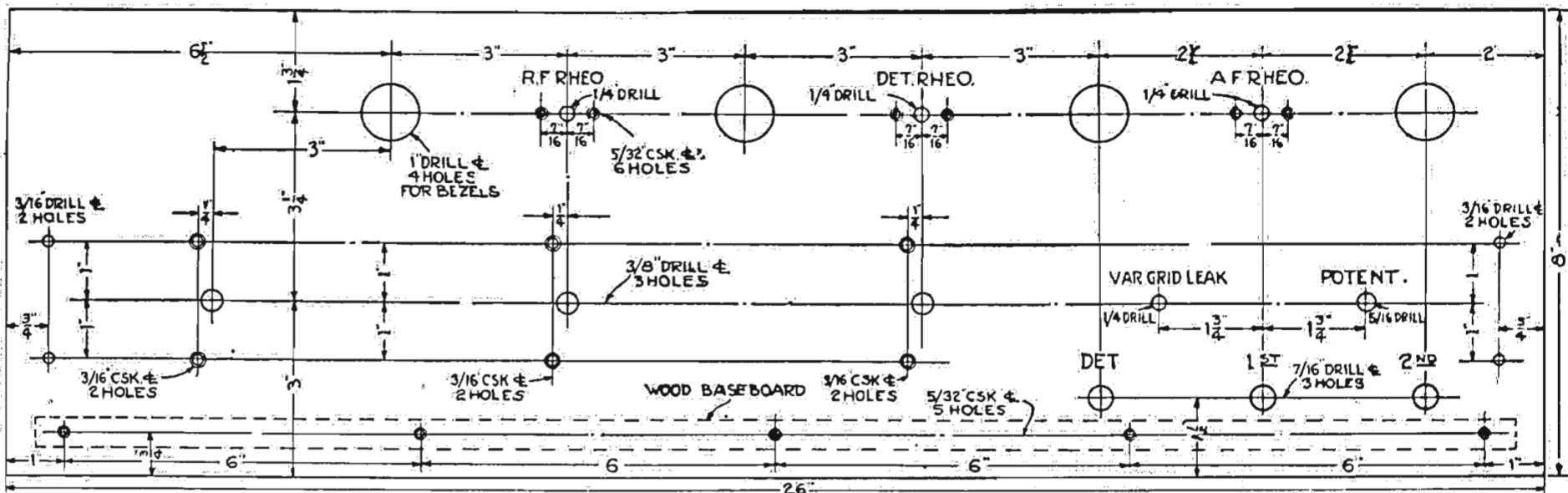
ACCESSORIES REQUIRED

- Four Amplifier Tubes.
- One Detector Tube.
- Six-Volt A Battery.
- Ninety-Volt B Battery.
- One Pair Receivers.
- Loud Speaker.
- Antenna Outfit.

wiring of the set. Of course, with such a set the leads can be decidedly reduced in length, but with a little care and attention in wiring slightly longer ones need cause no concern.

The three condenser dials with the variable grid leak and potentiometer are all in line across the potentiometer.

Four bezels are used at the top of the panel so as to permit observation of the lighting of the tubes. Three rheostats for controlling the tubes are arranged between the bezel holes. The rheostat on the right controls the two audio frequency amplifiers; the center one the detector tube, and the one on the left takes



The baseboard is attached so a clearance of 1/2 inch is left underneath to permit fastening the panel to the cabinet.

The arrangement of the apparatus on the baseboard in the rear can be seen in the photo reproduction.

Wiring

The leads should be kept as short as possible and covered with spaghetti whenever there is a possibility of contact with

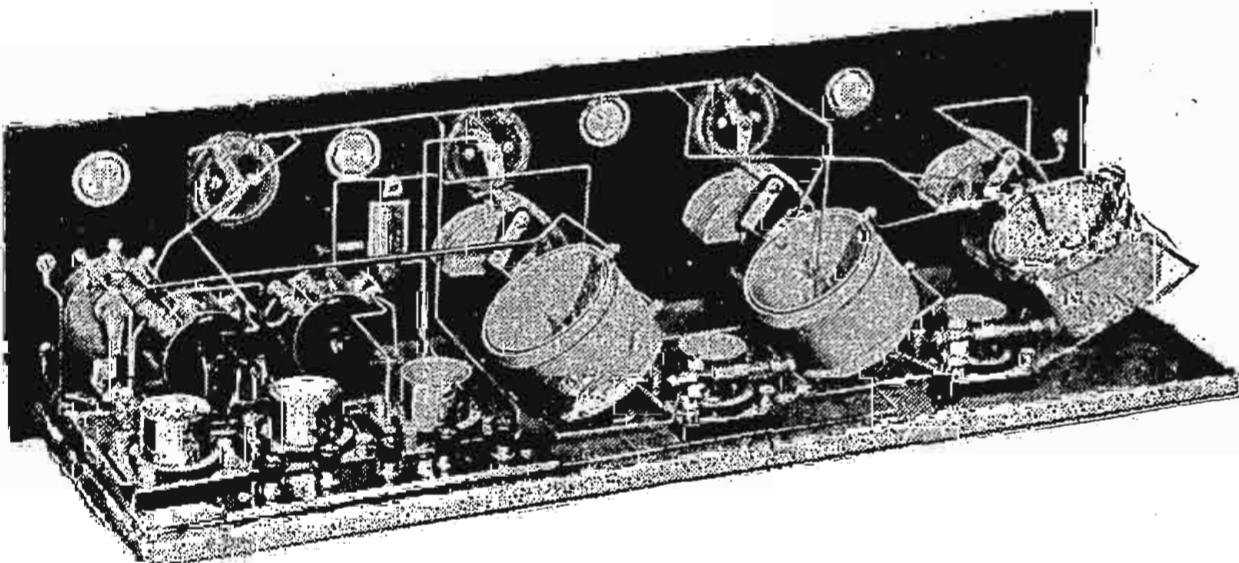
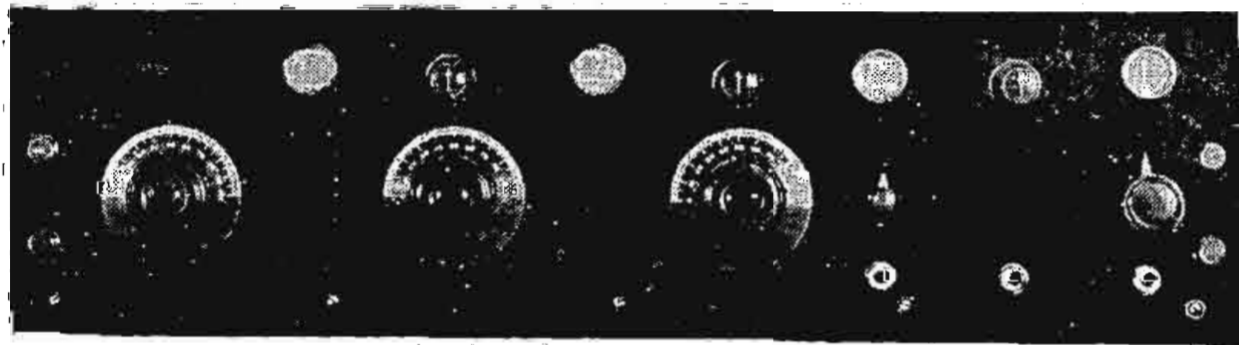
that the set has too much body capacity. Shield your panel if you want to, but watch out for short circuits.

Check your hook-up carefully and be sure you have it right.

Don't use so much solder that it requires a cold chisel to remove the surplus. That's no joke, the writer had to do that with one set he tested. The set worked fine after a little checking over.

Theory of Neutralization

In order to present the theory of neutralization, a long introduction dealing with equations, formulas, tube characteristics, transformers, capacity reactions, and what not, would be required; so, possibly, analogy will do more toward explaining the situation than a theoretical discussion that will leave the fan bewildered. (Continued on page 24)



care of the two Radio frequency amplifier tubes.

Three jacks in the lower right-hand side take care of plugging in on any stage of amplification desired.

The two binding posts on the left are for antenna and ground connections, while the two on the right are for permanent loud speaker connections.

With different makes of apparatus, the mounting holes may have to be altered to suit, but the relative location of the parts should be retained.

another wire, the baseboard, panel or apparatus.

Watch the grid and plate leads, keep them as short as possible and away from other leads. Don't run leads through the air core transformers or you'll wonder why your signals won't clear up.

One fan used a wooden panel and then wondered why he couldn't balance the set and keep it balanced.

Don't connect the grid side of the secondary circuits to the rotary plates of the variable condensers and then complain

S. HAMMER RADIO CO.
303 ATKINS AVE. BROOKLYN, N. Y.
All Sales on a MONEY BACK GUARANTEE

Standard Merchandise Only	\$54.00	\$85.00
655.00 GENUINE FADA PARTS FOR 5 TUBE NEUTRODYNE SET.....		A 5 TUBE NEUTRODYNE set with Genuine Fada parts, wired complete in Mahogany Cabinet without tubes or batteries.....
List	Our Price	List
\$ 2.25 Filkostat	1.90	\$71.00 AMPLEX KIT
2.00 Bradyleast	1.75	1.80 11 Plate Variable Condenser.....
2.00 Bradyleak	1.75	2.30 17 Plate Variable Condenser.....
		2.50 23 Plate Variable Condenser.....
		3.50 43 Plate Variable Condenser.....
		4.00 11 Plate Vernier with Bakelite Dial.....
		4.50 23 Plate Vernier with Bakelite Dial.....
		5.00 43 Plate Vernier with Bakelite Dial.....
		1.00 6 Ohm Rheostat with knob.....
		1.25 30 Ohm Rheostat with knob.....
		1.25 6 Ohm Rheostat with dial.....
		1.50 30 Ohm Rheostat with dial.....
		1.50 400 Ohm Potentiometer with dial.....
		1.75 400 Ohm Potentiometer with dial.....
		2 inch Bakelite Dials.....
		3 inch Bakelite Dials.....
		4 inch Bakelite Dials.....
		Layite Resistances, 48,000 ohms.....
		Amplex Grid-densers.....
		5.50 Cockaday Coils, Genuine Precision.....
		Tube Socket, table mount.....
		Tube Socket, panel mount.....
		LOUD SPEAKERS
		\$30.00 Music Master
		35.00 Magnavox
		25.00 Dictogrand
		55.00 Western Electric D-10.....
		30.00 Stromberg Carlson
		VARICOUPLERS
		\$ 3.50 Fisher 180 deg. or straight.....
		3.50 Workrite 180 deg.....
		8.00 Gillfillan
		4.00 Simplex 180 deg. silk wound.....
		3.25 Shamrock
		4.00 Sleeper Fixed
		7.00 All Wave

ALL MAIL ORDERS SHIPPED PROMPTLY. Orders over \$5.00 will be shipped prepaid. Money orders or C.D.D. IF IT IS NOT LISTED HERE ASK US—WE HAVE IT AT REDUCED PRICES

PEERLESS RADIO, 349 Fulton St., Brooklyn, N. Y.
Parcel Post prepaid on all orders above \$5.00. Express Money Order, Certified Check, Bank Draft accepted; also C. O. D. Guarantee with all merchandise.

LOUD SPEAKERS	VARICOUPLERS	PHONES
Magnavox (new type).....\$27.25	Fisher, 180°.....\$2.35	Neroo.....\$2.35
Music Master.....25.45	Shamrock.....2.65	Patent.....3.45
Pathé (new type).....16.30	Sleeper, no taps.....3.75	Brandes Superior.....4.85
Dictogrand.....15.25	Workrite.....2.95	Federal.....4.95
Stromberg Carlson.....17.75	Gillfillan, small.....5.95	National Baldwin Type C.....7.95
Mercury with Baldwin Unit.....9.95	Gillfillan, large.....7.45	Dr. Seibt, German Phone, 6000 ohms.....5.85
Natl. Baldwin Type C Unit.....4.85	Pathé.....3.25	Western Electric.....8.85
Manhattan Electric.....22.50	Genuine All Wave.....5.35	Ambassador.....3.50
VARIABLE CONDENSERS	Cockaday Coil.....1.85	Potter Precision.....4.25
11 Pl. Admiral or Signal.....\$1.35	Unxid, 180°, Bakelite.....1.95	
17 Pl. Admiral or Signal.....1.60		TRANSFORMERS
23 Pl. Admiral or Signal.....1.65		Acme Audio and Radio.....\$ 3.90
43 Pl. Admiral or Signal.....1.75		All-American (all ratios).....3.90
11 Pl. Montrose Vernier Cond.....2.55	VARIOMETERS	Federal No. 65.....5.95
17 Pl. Montrose Vernier Cond.....2.75	Fisher, large, 600 meter.....\$2.55	Modern.....4.95
23 Pl. Montrose Vernier Cond.....2.85	Shamrock.....2.65	Thordarson.....3.95
43 Pl. Montrose Vernier Cond.....3.85	Sleeper.....5.65	Eria Reflex and Audio.....4.45
11 Pl. U. S. Tool.....3.35	Workrite.....2.95	Akroy.....3.35
23 Pl. U. S. Tool.....3.55	Gillfillan, small.....7.45	Modern Push-Pull.....10.75
43 Pl. U. S. Tool.....4.10	Gillfillan, large.....7.45	Come Push-Pull.....10.75
	Pathé.....2.85	
CYCLONE BATTERIES		
Small 22 1/2 Volt.....\$.75		
Large 22 1/2 Volt.....1.75	HARD RUBBER PANELS	MAHOGANY CABINETS
Medium 45 Volt.....2.30	7 x 10.....\$.70	7 x 10.....\$2.45
Large 45 Volt.....3.45	7 x 12......90	7 x 12.....2.65
Large 22 1/2 Volt Eveready Battery.....2.35	7 x 14.....1.00	7 x 14.....2.80
Large 45 Volt Eveready Battery.....3.65	7 x 18.....1.40	7 x 18.....3.05
Small 22 1/2 Volt Eveready Battery.....1.15	7 x 21.....1.65	7 x 21.....3.35
Eveready "C" Battery, 4 1/2 Volt......55	7 x 24.....1.85	7 x 24.....3.65
MISCELLANEOUS		
Bell Socket, Bakelite Panel.....\$.69	Cutler-Hammer 30 ohm Rho-stat, Plain.....\$1.20	Single Circuit Jacks.....\$0.35
Mounting......95	Cutler-Hammer 400 ohm Potentiometer.....1.20	Double Circuit Jacks......45
Amsco 6 ohm Rheostat......95	Filkostat.....1.85	4" Dials, Fada Type......45
Amsco 20 ohm Rheostat.....1.15	Bradyleast or Bradyleak.....1.70	3" Dials, Fada Type......30
Amsco 30 ohm Rheostat.....1.25	Bruno 14 Tap Inductance Sw......70	Triple Sockets, Fada Style.....2.65
Amsco 400 ohm Potentiometer.....1.40	Sta-put Phone Plug......35	Marked Ebony Binding Posts, Each......17
Cutler-Hammer 6 ohm Rho-stat, Plain......95	Shelton Midget Vernier.....5.95	
Cutler-Hammer 6 ohm Rho-stat, Vernier.....1.20	Phone Plug for 2 pr. Phones.....1.25	
	Phone Plug for 2 pr. Phones......60	

2-LO, LONDON, ENGLAND ON ONE TUBE

Another Record for the **ELGIN SUPER-REINARTZ**

Tuesday, November 27, during the test period between 9 and 9:30 P. M., Rev. E. A. Cole in the residence of J. A. McIver, of Roodhouse, Ill., while operating a set made of materials and in accordance with the hookup furnished by the ELGIN RADIO SUPPLY CO., tuned in 2-LO, London, England, using receivers and but one tube. Later another tube was lighted and the loud speaker used, so that four people could hear the program and concluding announcement. The numbers, time, and the order in which they were played were

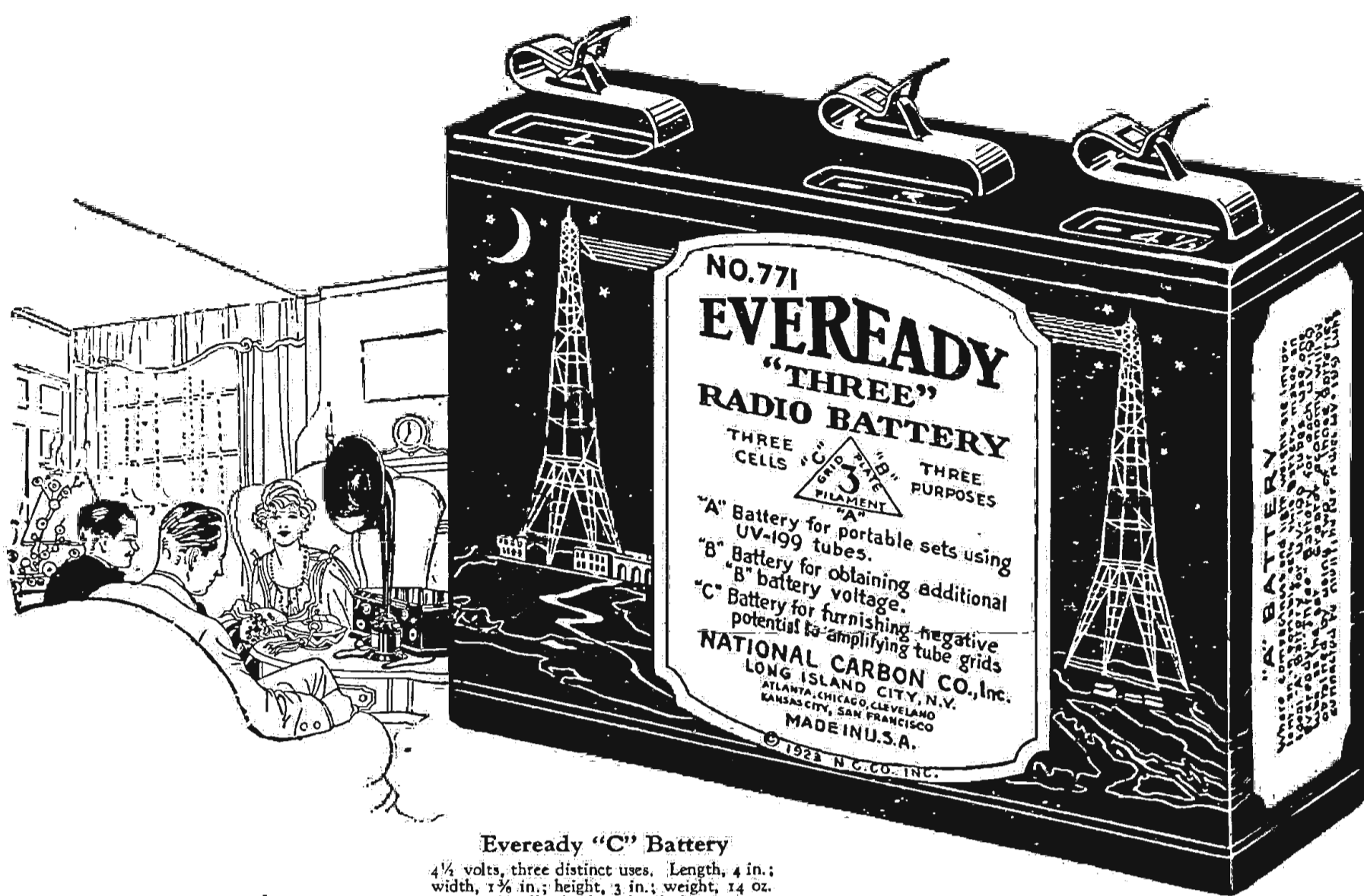
Officially Confirmed

by the St. Louis Post Dispatch in conjunction with the National Association of Broadcasters, who had charge of the tests. (See page 34, St. Louis Post Dispatch, Dec. 2, 1923.) This same hookup has been advertised extensively as the one which brings in stations 2000 miles overland on a loud speaker and one tube; and this has been demonstrated so often as to need no repetition.

Send a two-cent stamp for circular giving one, two, and three tube hookup, and price list of parts for this remarkable circuit. Address the

ELGIN RADIO SUPPLY CO.
207 Chicago St. ELGIN, ILL.

THE AIR IS FULL OF THINGS YOU SHOULDN'T MISS



Eveready "C" Battery

4½ volts, three distinct uses. Length, 4 in.; width, 1½ in.; height, 3 in.; weight, 14 oz. At all reliable radio dealers.

This "C" Battery is a Wonder Worker

YOU can make the loud speaker respond with a new fullness and naturalness of tone. You can save money by adding months to the life of your "B" Batteries. These things you can do by using the new Eveready "C" Battery.

You already have an "A" Battery for the filament and a "B" Battery for the plate. A "C" Battery is connected to the third element of your vacuum tube, the grid, affording a control that is marvelous in action on audio frequency amplifiers.

As a "C" Battery the Eveready "Three" prevents distortion and excessive flow of current from the "B" Battery, lengthening its life. It is a wonder worker that saves its small cost many times over. Connect it in your audio frequency amplifier and note the difference. Full

directions on the label and in "How to Get the Most Out of Your 'B' Battery," a booklet on "B" and "C" Batteries, sent free on request.

This triple-use battery can also be used as an "A" Battery in portable sets. Light and full of pep. Its third use is as a "B" Battery booster.

Use the Eveready "C"—a tested product of the world's leading electro-chemical battery laboratory. It serves more radio uses and effects more economies than any radio battery heretofore developed.

If you have any battery problem, Radio Battery Information Headquarters will solve it for you. Write G. C. Furness, Manager, Radio Division, National Carbon Company, Inc., Thompson Avenue and Orton Street, Long Island City, New York.

NATIONAL CARBON COMPANY, Inc., New York—San Francisco

Headquarters for Radio Battery Information

CANADIAN NATIONAL CARBON CO., Limited. Factory and Offices: Toronto, Ontario

EVEREADY Radio Batteries

—they last longer

Simple Explanation of Radio for Everybody

Chapter X—Part I—Loud Speakers

By M. W. Thompson

THE following article is the nineteenth of a series for Radio beginners, written by Marvin W. Thompson, well known in air-phone circles for his understandable style of approaching his subject. The remaining chapters will be:

- Chapter XI—Dry Cells and Storage Batteries.
- Chapter XII—Radio Frequency Amplification.

WE MAY begin this chapter by asking a question. Why does man set up an elaborate network of wires on his roof, carefully insulate the lead-in wire, put \$200 or \$300 worth of apparatus in a cabinet, constantly add to and refine that which he has and spend his evenings, week in and week out, twirling dials and

called fundamentals and overtones. This is similar to dividing colors into primary colors and their tints and shades. Every tone of music or speech is a composite. The separate component tones are called partial tones or partials; the partial having the lowest frequency of vibration is the fundamental, while the others are overtones. Those overtones having frequencies which are exact multiples of that of the fundamental are called harmonics; others are designated in-harmonic partials.

Frequencies of Tones

The piano has a range in fundamental notes between the frequencies of 27 vibrations per second and 4,138 per second. The human voice has a range in fundamental notes over those having vibration

removed, the remaining fundamental is of a dull, lifeless, colorless, droning quality. Does that description fit much of the music you have heard through Radio loud speakers?

Since intensity is one of the important characteristics of a musical tone we will

is the acoustical problems that remain to be solved.

Some time, an inventor will evolve a practical, economical method of sound reproduction that does not include a diaphragm. The present-day diaphragm cannot be made so that it will respond

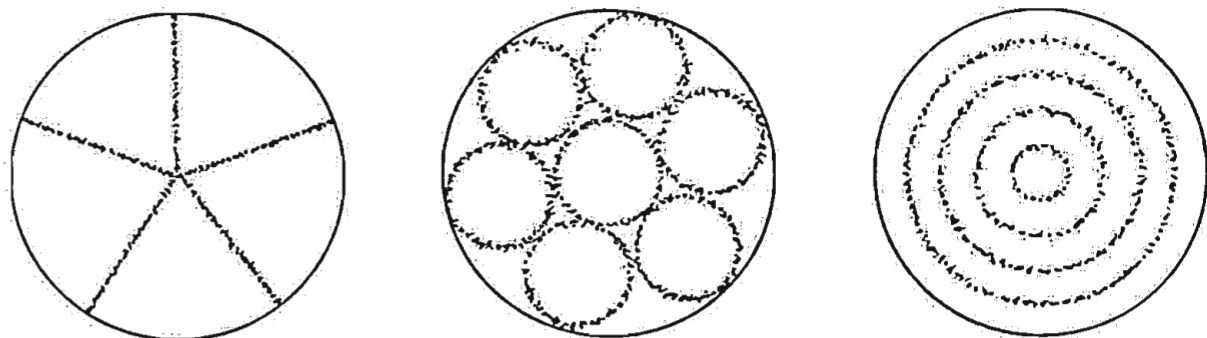


Figure 77—A diaphragm is checked by putting sand on it; three of the forms the sand takes are shown here.

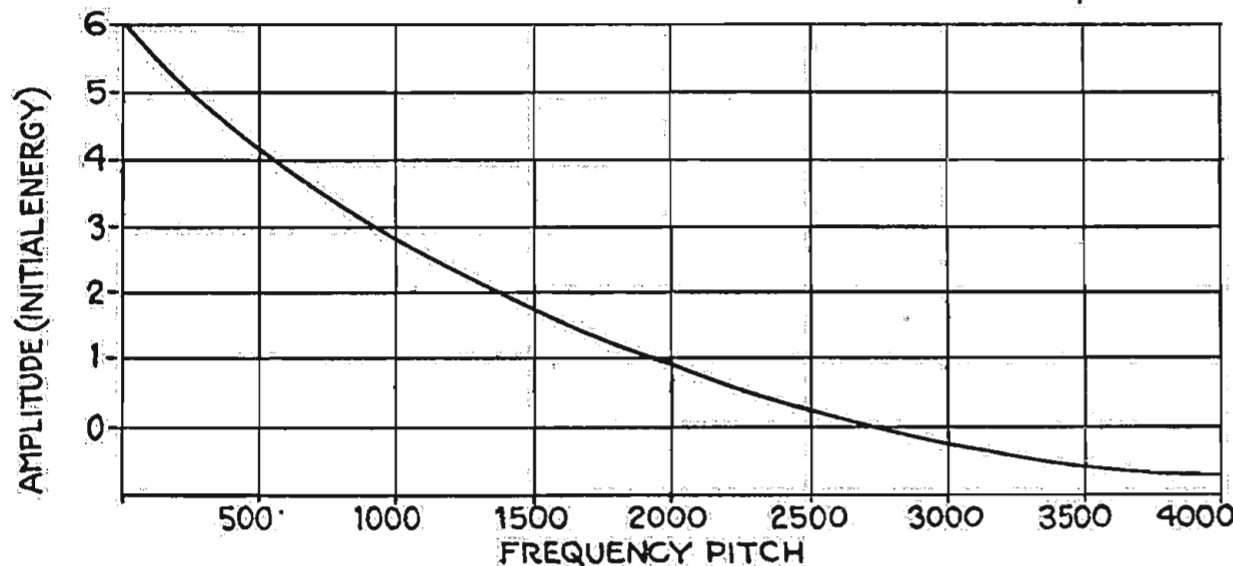


Figure 76—To affect us with equal intensity, the notes of the scale must be started with amplitudes shown by the curve.

adjusting knobs? To what end all this expenditure of money and time? There is but one answer: To obtain clear, strong reproduction of audible sounds created miles away.

After his antenna and outfit are electrically as perfect as human ingenuity can make them, what is the device that changes minute, invisible, inaudible electrical impulses into sound waves which are supposedly faithful reproductions of those made at the far-away microphone? The loud speaker—and if that is imperfect in either design or construction, the first expenditure of money and time is all for naught.

Tones Not Perfect

In the writer's opinion there is no loud speaker on the market that could honestly be called excellent. Each one dodges some problem, certain groups of notes in the scale are distorted or reproduced in a volume that is out of proportion to others. These facts, however, are no reflection on the engineers and designers of loud speakers. Much research and careful check on reproduction have been spent, but the problem is a difficult one.

Let us look at music from its scientific side, forgetting for awhile the sharps and flats, the lines and spaces. Then we will not only have learned what the engineer is up against but also to analyze loud speakers and judge with fair accuracy what they will do.

All speech and musical notes are a matter of air vibrations, in waves whose number per second determines the pitch. Most of the sounds which we hear are really combinations of notes called chords, and a chord is a very complex thing when analyzed. For purposes of discussion let us divide musical sounds into what are

rates between 60 and 1,300 per second. Though the pitch of the highest fundamental commonly used in music is 4,138, overtones with frequencies of 10,000 or more enter into the composition of a great many of the sounds of music and speech. A noted authority, Helmholtz, has said that the quality of a musical tone depends solely on the number and relative strength of its partial simple tones (harmonics).

Given the fundamental which is known to musicians as C2 and is placed on the second space of the base staff, and has a frequency of 129, there are nineteen harmonic overtones, viz., C3, 259; G3, 388; C4, 517; E4, 647; G4, 776; B flat 4, 905; C5, 1,035; D5, 1,164; E5, 1,293; G flat 5, 1,423; G5, 1,552; G sharp 5, 1,681; B flat 5, 1,811; B5, 1,940; C6, 2,069; C sharp 6, 2,199; D6, 2,328; D sharp 6, 2,457; and E6, 2,586. The above figures are approximate, decimal fractions having been omitted, and multiplying 129 by 19 will not give 2,457. The note C2 is slightly less, by a few hundredths of a vibration per second, than 129. The diaphragm of a loud speaker should, to be perfect, be able to handle all 20 frequencies at once, not for one note alone, but for many notes.

Characteristics of a Tone

What is it in an audible tone that makes us exclaim, "That is beautiful—perfect!" The characteristics of a tone are (1) pitch or frequency; (2) loudness or intensity, and (3) quality or tone color. A tone to have ideal tone color should have a strong fundamental containing about 50 per cent of the total energy or intensity, accompanied by a complete series of nineteen or twenty overtones of successively diminishing intensity. If the overtones are

now see how it may be altered and how it affects the beauty of what we hear. It will be a surprise to many to learn that if a high note and a low note are both started with equal strength (amplitude), the high note has a much greater intensity or loudness to our ears. Two factors enter into intensity and their effect is clearly stated in this rule: Intensity varies as the square of the amplitude, the frequency remaining constant; it varies as the square of the frequency, the amplitude remaining constant. To make a chord which affects us pleasantly, each of the notes of which it is composed must, to us, have the same intensity, but to give that effect, the low notes must be started with more energy contained in their waves. (See Figure 76.)

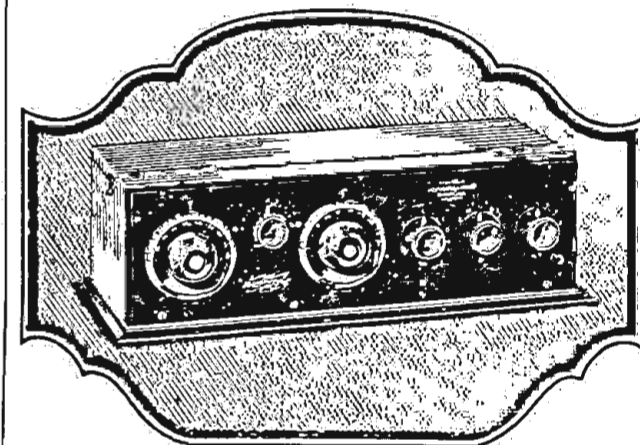
equally well to all frequencies; its chief defect is that it has a natural frequency of its own at which it vibrates freely and vigorously. At higher frequencies various parts of the circular disc vibrate independently of each other and each with far less energy than if the whole diaphragm vibrated to a lower note.

The action of a circular diaphragm made of either metal or mica is examined by sprinkling fine sand upon it and then setting it into vibration at gradually increasing frequencies. As the rate per second becomes higher, the sand will begin to assume regular, symmetrical figures, the areas of which are quite large at low notes and very small at higher notes. In Figure 77 we see samples of these shapes.

(TO BE CONTINUED.)

Design of Loud Speaker

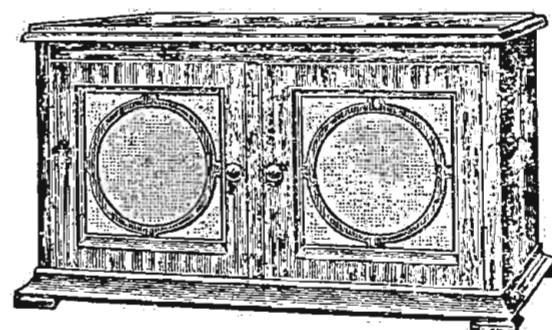
Now, as to the design of the various parts in a loud speaker, there are the diaphragm, the chambers behind and before it, the material of which the horn is made and its shape. The electrical components in several makes of loud speakers have been very well worked out and the magnetic field which affects the diaphragm, either directly or through a link, will respond and vary with every change in tone quality and intensity. It



RADIODYNE

"The Voice of the Nation"

NO LOOPS — NO ANTENNA



ACE Type 3C Console

The Most Satisfactory Radio Set For Real Entertainment

THIS is the last addition to the Ace Family. Has beautiful solid mahogany, wax finished cabinet. Set consists of a regenerative tuner, detector and two stages of amplification with built in loud speaker. Due to the particular method of winding Crosley coils it is exceptionally selective. Has sufficient room inside cabinet for dry batteries making a complete self contained long range receiving outfit. Licensed under Armstrong U. S. Patent No. 1,113,149. Phone jack for tuning with head phones; Crosley multistat; filament switch; engraved Formica panel. Uses all kinds of tubes. An efficient set at a remarkable price, \$125.00—without tubes or batteries.

THE RADIODYNE is operated by simply grounding to a water pipe or radiator, and throwing a few feet of wire on the floor. Uses any standard tubes—dry cell or storage battery. Extremely selective. Simple to operate—only two controls.

Stations within a radius of 2000 miles can be picked up on the loud speaker; any wave length from 200 to 700 meters.

PRICE \$150.00

For use in apartments, boats, automobiles, railroad trains, etc., the RADIODYNE is enjoyable where other receiving sets would not be practical. When interference, strays, static, etc., make other types of reception utterly useless, the RADIODYNE picks up broadcast programs clear and distinct.

Write for illustrated folder which describes the RADIODYNE in detail. Every radio fan will be interested in this new type (antennaless) receiving set.

Western Coil & Electrical Co. 312 5th St. Racine, Wisconsin

The Precision Equipment Co. Powel Crosley, Jr., President 127 Vandalia Ave., Cincinnati, Ohio

WEIGHS ONLY 8 OZ.

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We Guarantee The Scientific Headset to be the greatest value on the market. Try it for five days. If not satisfactory send it back and your money will be refunded immediately. Circular on request. Dealers wanted.

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Agents for New York and Vicinity—AMBASSADOR SALES CO.,
74 Cortlandt St., Phone Cortlandt 6296

NEUTRODYNE RECEIVER

(Continued from page 21)

dered and knowing even less than he did before. In boring underground, in tunnels or subways, to run under streams or bodies of water, there is likely to be a constant seepage or inflow of water. This inflow of water is naturally due to the pressure of the stream above it. A method employed in work of this nature is the use of a counteracting air pressure in the excavation, sufficient to overcome the natural external pressure. To compare this, then, with the situation in Radio frequency circuits, we would state that there is a leakage, or what might be termed a detrimental pressure, mainly between the grid and plate of each tube. In addition, we have considerable leakage throughout the windings of the transformers, the wiring of the set and in numerous other parts of the apparatus. Now, if there can be created a counter-pressure that exactly balances the detrimental pressure or leakage, we have balanced the set. If the counterpressure is insufficient, we have only partially remedied the trouble, whereas if our counter-pressure is too great we have introduced a new trouble. We find, therefore, that neutralization, unless properly adjusted, is valueless and might even be detrimental.

Balancing Operation

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

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

With this tube inoperative, reception will still be heard faintly in the receiver due to the capacity coupling that exists and which is to be neutralized. If the dials are slightly readjusted, the volume can usually be increased a trifle. This step is now ready for balancing.

The adjustment is made on the second neutrodon. The adjustment is varied until the reception is entirely eliminated or reduced to minimum volume. If the volume of the reception is too great, it will be very difficult to judge this point. The dial adjustment should then be gone over to see if readjustment does not bring back

the reception. If so, the balancing operation will have to be repeated. After the adjustment is complete on this neutrodon it should be locked by some means.

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

(TO BE CONTINUED.)

KING MILOPLEX

(Continued from page 19)

else does you father do with his pen and ink? Please tell him he can buy them already printed at the dime store." Teachers are so considerate—the fussy cats—and this repartee goes for the one that used to make me write "Dear Teacher" 500 times after school. Well, lady, this boy eats and he doesn't come by it honestly either—he may take after me—but usually is three square meals ahead. Well, you know "growing children, growing pains" or is it "hungry to bed, hungry to rise, if your cook won't feed you, advertise," and then "try and get it." Both of the above are not original but old truisms from the almanac, though they tell me that if you now ask a druggist for an almanac he starts sniffing to see if you are still wearing your "aesonfoetidia" (or however you spell it) bag, that smells like garlic—but it hain't.

I'm not going to have my hair hennaed this winter—was going to but think I'll look better with a Joan of Arc hair cut. You know the kind I mean, one of those you plaster down with water that makes you look like an Eskimo bride.

And now, ladies, may I step out of the Mystery Man character long enough to assure you both my good wife Maggie, whose real pet name is Tude, and myself would be ungrateful indeed, did we not assure each and everyone—the oh! so many who have written us—that we deeply appreciate the sincere well wishes and interest you have so lavished upon us, in order that he, your sweetheart, may still belong to "My Gang." Many seem to feel that Radio is to me an open book—they seekers for the light. Yet, truthfully, to me it is ever mysterious, ever a will-o'-the-wisp, a fairy tale. To me the bugaboo of static, the scratches, the howls mean nothing but another proof of our intellectual weakness. Because we see, we look not; because we feel, the sense of touch is commonplace; but to hear and to realize so inanimate an object truly "man-made" can be commanded to do our will, can reproduce with fidelity sounds originating hundreds of miles, yes

even thousands, away is positively uncanny. Scratches, cat calls, anything—they are truly marvelous conceptions.

Last week I promised the Reflex, but (the man who invented that word was a life guard) just as I was about to run it, I discovered another hardworking experimenter had been working on the same idea and published a circuit so near like mine that I fear I would be accused of cheating if I ran it.

So NIX on the reflex other than to say those getting my picture will also receive the circuit and I will gladly mail it to all who will send a stamped self-addressed envelope.

Atta baby! Let's eat.

(TO BE CONTINUED.)

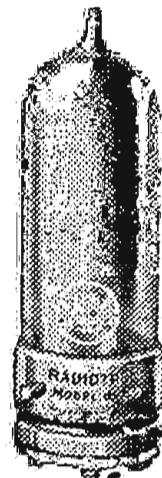
For Clear Reception

By placing a .001-mfd. fixed condenser between the grid leak on the secondary of the second audio-frequency transformer and the negative side of the filament of the first tube, clearer and sometimes louder reception will be obtained.

Trouble Caused by Dust on Plates of Condenser

Dust (as well as pieces of solder and stray bits of insulation, etc.), accumulates very quickly between the plates of variable condensers, and aside from the annoyance which the knowledge of its existence gives, it has several undesirable electrical effects. It increases the dielectric loss, reducing the efficiency of the apparatus, and under certain meteorological conditions the tiny particles accumulate static charges, which, in discharging, add to the sounds caused by the prevailing atmospheric disturbances. In low-power bulb transmitters, where receiving variable condensers are often shunted across high potentials, an accumulation of dust often leads to the breakdown of the condenser.

The dust and other accumulations can be swept away by a pipe cleaner (the kind sold in cigar stores at 5 cents a package) inserted between the plates.



Radiotron UV-199
A Small Tube That's a Big Performer

Radiotron UV-199

for detection or amplification

\$5.00

The new UV-199 is proving a mighty popular member of the Radiotron family, particularly for portable sets.

For quiet operation—great ruggedness—uniform operation Radiotron UV-199 is unsurpassed. Each new Radiotron has marked a big step in radio advancement. The R C A mark is the foundation of radio growth—and your protection when you buy. Ask for Radiotrons—and look for the mark.

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This symbol of quality is your protection

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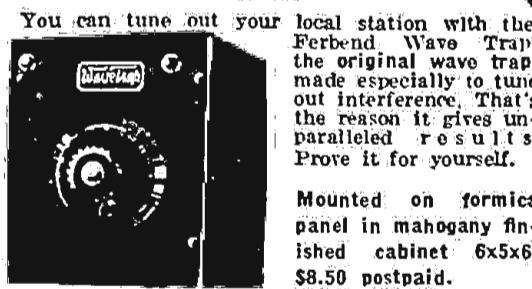
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The FERBEND Wave Trap
PATENT APPLIED FOR
STOPS INTERFERENCE

Unmounted Ready for Panel Mounting only
\$6.00 Postpaid

HEAR ONE STATION AT A TIME



You can tune out your local station with the Ferbend Wave Trap, the original wave trap, made especially to tune out interference. That's the reason it gives unparalleled results. Prove it for yourself.

Mounted on formica panel in mahogany finished cabinet 6x5x6, \$8.50 postpaid.

SEND NO MONEY

You need not send a penny. Pay the postman on arrival while you test your Ferbend. Every Ferbend is guaranteed to tune out local stations or money back quick. You see, you take no risk, so mail your name and address today.

"The Original Wave Filter"

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Proof of Performance 2-Year Written Guarantee

READ THIS SPECIAL NEW YEAR'S OFFER. THEN ACT!

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You need not send a penny. Just clip this ad and attach your name and address. The battery will be shipped to you the day your order is received. When the battery arrives, inspect it—read our 2-year guarantee before you pay one penny. Confide yourself you are protected from every angle—that the World battery price saves you 50%. Get the "B" Battery and hydrometer FREE. Order today.

COMPARE THESE PRICES: Special 200-hour Rechargeable Storage Batteries

- 2 Volt for WD-11 and 12 Tubes.....\$ 5.00
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World Battery Co., Dept. L, 60 E. Roosevelt Rd., Chicago, Ill.

Clip and mail this ad with your World battery order and get this hydrometer and "B" battery FREE.

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Send your order today.

An Absolute Guarantee with every instrument made them famous!

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SUPER VALUES
GENUINE

Fada-Hazeltine Neutrodyne Parts
FOR 5 TUBE SET
List Price\$65.60
OUR PRICE.....**\$50.15**
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RESISTANCES
Genuine P. L. Original Lavite
48,000 OHMS.....\$1.00 100,000 OHMS.....\$1.00
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We Have Just Received a New Shipment of
THE NEW MODEL D, N. & K. PHONES Our Price **\$6.50**
MADE IN GERMANY

WE GIVE A 20% DISCOUNT On All Standard Radio Apparatus Not Listed Above
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The RADIO MAIL ORDER HOUSE—Known for Low Prices. Write for Our Catalog B

HANES-ZENER
3 WEST 29TH STREET, NEW YORK CITY

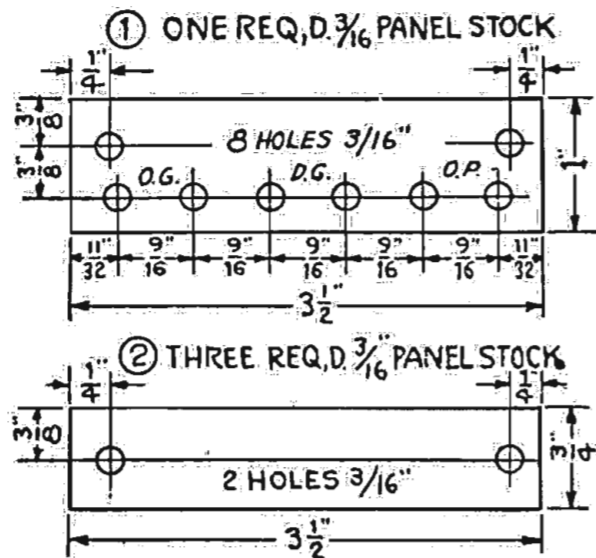
How and Why of Super-Heterodyne Receiver

Chapter III—Oscillator Construction Details

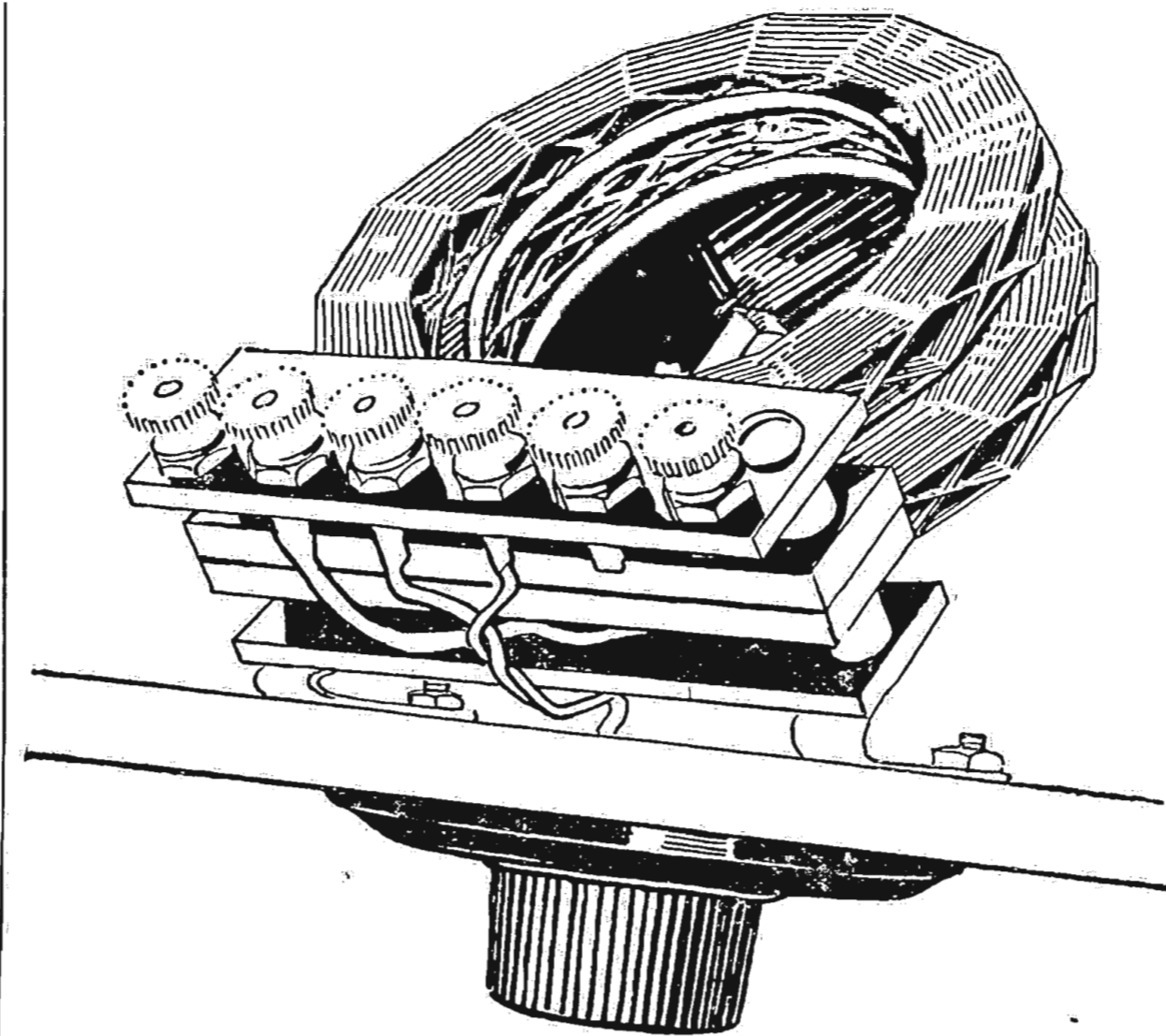
By H. J. Marx

AFTER the long wave or super-audible transformers have been constructed and the fan understands the reason for their employment in this receiver in preference to the average Radio frequency or even audio frequency transformer, the explanation of the oscillator is considerably simplified.

Let us assume that the super-audible transformers give maximum efficiency at a wave length of 10,000 meters, which is the same as saying at a frequency of 30,000 cycles. The broadcasting range



that is to be covered runs from 200 to 600 meters (1,500,000 to 500,000 cycles). Then the range of the oscillator should be from 470,000 cycles (500,000—30,000) to 1,530,000 cycles (1,500,000 + 30,000). This means that the oscillator circuit must tune from 196 to 638 meters. The idea is that we must synchronize the two frequencies so that we impress the one frequency on the other at certain beats. It is these beat values that carry the fluctuations which



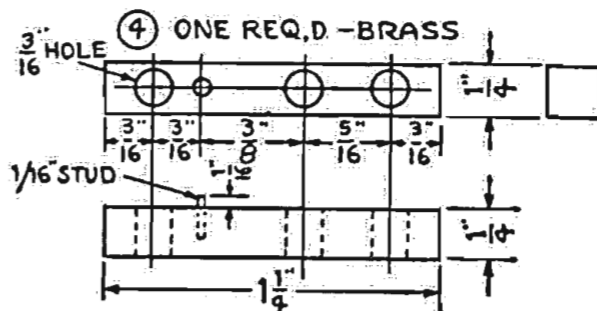
denser which should be of the best quality obtainable. The lower the losses and resistance of this condenser, the more selective are the tuning qualities of the super-heterodyne circuit.

If the oscillator does not cover the tuning range required, the circuit will not function. Then, again, the oscillator circuit parts must be so designed as to permit free oscillation of the tube. Improper design will be manifested by the fact that the tube will not oscillate.

Oscillator Coils
All the points discussed have been carefully considered in the design. The parts have been carefully detailed so that they can be assembled by any fan with a little mechanical ability. The special inductances are again used because of their high efficiency and low cost. The values and sizes given vary slightly from the standard form but these sizes will undoubtedly be placed on the market soon.

Fans can easily wind these forms

themselves. It is only necessary to cut a wooden rod to the diameter required, and use the size studs indicated for the two sizes of coils required. The wire is wound from one side to the other, always



going over two studs on each side. About 15 studs (odd number) are required.

Oscillator Parts

All the parts have been carefully detailed and numbered. Number 1 is the top (Continued on page 26)

are rectified in the second detector after having been amplified in the super-audible stages.

It is obvious that, when tuning, any close wave length which would otherwise interfere with reception, would not synchronize with the beats, and is therefore eliminated.

As may be expected, the oscillator tuning is controlled by the variable con-



Super-Vernier Rheostat Gets 'em All Gets 'em Clearly

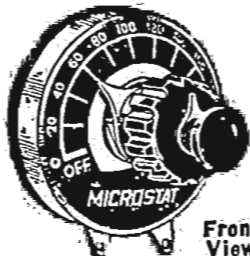
"MICROSTAT" is in a class by itself as a precision instrument for the perfect control of the filament current in detector tubes, and everyone knows that you must control this current to the finest degree if you are going to get the ultimate from any set—"MICROSTAT" does all this. Built on an entirely new principle. Two windings in parallel—one 6 ohm—other 40 ohm. Absolutely noiseless—infinite control—handles any tube. Capacity 3 Ampere Bakelite moulded—silver etched dial. Do not install a Rheostat until you know all about the "MICROSTAT." Our Bulletin No. 92 explains it in detail. Send for it. It's FREE.

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\$3.00

—and worth it.

Ask your dealer for "MICROSTAT" —and get it



Radio Apparatus
Favored and demanded by "those who know" in Radio

New "Regal" No. 162 Double Arm Inductance Switch
A 15 Point Switch complete in one unit. No more messy soldering. No more drilling of holes. No more chipped panels. Complete with hard rubber Knob and Dial. \$1.50

New "Regal" No. 120 Vernier Rheostat
For fine filament control of tubes, and superfine tuning, the Regal Vernier stands alone. Nothing just like it on the market. Complete with Knob
6-ohms\$1.25
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New "Regal" No. 200 Audio Frequency Amplifying Transformer
For clearness of tone, amplification of voice and music from nearby and distant broadcasting stations, is unequalled by any Transformer on the market.
3/4 to 1 Ratio....\$4.25
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RADIO CABINETS
Direct from manufacturers. Excellently finished in genuine Mahogany and Oak.

7 x 7 x 9.....\$2.85	7 x 7 x 21.....\$3.50
7 x 7 x 10..... 2.95	7 x 7 x 24..... 3.85
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POSTPAID IN U. S.
Strongly constructed with grooves for panels. No fasteners or screws needed. Cash with order.
Sizes denote size of panels required to fit in grooves of cabinet. Base Boards up to 18 inch, 25c extra; over 18 inch and up to 28 inch, 40c extra.

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237 South Market Street, Dept. 21, Chicago

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The Antenna Connector.
Price 10c

Snap larger connector over Antenna Wire; insert Lead-in Wire into smaller clip and a perfect connection is the result.

PERFECT CONNECTIONS
are always sure with
Fahnestock Patent Wire Terminal

Grips like a Vise
Eliminates Vibrations
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Best of All for RADIO OUTFITS

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Made in all Sizes and Shapes
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BETTER TUNING
with
BREMER-TULLY
VERNIER TUNER

\$5

Says **N. T. BRADFORD**
Terra Bella, California, Jan. 3rd, 1924.
"I assembled your No. 2 with two stage amplifier at an expenditure of two hours' time, including the amplifier. Since that time my Neutrodyne has been laid away and all our Radio receiving has been by way of B. T. No. 2. The tones are the best of any set I ever operated."

Says **GEO. COLMAN**
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"I saw in the Daily News Saturday an article about Minor's Superdyne being able to pull in Elgin through WJAZ. Just want to let you know that with your No. 2 hook-up I have just now pulled in Elgin, Cincinnati, Cleveland, and Pittsburgh with both KYW and WMAQ going strong and can do it every time, as well as get almost anything else I want."

Better Tuning B-T
Tells you why—shows you how. Sent on receipt of ten cents—packed free with each tuner.
Price 10c

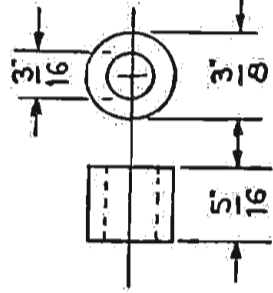
BREMER-TULLY MFG. CO.
532 South Canal Street CHICAGO

SUPER-HETRODYNE

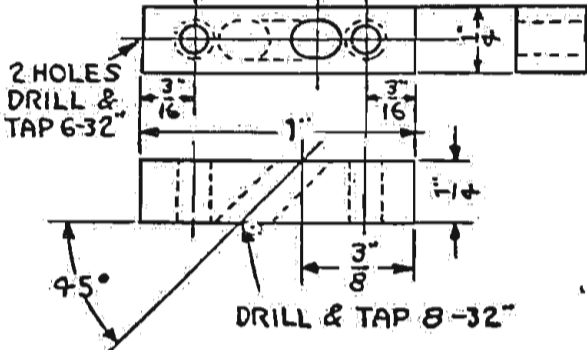
(Continued from page 25)

clamping strip and terminal holder. The two holes marked OG are for the oscillator grid coil (48 turns). The two marked

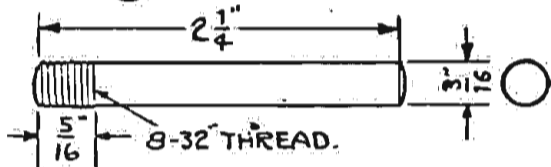
⑤ FOUR REQ.D.—HARD RUBBER.



⑥ ONE REQ.D.—BRASS

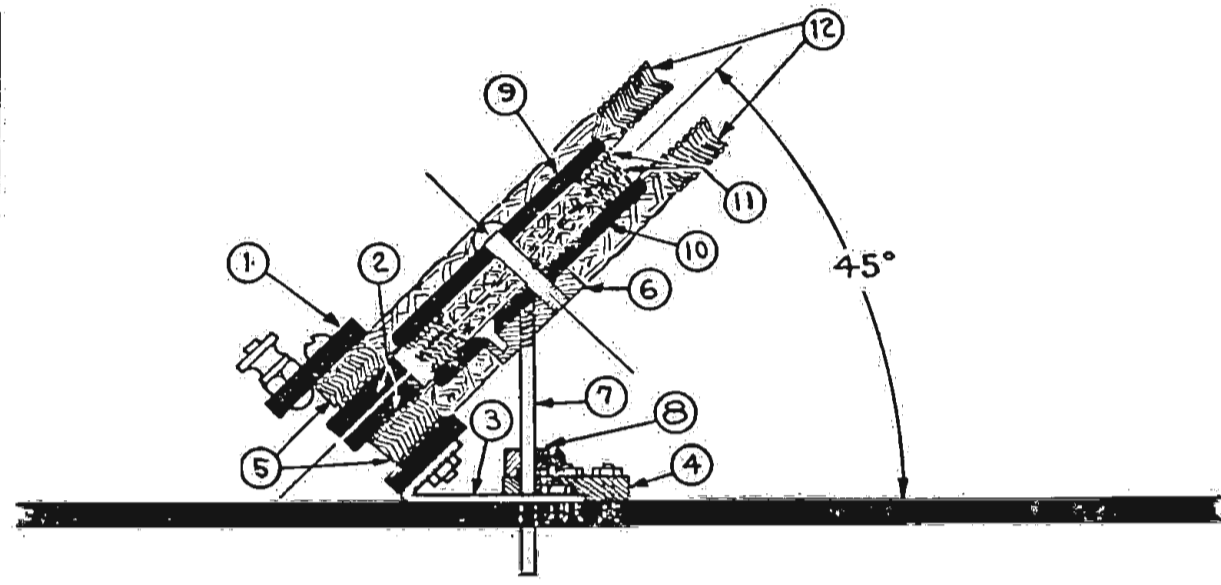


⑦ ONE REQ.D.—BRASS



OP are for the oscillator plate coil (48 turns) and the two in the center marked DG are for the two rotor coils (28 turns each in series), which are connected to the first detector grid circuit.

This variable coupling is not always



necessary, but as it is not very critical, it can well be added as it was found to have an advantage for clearing up any overloading of the first detector tube.

The three strips number 2 are merely clamping and spacing strips for holding the fixed coils in proper position.

Brass angles number 3 hold the fixed unit in proper relative position on the panel.

The brass piece number 4 is the bearing for the rotor shaft and is mounted on the panel. The small stud is a stop pin which

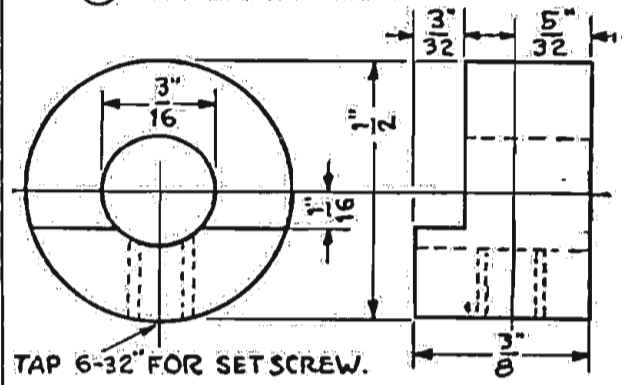
limits the rotation of stop collar number 8. This stop collar slides over the shaft 7 and is locked into position with a set-screw.

The four hard rubber collars number 5 are spacers which are slipped between the strips and prevent the coils from being crushed.

The brass piece 6 holds the shaft at the proper angle when mounted on the inside clamping disc number 10.

The two small coils are clamped in position between the two discs 9 and 10. The outside wire of one coil (28 turns) and the inside wire of the other (28 turns) are connected together. The other end of

⑧ ONE REQ.D. BRASS



each coil is connected to flexible leads which pass through the hole provided in the inside clamping disc and are connected to the two center terminals on strip. These leads should be long and

(Continued on page 28)

YOU DON'T NEED TUBES

to hear concerts from out of town. If you want to get new stations

ON YOUR CRYSTAL SET

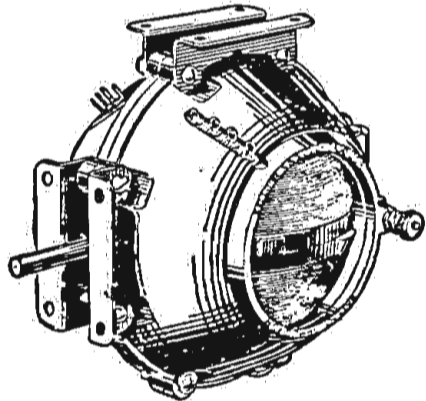
write me today. I get new records every day from people using my plans who hear programs on Crystal from stations 400 TO 1000 MILES AWAY

No tubes, batteries or amplifying apparatus necessary. I hear KDKA (Pittsburgh Pa.) on Galena. You may already have everything you need and just have it connected up wrong. Send self-addressed envelope for picture of my set, and reasons why you need my plans.

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Kellogg Variocouplers



No. 501 VARIOCOUPLER

The Kellogg variocoupler furnishes coupling of the highest degree assuring maximum volume and clarity.

The shells are of Bakelite treated to prevent distributed capacity. There are eleven stator and two rotor taps. No sliding contacts; rotors are made with special flexible wire through hollow shaft to binding posts on stator shell. Can be used as a split-variometer. Large bearings warrant smooth operation and long life.

Specify Kellogg and know you have the best.

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A loud speaker on one tube

TRI-COIL for PEP!
TRI-COIL Radio Frequency Transformers put "pep" into a set—"pep" of the kind that makes a one tube set operate a loud speaker! And yet the list price is only \$2

FREE—"How To Build The TRI-COIL Reflex" free at your dealer's or direct from us.

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NAZELEY'S PORTENA Folding Loop
Patent Pending

Folds up like an umbrella— Works like a charm.

Spread 28 inches

Genuine Bakelite Facings; 85 ft. green covered wire; rich mahogany finish. In an individual morocco covered tube.

List \$7 each

One Dozen to a Case

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Burned Out or Broken RADIO TUBES REPAIRED

All Tubes Guaranteed to Work Like New

Mail Orders Given Prompt Attention

24 HOUR SERVICE—All Tubes returned P.P. C.O.D.

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UV-201 3.00	C-301 3.00
UV-202 3.50	C-302 3.50
UV-201A 3.50	C-301A 3.50
UV-199 3.50	C-299 3.50
DV-1 or 2..... 3.50	DV-6 or 6A..... 3.00

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GLOBE ELECTRIC CO. 609 Cham. of Com. Bldg. Pittsburgh, Pa.	WELLSTON RADIO CO. 1479 Hodiarnont Ave. St. Louis, Mo.

Crosley "Harko Sr."
1-Tube Receiving Sets
Non-regenerative type. Brand new, in original boxes.
WERE SOLD FOR \$20
My Price
\$7.50
NO CIRCULARS—ORDER FROM THIS AD
Prepaid While The Last
TWITCHELLS RADIO HOME
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Why JUNK YOUR SET?

The new TWITCHELL AUXILIARY TUNER connected to your present set will enable you to bring in the long and short wave stations which your present set cannot get. It also cuts out all local stations so you may bring in distance any time without local interference. Copyrighted diagram of this tuner 50c. or with all parts \$9.00. Complete instrument in walnut cabinet, ready to use, \$15.00. Transportation prepaid.

MY HIGHLY IMPROVED REINARTZ brings in all important stations on this Continent loud, clear and without distortion. We dance to music from Atlanta and Los Angeles.

Build one of these wonderful 3 tube sets from my blueprint and specifications, price 50c. or with a complete and perfect double-wound spiderweb coil \$3.00 by mail. Picture of this set on a glass panel with every order. This copyrighted circuit is the most successful of any Reinartz modification yet produced, and is imitated the most. Thousands are in use.

My W. D. 11 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. Sets built from these copyrighted plans will receive all broadcasting stations operating under the new laws. Their wave length range is from 170 to 800 meters. All goods prepaid. These instruments are easy to build, easy to operate. Everything clearly shown.

S. A. TWITCHELL
1925 Western Avenue Minneapolis, Minn.

Infinite Adjustment for ALL TUBES!

DESIGNED to permit infinite adjustment of currents used in vacuum tube. Gives absolute control of electronic flow and finest tuning possible. Fil-Ko-Stat will bring in DX you never heard before and shut out noise.

30 ohms full resistance. No adjustment to tuzzle. No discs to break. No Carbon Powder.

\$2 AT ALL DEALERS!

FILKO-STAT
Made and Guaranteed by
DX Instrument Co. Harrisburg, Pa.
Radio Stores Corp., 218 W 34th St., New York
Sole International Distributors

CLEAR RECEPTION ASSURED

Crosley "Harko Sr." 1-Tube Receiving Sets
Non-regenerative type. Brand new, in original boxes.
WERE SOLD FOR \$20
My Price
\$7.50
NO CIRCULARS—ORDER FROM THIS AD
Prepaid While The Last
TWITCHELLS RADIO HOME
1925 Western Ave. Minneapolis, Minn.

A Crosley brings in distant Stations Easily. Listen to Crosley Broadcasting Station WLW.

NO MATTER which Crosley Receiver you choose, you can be assured of unexcelled performance at the lowest price. The Model X-J has proven especially popular. With it, Stations in all parts of the United States and Canada may be clearly heard. Even Honolulu has been frequently brought in from the eastern seaboard.

Compare These Prices

Crosley Model VI—a Two Tube Set	\$ 30
Crosley Model X-J—a Four Tube Set	\$ 65
Crosley Model X-L—a Four Tube Console	\$140
Special Mahogany Stand for Model X-L	\$25

For Sale by Good Dealers Everywhere.

Write for free Catalog.

The Crosley Radio Corporation
Powel Crosley, Jr., President
Formerly The Precision Equipment Company and Crosley Manufacturing Company
2491 Alfred St., CINCINNATI, OHIO
The Largest Manufacturers of Radio Receivers in the World

Modified Form of a Green Regenerative Circuit

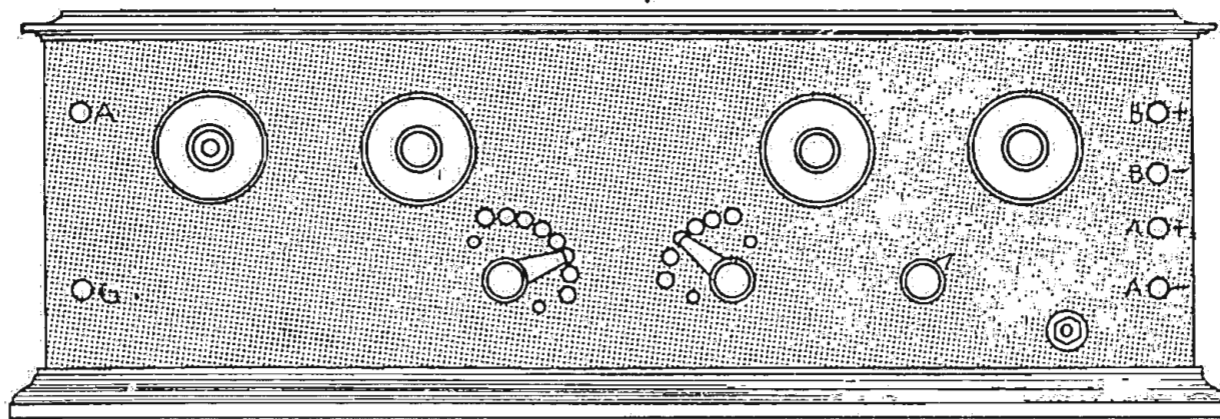
Part I—Loud Signals Attuned with Circuit

By Myron P. Green

THERE have been certain rules emphatically dished out to the Radio public specifically stating that any circuit not accepted and considered "standard" was a "freak." No reason is given why any circuit not acceptable to these experts is considered in this light other than that it doesn't comply with what they call "standard."

The fact that it might work much better or more consistently is lost sight of and the moment any circuit is presented that diverges in the least, it is taboo and rubber stamped "freak." This fact might be harmful to the science of Radio were it universal, but I am thankful to say it is not.

Radio has improved by leaps and bounds by diligent experimenting on the part of those most interested in this wonderful science, and by those who take nothing for granted. None of these men have any ax to grind; they are workers toward a result that perhaps will make Radio history.



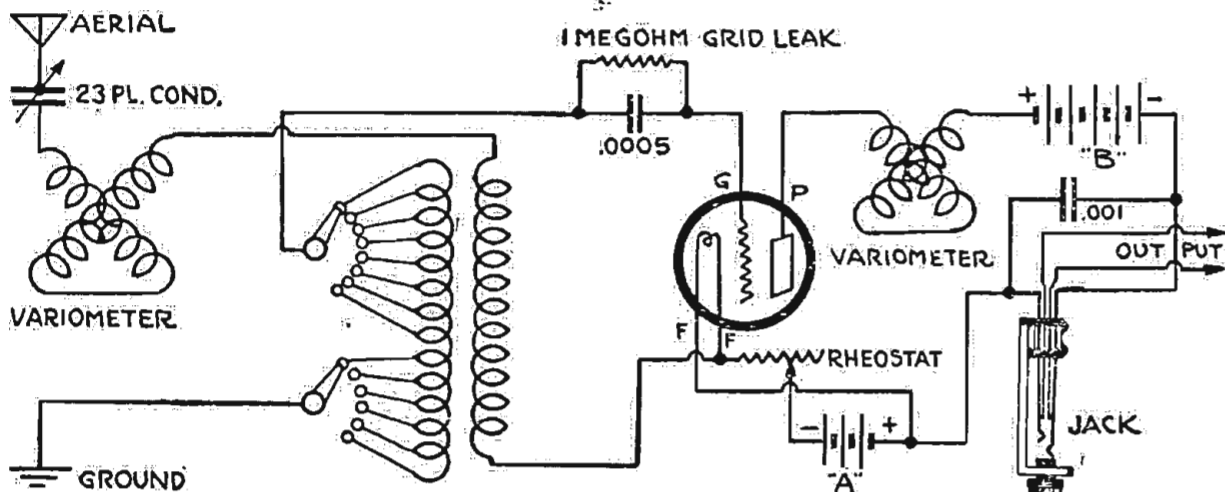
Improving Regeneration Circuit

The writer formerly had a standard form of regenerative circuit consisting of two variometers and a variocoupler. This set did all that was claimed for it and I was satisfied until I began to experiment to see if the circuit couldn't be

its standard predecessor, and I have given a fair test to both sets, trying them on same antenna in different localities.

For DX work it leaves nothing to be desired. On one tube I have received the following stations loud enough to hear every word clearly and without straining, all of them within a period of twenty days:

- | | |
|-------------------------|-------------------------|
| WEAN, Providence, R. I. | WDAJ, College Park, Ga. |
| WCX, Detroit, Mich. | WHAS, Louisville, Ky. |
| WDAF, Kansas City, Mo. | WJAR, Prov., R. I. |
| WDAR, Philadelphia, Pa. | WLW, Cincinnati, Ohio. |
| WBAK, Harrisburg, Pa. | WHAZ, Troy, N. Y. |
| WBT, Charlotte, N. C. | WMAF, Dartmouth, Mass. |
| WCAP, Washington, D. C. | WSB, Atlanta, Ga. |
| WBZ, Springfield, Mass. | WMC, Memphis, Tenn. |
| KOP, Detroit, Mich. | WTAM, Cleveland, Ohio. |
| WOC, Davenport, Ia. | WVDA, Phila., Pa. |

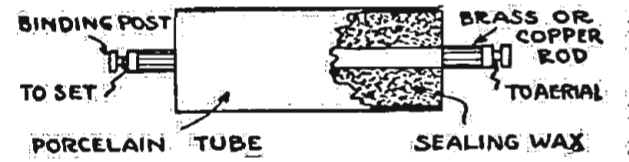


The circuit herein shown might be termed "freak" possibly because it differs so much in the placing of the parts from the standard form, but right here I wish to explain how this circuit originated.

An Efficient Lead-In

The materials necessary for making this lead-in are one porcelain tube, 1 1/2 or 2 inches in diameter, such as electricians use in wiring a house; a copper or brass rod, 1/4 inch in diameter and 1 inch longer than the tube; two binding posts and a quantity of the compound used to seal dry batteries.

Bore a 1/4-inch hole, 1/2 inch deep, in any old board and insert the rod therein in a vertical position. Place the porcelain tube over the rod so that the rod extends



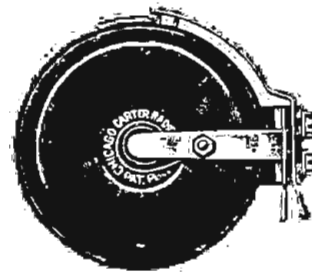
up through the center. Melt the wax and pour enough of it into the tube to fill it completely. When the wax has hardened, solder a binding post to each end of the rod and you will have a lead-in free from energy losses.—J. Hovey, Sylvan Beach, N. Y.

The Best Type of Aerial

A single wire of number 14 bare copper, from 40 to 80 feet in length, just as high and straight as it can be erected, with the lead-in coming from one end, and not from the middle, or anywhere near it, makes the best aerial. Insulate the aerial carefully to see that it does not touch anything.

improved upon. I changed this and changed that, making all manner of combinations with the idea of increasing the tone volume, and I claim that I have done it. Without fear of contradiction I honestly say that the tone volume of this "freak" circuit is far better than that of

CARTER Vernier Control Rheostat



- 6 ohms \$1.50
- 20 or 30 ohms.... 1.75

No scraping.
No jerking.
No friction bearing connections.
Phosphor-bronze contact spring.
Pig-tail connection insures positive contact.

Carter Vernier Control Rheostat gives that close adjustment so essential to successful broadcast reception, where stations operate on wave lengths but a few meters apart. A Carter Vernier Control Rheostat makes your set much more selective. Write for catalog of other Carter Products.

Carter Radio Co.
305 S. STATE STREET
CHICAGO

Columbia Radio Corporation

155 N. UNION STREET, CHICAGO

Columbia Inside Coil Mounting

Newer, Neater, Better

Here is an inside coil mounting made for the radio owner who wishes to keep bulky coils out of sight. It is friction geared and fine "vernier" adjustments are possible. Nothing shows outside panel except knob and pointer. Only \$6.00 at all good dealers.

DEALERS—Responsible distributors all have Columbia Radio products. It pays to give your customers the best. No other radio products have this name—Insist on it.

Columbia Radio Corporation
It's Columbia—So It's Good!

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|-----------------------------|-----------------------|
| KDKA, Pittsburgh, Pa. | WWJ, Detroit, Mich. |
| WCBD, Zion City, Ill. | CFCA, Toronto, Can. |
| KDOW, S.S. America (at sea) | WGR, Buffalo, N. Y. |
| WSAH, Chicago, Ill. | WRW, Tarrytown, N. Y. |
| WDAP, Chicago, Ill. | WBAN, Paterson, N. J. |
| KYW, Chicago, Ill. | WNAQ, Chicago, Ill. |
- (Continued on page 28)

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A no capacity, all inductance winding

	Turns	List Price	Wave Length
P-201	25	\$.55	100-340
P-202	35	.59	125-470
P-203	50	.65	170-650
P-204	75	.74	220-960
P-205	100	.90	300-1300
P-206	150	1.10	470-1980
Pfanstiehl Ultra-Audion		.95	150-600
Pfanstiehl Reinartz		1.75	150-600

Pfanstiehl Tuning Unit, consisting of 2 Spider Web Coils with mechanism for supremely sensitive adjustment \$5.00

At all good dealers or direct on receipt of purchase price.

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Highland Park, Ill.

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The New Voice of Radio

No. 804 \$15.00

Made from "Madera," an artificial wood, cast in steel dies, under great pressure and heat. Is twice as dense as natural wood.

Choice of 5 styles complete with Baldwin loudspeaker unit, ready for use with any radio set.

Wonderful Acoustic Properties

resembling a century-old violin. Reproduces human voice or music with rare fidelity, preserving the "overtones" that distinguish each voice or instrument.

Order from your Dealer. If he cannot supply you, send us his name and address.

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347 West Austin Avenue CHICAGO

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A Laminated Phenolic Condensation Product

SHEETS TUBES RODS

RADIO PANELS

POLISHED BLACK FINISH

CUT PERFECTLY SQUARE TO ANY SIZE

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

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

STARRETT MFG. CO.
519 SOUTH GREEN ST. CHICAGO

Which Aerial—Wire or Ribbon?

YOUR Aerial is a part of your Receiver! Don't blame your set for unsatisfactory results. Nine times out of 10 the fault is in the Aerial. Try the sensational new TRANSCONTINENTAL "Ribbon" Aerial—adopted by Radio Engineers, broadcasting laboratories, and thousands of enthusiastic radio fans. It's guaranteed to give clearer tone, bigger volume, greater distance, sensitiveness and selectivity or money refunded.

500% better results with the sensational TRANSCONTINENTAL Copper Aerial

150 FOR 50 FOOT COMPLETE

75 ft. \$2.25
100 ft. \$3.00
150 ft. \$4.50

Complete, ready for use with soldered snapbooks to fasten on to insulators.

supply you promptly. Postage paid when cash with order, or C. O. D. plus postage. Now sold in good radio stores, all over the U. S.

DEALERS and AGENTS! Write for attractive propositions today! Big sales, good profits sweeping the country so get busy.

ACORN RADIO MFG. CO.,
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Radio Supplies at Cut Prices

BATTERY CHARGERS

- Tungar Type Charger..... \$ 9.21
- Homchargers 13.25

CONDENSERS

- Crosley D..... 1.90
- Bremer-Tully No. 23 Vernier..... 3.65
- Bremer-Tully No. 43..... 4.39
- 17 Plate Standard..... 1.04
- 23 Plate Standard..... 1.12
- 23 Plate Vernier..... 1.98

VARIOCOUPERS & VARIOMETERS

- AC Dayton Coupler..... 5.35
- AC Dayton Variometer..... 4.88

LOUD SPEAKERS

- Manhattan..... 19.20
- Atlas..... 17.50
- Baldwin Standard..... 19.25
- R3 Magnavox..... 24.80
- M1 Magnavox..... 24.80
- Western Electric 10-D..... 39.50
- Western Electric Via Att..... 29.25
- Baldwin Unit..... 5.21
- Atlas Unit..... 9.60

NEUTRODYNE PARTS

- Bremer-Tully complete parts for 5 tube..... 34.90
- Air Core Transformers..... 1.35
- Neutrodions..... .69

TRANSFORMERS

- Acme Audio..... 2.76
- No. 45 Jefferson Trans..... 3.33
- No. 41 Jefferson Trans..... 2.83
- Dayton Fan Trans..... 2.00
- Wetmark Trans..... 3.25
- General Radio Trans..... 3.41
- Amertran Trans..... 4.23

PHONES

- Western Electric..... 8.50
- Baldwin C..... 8.45
- Frost..... 2.85

SETS

- Precision Ace..... 14.95
- Crosley VI..... 21.53
- Crosley XJ..... 49.75
- B. T. Neutrodyne 5 tube..... 87.50

Write for Agent's Price List. Always Include Parcel Post and Insurance.

VALLEY RADIO SUPPLY CO.
2206A Locust St., ST. LOUIS, MO.

MODIFIED GREEN CIRCUIT

(Continued from page 27)

- | | |
|-----------------------------|---------------------------|
| WJAZ, Chicago, Ill. | WWR, Atlanta, Ga. |
| WBAP, Fort Worth, Texas. | NNA, Arlington, Va. |
| WFL, Philadelphia, Pa. | WAC, Kansas City, Mo. |
| WOO, Philadelphia, Pa. | WAAZ, Emporia, Kan. |
| WGI, Medford, Mass. | 6KW, Tuinucu, Cuba. |
| WGY, Schenectady, N. Y. | WHAD, Milwaukee, Wis. |
| WHAM, Rochester, N. Y. | WTAR, Norfolk, Va. |
| WIP, Philadelphia, Pa. | WAAN, Columbia, Mo. |
| WEAM, No. Plainfield, N. J. | WEAR, Baltimore, Md. |
| WEAO, Columbus, Ohio. | WMAC, Cazenovia, N. Y. |
| WCAE, Pittsburgh, Pa. | WNJ, Albany, N. Y. |
| WQAA, Parkersburg, Pa. | WPAZ, Charlestown, W. Va. |
| PWX, Havana, Cuba | WRAY, Scranton, Pa. |
| WMAK, Lockport, N. Y. | WQAO, Mishawaka, Ind. |
| WOAW, Omaha, Neb. | WQO, Kansas City, Mo. |
| WOS, Jefferson City, Mo. | WHAA, Iowa City, Iowa. |
| WQAM, Miami, Fla. | WOH, Indianapolis, Ind. |
| KSD, St. Louis, Mo. | WABG, Jacksonville, Fla. |
| WRC, Washington, D. C. | WCM, Atlanta, Ga. |
| WNAC, Boston, Mass. | WLAG, Minneapolis, Minn. |
| WLAJ, Bellows Falls, Vt. | HTAK, Steubenville, Ohio. |
| WSAL, Cincinnati, Ohio. | WSY, Birmingham, Ala. |
| | NAH, Brooklyn, N. Y. |

I recommend good substantial parts for this circuit and suggest that the purchaser do not try to see how cheaply he can buy the different instruments, for by actual experience I have found this poor economy.

Good Parts Necessary

It is an excellent idea to have vernier adjustments on the two dials governing the variometers. It is essential to shunt the phones with a .001 mica condenser. For good DX work the antenna need be only 50 feet in length. See that it is properly insulated, however, for this means much in the quality of your reception.

Do not use a ground clamp, but file a bright spot on the pipe or radiator, wind a good length of wire around it several times, each strand close to its neighbor, tighten it well and solder over it all. This makes an excellent ground and you need not fear it will come loose.

Do not rush it when tuning, but take it slowly, work each control with infinite care and you will be surprised at what this "freak" will do.

(TO BE CONTINUED.)

Practically every section of the British empire is linked by Radio.

Morrison



Loud Speaker

USE YOUR PHONOGRAPH FOR RADIO

To really enjoy radio you require a loud speaker that reproduces all broadcasting in full volume with rattle, vibration and distortion eliminated. Your phonograph has a sound-box that cannot be excelled. So attach a Morrison Loud Speaker to the tone-arm of your phonograph and you have a perfect combination—a scientifically developed loud speaking unit reproducing Radio's wonderful concerts through your phonograph's incomparable sound-box. It is the refinement of radio enjoyment.

A little dial on the Morrison enables you to adjust the tone, soft or loud, to suit your taste. Further than that, Morrison is fool-proof—requires no technical skill nor constant adjustment to operate.

This remarkable loud speaker complete with a 5-foot cord costs only

\$10.00

Nickel-Plated Model

Every Morrison Loud Speaker is sold on a satisfaction or money-back guarantee. Our 2-color catalogue describes Morrison fully—we would like to send you one free.

DEALERS

Our merchandising plan to help you sell Morrison Loud Speakers assures you a profitable business. Every sale you make brings many more. Let us tell you about this plan.

Morrison Laboratories, Inc.
343 Jefferson Ave., E., Detroit, Mich.

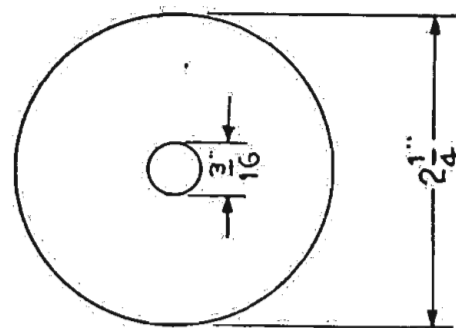
SUPER-HETERODYNE

(Continued from page 26)

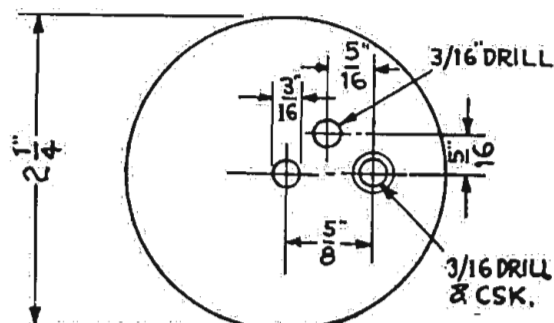
flexible enough so as not to interfere with rotation.

A cross-section and an assembled view are given of the whole unit to clear up any doubts as to the proper assembly of the parts.

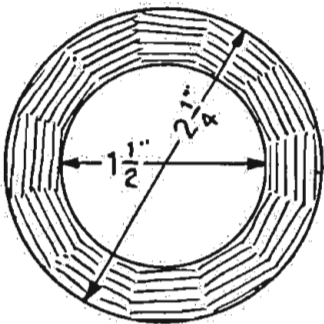
⑨ ONE REQ.D. 1/8 PANEL STOCK



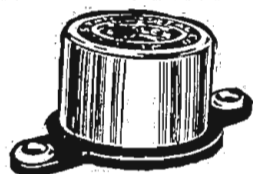
⑩ ONE REQ.D. 1/8 PANEL STOCK



⑪ TWO REQ.D. - SPECIAL INDUCTANCE 28 TURNS WOUND AROUND 1/8" STUDS



HITCH YOUR RADIO TO A STAR FIXT CRYSTAL



Price \$1.25

A sure cure for catwhiskeritis. Easy to attach to any crystal or reflex set. Positively cannot jar out of adjustment. Increases the pleasure of your set 100%. The logical successor to the open cat whisker and crystal. Sold with a positive GUARANTEE TO SATISFY THE PURCHASER WHEREVER BOUGHT. Never anything like it produced before the STARS came out.

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TEN REAL BIG REASONS WHY YOU, Yes, YOU Should TODAY ORDER and ALWAYS USE WHERE I GO BY RADIO

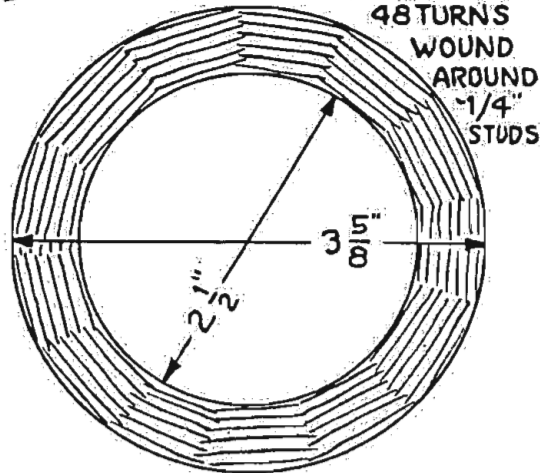
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6. Special copyrighted symbols make recording easy.
7. Enable you to keep permanent records of everything interesting you hear, such as when Lloyd George, Woodrow Wilson, President Coolidge spoke, etc.
8. Supplies at Small cost what every "Ra-Owl" has long been wanting.
9. Endorsed and used by both amateurs and professionals everywhere.
10. New, Unique Radio Record System, with an idea that appeals. It's the idea and not just the number of pages, each 8x11 inches, that makes it worth while.

Now "Listen In" on This. The names and addresses of the First Person from each of the First Ten States, and the Last Person from each of the Last Ten States, revealed by us to February 9th, inclusive, sending \$1.00 for one Holiday, or two copies Popular Edition of Radio Record Books "Where I Go by Radio," will be published later in this paper. This is a test of the "pulling power" of this advertisement. Why Not Be First and see YOUR name in print?

RADIO BOOK DEPT.
PROGRESS PRESS
Union, South Carolina, U. S. A.

⑫ TWO REQ.D. - SPECIAL INDUCTANCE



It is advisable to shield the entire oscillator circuit carefully as interference will seriously affect reception.

(TO BE CONTINUED.)

Turning On Battery Current

Snap switches of any sort may be placed on the panel of your set and it will not be necessary to disconnect the batteries each time you listen in. Always have the current turned off the B batteries when the A battery current is turned on. Let it have time enough to warm up the inside of the tube before turning on the B battery current.—J. B. Owen, Blair, Okla.

TUBES \$4.24

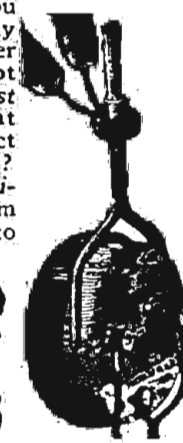
Genuine R. C. A. Radiotrons
UV199, UV201A, WD11, WD12
Guaranteed Firsts in Original Packages

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| Brandes "Superior" Phones..... | \$4.75 |
| Brandes "Table Talker"..... | 8.12 |
| Bremer Tully Vernier Tuner..... | 3.97 |
| 3-Amp. Tungar Type Battery Charger, Complete | 9.38 |
| "Erla" Reflex or Audio Transformers..... | 3.96 |
| All American Transformers (All ratios)..... | 3.82 |
| "Como Duplex" Push-Pull Transformers (pr.)..... | 9.87 |
| Acme Audio Transformers..... | 3.97 |
| 23-Plt. Vernier Condenser, Knob and Dial..... | 2.13 |
| 23-Plt. Variable Condenser..... | 1.14 |
| \$25.00 "FADA" Neutrodyne parts..... | 19.75 |
| Complete (BREMER-TULLY) parts for 5-tube Neutrodyne set..... | 29.89 |

Cash or C. O. D.—Send for Complete List.
SIMPLEX RADIO SALES CO.
1806 Lafayette Ave. St. Louis, Mo.

Guaranteed Head-Sets

"RED-HEADS" are guaranteed radio phones. You run no risk when you buy them. Money back if, after 7 days' trial, you're not satisfied that they're the best receivers on the market at the price. Why not act right now and get a pair? It'll mean getting the maximum from broadcasting from the day you put them into use.



RED-HEAD RADIO RECEIVERS

NOW READY

The new 1924 Model F | The new "Red-Head" Jr.
\$6.50 Per Pair Complete | **\$5.00** Per Pair Complete

"Red-Heads" sent prepaid on receipt of price if you are unable to get them at your dealer's.

THE NEWMAN-STERN COMPANY
Dept. R. D., Newman-Stern Bldg., Cleveland

Another Scoop

for C. W. Thompson Company

ANNOUNCING A NEW

WESTERN ELECTRIC LOUD SPEAKER

Cabinet Type—No unsightly horn with 2-stage push pull amplification.

The Speaker Supreme—List price, with 3 W. E. Tubes.....\$175.00

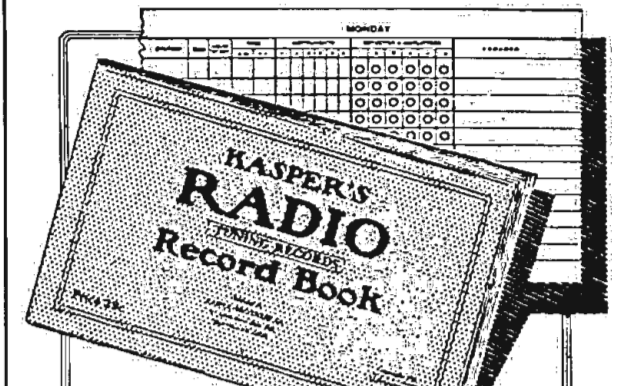
Also the improved type 521-W with Fibre Horn at \$23.00 list.

Dealers: Write



Swaying of the Antenna

While air currents do not affect the propagation of ether waves between the transmitting and receiving stations, the swaying of the antenna of the transmitting station in the wind frequently causes changes in capacity of the aerial and therefore a change in wave length which may be noticeable at the receiving station. This fact is most evident when the transmitting station is employing continuous waves and the receiver is operating on the heterodyne (synchronous) principle.



Don't Waste Your Time

Looking for stations you already had. When you get a station simply copy the readings in a KASPER RADIO RECORD BOOK, then when you want it—IT'S THERE. This book can be used with any set and it is so arranged and printed that each day's broadcastings are kept separate; also contains full illustrations and instructions HOW TO RECORD STATIONS. 25 cents—or 6 for \$1.00, postage paid—don't send stamps.

Write Today
KASPER BROTHERS COMPANY
317 Lorain St. Bank Building
Cleveland, Ohio
Dealer or Agents Wanted Everywhere



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| TURNEY SPIDER WEB TUNER..... | \$ 6.00 |
| FADA NEUTRODYNE PARTS, for 5 Tube Set | 50.15 |
| NEUTRODYNE PARTS for 5 Tube Set, Standard | 46.75 |
| Tuned R. F. Units mounted on panel 7x24, drilled, can be used with Neutrodyne, Melco, Radiodyne circuits, etc., set up in one hour | 45.00 |
| Set of 3 Neutrodyne Transf. with Neutralizing Condenser | 14.70 |
| TUBES | |
| DX 6 V. 1/2 amp. hour..... | 4.25 |
| 1/2 amp. hour..... | 4.50 |
| Type UV 199, 6 100 amp. hour, standard base Schicklering Tube, Amplifier or detector..... | 5.50 |
| \$3.00 Electrohot Soldering Iron, small tip..... | 2.50 |
| 1.00 K. D. Portable Loop..... | .80 |
| VARIOMETERS | |
| \$6.50 Pioneer, specially recommended for Autoplex circuit..... | 4.85 |
| VARIOCOUPLERS | |
| \$7.00 Pioneer, all moulded, bakelite..... | 4.95 |
| 2.50 Acme Audio & Radio Transformers..... | 1.92 |
| 5.00 Acme Radio, most selective, Transf..... | 3.95 |
| Globe High Radio, Highest Quality | 3.45 |
| B BATTERIES, Highest Quality | |
| 22 1/2 V. small..... | \$.75 |
| 22 1/2 V. large..... | 1.45 |
| 45 V. Medium..... | 2.00 |
| 45 V. large..... | 2.90 |
| \$18.50 A. C. Homcharger "Gold Seal"..... | 14.95 |
| \$18.00 Westinghouse Rectigon Charger..... | 14.63 |

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MARVEL RADIO CO.
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KEYSTONE RADIO LIGHTNING ARRESTERS

\$2.00

Should be on every aerial the year 'round. Provides highly efficient lightning and static protection for the home. Fully approved by Fire Underwriters. Can be installed outdoors. Has no vacuum to lose. Install one in your aerial lead now—be safe. This pioneer radio arrester is backed by 31 years' experience in lightning arrester design. For sale by Dealers everywhere, or sent postpaid for \$2.00. Write for circular.

Electric Service Supplies Co.
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Menadock Bldg., Chicago
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Compact Set Using Bean-Shaped Coils

Ordinary Spider Web Winding on the Form

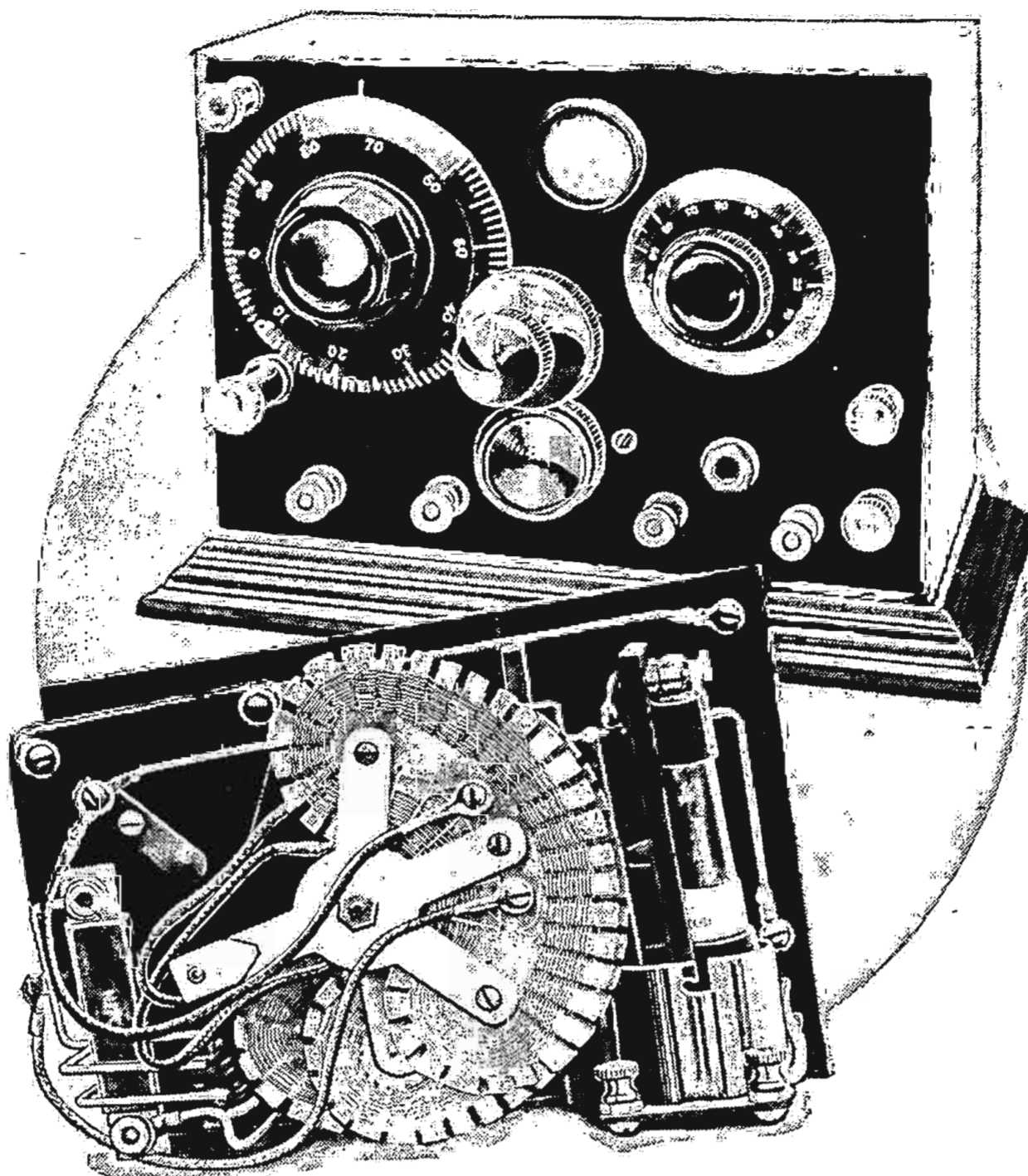
THE writer recently completed a miniature set of rather novel construction. This set consists of a standard regenerative circuit employing as inductances triple coils of the spider web

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

RADIO KINKS DEPARTMENT,
Radio Digest,
123 W. Madison St., Chicago

PANEL LAYOUT FOR INSTRUMENTS

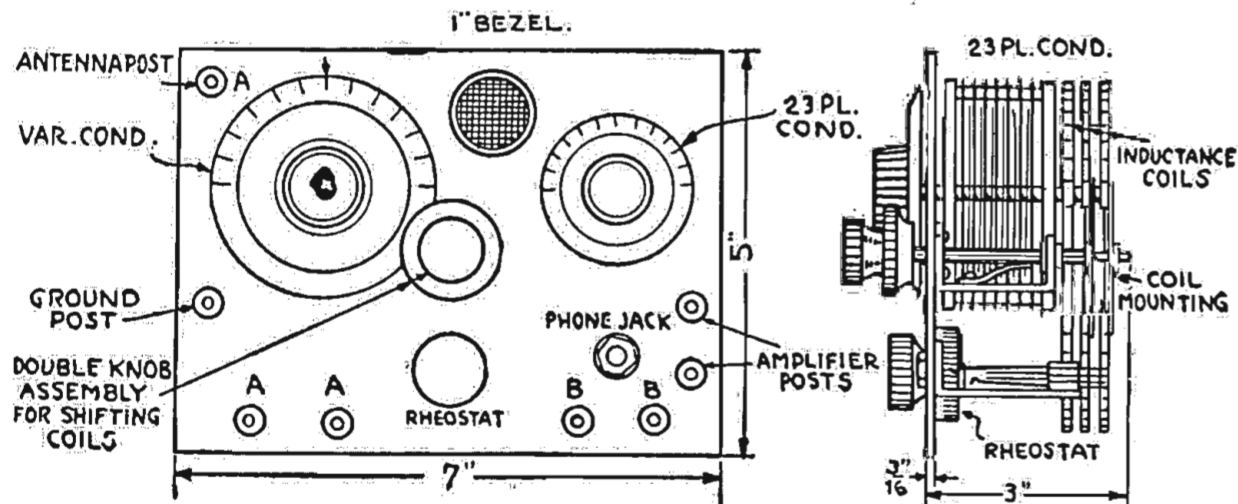


variety, but of a shape similar to the kidney bean. These coils are concentrically mounted on two shafts, one tubular, the other extending through this tube, in such manner as to be operated from the front of the panel. The two operating knobs are shown in the picture. The set is inclosed in a cabinet, 7 inches long, 5 inches high and 3 inches deep, inside measurements.

Description of the Set

The picture of the inside of the set shows the manner of mounting the various parts and construction of the inductances. Of the three coils used in the circuit the secondary, which is permanently mounted to the panel, has 55 turns of number 28 scc. wire; the primary has 45 turns, while the tickler coil has 30 turns of the same size wire. The primary and tickler coils can be rotated past the secondary through 180° and are spaced 1/4 inch apart. In practice it is seldom found necessary to move the coils from a position exactly opposite one another, all tuning being done by the secondary and tickler condensers. When, however, interference is encountered a slight shift of either the primary or tickler coil with relation to the secondary will suffice to clear

variable condenser and a 23-plate air condenser is used to tune the tickler circuit. No condenser is used in the primary. The coil forms are cut from 1/2-inch gray fiber, properly shaped, and each has 43 slots, 3/4 inch deep, to carry the windings. The outer coil, the tickler, is fitted with a



up reception. This method of tuning, that is, to shift the inductances concentrically rather than laterally, as in the ordinary spider web coils, has been found very satisfactory.

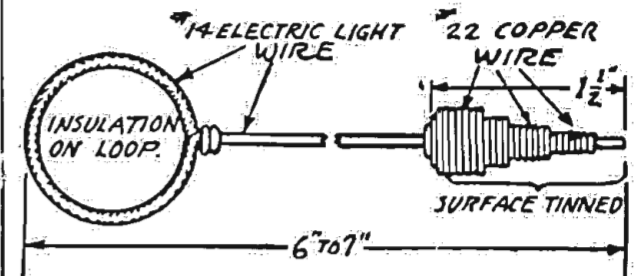
The illustration shows a Myers tube in use in an adapter for a standard socket. The secondary is shunted by a Brockway

small brass counterweight; this with the natural friction of the close-fitting shaft running through its accompanying tube suffices to make the coil "stay put." The brass tube-shaft carrying the primary coil is frictioned by a small spring. The

(Continued on page 30)

Small Soldering Iron Made of Copper Wire

A short time ago I chanced to be miles away from a soldering iron and greatly in need of one. I produced a makeshift from a piece of number 14 electric light wire which was rubber covered. The piece used was 12 inches long. Four inches of the insulation was removed from one end and 1 1/2 inches taken off from the other,



and a loop was formed of the covered part to make a handle. On the long, bare end I wound a bunch of number 22 copper wire to hold the heat. This, heated over a gas flame, was found to be very handy and useful for soldering the wire to taps on the variocoupler. It will reach into places where a common soldering iron will not enter.—George H. Humphrey, Providence, R. I.

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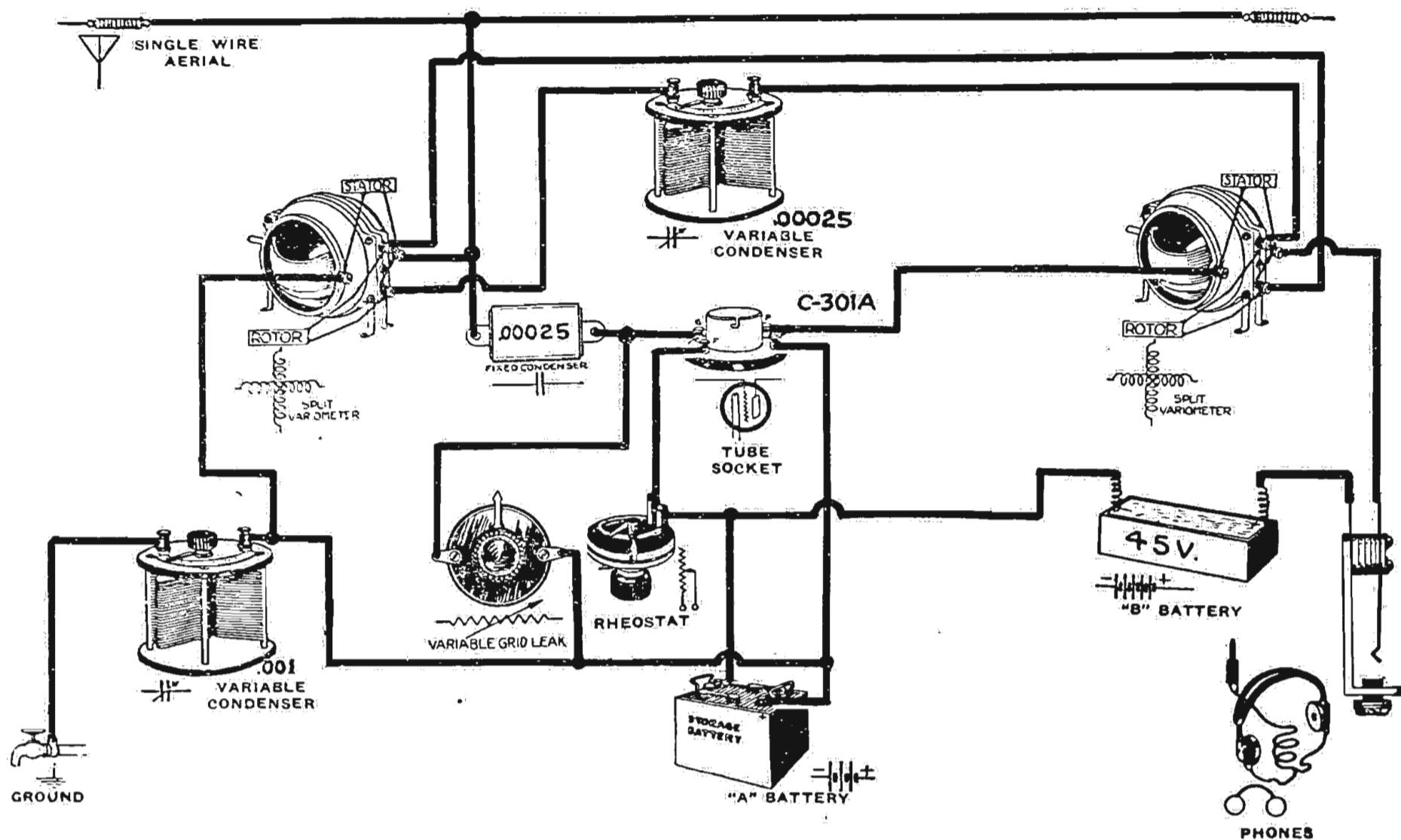
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The NIGHTINGALE

TWO SPLIT VARIOMETERS USED IN SIMPLEX HOOK-UP



HERE'S the variation of last week's Simplex diagram. With exactly the same apparatus, but increasing the voltage to 45, the unusual feature is the employment of a wave trap or absorption circuit consisting of the two rotors of the two variometers and one .00025 variable

condenser, which absorption circuit is inductively coupled to both the grid and plate circuits. We have then a single circuit receiver that becomes regenerative in form, with a wave trap action on the secondary circuit and an oscillation control in the plate circuit. The result is a stable

circuit with unusual volume and a high degree of selectivity. Naturally a high quality split variometer is required. There is ample room for experimentation with this circuit, and we are interested in the results the fans accomplish with it.

the front of the panel. Two bakelite knobs were suitably placed at the operating ends of the shafts. The largest of these (that operating the primary coil), was bored with a $\frac{1}{8}$ -inch bit to make a hole for the tickler coil shaft, which was fitted with a small knob at the end and was spaced $\frac{1}{8}$ inch from the larger knob.

Compactness of Set
As space was at a premium in this set, it was necessary to use some sort of condenser for the secondary coil that would not occupy the whole of the 5 by 7 by 3-inch cabinet; the writer therefore chose a Brockway variable condenser. It is mounted on the outside of the panel and as it has the capacity of the conventional 43-plate variable, it has been found very suitable. For the tickler coil I used a 23-plate condenser. In lieu of the brass contact spider I substituted a contact spring on the end of rotor shaft. All leads to the coils are flexible to allow for rotation. The set is fitted with a standard socket and has a fixed grid leak and condenser, also a fixed phone condenser of .001 capacity, which can be seen in the illustration just below the phone condenser.

The set has a standard jack. It was found necessary to shorten this jack by $\frac{1}{2}$ inch to make it go into the cabinet. Busbar wiring is used throughout. A 6-ohm rheostat is used. It functions very well with the Myers tube now being used, but if dry-cell tubes are used, it should be replaced with one of a higher resistance. A 1-inch black bezel is set into the panel at the front, as shown.

Circuit Used
The circuit used is the standard Armstrong regenerative. I do not use a condenser in the primary circuit; in fact, have always had best results without it. My aerial consists of four lengths of number 18 annunciator wire, each 28 feet long, strung on porcelain knobs in the peak of my attic. The set is operated in an upstairs bedroom with a 6-foot lead to the radiator for ground.

I have tried this set on different aeri- als and have always found it to operate well. Have had it connected to a loud speaker through an amplifier and the results have proved surprisingly satisfactory.—H. S. Blaine, Toledo, Ohio.

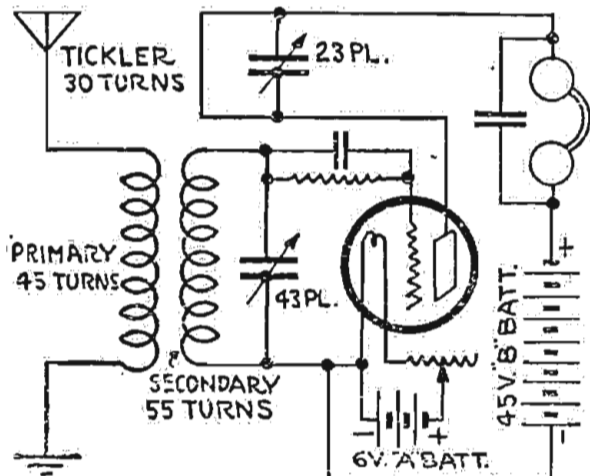
BEAN-SHAPED COILS

(Continued from page 29)

cabinet is made of veneered birch, highly polished and presents a pleasing appearance. All binding posts and instruments are mounted on the panel, which can be withdrawn from the cabinet for inspection or repairs. The coils are mounted on fiber forms as shown in the picture.

Performance of Set

This set functions very well. To this time the most distant station heard is



KHJ, Los Angeles, approximately 1,950 miles from Toledo. Stations within a range of wave length from WLW, Cincinnati, 309 meters, to KSD, St. Louis, 546 meters, have been regularly received.

Having in mind the construction of a small Radio set that could be taken with one on a vacation trip and desiring to utilize the standard regenerative hook-up, which had given me excellent results up to that time, I conceived the idea of mounting my three coils used as inductances on bean-form fiber frames that could be made to rotate past each other and thus vary the inductive relation with reference to each other. At the beginning it was recognized that the usual spider web forms would occupy too much space, therefore it was determined to cut down the available space to 1 by 4 inches.

How Inductance Coils Are Made

I made my forms in the following man-

ner: I first laid out the general shape on a piece of paper and stepped off the desired number of slots to receive the windings, 41 in all. Having completed the plan, I glued it onto a piece of gray fiber of sufficient size, having first bored two mounting holes therein. I then took two more pieces of the same kind of fiber and having bored similar holes in them, placed them below the first and screwed the three firmly onto a piece of thin wood. A small power saw was then used to cut the slots in the whole assembly to the required depth.

When all slots were cut the fiber forms were disassembled and the wood part thrown away. The webs were then wound with number 28 sec. wire, as follows: 45 turns on the primary, 55 turns secondary and 30 turns on the tickler. As it was of course necessary to vary the position of but two coils with relation to the third, one coil was rigidly mounted to the panel—the largest, or secondary; the primary was made to rotate past the secondary and the tickler coil was placed next to the primary. The coils were spaced $\frac{1}{4}$ inch apart. A section of brass tube, $\frac{1}{4}$ inch in diameter, served as a shaft for the primary coil, while a brass rod, $\frac{1}{8}$ inch in diameter, was found too large to pass through the tube to serve as a shaft for the tickler coil; it was therefore turned down to an exact fit for the tube.

Coil Mounting
I then made a mounting for the coils as follows: I took a piece of brass, $3\frac{1}{2}$ inches long by $\frac{1}{2}$ inch wide by $\frac{1}{8}$ inch thick, and bent it into a U-shape with the longest leg of the U ($\frac{3}{4}$ inch) next to the panel. This I bored with a $\frac{1}{4}$ -inch hole to receive the brass tube-shaft of the primary coil and bored a similar hole in the other end of the mounting for the same purpose.

The necessary friction to retain the coil in whatever position placed was obtained by riveting a strip of phosphor bronze spring stock onto the bottom of the mounting so that it impinged against the brass tube. This mounting was fastened to the panel by a single 8-32 screw from



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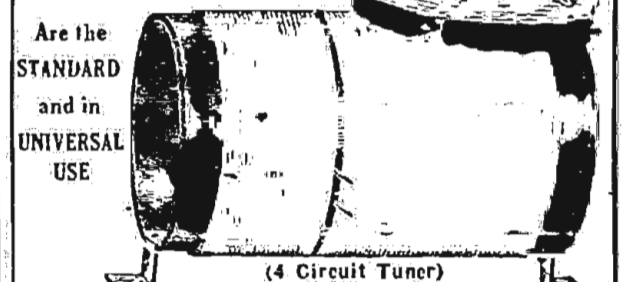
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Questions and Answers

Interference

(05749) FSS, Lewistown, Pa.

I operate an ultra-audion Simplex getting good reception, and need not touch my set for hours, but every now and then some one turns in and lets his set on a whistle. I let him whistle till he changes his tuning again and it comes in clear as before he interfered. There seems to be three or four sets within a half-mile radius that cause these howls. I would like to know if the trouble is in my set or is it the others' tuning that causes all the trouble? It seems as though it is the set that has switch point tickler adjustments as it runs the scale in steps and makes miserable sounds. I have built eight sets and have a good many records of distance and have found the Ultra-Audion Simplex the best and simplest all around. I have been receiving good records all summer when my neighbors' sets, among which there are all kinds and makes, were dead. When told of my set they would come and listen in and were surprised to hear volume.

A.—The interference encountered is external to your own receiver and due to re-radiation of improperly tuned regenerative circuits in your vicinity.

It is a regrettable fact that this is becoming somewhat of a menace to satisfactory Radio reception in congested districts. It is certainly reprehensible in any operator to fail to familiarize himself with the correct method of tuning his circuit. It becomes each person's duty to his neighbors to learn to keep his set from oscillating. Each should consider the rest of the public, and the way to do this is to learn the fundamentals of the art and the principles and operation of his own particular circuit. It requires some skill, no doubt, but a little attention and practice will locate the point just below oscillation, and this is to the interest not only of outsiders but of oneself.

Standard Receivers

(05413) FJS, Buffalo, N. Y.

Kindly write me the types of standard receivers I have missed. I have six of them; they are as follows: Federal DX, type 58; Symphony, number 503; Zenith 1-R; Kennedy, type 220; Ultra, type 401, and Premier.

I want to know which I missed so I can get them, they were all in that series you run.

A.—The series of standard receivers illustrated in Radio Digest included:

Telmaco, type R 5; Grebe, CRS; De Forest Inter-panet; Aerex combination set; Crosley Det. Amp.; Tresco, S U 3; Paragon RA 10; Ultra, type 401; Elmco Tuner, S. 1 & Amp A-3; Westinghouse DA; Amrad, 2506 & 2634 amp.; C & W, type 11; Federal, type 8; Symphony, Rec. Amp.; Aerial-A Detector; Clapp Eastham, H R.

Simplex Diagram

(06055) EW, Spangle, Wash.

In Radio Digest for November 17, on page 10, I notice a Simplex diagram for a single tube set sent in by Mr. Owens of Denver.

Do the honeycomb coils require a movable or do they have a stationary mounting?

A.—The honeycomb coils shown in this circuit require a variable mounting.

Variocouplers

(06005) JLD, Washington, D. C.

I am a constant reader of the Radio Digest, and am interested in the single-tube Reflex circuit published November 10, 1923. Will you kindly give or publish in your next issue, the drawings of such a set and number of turns of wire taken off at each tap; also number of wire used, etc., together with voltage of both A and B batteries?

A.—A standard variocoupler is indicated. It can be accomplished by winding primary with 56 turns of number 20 dcc. wire, tapped at every seventh turn, and secondary with 50 turns of number 26 wire.

An amplifier tube must be used in Reflex circuits. The voltage of A and B batteries will depend on the type of tube employed.

PATENT ATTORNEYS

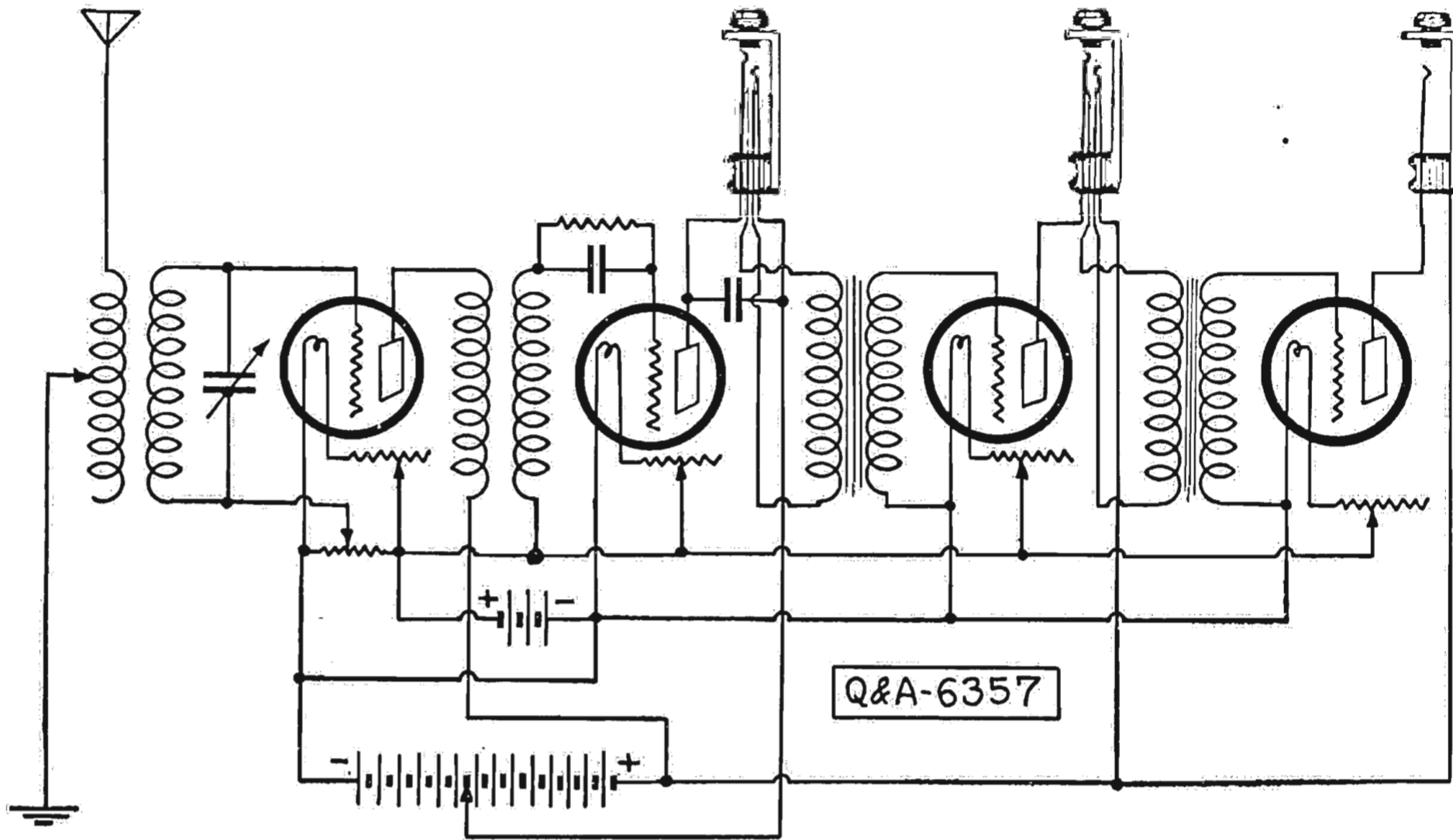
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R. F. and A. F.

(06357) JR, East Troy, Wis.

Would you kindly send me as soon as possible a diagram or plan showing how to hook up a set with two stages of audio frequency amplification, one stage Radio frequency, one detector tube and a good tuner?

A.—We are presenting a diagram herewith of circuit conforming to your specifications.

Honeycomb Variometer

(06115) BB, St. Louis, Mo.

I have built a single condenser Flewelling circuit receiver and, thanks to Mr. Flewelling's instructions published through your valuable paper, I have had success with it. I am able to cut through all local stations, being only three miles from KSD, and the most distant stations are PWX, KHJ, WSB, WOR, WEA, WCAP, WGY, WOAI and WDAF.

I do not agree with your assertion that it requires 45 volts or more on the plate to get the super action. I obtained the above results with voltages from 22½ to 40.

Using an aerial, I find the capacity effects not so bad. With no shielding, as a plain regenerative circuit, using no aerial or ground, I have received WDAF, KDKA and WDAF.

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What wave lengths will the honeycomb variometer cover, shown on page 13 of March 24 issue, with no condenser across it?

Would like to build a variocoupler on the same principle as the above variometer. What number of turns will be required on stator, not using a primary condenser, and what number on rotor, using a .0005 variable condenser, in order to reach the 600-meter wave length?

A.—The honeycomb coil type of variometer referred to will permit tuning to from 180 to 600 meter wave lengths.

A variocoupler of efficient construction can be made by winding primary with 56 turns of number 20 dcc. wire, tapped at

every seventh turn, and secondary with 50 turns of number 26 dcc. wire.

We congratulate you upon your excellent record of reception accomplished with the Flewelling circuit.

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The Radio set is becoming ever present. Here we see two fans, Misses Arvilla Hammitt, of New York, and Hester Merwin, of Chicago, with their bobsled outfit enjoying the winter sports at Lake Placid, yet not cut off from their respective home cities.

K. & H. Photo



Radio music renders "making up" at Fulton theater, New York, less of a bore.

Keystone Photo



Enter the Radio reporter, a new member on the big daily staff. He does not write on Radio subjects but prowls through the ether, listening in for news of every kind.

P. & A. Photo



"Buddy" is a fan and full of curiosity. Here he investigates the loud speaker.

Fotograms Photo

