

New Capacity Bridge Circuit—a Revo
Various Uses of Filament Control Jacl

Radio

EVERY WEEK **INVEST** PROG

REG. U. S. PAT. OFF.

Vol. XIII

Copyright 1925
By Radio Digest Publishing Co.

SATURDAY,

KDKA TO HUNT EXPLORERS

COOLIDGE IN BUDGET TALK ON WEAF LINK

WILL BE HEARD MONDAY
FROM SIX STATIONS

President and General Lord Have Mes-
sage for Taxpayers—Marine
Band to Play

NEW YORK.—Fans will have an opportunity to hear addresses of importance to every taxpayer by Calvin Coolidge, president of the United States, and General Lord, director of the bureau of the budget. The addresses will be broadcast during the regular meeting of the budget bureau from 7:30 to 9:00 p. m., Eastern time, on Monday, June 22.

This event, broadcast direct from the Continental Memorial hall, Washington, D. C., will be featured on the programs of WEAF, New York; WCAP, Washington, D. C.; WEEI, Boston; WOO, Philadelphia; WJAR, Providence, R. I.; and WSAI, Cincinnati. Incidental music will be furnished by the U. S. Marine band, Capt. William Sarteimann, director.

An opportunity was offered Radio listeners to hear the last session of this bureau, known as the Business Organization of the Government, when it also was broadcast by a chain of stations.



Above, Kathaline Carr, contralto, who is frequently heard from WEEI. Right, Eleanor Woodford, soprano, who graces the program at Station KNX in Hollywood.

WILL FOLLOW SEARCHERS IN ARCTIC BY AIR

Seek Nutting Expedition

Pittsburgh Station to Broadcast
News from "Arctic" on Which
Searching Party Sails

PITTSBURGH.—Radio, used to broadcast to police and fur trading posts of Baffinland, warning of the loss of the Nutting expedition between that shore and Greenland, in the fall of 1924, may also be used to convey to anxious friends

(Continued on page 2)



Kathryn Reece Haun, whose lovely voice has won her the title, "Songbird of the Air" at Station W L W.



Marconi Predicts Great Future for Beam Radio

LONDON.—The recent achievement of successful two-way working between England and Australia in broad daylight is a striking indication of the possibilities of short-wave transmission. Senatore Marconi is of the opinion, as a result of exhaustive tests, that a combination of short electric waves with what is known as the "Beam system" is likely to revolutionize the methods of commercial long-distance communication.

A new broadcasting station being erected at Valencia, Spain, will have sufficient power to be heard in all parts of that country.

\$5,000 A MINUTE FEE OFFER FOR BRITISH AD

B. B. C. Refuses Business; Thinks
Listeners Would Object

LONDON, Eng.—Five thousand dollars a minute has been offered the British Broadcasting company by a big London department store for Radio advertising, but the company turned down the offer, as it conflicted with its license rights, and it also was of the opinion that listeners never would accept an advertising program forced on them. South African listeners, incidentally, have objected very seriously to all broadcast advertising.

CONSENSUS OF OPINION VOTE

Send to Radio Digest, 510 N. Dearborn Street, Chicago To be forwarded by Radio Digest to the Department of Commerce for the attention of members of Congress.

- 1. Do you want less class B (500 watts or more power) stations?
2. Shall B stations be reduced to 94 in number, so that they can be accommodated satisfactorily in the 'ether roadways' now available for the use of broadcasting stations?
3. How far away, approximately, is the nearest class B station?
4. Are you troubled by B stations heterodyning and interfering with one another?
5. Have you read a description of the Kintner plan?
6. Are you in favor of it or some similar plan which will help clear the air of the present 'traffic' congestion?
7. Do you favor the appointment of an unbiased, non-partisan broadcasting control board for the settlement of all differences pertaining to broadcasting and the interpretation of present or future Radio legislation?
8. Include separately a list of five stations you like most and five you dislike most.

How many members Name
in your family? Address
Are all of the same City, County, State
mind as yourself? (Check here if more blanks are desired)

HAY ROMPS AHEAD; COMPETITION POOR

GENE ROUSE TAKES THIRD IN SPURT FOR GOLD CUP

World's Most Popular Announcer for 1925 Still Mystery—Contest More Than Half Finished

If somebody doesn't display a burst of pep, George Dewey Hay, "The Solemn Old Judge" of WLS, Chicago, is going to run away with the second annual Radio Digest Gold Cup Award, and have himself declared world's greatest announcer for 1925.

The most sensational rise of the week was that of Gene Rouse, WOAW's "Heavenly Voice," who jumped from sixth to third place and looks like a good bet to pass McNamee for second.

In making his jump, Rouse put the Hired Hand, WBAP, H. W. Arlin, KDKA, and Henry Field, KPNE, down one position each.

W. G. "Bill" Hay, of KFKX, decided to go up one, traveling from eighth to seventh, while last week's holder of that place, Lambdin Kay, of WSB, "At-lan-taw, Gaw-gia," slipped into eighth.

Barnett and Brokenshire Advance Stanley W. Barnett of WOC, gained two places, while Charles Erbstein, WTAS, and Jerry Sullivan, WQJ, dropped one and two positions respectively.

Another surprise this week is the reappearance in the leaders of Norman Brokenshire, WJZ, who comes up again from oblivion and is now in twelfth place. In the constantly changing and interchanging of positions, Fred Smith, WLW, dropped from thirteenth to sixteenth place, and incidentally forced Frank D. Lane, KFRU, out of the published standing.

The thirteenth official ballot appears this week. Only nine more will appear. The race is in the half over, but watch out for the bonus votes which will run the totals high at the close. The bonus vote plan is explained below.

Standing of Sixteen Leaders

The standing of the sixteen leaders with the total number of votes accredited at the close of this week is as follows:

Table with 2 columns: Rank and Name with votes. 1. George D. Hay, WLS, 10,369; 2. Graham McNamee, WEAF, 8,738; 3. Gene Rouse, WOAW, 5,591; 4. The Hired Hand, WBAP, 4,970; 5. H. W. Arlin, KDKA, 4,496; 6. Henry Field, KPNE, 4,122; 7. W. G. "Bill" Hay, KFKX, 3,832; 8. Lambdin Kay, WSB, 3,528; 9. N. Dean Cole, WFL, 2,949; 10. S. W. Barnett, WOC, 2,827; 11. Charles Erbstein, WTAS, 2,524; 12. Norman Brokenshire, WJZ, 2,186; 13. Jerry Sullivan, WQJ, 2,174; 14. Robert Emery, WREB, 1,950; 15. Leo Fitzpatrick, WDAF, 1,931; 16. Fred Smith, WLW, 1,889.

Seems as if the nomination business would continue. This week brought three new names into the contest. They are KFRU, David Franklin; KPRC, Alfred Daniel; and KSD, William Ludgate.

How to Vote and Get Bonus

Don't miss a single ballot, for when these are turned into Radio Digest in a group of CONSECUTIVE numbers, extra bonus votes are allowed the announcer for whom you are voting.

The ballots, top of page two, numbered consecutively, will appear in each issue of the Radio Digest until the close of the contest, with the August 22 number.

Each of these ballots will count for one

vote when sent in separately. You can hold these ballots until you have 4 that are consecutively numbered, and when they are sent in a bonus of 3 votes will be allowed for your favorite announcer.

For each 3 consecutively numbered ballots your candidates will receive a bonus of 20 votes. For each 12 consecutively numbered ballots, 30 votes. For each 16 consecutively numbered ballots, 40 votes. For each 20 consecutively numbered ballots, 50 votes, and for each 22 consecutively numbered ballots, 60 votes bonus will be allowed.

Send nominations or ballots to the GOLD CUP AWARD EDITOR, Radio Digest, 510 N. Dearborn St., Chicago.

Don't connect your receiver to the electric light wire unless you use some approved form of condenser adaptor.

Give Unusual Memorial Day Program at Station WJAG

NORFOLK, Nebr.—One of the most unique Radio programs on the air Memorial Day was that from The Norfolk Daily News station WJAG, known as "The Home of the Printer's Devil." Students of the Norfolk high school directed by Leo Schula, orchestra director and Miss Ina Mae Sanders, vocal music director and assisted by Miss Marjorie Beeler, the Radio station's soprano, sang civil war songs and played patriotic music.

The program was so arranged that throughout the two hours time the melody of "Tramp, Tramp, Tramp, the Boys are marching," was heard by listeners. WJAG broadcasts on 276 meters with 250 watts power.

WILL HUNT EXPLORERS

(Continued from page 1)

of members of the expedition tidings of its fate.

The Canadian government ship Arctic is leaving Quebec on June 27, for the Polar regions. It will visit for the first time since last summer the posts to which was addressed the message appealing to them to be on the lookout for the Nutting expedition's ship or wreckage indicating its fate. The Arctic will learn whether the posts were able to get any tidings of the expedition, and will transmit by wireless to KDKA, Westinghouse station at Pittsburgh, anything it may learn of the expedition.

Arctic Established Record

The Arctic last August established the "farthest north" Radio record when it received short wave messages from KDKA without difficulty in the continuous daylight zone at Cape Sabine, north of Peary's winter base at Etah, Greenland, and within 11 degrees of the north Pole. It is equipped with an especially constructed transmitting set designed to transmit Radio signals from the polar regions to KDKA in the 1925 short wave tests arranged by the Canadian government and the Westinghouse stations.

All messages sent from the Pittsburgh station during the 1924 tests were received by the ship, but the vessel's transmitting apparatus was not equal to the task of putting all the Arctic's reply messages through from the continuous daylight zone in the extreme north. This year the ship is carrying a more powerful transmitter.

Sail in 40-Foot Yacht

The Nutting expedition set sail from Scandinavia in a 40-foot American yacht to follow the course of the Norseman of a thousand years ago in an endeavor to learn more about where on the American shores the prevailing winds had landed the vikings. The leader, William Nutting, and two others of the party, John Todahl and Arthur Hildebrand, were Americans, and the fourth, Mr. Fleischer, a Norwegian. The party was last heard of last September when it skirted the southern end of Greenland and headed west.

Practically all of the police and fur trading posts in the Baffin Bay region are equipped with receiving sets and during the long Arctic winter when the traders are marooned by the ice, they while away the tedium by listening in.

It was from KDKA that the message was broadcast last winter asking the posts to watch for some trace of the Nutting expedition.

Famous Figures to Speak to War Vets from WOAW

OMAHA, Nebr.—Addresses by national figures, entertainment programs by veterans' musical and choral organizations and selections by headline artists will be broadcast from Station WOAW, Woodmen of the World here, during the week of the fifth annual national convention of the Disabled American Veterans of the World War, on June 22 to 27. It is expected that the programs will reach many thousands of world war wounded and disabled veterans who cannot come to Omaha.

Records Artists' Voices

LOS ANGELES, Calif.—W. G. Leavens of Fresno, California, has succeeded in recording on dictaphone records the voices of his favorite stars at Station KEF. He liked their entertainment so much that he wanted them every night, and wrote to the station saying as much. It was impossible to have them oftener, the station management said.

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Looking Ahead

Milo Gurney Springs Some Surprises next week in his article on tuned radio frequency amplification. It seems that at least half the success of a tuned radio frequency set lies in the wiring. Some ideas along this line, new to Radio Digest readers, are presented, and there are more circuits.

WGY, the Parent General Electric Broadcasting Station, will be pictured and described in next week's issue. Schenectady is the source of entertainment for fans all over the United States and Canada, and is tuned in many times in England and the Continent. The development of the audio drama at WGY is notable. Watch for this feature.

Who'll Lead in the Gold Cup Award Next Week? Will Graham McNamee come to the top again, or will Gene Rouse put on another sprint and pass the "Solemn Old Judge"? So far the 1925 Gold Cup Award for the world's most popular Radio announcer is any man's race. Follow the weekly standing.

An 8-Tube Super in a Week End Bag will provide vacationers with a set that gets everything, no matter where they are. The photos and diagrams that accompany this article next week make construction surprisingly easy.

A Full Description of the Edison Battery, telling what is inside of the perforated tubes and why, forms the basis of the next A. B. C. article. Professor Moreton also tells our readers how to care for storage batteries of either type.

Newsstands Don't Always Have One Left

WHEN YOU WANT

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Publisher Radio Digest, 510 N. Dearborn St., Chicago, Illinois.

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

Name
Address
City State

STATION GLEANINGS AND NEWSY BRIEFS

WEAF INAUGURATES "HUMOROUS HALF HOUR"

WOR Presents Newark Philharmonic Concert Band—WCCO Opens New Saint Paul Studios

WEAF has inaugurated a series of Saturday evening entertainments known as the "Humorous Half Hour." Each Saturday evening from 9:30 to 10 o'clock Eastern time the audience hears a program including such artists as William Pryor, banjoist-humorist, Harry Atkinson, known as the "Australian Orpheus" and the Three Star Trio. William Pryor plays several instruments, sings, and tells stories and for three seasons was one of the foremost artists with Eddie Leonard's company. He has been a success with every audience before which he has appeared. Harry Atkinson is a wizard at imitating musical instruments. He possesses the peculiar faculty of imitating the mandolin, musette, cornet, banjo, harp, violin (played both pizzicato and with the bow), bagpipes and penny trumpet.

Part of the "Rolling Stones" cast which broadcasts parts of the comedy now playing in New York over WJZN. Right, Eleanor Gale, prima donna; below, Henri Gendron, leader of Strand Roof orchestra; lower right, Gloria Sylvia, and lower center, "Miskey" Seiden.



WOR is presenting each Monday evening at 7 o'clock Eastern time the Newark Philharmonic Concert band, broadcasting the organization direct from the band plaza of Branch Brook Park, Newark, N. J. The program of classical numbers continues from 7 to 8 p. m. The season, which recently opened, is the third open-air season of the Newark Philharmonic Concert band, and will continue each Monday evening for ten weeks from WOR under the direction of Carl D. Bethel and Louis R. Anderson.

The new Saint Paul studios of the Gold Medal station, WCCO, Saint Paul, Minneapolis, just completed in Saint Paul's new fifteen million dollar Union Depot, were formally opened recently June 8th. An elaborate program heralded the event.

A full reading course is being given from Station WKRC, Cincinnati, every Wednesday night at 7 o'clock Central time. The reading course and book review are given under the auspices of the Cincinnati Public Library.

The second anniversary of broadcasting the Vanmaker Auditorium Radio Concerts is being celebrated by a series of special Tuesday programs broadcast through WJZ, New York, WRC, Washington, D. C., and WGY, Schenectady, from 7:10 to 8:10 p. m. Eastern time. Three have been given; June 2, 9 and 16. Two remain, June 23 and 30.

Even Radio singers take vacations. Virginia Flohri, the "Radio Nightingale" of KFI, will make a tour of the United States which will take her as far east as

PLAN EXPERIMENT IN COLOSSAL THINKING

GENEVA.—An interesting experiment to see what would happen if 50,000,000 persons thought or wish the same thing at exactly the same time will probably be attempted some time in the near future. An American society has put this problem up to the new International Broadcasting Bureau at Geneva, and it is thought probable that the Bureau may put it through later on. The idea is that through all the chief broadcasting stations in the world every listener in would concentrate simultaneously upon a prearranged thought. It is not stated what the society expects to happen if everyone thinks hard enough all together.

Ford and Glenn Start Long Tour

"Lullaby Boys" of Station WLS Leave on Extended Coast-to-Coast Auto Trip

CHICAGO.—Ford Rush and Glenn Rowell, the "Lullaby Boys," whose songs and bedtime stories during "Lullaby Hour" and "Ford and Glenn Time" at WLS, the Sears-Roebuck station, Chicago, have endeared them to the hearts of kiddies and their parents throughout the nation, started on a transcontinental tour of the United States, June 2. The WLS favorites will broadcast their most popular features over nineteen of the principal stations clear to the Pacific coast. The journey from station to station will

"BOTTLED" CONCERT LATEST RADIO STEP

IMPRESS RECORD ON WIRE BY NEWEST INVENTION

Use Magnetic Principle in the Making of "Canned" Music for Radio Use

LONDON.—Concerts, which now go out into the ether, are received, and forgotten, may now be "canned" or "bottled" and repeated at will at any time in any part of the world.

America may broadcast British concerts without an obligato of atmospherics. Britain may broadcast American music instead of its local jazz.

The process of translating the spoken word and music into a permanent mechanical record can be understood better by analogy with the film than with the phonograph. In place of the unwieldy lengths of celluloid there is employed a similarly long, hard steel wire, similarly run on to a spool.

In place of the camera which imprints on the film the everchanging picture, there is a powerful magnetic field through which the wire is drawn by a small motor.

Words Magnetized Into Wire
The strength of this magnetic field (lessened or increased by the superimposition of currents varied by their passage through the ordinary Radio microphone) permanently magnetizes the steel wire in accordance with the changes in the microphone. The words of a speaker or the notes of a singer are literally frozen into solid steel as the wire runs from one spool on to another.

After the wire has received its magnetic impression, it can be reversed and run past a soft iron core that is magnetized and itself is creating a field. This time the wire will duplicate the fluctuations that were originally impressed on it. It thus gives back through a telephone receiver the sounds which were made days, months or perhaps years ago.

Also the soft iron core, with its changing field, can be placed in circuit with a Radio transmitter, to take the place of a "mike."

Corrections can be made in a wire record by passing a part of it through an intense magnetic field. This completely wipes out the recorded vibrations, and the passage can be remade.

PLAY AT "ROLLING STONES" ON AIR



New York. She has been asked to sing at important stations in the various cities she will visit. Her vacation is reminiscent of the postman who went out for a hike on his day off.

"Doc Howard's WKRC (Cincinnati) Broadcasters," who present a regular Monday midnight program known as the Kodol Midnight Frolic, and appearing again every Tuesday night with orchestra, male quartet, character singers and whistlers, go into vaudeville this summer billed as the WKRC Broadcasters. They are already booked in theaters throughout the country.

Give Weekly Road Talks

CINCINNATI.—Road service information is broadcast every week from Station WKRC, the new 1,000-watt station operated by the Kodol Radio corporation here, by Ralph D. Metzger, touring manager of the Cincinnati Automobile club. Road logs are avoided as much as possible and the talk is based on descriptive features of national parks and vacation spots to attract motorists during the summer season.

be made in their new sedans, in which they will carry complete camping outfits. In many of the places they will live out in the open with their families, who will accompany them. Their first program was broadcast from WOC, at Davenport, Iowa, June 2.

From the Middle West and Rocky Mountain states, the WLS tourists will jump to California, appearing at KFI June 29. The other stops in California will be KPWB, Hollywood, June 30; KGO, Oakland, July 4 and 5; KPO, San Francisco, July 6, and KFKV, Sacramento, July 7. Up the coast they will motor to Portland, Oregon, where on July 13 their features will be broadcast over Station KGW.

Fans Hear Real Newspaper Interview Through WAMD

MINNAPOLIS.—Radio listeners of the country had a new experience recently when they tuned in on WAMD, broadcasting a telephone interview.

Editor Earle Buell called Frank Burke a Minneapolis newspaper man covering the Lopez-Frazier case, and asked him for the "side lights" of the trial. The entire telephone conversation that followed was heard very plain, over the microphone and carried out over the air. This is the first time that a Radio audience has heard a genuine newspaper interview.

Inherently Selective



The Synchronphase is the result of painstaking care whose objective has ever been "quality first."

Doctor H. Grebe

THE Grebe Synchronphase maintains its ability to select desired stations even when in unfavorable locations.

This power is due mainly to the *Binocular Coils* which are truly fieldless coils and are unaffected by impulses from undesired stations. The set is thus kept automatically balanced.

These coils form one of several exclusive features which enable this set to give such unusual performance. Others are *Grebe S-L-F* (straight line frequency) *Condensers* and *Grebe Volume Control*.

Ask your dealer to demonstrate these and other features of the Synchronphase

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Western Branch: 443 So. San Pedro Street, Los Angeles, Cal.

THE GREBE SYNCHROPHASE

TRADE MARK

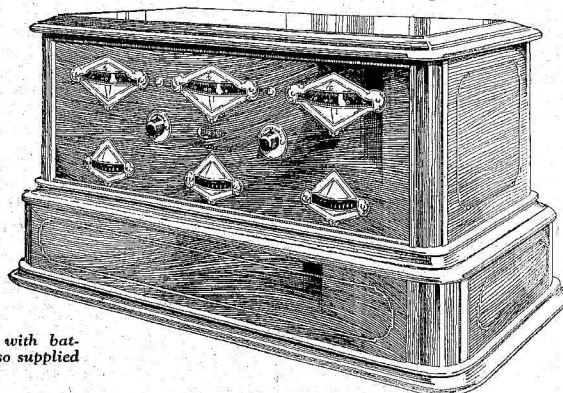


TRADE MARK
Reg. U. S. Pat. Off.

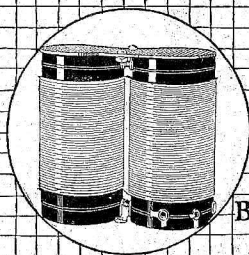


All Grebe apparatus is covered by patents granted and pending.

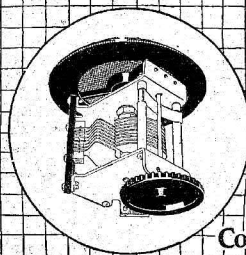
This Company owns and operates stations WAHG, WBOQ; also mobile and marine low-wave rebroadcasting stations



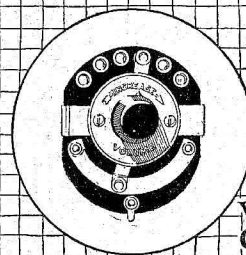
Synchronphase with battery base. Also supplied without base.



Binocular Coils



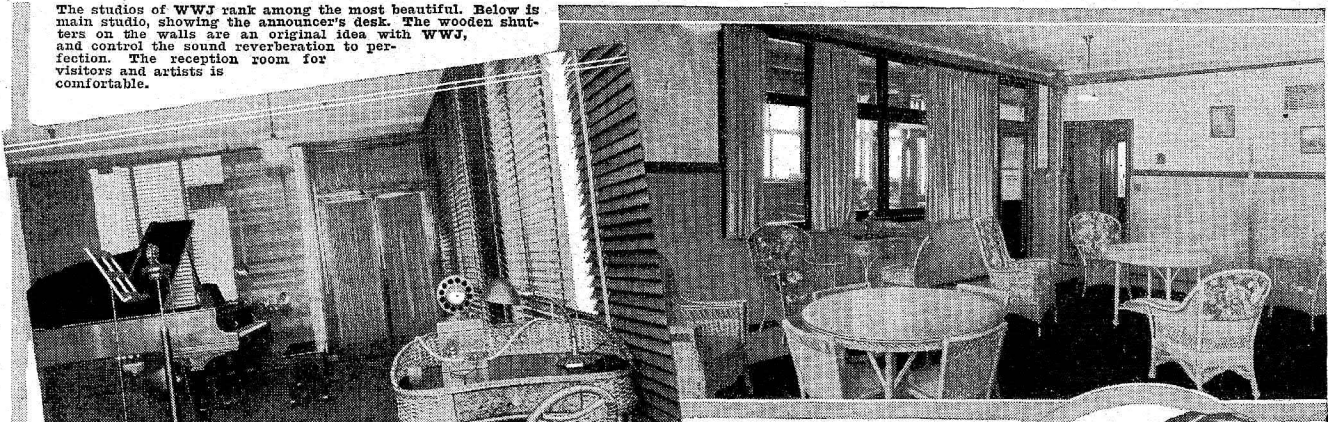
S-L-F Condenser



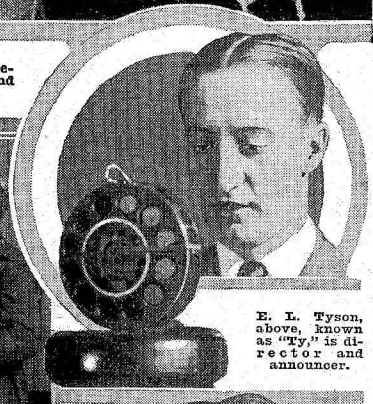
Volume Control

WWJ—Pioneer of Newspaper Broadcasters

The studios of WWJ rank among the most beautiful. Below is main studio, showing the announcer's desk. The wooden shutters on the walls are an original idea with WWJ, and control the sound reverberation to perfection. The reception room for visitors and artists is comfortable.



The Detroit News orchestra, below, is led by Otto E. Krueger and broadcasts every day.



E. L. Tyson, above, known as "Ty," is director and announcer.

STATION WWJ boasts one of the most venerable records in the history of Radio. This well-known plant, owned and operated by the Detroit News, will celebrate its fifth birthday on August 30 of this year. It was the first newspaper owned station in the United States and therefore the world. It has been broadcasting continuously since it was erected and has expanded in size and power along with the growth of Radio. And now it announces it will soon install a new transmitter of 1000-2500-watt capacity.

A real record of service! In August of 1920 the Detroit News purchased a 250-watt transmitter. That was even before call letters were used as station designations. The station used the call SMK. These letters were used for a few months and then WBL was assigned the small broadcaster which was considered large then. Early in 1922 the first type 1A 500-watt transmitter ever sold was purchased by the News and installed to take the place of the smaller one. With the new station came new call letters. They were WWJ, the ones that are now so well known to a legion of listeners.

The arrival of the more powerful set stirred things up considerably. Just

a few weeks after the plant had been installed a sixteen-piece orchestra was organized for the sole purpose of playing for the Radio audience. Regular schedules were made out and the station stepped out of the experimental stage into that of an institution. In passing we might say that to this day the same orchestra is a regular feature of WWJ programs.

About a year ago one of the later types of 500-watt transmitters was installed and Radio broadcasting service moved another notch ahead. Now comes the big new 1000-2500-watt, and with it, the distinction of being the only station outside of WSB at Atlanta, that is so equipped. This will make WWJ one of the most easily heard stations in the country.

As to the personnel of the station, the chief announcer is E. L. Tyson, better known to the great Radio audience as "Ty" Tyson, was with WWJ when it was still SMK.

He is rated by many as one of the best announcers in the country because of his clear and concise method of handling the work. Ty is also program director of the station and through his hands passes all the material that goes to make up the entertainment.

Assisting Tyson is Robert Kelly, who acts as relief announcer and Radio editor of the Detroit News. Kelly is one of the best known Radio men in Michigan.

The Detroit News orchestra, before mentioned, is with WWJ listeners every day including Sundays. It is under the direction of Otto E. Krueger, and all its members play in the Detroit Symphony orchestra.

Walter R. Hoffman is chief engineer at WWJ and handles the operating end of the plant. WWJ's well-known purity of wave is his pride.

This station has been among the most conscientious in its effort to present the listening public with the very best in entertainment. Programs are constantly watched and every means known is taken to make them ever better.

(Turn to page 6)

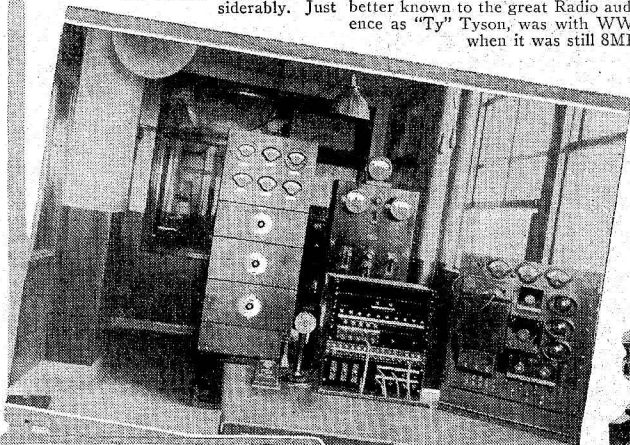
Two motor generator sets supply WWJ's type 1B 500-watt set. One is for emergencies.



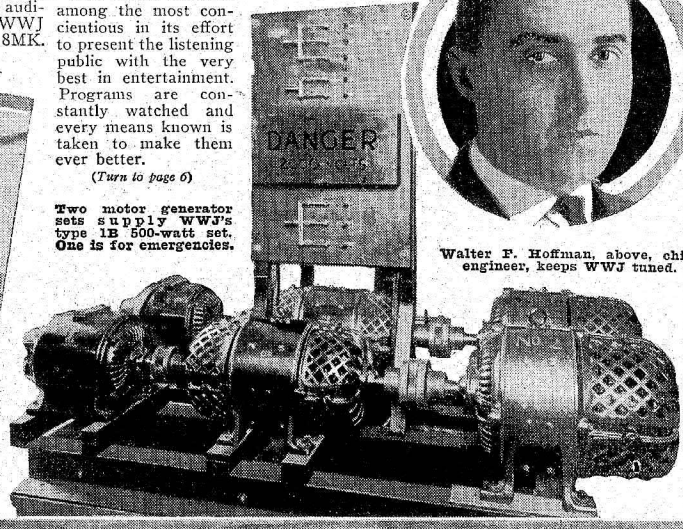
Robert Kelly, above to the right, is assistant announcer and Radio editor of the News.



Walter F. Hoffman, above, chief engineer, keeps WWJ tuned.



The operating room. Speech amplifier and remote control board are on desk; transmitter in back.



PRESS MEN DISCUSS NEWS IN DAILY TALK

WHAD INAUGURATES NEW TOPICS OF DAY SERVICE

Milwaukee Journal Staff to Give Brief "Editorials" on News and Current Problems

MILWAUKEE.—Department editors and special writers on the staff of the Milwaukee Journal now broadcast daily concise comment on the news and current topics in the form of Radio editorials. Day Time "service schedules"—a period of fifteen minutes at 11 a. m. and ten minutes at 4 p. m. Central time, have been added to the regular schedule of "WHAD Marquette university—Milwaukee Journal station," at which times there are featured important news bulletins, and sports, finance, market and produce reports, with special reference to the Wisconsin farmer. At the same time persons on "The Journal staff" discuss, briefly and simply, such topics as the latest books, questions of investment, practical golf, boxing, nature study, gardening, Radio and problems of the housewife. The afternoon program includes musical numbers most of which are given by Journal employees.

The Journal and Marquette university joined forces in January, putting on the air Wisconsin's first 500-watt, complete service station and are now broadcasting from four strategical points in the city. The transmitting station is located in the new science building of the university. The transmitter now has 750 watts available power and is arranged so that 1,000 watts can easily be radiated.

HERE IS THE RADIO POLICEMAN OF WGR

BUFFALO, N. Y.—Ladies and gentlemen! We introduce to you "The Radio Policeman," Frank R. Clabeaux, of Buffalo's finest. Clabeaux is called The Radio Policeman because he



Frank R. Clabeaux

has become of more than passing interest to the WGR staff. Since WGR was established on the roof of the Hotel Staler, Clabeaux has been assigned to duty at the hotel. His official specialty is traffic. His unofficial specialty is Radio.

Probably the average policeman doesn't know any more about Radio than a lot of other people, but that is not the case with Clabeaux. He knows the inside doings at WGR and the operation of the station as well as any one on the staff. Moreover, he knows most of the entertainers and most of them know him. He is an unofficial bureau of information about the station as well as the hotel. Entertainers always know if they show up a little late, that Clabeaux can usually tell them of a place to park without violating the traffic rules.

WGR listeners need not be surprised if they hear Clabeaux pinch-hitting at the microphone in place of Becker or Pickett, just as a matter of initiating Clabeaux still further into the mysteries of broadcasting.

"Roxy" to Build New Theater of His Own

Vast Auditorium to Be Devoted to Features and Radio

NEW YORK.—S. L. Rothafel of the Capitol theater, known to fans throughout the country, as "Roxy", is to have a theater of his own. It will be the largest in the world, and will be known as the Roxy theater.

This announcement was made recently by Herbert Lubin, president of the Associated Pictures corporation, who will build the theater for Mr. Rothafel.

The new theater will be located at Seventh Avenue and Fiftieth street, this city, and the project will cost about \$6,000,000. It will have a seating capacity of 6,000 which considerably exceeds the present capacity of the Capitol, now the largest motion picture theater in the city.

Mr. Rothafel is now in charge of the presentations at the Capitol theater. His contract with them has still some time to run, but the new theater is expected to be completed late in the Fall of 1926.

New Stations and Recent Changes

KTCL, Seattle, Wash., 305.9 meters, 1,000 watts, is listed among the new class B licenses. The American Radio Telephone company is listed as the owner. The company formerly owned and operated KFQX in Seattle.

WHAR, Seaside House, Atlantic City, is now listed among the B stations with 500 watts power and a wave of 275 meters.

Other new licenses in class A during the past week include KPVS, Cape Girardeau Battery Station, Cape Girardeau, Mo., 224 meters, 50 watts; KFWE, F. W. Morse, Jr., Chico, Calif., 254 meters, 100 watts; KWKC, Wilson Duncan Studios, Kansas City, Mo., 236 meters; 100 watts; WBRC, Bell Radio Corp., Birmingham, Ala., 248 meters, 10 watts; WIBL (portable), McDonald Radio Co., Joliet, Ill., 215.7 meters, 250 watts; WJH, H. M. Couch, Joliet, Ill., 214.2 meters, 100 watts.

WWJ—DETROIT NEWS

(Continued from page 5)

One of the latest improvements was the linking of WWJ with WEAJ in New York so that Detroit listeners might hear the best offerings from the East.

These things have advanced WWJ until today it stands out as one of the most up-to-date and complete stations in the Middle West.

KYW, Chicago, will soon boast of a transmitter on the Congress hotel capable of delivering 25,000 watts. When opened, however, a maximum of 1,000 watts will be used. The reserve will be used to overcome transmission difficulties caused by nature in the summer and other times.

WOAI, Southern Equipment Co., San Antonio, Texas, is now a superstation. The new maximum power has not been announced.

Don't, under any circumstance, use the electric light wires in place of antenna, if the electric light wires are incased in conduit.

WILL USE RADIO TO FIGHT FOREST FIRES

KOA TO SEND OUT REPORTS FOR RANGERS IN FIELD

Enlist Broadcast Service as Hazard Grows in Rocky Mountain Wood Country

DENVER, COLO.—Radio has been mustered into service by Uncle Sam's fire-fighting forces.

In face of growing forest-fire hazards which are said to be the most alarming in the history of the Rocky Mountain states, KOA, the General Electric station at Denver, has joined the government's ranks in a desperate effort to check destruction of life and property during dry months.

Effective immediately, fire-warnings are to have the broadcast right-of-way at the Denver station following plans just completed with the United States forest service and the weather bureau.

The Old Way

The BELDEN Way

Save Tubes, Time and Trouble with a Belden Radio Battery Cord

The old, crude way of connecting batteries to your radio set with a mess of tangled wires never was satisfactory. There was always the danger of crossed wires, discharged batteries, and burned-out tubes.

Today, the Belden Radio Battery Cord provides a neat, compact installation. Each conductor is oversize, and color-coded to simplify A and B battery connections. The handy 6-foot Belden Cord is used in thousands of homes, because one cord replaces the unsightly array of loose wires that formerly detracted from the appearance of the set, and invariably caused trouble.

Specify Belden

Ask your dealer about Belden Magnet Wire on small spools, if you wind your own radio coils. Also inquire about Belden loop wire, Litz wire, terminals, hook-up wire, solder, tape, and dozens of other radio items. The coupon will bring a booklet about them

Buy Belden Cord, Today!

Belden

Manufacturing Company
2310A So. Western Ave.
CHICAGO, U.S.A.
Manufacturers of Electrical Wire
Products since 1902

MAIL THIS COUPON FOR FREE BOOKLET

Belden Manufacturing Company, 2310A So. Western Ave., Chicago, Ill.

Please send me your booklet—Helpful Hints for Radio Fans.

Name _____

Address _____

Recent Advances in Tuned R.F. Amplification

Part IV — The Capacity Bridge

By Milo Gurney

IN BRINGING into Radio the advantages of the principle involved in the Wheatstone bridge for the control of sustained oscillations, or the neutralization or compensation of undesired plus regenerative effects through reaction from the plate to grid circuit which method is to play such an important part in many of this coming season's receiving sets, it seems important to point out that the employment of this well-known principle is not revolutionary within itself.

The Wheatstone bridge plan for the measurement of unknown resistances, capacities and inductances or their combination, has been practiced for a great number of years in the electrical industry. Nearly one hundred circuit combinations covering methods of electrical measurement using this theory have been published and are available at many public libraries. However, it is only of recent date that three, or possibly four, prominent engineers have appreciated its practical oscillation control value, particularly in tuned radio frequency circuits. Therefore, in these circuit marvels one must not be confused into believing that they are untried experiments because to the contrary they represent a practical advancement in the art of science of Radio receptors.

Another misunderstanding which has existed so long that it has now become a byword, is the crediting of Sir Charles Wheatstone with the invention of the balanced bridge theory carrying his name. Contrary to this impression an engineer by the name of Christie of the Royal Military Academy at Woolwich was the inventor, though Wheatstone was responsible for bringing it to the attention of the electrical fraternity and it is to his credit that Wheatstone also gave Christie full credit for the idea and invention.

tors enter into the design of input and output circuits of any type, samples of bridge theory modifications are furnished in the hope that they may serve as an inspiration to some of my readers. Often an analogy is helpful in studying causes

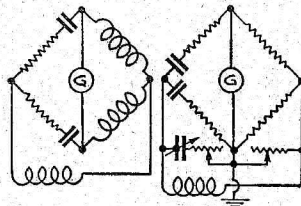


Figure 23 Figure 24

and effects, and more often it is the one assistance most required by those who have not had the opportunity to make playmates of inductances, resistors and capacities. Hence, in order that I may not be accused of a lack of consideration

For those so penalized, in figure 26 I am giving an analogy covering the theory of Wheatstone bridges using the familiar tank of water with connected drain pipes as the illustration indicates.

Assuming that AD, AE, DC and EC are interconnected as shown and cross-connected from D to E with equal size discharge piping, then, as the four arms AD, AE, DC and EC are of equal size, the four arms permit water to drain at equal ratio. In this process the cross-connected pipe DE will fill up until the pressure at D and E are equal from A, but water from DE will not flow, as a balance from AE to AD as been established. However, if we open DE at B and connect it at X of CY, then our balance is destroyed and water will flow in BX.

Let us now have it clearly understood in our mind that a bridge circuit in order to be balanced must comprise (so far as Radio receiving circuits are concerned) two points electrically isolated from two other points, and for our further consideration we must consider these isolations as two points of the input or grid filament circuit and the two points of the output or plate filament circuit. Thus it

is these two which must be balanced, neutralized or compensated, and it holds that sustained oscillations in the degree of "howling" obviously spell an unbalance between the input and output circuits. Then if it is possible to balance them,

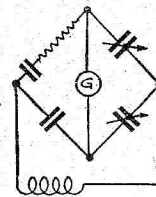


Figure 25

through hooking them up Wheatstone, we have obviously solved our problem for the positive control of regeneration and there is no reason, other than a physical one, why we could not hook up fifty or a hundred stages of tuned radio frequency (Continued on page 20)

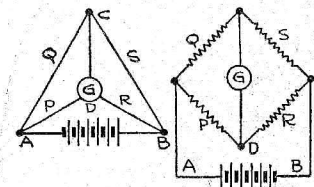


Figure 19 Figure 20

The Wheatstone bridge is usually defined as a network of six conductors and is usually represented as an arrangement of trilateral symmetry about the point D as shown in figure 19.

With this arrangement, a battery is inserted in the branch AB while a galvanometer is in series with CD. In practice, adjustments are made of one or more of the several branches until the current through the galvanometer G is zero. The circuit is then said to be balanced and

$$\frac{P}{Q} = \frac{R}{S}$$

the arms PQ and RS representing the resistances of the conductors AB, AC, BD and CE. Hence when no current can flow through G, it is obvious that the currents in P and R have the same value, also the currents in Q and S have a like value. Therefore, according to Ohms law, P is equal to Q while R is equal to S or P is equal to QR divided by S.

I digress to ask the reader to whom a quick reading leaves this definition somewhat hazy, that he then go over the definition in conjunction with the diagram a sufficient number of times to clarify his understanding of it, for without such un-

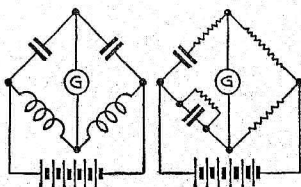


Figure 21 Figure 22

derstanding, experimental work will prove but a maze of mysteries. An additional help is figure 20, which is identical with the schematic shown in figure 19, but which has also the resistances inserted.

To further aid the experimenter, and not to confuse it with the text, figures 21, 22, 23, 24 and 25 indicate five forms of well-known bridge circuits for the determination of resistance, inductance and capacity, or two or the three in combination both with fixed and variable inductances. Another reason for giving these is that because all three fac-

The Train you want to meet —

DAY-FAN is like a great railroad station into which run a hundred tracks. The train from San Francisco comes in on track 47. Pittsburgh's train rolls in on track 17. A long distance express from Nebraska comes in on track 13. A big New York special comes in at 65.

These tracks belong to these trains. They always come in on them. You know where to meet them. So for a hundred other trains from all over the United States.

Yes, you have guessed it. The trains are the music, the speeches, the songs, that travel through space to your radio. The hundred tracks are the hundred lines on your Day-Fan dial.

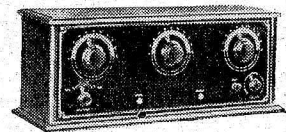
Instead of running from track to track, know in advance where your train comes in. The Day-Fan Air Telephone Directory will tell you. And no other set can do this. You need never again miss the "music train" you had planned to meet and enjoy.

Day-Fan owners take distance for granted, just as they speak across

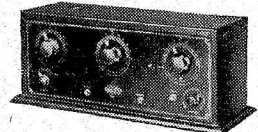
the continent by telephone. They take selectivity for granted, and as a matter of course expect to cut out one station and get another. The thing that they are never able to take for granted is Day-Fan's sound beauty, for in this radio sets differ as a fifteen dollar violin differs from a fifteen thousand dollar Stradivarius. Magnificent as Day-Fan is in volume, exact as it is in its arrow-like flight to the music you seek, marvelous as it may be in simplicity and sureness, its outstanding feature must always be its beauty of tone. The more sensitive your ear may be, the more you will enjoy Day-Fan. The more you have said "I can never enjoy radio," the more surely you will enjoy Day-Fan. When some one told Ole Bull that he didn't like music, the master nodded and said "Good. I will play to you."

Go hear a Day-Fan today and prove these things to yourself right away. If you do not know who is your nearest Day-Fan dealer drop us a line and we will tell you.

and what it brings to you



OEM 12, \$75.00



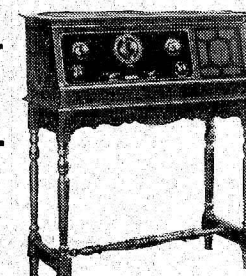
OEM 7, \$98.00



DAY-FAN 5, \$115.00



Here's where they always are on the Day-Fan Radio Dial



DAY CRAFT \$145.00

With Legs \$165.00

Legs Separate, \$20.00

THE DAYTON FAN & MOTOR COMPANY DAYTON, OHIO

For 30 Years Manufacturers of High Grade Electrical Apparatus

METROPOLITAN MUSIC MAKERS AT WOS

Sunday, June 21

(Continued from page 8)

Heinroth, organist; 3:45, Shady-side Presbyterian church; 8:45, church services.
 KYW, Chicago, Ill. (636), 10 a. m., church service; 3-4 p. m., studio concert.
 WBSN, Chicago, Ill. (266), 7-8 p. m., classical concert, Walter League; 8-11, Midway Dancing Gardens orchestra; Jack Parker; Casey & Gorvias; Big Boy Yazle.
 WBZ, Springfield, Mass. (333.3), 9:55 a. m., Church of the Unity, Rev. Charles A. Wing; 8, Ernest Malchuk, director of program; 8:30, Florence Owen, contralto; Howard S. Layman, pianist; Jack Battle, violinist; William S. Self, organist.
 WDX, Detroit, Mich. (516.9), 7:15 p. m., services, Central Methodist Episcopal church.
 WEAR, Cleveland, Ohio (589.4), 3:30-5 p. m., Hotel Cleveland orchestra; 7-8, Park theater orchestra; 8-9, Vincent H. Percy, organist; 9-10, evening program.
 WEBH, Chicago, Ill. (370.2), 7-9 p. m., artist's program.
 WGES, Oak Park, Ill. (250), 5-7 p. m., John Stamford, tenor; Howard Neumiller, pianist; Edwin Kemp, tenor; Bryce Balbo, baritone; 10:30-12, A. Canallo and his 11 Master Musicians; Ralph Olson; Andre Scarlatti; Rudolph Hess; Coyne Electrical School serenade.
 WGN, Chicago, Ill. (370.2), 3:30 p. m., faculty artists, Chicago Musical college; 9-10, Drake concert ensemble, Ravenswood Methodist Episcopal church choir; WGY, Schenectady, N. Y. (379.5), 9:15 a. m., services, First Church of Christ Scientist; 6:30 p. m., services

of First Baptist church; 8:30, grand opera, from WGBS.
 WHT, Deerfield, Ill. (398.8), 9:30 a. m.-9 p. m., Paul Rader.
 WBO, Chicago, Ill. (226), 10:15 a. m., Edgewater Presbyterian church; 2-4 p. m., Dorothy Day Dillon, soprano; Vic Lehman, tenor; William Madden, tenor; Dan Busch, violinist; 10:30-12, Maria Danprova, Russian soprano; Victor Young, violinist; Joe Albaugh, double bass.
 WJJD, Moseheart, Ill. (302.8), 12 midnight, frolic, Les Cameron, Walter Pett, Charles Straight's orchestra.
 WKRC, Cincinnati, Ohio (422.3), 6:45 p. m., Walnut Hills Christian church; 10, classical program.
 WLS, Chicago, Ill. (344.6), 7:30 p. m., Ralph Emerson, organist; 8-8:35, WLS Little Brown Church.
 WLW, Cincinnati, Ohio (422.3), 9:30 a. m., school, Editorial Staff of Sunday School Publications, Methodist Book concern; 11, services, Church of Covenant, Dr. Frank Stevenson; 7:30 p. m., services, First Presbyterian Church of Walnut Hills; Dr. Frederick McMillan, minister, orchestra concert.
 WMBE, Chicago, Ill. (250), 7-8:30 p. m., semi-classical program, J. Bodewalt Lampe, director; Heatrice Teller and Trianon ensemble; Marie Canuso, Rita McPown, Hazel O'Neil, Armin F. Hand and Woodlawn theater orchestra; 9:30-10:30, Dell Lampe and Trianon orchestra; Walter Ford's Inter-Collegiate orchestra; Gertrude Doyle; Morye Atzawa, Cecil Ward, Armin F. Hand and Woodlawn theater orchestra.
 WORD, Batavia, Ill. (275), 10 a. m., hymns, sacred songs; address, L. M. Smith; 6:45 p. m., sacred music; address, L. B. E. A. A. choral singers; Mervie Boyd Mitchell, soprano; James W. Mitchell, baritone; address, G. Hall.
 WOL, Chicago, Ill. (447.5), 8-10 p. m., Ralph Williams and his Rainbow Gardens orchestra; Jeanette Van Lennep, soprano; Mary Van Lennep, accompanist; Lucille Mathews, violinist; Gertrude Mathews, accompanist; Len Hamilton, pianist; Henshaw concert orchestra.
 WRED, Lansing, Mich. (265.7), 10 p. m., baseball.
 WSAI, Cincinnati, Ohio (326), 3 p. m., sermonette, sacred chimes concert.
 WTAS, Elm, Ill. (392.2), 2-5 p. m., Sunday afternoon popular concert, Joe Rudolph and the Boss' Own orchestra; 8-12, Villa Ohria radio concert, Joe Rudolph and the Boss' Own orchestra; Frank Morris, Polly Willis, Fanny and Eddie Cavanaugh.
 WWT, Detroit, Mich. (352.7), 11 a. m., St. Paul's Episcopal cathedral; 2, Detroit News orchestra; 6:20, Roxy and his Gang.

Ruth R. Petrotta, (below) soprano, will be the soloist on the Sunday afternoon program at KPO, the Hale Brothers' station at San Francisco.



Senator Harold C. Kessinger of the Fourteenth Senatorial District will give a series of talks at WJJD, Springfield, on events at Springfield, so that the Illinois taxpayer may have an unbiased idea of the bills up before the legislature.



Billie Dunn is the popular pianist at the Warner Brothers' station, KPWB, Hollywood. No program is complete at this studio without Miss Dunn.

Stewart P. MacLennan, pastor; 8-9, Ambassador hotel concert orchestra, Josef Rosenfeld, director; 9-10:30, Midsummer Night's Dream program, Beverly Hills nurses.
 KPO, San Francisco, Calif. (428.3), 6-6:30 p. m., Waldemar Lind, States Restaurant orchestra; 6:35-7:20, Palace hotel concert orchestra; 8-8:30, Palace hotel concert orchestra; 8:30-10, Rudy Selger's Fairmont hotel orchestra.
 Monday, silent night for: ATB, KCAC, CKY, CNRT, KFAE, KFDW, KGW, KHL, KIDS, KYW, P.W.X., WBBM, WBCN, WCAU, WDFW, WEAD, WEBB, WEP, WFI, WGBS, WGSB, WHAS, WIDW, WLY, WKA, WLS, WMAQ, WMBB, WOC, WOI, WJ, WRC, WREO.



Meeting; addresses, Calvin Coolidge, General Lord; music, United States Marine band, Captain William Santelmann, director; 10-10:30, Invitable Choir from Washington, D. C.; 10:30-11:30, Ben Bernie's Hotel Roosevelt orchestra.
 WEA, Boston, Mass. (476), 6:30 p. m., Big Brother band; 7:30, Boston Saxophone band; 8:15, Tower Health talk; 8:30, from WDAF, Meeting of the Bureau of the Budget, address, Pres. Coolidge; Marine band; 10, Blue Ribbon quartet; 10:30, Ed. Andrews Nautical Garden orchestra.
 WFI, Philadelphia, Pa. (394.5), 3 p. m., Loreta Kerk, pianist; 6:45, Bellevue Stratford roof garden orchestra.
 WGBS, New York, N. Y. (315.6), 3-4 p. m., authors' program, direction of Harper Brothers; talk, Anna Steese Richardson, writer; Anna Berger, violinist; 6-6:30, Uncle Geesbe; 6:30-7, Aladdin dance orchestra; 7-7:10, "Viewpoint of Senator DuBois of Idaho," Captain Archibald.
 WGR, Buffalo, N. Y. (319), 2:30-4:30 p. m., WGR's afternoon program, A. J. Erlanson, director; 6-7, Rush Yates and his Terrace orchestra; 8-3, Buffalo Shrine band; 9-10, mixed program by Buffalo Strikers; 11-11 a. m., supper-dance music, Vincent Lopez Hotel Statler dance orchestra, Harold Geiser, director.
 WHAR, Atlantic City, N. J. (278), 7:30 p. m., Seaside hotel trio; 8, Shelburne hotel concert orchestra.
 WHN, New York, N. Y. (360), 6:30-7 p. m., Palais D'Or orchestra; 8-8:05, talk, "Storage Batteries," H. B. Shontz; 8:05-8:35, Roseland dance orchestra; 8:35-8:40, talk, H. W. Carrough of Terminal Barber Shop; 8:40-8:50, Littman's Employees orchestra; 11-11:30, organ recital, Loew's Lexington theater; 11:30-12, Silver Slipper revue and orchestra.
 WIP, Philadelphia, Pa. (308.2), 3 p. m., "Song of the Surf"; 3:30, Comfort's Philharmonic orchestra; 6-6:05, Benjamin Franklin concert orchestra; 7, Uncle Wally's bedtime stories.
 WJAR, Providence, R. I. (305.9), 8 p. m., Berry Spring dance team; 9, A. & P. Gypsy sitting ensemble.
 WJZ, New York, N. Y. (455), 4-5 p. m., Poughkeepsie regatta on Hudson river; 7-8, Bernard Lettlow's Hotel Commodore dinner concert; 8-8:30, Wall Street Journal review, 8:10-8:30, NYU Air College; 8:30-9:30, program, Lantano Hall; 10:15-11:45, Jacques Green and his Club Desairite orchestra.
 WLIT, Philadelphia, Pa. (394.5), 7:30 p. m., Dream Daddy's bedtime stories; 8, Pennsylvania male quartet; 9, auto talk; 9:30, Stanley theater symphony orchestra and concert; 10, Arcadia cafe dance orchestra; Charles Frey's Millard Dollar Pier orchestra.
 WMCMA, New York, N. Y. (341), 8-5 p. m., musical program; 8:30-7:30, Ezrie Golden and his Hotel McAlpin orchestra; 9-10, hour of Spanish music, Margaret Taylor.
 WNYC, New York, N. Y. (526), 7-7:35, dance music; 7:35-7:50, baseball results; 7:55-7:57, health talk; 8-8:15, "Knotty Problems in Baseball," John B. Foster; 8:15-10:15, concert, Paul Hensberg and his band from the Mall, Central Park; 10:15-10:30, "Trend of the Times," Dr. Sydney N. Usher.
 WOO, Philadelphia, Pa. (308.2), 4:35 p. m., organ recital, Mary E. Vogt; 7:30, A. Campello's roof garden orchestra; 8, Mark Strand theater concert; 8:30, organ recital; Mary E. Vogt; 9, A. and G. Gypies; 10, organ recital, Mary E. Vogt; 10:20, Hotel Sylvia dance orchestra.
 WOR, Newark, N. J. (465), 6:15-7:15 p. m., Ernie

Monday, June 22

Central Standard Time Stations
 CKY, Winnipeg, Can. (384.4), 7 p. m., Broadway Baptist church.
 KFAB, Lincoln, Neb. (340), 4-5 p. m., church service.
 KFWD, Beaumont, Texas (315.6), 11-12 p. m., church services.
 KFWB, Hollywood, Calif. (252), 9-11 p. m., late news, Warner's Sunday night movie, music, fun and song stars.
 KGO, Oakland, Calif. (361.2), 11 a. m., St. Luke's Episcopal church; 3:30 p. m., KGO Little Symphony orchestra; 8, St. Luke's Episcopal church.
 KGW, Portland, Ore. (491.5), 10:30-12 p. m., First Presbyterian church; Dr. Harold Leonard Bowman, pastor; 7:45-9 p. m., services, First Presbyterian church.
 KHL, Los Angeles, Calif. (405.2), 6-8:30 p. m., Lighthouse Arcadia orchestra; Jack Cronshaw, leader; 7:30-7:45, Art Hickman's Billman hotel concert orchestra; Edward Fitzpatrick, director; 7-7:30, organ recital; remote control from First Methodist Episcopal church, Arthur Blakely, organist; 8-10, program, Martin Music company, arranged by J. Howard Johnson.
 KNX, Hollywood, Calif. (336.9), 7-8 p. m., First Presbyterian Church of Hollywood, remote control, Rev.

chestra; 10-12, dance music, Fleetwood Radio orchestra, specialties.
 WMC, Memphis, Tenn. (499.7), 11 a. m., Second Presbyterian church, Rev. A. B. Curry.
 WDOAN, Lawrenceburg, Tenn. (282.9), 9 p. m., Vaughan Radio orchestra.
 WOAW, Omaha, Neb. (526), 9 p. m., chapel service, Rev. R. R. Brown; 9, First Memorial Methodist church, Rev. E. Knight.
 WOC, Davenport, Iowa (483.6), 1-2 p. m., orchestra, concert, Palmer Little symphony, Edwin Swindell, conductor; 6:45, baseball scores, dance orchestra; 10-11, Emil F. Berggren; 9:30-11:30, Palmer Little symphony, Edwin Swindell, conductor.
 WOS, Jefferson City, Mo. (449.9), 8 p. m., Union religious service.
 WSPU, Iowa City, Iowa (483.6), 9 p. m., familiar hymns.

Monday, silent night for: ATB, KCAC, CKY, CNRT, KFAE, KFDW, KGW, KHL, KIDS, KYW, P.W.X., WBBM, WBCN, WCAU, WDFW, WEAD, WEBB, WEP, WFI, WGBS, WGSB, WHAS, WIDW, WLY, WKA, WLS, WMAQ, WMBB, WOC, WOI, WJ, WRC, WREO.
 Atlantic or Eastern Daylight Saving Time Stations
 CHNO, Toronto, Canada (357), 8:30 p. m., CHNC orchestra.
 WAGB, Richmond Hill, N. Y. (315.6), 7:30-7:45 p. m., sports talk, Thurston Fisher; 7:45-8, Edward Kruse, tenor; 8-8:15, Horace J. Taylor, reader; 8:15-8:30, Ruth Hays, soprano; 8:30-9:15, Synchrophase string trio; 9:15-9:30, Edward Kruse; 9:30-9:45, Ruth Hays; 9:45-10:15, Synchrophase string trio; 10:15-10:55, Kentucky Hamblers; 11:05-11:30, Kentucky Hamblers.
 WBBR, New York, N. Y. (272.6), 8 p. m., Irene Klempner, soprano; 8:10, vocal duet, Irene Klempner, Fred Franz; 8:20, "Public Safety," C. E. Sneyd; 8:40, Fred Franz, tenor; 8:45, Bible instruction from "The Harp of God"; 8:55, vocal duet.
 WCAE, Pittsburgh, Pa. (461.3), 8 p. m., dinner concert, William Penn hotel; 8:30, concert; 9, Hamilton ensemble; 10, Press-Kaynes.
 WCAF, New York, N. Y. (461.5), 4-4:10 p. m., Henry Korman, pianist; 4:10-4:20, Joaquin Quevedo, tenor; 4:20-4:30, William Brinkley, violinist; 4:30-4:40, Henry Korman; 4:40-5, lecture, "Good Speech," Columbia university; 6-7, dinner music, Waldorf-Astoria; 7-7:15, talk, "Conservation," associations; 7:15-8:15, program, Mark Strand theater and studio, direction of Joseph Plunkert; 8:30-10, Bureau of Budget

(Continued on page 10)

MARIMBA ARTIST FEATURE AT WLW

Tuesday, June 23

(Continued from page 10)

cert orchestra; special feature: Armand Le Brun, marimba artist.

WMAQ, Chicago, Ill. (447.5), 6 p. m., Chicago theater organ; 6:30, Hotel LaSalle orchestra; 8, Jack Chapman's orchestra; 8:30, talk, Harry Hansen; 9:15, Chicago intercollegiate.

WMBB, Chicago, Ill. (250), 7-8:30 p. m., semi-classical program, J. Hodevall Lampe, director; Beatrice Teller and Trilane concert; Ambrose Wynick; Rita McFawn; Hazel O'Neil; John S. Everett; Armin P. Hand and Woodlawn theater orchestra; 8:30-10:30, Dell Lampe and Trilane orchestra; JoAnne Kraus, Bob Duffy, Geraldine Doyle, Charles Agne and Trilane orchestra; Fisher and Smith; Florence Tison, Little Orphan Annie production, Phyllis Harris, Annie, Emily Schneider, Tony the Janitor's Boy, Clyde Hager, Cap. Irish Weimer, Pedro, the Organ Grinder.

WOOD, Detroit, Mich. (327), 8 p. m., World News Digest, G. L. Pyle; 8:50, Webster hotel orchestra; 9, Pamela Newby, contralto; Madeline E. Magnus, tenor; Florence E. Magnus, accompanist.

WQJ, Chicago, Ill. (447.5), 7-8 p. m., Ralph Williams and his Rainbow Gardens orchestra; Lou Byron Reed, violinist; Mrs. A. Scott, Armitage, accompanist; Fayette Miller, baritone; Mrs. Adelaide Steen, contralto; H. L. Ralph Williams and his Rainbow Gardens Siskiyah; Everett George Ogle, reader; Frank Blasco, boy tenor; Tommy Janossek, harmonica player; Mack Sisters; J. Reszler; Ma Shannabook, soprano; 1-5, Ginger hour.

WRC, Washington, D. C. (469), 7:19 p. m., Wammaker program; 9:30, "The Political Situation in Washington Tonight," Frederic William Wiles; 10, Le Paradis band; 11, Otto F. Beck, organist.

WREO, Lansing, Mich. (283.5), 8:15-9:45 p. m., Leo Broadcasting band; Red male clee club; 10, baseball.

WSAI, Cincinnati, Ohio (326), 6:45 p. m., WSAI studies; 7, Hotel Sison instrumental trio; 8, Eveready hour of music; 9, Mrs. Haloux Filaret, soprano; Ronald McFarland, fiddler; George Clifford Cook, bass.

WTAS, Elgin, Ill. (302.8), 8-10:30 p. m., Joe Rudolph and the Boss' Own orchestra; Frank Morris, Polly Willis, John Post, Eddie and Frankie Caravanagh.

WTIC, Hartford, Conn. (348.6), 6:50 p. m., baseball; 7, Austin organ company; 7:40, E. K. Slack, tenor; Gladys Tule, reader; talk on automobile camping; 9, Bill Tassilos orchestra.

WWJ, Detroit, Mich. (352.7), 8 p. m., dinner concert; 7, concert from New York, WEAAP.

Central Standard Time Stations

CKY, Winnipeg, Can. (384.4), 8:30 p. m., Manitoba Agricultural college lecture; 8:45, concert, J. A. Bandfield limited; 9:45, popular songs of twenty years ago, Joe H. center.

KFAB, Lincoln, Nebr. (240), 5-6 p. m., Schmoeller and Miller; 11-12:30, midnight readers.

KFDM, Beaumont, Tex. (415.6), 7-7:30 p. m., children's program; 10-10:30, musical program.

KFVE, University City, Mo. (240), 6-7 p. m., Radiocast review, Romaine Fielding; 10, C. G. Cosby, baritone; readings, Romaine Fielding.

KLDS, Independence, Mo. (441), 8 p. m., Carolyn Ethnor Haines, pianist; Thomas Holsworth, reader.

KSD, St. Louis, Mo. (545.1), 6:45 p. m., Abregi's concert ensemble; Arne Arnesen, violinist.



Edith M. Aab, contralto, is a favorite entertainer at WTIC, Hartford. Miss Aab is the director of the vocal studios bearing her name and has a reputation for being as good a teacher as she is a singer.

Mae Skoglund is called the girl with two voices because she can sing either tenor or soprano. She will appear on the Saturday program at WBCN.

KTHS, Hot Springs, National Park, Ark. (374.8), 9:15 p. m., baseball; 9:25, Meyer Davis.

WCCO, Minneapolis-St. Paul, Minn. (416.4), 6 p. m., baseball; 6:05, Billy St. Paul, hotel orchestra; 7-9, national program from WBAF; 9, baseball; Ohio Kixis band.

WDAF, Kansas City, Mo. (365.6), 6-7 p. m., piano tuning-in number on the Duo-Art; Tell-Me-a-Story Lady; Maxwell Littlefield, pianist; Plantation players; 11:40-1, Merry Old Chief; Carl Nordberg's Plantation players; Charles Dornberger's Kansas City Athletic club orchestra.

WFAA, Dallas, Tex. (475.9), 6:30-7:30 p. m., Haualea School of Hawaiian music; 11-12, Patricia Randle and assisting Dallas musicians.

WHAD, Milwaukee, Wis. (275), 6-7 p. m., organ music.

WHAS, Louisville, Ky. (399.8), 7:30-9 p. m., concert; Blue clee orchestra; S. J. Cooper, director; talk.

WHO, Des Moines, Ia. (526), 7:30-9 p. m., musical program.

WMBF, Miami Beach, Fla. (884.4), 8:30-7 p. m., Fleetwood Radio orchestra; 7-7:30, Fleetwood Radio orchestra; 10-12, dance music, Fleetwood Radio orchestra.

WMC, Memphis, Tenn. (499.7), 7:30 p. m., health talk, Dr. E. B. Francis; 8:30, musical; 11, Harry O. Nichols, organist.

WOAN, Lawrenceburg, Tenn. (282.8), 9 p. m., Vaughan Radio orchestra.

WOAW, Omaha, Nebr. (526), 6 p. m., advice to lovers; 10-11, baseball scores; 6:25, program; 9, Deluxe program; 10-30, orchestra.

WOC, Davenport, Iowa (683.6), 5:45-6 p. m., chimes concert; 6, baseball scores; 6:30-7, Gold Dust Twins

from WEAAP; 8-9, musical program, artists from Clinton, Iowa.

WSMB, New Orleans, La. (319), 6:30-7:30 p. m., dinner music.

Mountain Standard Time Stations

CNRB, Regina, Can. (356), 8 p. m., bedtime travel talk, Jingles Klidder; Grace Newman Mandolin club.

Pacific Standard Time Stations

KFI, Los Angeles, Calif. (447), 9:30-9 p. m., Examiner's matinee music; 6-6:15, McDaniel's nightly doings; 6:45, radiotele talk; 7-8, program, Hills Bros. presenting Hills Brothers dinner-dance orchestra, Way Watts, baritone, and Starr Russell, blue streak Radio; 8-9, Examiner program arranged by Sean Jacques; 9-10, KFI. Bulletins in a variety program; 10-11, Packard Ballard hour, Billy and Polly Hall, Ashley Sisters, Emyl Talmadge, Bud Janison and others.

KFWB, Hollywood, Calif. (222), 6-7 p. m., children's hour, Big Brother of KFWB; 8-9, late news, program by Western's super-service garage; 9-10, program, Union Oil company of California, Non-detonating dance orchestra, Kathryn Martin, soprano, Miller's International Hawaiian trio; 10-11, Warner Brothers. Frolic, director, Charles Willman.

KGO, Oakland, Calif. (361.2), 6-7 p. m., dinner concert, Wiley B. Allen company; 8, program, Magnacox company; Clyde Gales, violinist; Mrs. Herschell L. Hagan, soprano; Norman Woodside's Metropolitan orchestra; Ruth Waterman, contralto; John T. Brown, harmonica soloist; Ellen Clarke, pianist; Beatrice L. Sherwood, soprano; string duets, Elsie Maud, Arthur O'Neil; Neppalton Street singers; Emanuel Porcini, baritone; Frank Pigons, bass; 10-11, Henry Halseus's orchestra.

KGW, Portland, Ore. (491.5), 7:30-8 p. m., baseball; 8-10, concert, Woodack & Fowell company; 10-12, con-

dialogue, Emile Boucher, Emile Desrosiers; Chateau Laurier dance orchestra.

WAGH, Richmond Hill, N. Y. (315.6), 7:30-7:45 p. m., sports talk, Thornton Fisher; 7:45-8, Joe Zimmerman, pianist; 8-8:15, Jack Abbott, tenor; 8:30-8:45, Arthur Elliott, reader; 8:45-9, Hyde And, baritone; 9-9:15, Paul Haensler, pianist; 9:30-9:45, Jack Abbott; 9:45-10, Paul Haensler; 10-10:30, Anshaw Harmony Girls; 11:05-11:30, Anshaw Harmony Girls.

WAE, Pittsburgh, Pa. (461.3), 6:30 p. m., dinner cert, William Penn hotel; 8:30, concert; 9, concert.

WCAU, Philadelphia, Pa. (278), 6:30 p. m., Hotel Pennsylvania Interfraternity dance orchestra; 8:45, concert, N. B. T. boys; 10:45, Jack Myers' musical architect's dance orchestra.

WEAF, New York, N. Y. (481.5), 4-4:10 p. m., Pleiades ensemble; 4:10-4:25, Sara Fuller, soprano; 4:25-4:35, Frances Greenbart, pianist; 4:35-4:50, talk; 4:50-5, Pleiades ensemble; 6-7, dinner music, Waldorf-Astoria; 7-7:30, services, United Synagogue; 7:30-8, A. Russ Patterson and his artists; 8-9, concert, United States Navy band, direction of Lieut. Charles Benter; 9-10, Ipana hour; 10-11, Royal Little symphony; 11-12, Ben Bernie's Hotel Roosevelt orchestra.

WEJ, New York, N. Y. (233), 8-8:30 p. m., piano recitals, Norman Hensel's pupils; 8:30-8:45, Henrietta Turner, ukulele girl; 8:45-9, Arthur A. Feldman, tenor; 9-9:15, Sara V. Turris, soprano, accompanied by Eleanor Fastenberg; 9:15-9:30, A. Wayne, baritone; 9:30-9:45, harp recital, Madame Gilda Cardini.

WEI, Boston, Mass. (476), 6:30 p. m., Big Brother club; 7:15, musical; 7:30, baseball; 8, Traveler Shoe concert; 8:30, M. B. Cohen's half hour musical; 9, Jane Footpaste George; 10, talk.

WF, Philadelphia, Pa. (394.9), 6:45 p. m., Bellevue Stratford rock garden orchestra.

WGS, New York, N. Y. (345.6), 3:10-3:30 p. m., "Indian Pauna Gressler, soprano; 3:40-3:50, "Indian

talk; 8:15-10:15, Shannon's Band from the Mall, Central Park; 10:15-10:30, popular songs.

WOO, Philadelphia, Pa. (388.2), 4:45 p. m., organ recital, Mary E. Vogt; 7:30, A Candler's Rock Garden orchestra; 8, concert from WEAAP; 10, organ recital; 10:50, Hotel Sylvania dance orchestra.

WOR, Newark, N. J. (403), 6:15-7:15 p. m., Tivoli theater orchestra; 7:15-7:30, sports talk; 7:30-8, Vincent Lopez orchestra; 8-8:15, "Topics of the Day," Spencer Armstrong; 10:15-10:45, Jascha Gurevich Sacapane ensemble; 11-12, Cirio's orchestra.



Carlos E. Penfield is the leader of the Boston orchestral club which broadcasts regularly through WBEI, Boston.

Eastern Standard or Central Daylight Saving Time Stations

KDKA, Pittsburgh, Pa. (509.1), 2:30-5 p. m., baseball; baseball; 8:45, Jerry Sitts Hour, music; 9:05, baseball.

KYW, Chicago, Ill. (536), 6-6:30 p. m., Congress hotel; 6:30, Evelyn Handrick, soprano; Louis Meslin, tenor; Walter A. Dorchard; violinist; Thomas B. Stephenson, recital; 9-11:30, Chicago Evening American features; Paul Whitman's Collection; Albert Hay Malotte, organist.

PWA, Hartford, Conn. (400), 8:30-11 p. m., concert, Malotec band stand.

WBCN, Chicago, Ill. (266), 8-11 p. m., exclusive WBCN artists; Doolen Brothers; Arcady Sisters; Clarence Jones, pianist; Johnny Special, harmonica acrobat; Ed Dempsey, Irish tenor; Flimney Briggs, humorist; West End Harmony boys; Albert Blaha, concertist; John Williams, baritone; Dick Hoiland, tenor; Ruth Webster Cross, reader; "Big Boy" Yagle, pianologist; Percy O'Neil, soprano; Mildred Danings Garden orchestra.

WBZ, Springfield, Mass. (333.3), 6 p. m., Hotel Kinnal Fulhamville orchestra; 6:30, Harry Tabbot, baritone; Thornton W. Burgess; S. Rene F. Dezanais, pianist; 8:15, Ottilie P. Hesse, contralto; 8:30, popular songs; George Rogers; 8:45, folk songs, Marguerite Le Mans, soprano; 9:30, baseball.

WEE, Elgin, Ill. (275), 10:30-12, midnight. Joe Rudolph and the Boss' Own orchestra; Frank Morris, Polly Willis, John Post, Eddie Caravanagh.

WEX, Detroit, Mich. (318.8), 4:15 p. m., musical program; 6, dinner concert, Book-Cadillac hotel; 7, musical program.

WEAO, Columbus, O. (293.9), 8 p. m., faculty lecture; Eilensworth string quartet.

WECL, Cleveland, O. (369.4), 7-8 p. m., Hotel Cleveland orchestra.

WEBH, Chicago, Ill. (370.2), 7:30-8:30 p. m., Oriole orchestra; books of the day, Leveillon Jones; Riviera theater; 8:30-10:30, Oriole orchestra; Kay Romney, Robert York, tenor; 11:30-1, Oriole orchestra; Kay Romney; Langdon Brothers; Robert York; tenor; Gordon Eddy.

WGES, Oak Park, Ill. (250), 5-5:30 p. m., Margaret Hayes, soprano; Myra Tabbot, baritone; Frank Vandland, pianist; 8:30-7, Cornelia Dugan; 10:30-1, A. Cavallo and his 31 Master Musicians; Ralph Olson; Edwin Fleety, tenor; Corina Eddy, vocal soloists.

WGN, Chicago, Ill. (370.2), 6:30-7:30 p. m., Drake Concert ensemble, Blackstone string quintet; 8:30-9:30, Hotel Terrace Garden orchestra.

WGY, Schenectady, N. Y. (379.5), 5:30 p. m., children's hour; 6:30, Albany Grand Symphony orchestra; Julius Bachson, conductor; Floyd H. Walters, organist; 6:50, feature from Book-Cadillac hotel.

WHAR, Providence, R. I. (305.9), 7:30 p. m., program from New York.

WIZ, New York, N. Y. (455), 4-4:30 p. m., program, Spanish songs; 4:30-5:30, Hotel Belmont tea music; 5:35, Cafe Boulevard orchestra; 8-8:15, Wall Street Journal review; 8:10-8:30, NYU Art College; 8:45-9:15, S. S. Minnekaunda orchestra; 9:30-10, Robert Dornberger; 10:30-11:30, Billy Wore's Greenwillow Village Inn orchestra.

WKAQ, San Juan, P. R. (340.7), 8-10 p. m., municipal band.

WLIT, Philadelphia, Pa. (394.5), 2 p. m., Arcadia cafe concert orchestra; 4:30, "Care of Children," Mrs. Louis Love; 7:30, Dream Daddy's bedtime stories; 8:30, Cafe Boulevard orchestra; Dorothy Powers, harpist; Ernestine Bacon, soprano; Pennsylvania male quartet; 10, Arcadia cafe dance orchestra.

WMAA, New York, N. Y. (341), 3:25 p. m., musical program; 6:30-7:30, Eric Golden and his Hotel McAlbin orchestra; 8-8:30, May Singli Breen and Peter de Rose; 9-9:30, Nickel's trio.

WNYC, New York, N. Y. (526), 6:50-7 p. m., market high spots; 7-7:25, Five Messner Brothers; 7:25-7:30, baseball results; 7:30-8, Five Messner Brothers; 8-

Wednesday, June 24

Wednesday, silent night for: CHNC, CKAC, KQV, CNRT, KFDM, KGO, KLDS, WBBR, WBCB, WDFW, WEFW, WFAA, WFB, WFSB, WFLZ, WFW, WMAK, WMC, WQAW, WL, WQRF, WPG, WRB, WRC, WRO, WSUI, WTC.

Atlantic or Eastern Daylight Saving Time Stations

CNRB, Montreal, Can. (41), 9 p. m., orchestra, White Star-Dominion Line "Meganic"; address.

CNRO, Ottawa, Can. (435), 8 p. m., Chateau Laurier concert orchestra; 9, Madame Edouard Laverdure, soprano; D. Edouard Laverdure, tenor; Reine Bardo, pianist; Madame Charles Parc, mezzo-soprano;

(Continued on page 12)

PRESIDENT COOLIDGE TALK MONDAY

Index to Popular Concerts

TABULATED below is a time table of the stations giving popular concerts this week. Stations are divided into the four different standard times in use. The hours are given in the kind of time in use at each listed station. By using this table as an index and referring to the complete programs below, full information will be obtained.

Popular

Atlantic or Eastern Daylight Saving Time Stations

Saturday, June 20: 7:30, WHAR; 8:15, WFAE; 8:30, WHN; 10:15, WNYC; 10:30, WFAE; 12, WMCA.

Sunday, June 21: 7:30, WCAE, WFAE, WBEI, WJAR; 10, WHN; **Monday, June 22:** 7:30, WBEI, WHAR; 8, WGR; 8:30, WAHG, WBZ, WOR; 9, WBAF, WBEI, WJAR, WOO; 9:45, WAHG; 10:15, WAHG; 10:45, WOR.

Tuesday, June 23: 7, WHN, 7:30, WHAR; 8:30, CKAC, WCAE, WFAE, WBEI, WFI; 8:45, WBZ; 12, WHN.

Wednesday, June 24: 8:30, WNYC; 9, WMCA; 10, WAHG; 10:15, WNYC; 10:30, WGR.

Thursday, June 25: 7:30, WBAE; 8, WHN; 9, WBEI; 9:30, WGSB; 10, WHN; 11, WMCA; 12, WHN.

Friday, June 26: 6:30, WGSB; 7, WBEI, WHN; 7:30, WHAR; 7:45, WAHG; 8, WAHG, WFAE; 8:15, WAHG; 8:30, WFAE; 8:45, WAHG; 9:30, WBEI; 10:45, WFAE; 11:30, WHN; 12, WHN.

Eastern Standard or Central Daylight Saving Time Stations

Saturday, June 20: 6, WBFB; 7, WFAE, WLS, WBBM, WBCN, WIBO, WLS, WMAQ; 8:30, WBMB, WTAS; 9, WBBM, WBCN, WLS, WTAM; 9:30, WBBM, WGN, WBMB, WHT; 10, WBBM, WBCN, WLS, WLS, WBMB, WQJ, WTAM; 10:30, WBBM, WGSB, WJLD, WRC; 11, WBBM, WHT, WKRC, WLS, WQJ; 11:30, WBBM, WGN, WBMB, WHT, WLS, WQJ, WSAI; 12:30, WBBM, WGSB; 1, WEAR, WQJ; 2, WEAR, WQJ.

Sunday, June 21: 8:20, WWJ; 8, WBBM, WBCN, WTAS; 8:30, WTAS; 9, WBBM, WBCN; 9:30, WTAS; 10, WBBM, WBCN, WBMB; 10:30, WJLD, WTAS; 11, WGSB, WIBO, WBMB; 11:30, WTAS.

Monday, June 22: 8, WTAS; 8:30, WBZ; 9, WTAS; 10, WKRC, WTAS; 10:30, WBEI, WJLD, WBMB; 11, WKRC, WSAI; 11:30, WCEE, WBMB; 12, WKRC.

Tuesday, June 23: 8, WBBM, WBCN, WBZ, WTAS; 8:30, WBMB; 8:45, WBZ, WHT; 9, WEAR, WTAS; 9:30, WERH, WBMB; 10, WBBM, WBCN, WGSB, WKRC, WLS, WBMB, WQJ, WTAM; 10:15, WLS; 10:30, WCEE, WBBM, WGSB, WGN, WHT, WJLD; 11, WBBM, WBCN, WGSB, WKRC, WLS, WQJ; 11:30, WLS; 11:30, WCEE, WBBM; 12, WBBM, WBCN, WLS, WQJ; 12:30, WBBM, WGSB, WHT; 1, WIBO, WQJ.

Wednesday, June 23: 8, WBBM, WBCN, WLS, WLW, WTAS; 8:15, WKRC, WLS; 8:30, WBZ, WBBM, WBMB; 8:45, WHT, WKRC; 9, WBBM, WBCN, WTAS; 9:15, WKRC; 9:30, WBMB, WBMB; 10, WBBM, WBCN, WMO, WBMB, WQJ, WSAI, WTAS; 10:30, WBBM, WGSB, WGN, WHT, WJLD; 11, WBBM, WBCN, WLS, WQJ; 11:30, WBBM; 12, WGSB, WQJ; 12:30, WBBM, WHT; 1, WQJ.

Thursday, June 24: 6:30, WSAI; 7, WRC; 7:30, WBBM, WBCN, WFAE, WTAS; 8:30, WBBM, WBMB; 8:45, WHT; 9, WBBM, WEAR, WTAS; 9:30, WBBM, WBMB; 10:30, WEAR, WBMB, WQJ, WTAS; 10:30, WBBM, WGSB, WGN, WHT; 11, WBBM, WQJ; 11:30, WGSB, WGN, 12, WBBM, WIBO, WQJ; 12:30, WGSB, WHT; 1, WIBO, WQJ.

Friday, June 25: 6, KYW, WBBM, WBCN, WLS, WTAS, WWJ; 8:30, WBBM, WBMB; 9, KYW, WBBM, WTAS; 9:30, WBMB; 10, KYW, WBBM, WBCN, WLS, WTAM; 10:30, WBBM, WQJ, WTAM; 10:30, WBBM, WGSB, WJLD, WRC; 11, WBBM, WHT, WKRC, WLS, WQJ; 11:30, WBBM, WGN, WBMB, WHT, WLS, WQJ; 11:30, WLS; 11:30, WCEE, WGSB, WBMB; 12, WBBM, WIBO, WQJ; 12:30, WGSB, WHT; 1, WIBO, WQJ.

Central Standard Time Stations

Saturday, June 20: 6:30, WFAA; 8, WLS; 10, KFVE; 10:45, WSB; 11, KFAB; 11:45, WDAF.

Sunday, June 21: 9:30, WFAA.

Monday, June 22: 6:30, WFAA, WOAW; 6:45, WCKF; 7:30, KFAB; 8, WCKF; 8:20, KFAB, WSBM; 9, KSD; 9:25, KTHS; 9:30, WSBM; 10, KFVE, WOI; 10:45, WSB; 11:45, WDAF.

Tuesday, June 23: 6:30, WFAA; 9, WOAW; 9:25, KTHS; 9:30, WOAN; 10:45, WSB; 11, KFAB, WFAA; 11:45, WDAF.

Wednesday, June 24: 7:30, KFAB; 11, WOAW; 9:25, KTHS; 9:30, WOAN; 10, KFVE; 11:45, WDAF.

Thursday, June 25: 6:30, WFAA; 7:30, KFAB, KFNF; 8, WDAF, WSB; 8:30, KFAB, WFAA; 9, WCCO; 9:30, WOAN; 10, KFVE; 11, WMO; 11:45, WDAF.

Friday, June 26: 6:30, WFAA; 7:30, KFAB, KFNF; 8, WDAF, WSB; 8:30, KFAB, WFAA; 9, WCCO; 9:30, WOAN; 10, KFVE; 11, WMO; 11:45, WDAF.

Mountain Standard Time Stations

Monday, June 22: 8, KOA.

Wednesday, June 24: 8, KOA.

Friday, June 26: 8, KOA.

Pacific Standard Time Stations

Saturday, June 20: 8, KFWE, KNX; 9, KFWE, KNX; 10, KFI, KFWE; 11, KFI, KNX; 11:30, KFI; 12, KFI, KNX; 12:30, KHJ; 1, KFI, KNX; 2, KHJ.

Sunday, June 21: 8, KHJ; 9, KFWE, 10, KFWE.

Monday, June 22: 8, KFWE, KNX; 9, KNX; 10, KFI, KFWE, KNX; 11, KFI, KNX; 11:30, KHJ, KNX, KPO; 10, KFWE, KNX; 11, KGW, KHJ.

Wednesday, June 24: 7:30, KFI; 8, KFWE, KGW; 9, KFI, KFWE; 10, KFWE, KGW, KNX; 11, KNX.

Thursday, June 25: 8, KHJ, KNX; 9, KFI, KNX; 10, KFI, KNX; 11, KNX.

Friday, June 26: 8, KFWE; 9, KFI, KFWE, KHJ; 10, KFWE, KNX; 10:30, KGW; 11:30, KGW.



Robert Visconti, violinist, is the director of the popular Hotel Gibson orchestra playing from 7 to 8 every Monday, Wednesday and Thursday at WLW, Cincinnati.

Pacific Standard Time Stations

KFAE, Pullman, Wash. (348.6), 7:30-9 p. m., program, Fourth Annual Conference of Boys' and Girls' clubs of Washington; messengers, stories, songs, instrumental.

KFI, Los Angeles, Calif. (467), 5:30-8 p. m., Examiner's ballroom program; 6-8:15, McDougall's night; 8:15, musical appreciation talk; 9, detective story by Nick Harris; 9:30, talk on psychology; 9:30-8, Warner Bros. movie; 10:15, 11:30, Art Hickman's Billie; 10:15, 11:30, Art Hickman's Billie; 10:15, 11:30, Art Hickman's Billie; 10:15, 11:30, Art Hickman's Billie.

KGO, Oakland, Calif. (361.2), 6-7 p. m., Ben Black's; 7:30-8:30, Ben Black's; 8:30-9:30, Ben Black's; 9:30-10:30, Ben Black's; 10:30-11:30, Ben Black's; 11:30-12:30, Ben Black's.

KGW, Portland, Ore. (491.5), 6-7 p. m., dance music; 7:30-8:30, dance music; 8:30-9:30, dance music; 9:30-10:30, dance music; 10:30-11:30, dance music; 11:30-12:30, dance music.

KHJ, Los Angeles, Calif. (405.2), 5:30-6 p. m., Leighton's Arcade cafeteria orchestra; Jack Cronshaw, leader; 6-8:30, Art Hickman's Billie; 8:30-9:30, Art Hickman's Billie; 9:30-10:30, Art Hickman's Billie; 10:30-11:30, Art Hickman's Billie; 11:30-12:30, Art Hickman's Billie.

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Central Standard Time Stations

KFAE, Pullman, Wash. (348.6), 7:30-9 p. m., program, Fourth Annual Conference of Boys' and Girls' clubs of Washington; messengers, stories, songs, instrumental.

KFI, Los Angeles, Calif. (467), 5:30-8 p. m., Examiner's ballroom program; 6-8:15, McDougall's night; 8:15, musical appreciation talk; 9, detective story by Nick Harris; 9:30, talk on psychology; 9:30-8, Warner Bros. movie; 10:15, 11:30, Art Hickman's Billie; 10:15, 11:30, Art Hickman's Billie; 10:15, 11:30, Art Hickman's Billie.

KGO, Oakland, Calif. (361.2), 6-7 p. m., Ben Black's; 7:30-8:30, Ben Black's; 8:30-9:30, Ben Black's; 9:30-10:30, Ben Black's; 10:30-11:30, Ben Black's; 11:30-12:30, Ben Black's.

KGW, Portland, Ore. (491.5), 6-7 p. m., dance music; 7:30-8:30, dance music; 8:30-9:30, dance music; 9:30-10:30, dance music; 10:30-11:30, dance music; 11:30-12:30, dance music.

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"Silent" Night in Name Only

WITH the erection of a number of high power stations close to Chicago, which even have studios in Chicago, the plan of Monday night being silent for DX listeners, has been lost to the greed of the publicity seekers, propagandists and other of these stations which believe their service indispensable for the short period of about six evening hours each week.

Once upon a time Chicago's silent night meant what it implied. Now it means only that the stations whose transmitters are in the city boundaries remain off the air, while those stations with transmitters removed some ten, twenty or sixty miles shoot everything they can to the great Chicago audience, having as they do zero competition from the purely locals.

Public indignation is rising. When WTAS was the only station within fifty miles on the air Monday night, the situation wasn't so bad. WTAS was on lower power then, and besides, it wasn't selling the air. Then came an increase in power, a sister station, WCBE, and both stations went toll. Shortly afterward, WJJD took the air. Then came WORD, Batavia, with its religious program on high power. Superstation WHT finally opened, shooting plenty of power into the gradually noisier "silent" night of Chicago fans. WHT is also operated for toll.

The religious station, WORD, claims it located at Batavia so that it could broadcast Monday nights. WHT claims it has a big investment and must sell time Monday nights. WTAS duplicates WHT's statement. WJJD refers to the 20,000 members of the Loyal Order of Moose who financed the station, saying that these men want to hear WJJD every night. We wonder if they live in Chicago?

Most of the nearby Monday operating broadcasters claim that the poor crystal fan and single tube listener must be entertained. That is the chief altruistic motive for their existence. And this premise is incorrect, because the crystal fans have six days a week to be entertained. The seventh gives them a chance to clean off the crystal or go to a movie.

Most single tube listeners would be glad to have the whole Central time band silent one night a week. Then their unselective sets would perhaps get a change of diet.

The expensive, or average set owner will unanimously prefer to have these nearby stations silent Mondays as well as the purely locals. The owners will have a real opportunity to learn how to tune a set, and besides, can listen to every distant station. The average set owner might thus become acquainted with what other broadcasters are like, and—horrors—might decide that the distant stations knew a whole lot more about putting on a program than the Monday jammers who persist in spending their money on electricity every night in the week.

As a cure, may we suggest that EVERY Chicago station, purely local especially, break down the Monday rule, and for two months straight keep Monday filled with the beautiful local program for the poor programless Chicago listeners? Then, perhaps, the public will rise up and tell all broadcasters within sixty miles of Chicago to take a night off on Monday and arrange good programs for the rest of the week, taking care to make all advertisements as indirect as possible, and washing their ears good so that they will be presentable next time they go on the air.

Promoting Interest in Art

STRIKING evidence of the value of Radio as a means of arousing interest in art, has been given in Vienna, Austria, where a largely increased attendance of the Viennese at the art galleries and museums followed broadcast talks on the paintings and sculpture there.

We would be delighted if some of the American stations would follow the example of the Austrian broadcaster, and tell the public of the treasures they can see at their local art galleries. Such lectures would be worth countless times more to the invisible audience than some of the wash-pan beating orchestras that unblushingly claim to be exponents of symphonic jazz music.

RADIO INDI-GEST

The recent saxophone concert was a great success. Gene Paul says that it is his desire to show people that beautiful classical can be played on the much maligned instrument and it is his prediction that people will begin to see the real hidden beauty of the saxophone.

(News copy from KFOA at Seattle)

For many generations now,
The poets, bound by duty,
Have sung of clouds and rolling waves
And things of hidden beauty.

They sang of love, and also fame,
But not in things so tootey
As the blooping of the saxophone
Did they seek for hidden beauty.

The violin's been doled its share,
And so's the flute so futey,
But Mr. Paul will show us now
The swinette's hidden beauty.

News Bulletins from Milwaukee Furnished in Cooperation with the Milwaukee Daily Beverage

(Beer up, my friend, beer up)

Erich Stroheim, local Radio dealer, gives away a prize with each Radio set. He has one for the flappers which is proving exceedingly popular. It consists of a neat leather carrying case containing a complete Flapper's Road Outfit. The articles are a pair of collapsible roller skates, a road map showing dirt roads in detail and a box of Keep-a-Shine Shoe Polish. Erich is some progressive.

The young man in the garage next to ours said he got Spain last night. You couldn't make out what they was saying, so it musta been a foreign language, and the orchestra, or was it singing maybe, there was some code going, was playing "La Paloma," that's Spanish, ain't it? and it was two degrees away on the dial where Spain shoulda been like it said in the book he won on a raffle last year on Radio, so it musta been Spain, wasn't that wonderful? We asked him whether they were broadcasting any bull fights, but he was stepping on the starter and didn't hear us.

High Pressure Salesman Julius Bierbaum went to Zion City the other day to sell Overseer Revolver a Radio set. "With this set," said Julius, "you can always cut out that consarned local station." Noteworthy was the floral tribute from the Sangverien consisting of a loop aerial with the words, "No static up yonder." Further particulars in the obituary column.

A Radio installed in the convention hall of Milwaukee Soft Drink Parlor Dispensers proved a sensation. When Florence Gushley sang, "Tell Mother I'll Vote Dry," many an eye which had never looked softer than a ten-minute egg shed copious tears and many a fist which had landed an unfortunate Coca Cola addict in the streets completely Horlicked was folded in prayer.

Hoping you are the same,
THE THIRD TROMBONE PLAYER.

It's too bad Mr. Paul can't go to Milwaukee to display the saxophone's hidden beauty. The home of cornet music would undoubtedly see the point.

The Ear-Lap

Oh, ye waves of the ocean,
You're mightily mean,
As action's conjuror
You've sure got the steam;
You rumble and pound
When the wind makes you mad—
But piffle, old ocean,
You're only half bad.

Why, waves of the ocean,
You haven't the strength,
Nor even, by Judas,
One half of the length
Of the ponderous, stringy,
Entang-ling snare
Condensed in my speaker
From ariel air.

They rear and they fear,
And they leap and they clap,
Till they heave the loud speaker
Right into my lap;
They twist where they list,
But they never play dunce—
They're so darn educated
They talk six at once.

Yet I, like the ocean,
Am never at rest,
Though oftentimes quiet—
May virtue attest—
For sally I may
To the dump with my fears,
But I've always that lappy lap
In my ears!

RUSTY LEWIS OF ELAND.

"What I Like Least About Radio" (Send in Your Pet Peeve)

Dear Indi: Here's a starter for this valuable department which I hope you will incorporate in your splendid column:

Any station that thinks that the soprano will soon be extinct, and that gives us plenty of such stuff as Miss Lucy So-and-So of the Squeedunk church choir, who will oblige with "Little Gray Home in the West" and two of her own compositions, so we will be sure and remember just how glorious a soprano voice was.....and the telegram readers.....and the long-winded mayors and chairman of the Society for the Uplift of Such-and-Such.....and other pseudo orators.

The fact that this paper goes into the home forbids us from expressing our own peeve-rating announcers.

News of the Week



Condensed

By DIELECTRIC

Several of the broadcasting stations have facilities for transmitting on either of two wave lengths, which provides a medium whereby more than one style of program may be given at one time without conflicting with each other. Station WBOQ is the low wave studio of WAHG, A. H. Grebe at Richmond Hill, L. I. Upon the occasion of the last appearance of the inimitable Finn—Nurmi—this station entertained with an account of the race given by Thornton Fisher. These WBOQ and WAHG sporting events are followed by a large audience of Radio listeners, whose appreciation is genuine.

New England has some very good musical talent and, thanks to broadcasting, it is possible for music lovers in many parts of the country to share in the enjoyment they offer. WBZ, Springfield, has been generous in the manner of such concerts it has included in the programs. The Huntington music clubs appeared in the studio of WBZ to spend a large part of one evening having a royal good time while we fans listened in. This is but another sign of musical growth in America.

Dialing down into the land of Georgia, WSB was discovered in process of introducing the Melody Artists' orchestra. Not all of the tunes from southern climes are in the nature of languorous harmonies, as this aggregation of musicians proved. Real fast and furious jazz numbers constituted most of the numbers played and dancers had to step lively to keep pace with them: Just wait a month or two for the new installation at WSB and see how the programs come in.

Station WGN, Chicago, had two excellent features to present not long ago in the Southland concert and the WGN trio. Unquestionably the latter had the better of it. I wish to express my conviction that few, if any, station trios surpass this one. It was the initial appearance of these players and I followed their work carefully with increasing admiration for their balanced playing and studious attention to the intent of each selection rendered. This is truly an asset.

After hunting around to find a violinist capable of impressing a Radio audience, I finally found Miss Magee playing at WSAI, Cincinnati, on an instrument with pleasing tone. Had such a program as this lady arranged been disrupted by the reading of telegrams, as still happens in many studios, the effect would have assumed an entirely different aspect. It is heartily to be hoped that encomiums will continue to pour into the studios, but NOT spill over into the microphone. That is a practice devoid of public appeal.

All offenders take notice. Took a long breath the other night and tuned in on KFWB, the movie station in Hollywood, and listened to a right-down-in-movieland dance orchestra play. This Montmartre cafe orchestra has it all arranged so that the station call letters—no more—are announced after each number is played. Between suites of numbers the usual procedure of treating the public to eight or ten minutes of carrier-wave hum is varied to the extent that obliging members of the orchestra play solos. First time I ever heard a brass horn solo in dance time. And what is a terepach? The banjoist plays it. At any rate, I voted the boys were good.

Various Uses of Filament Control Jacks

By Harry C. Lodge

COMPARATIVELY few fans use filament control jacks because the majority of the Radio public does not know how. Most home constructors feel that these jacks are too complicated, hence they resort to the plain variety. There is another reason for not employing these jacks, that is a theory, started by no one knows who, that the use of these jacks is detrimental because there is too much distributed capacity in the jacks. Jacks do have some distributed capacity; however, this capacity is not the least bit harmful on the broadcast range. The use of filament jacks on a receiver made to tune on wave lengths around 50 meters is inadvisable.

On the broadcast range, that is from 200 to 550 meters, the use of filament jacks is a convenience with which every fan building a set should be familiar. With them installed it is no longer necessary to have an extra switch to turn out the A battery. The simple performance of plugging the phones or loud speaker in and out, does the work. Put the phones in and automatically the filaments light up. When one is through for the evening pull out the plug and the filaments go out. Filament control jacks may be used with any number of audio stages and will light or put out the filaments as they are used.

Types of Filament Control Jacks

There are two types of filament control jacks, one for use on the last stage and the other for use on other than the last stage. As may be seen from the drawings, filament control jacks consist first of the part which makes up the ordinary

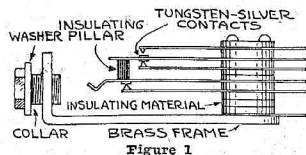


Figure 1

jack, that is the part which takes care of the phone circuit, the second being of course the part which controls the filament. This part is insulated from the rest of the jack usually by a pillar of

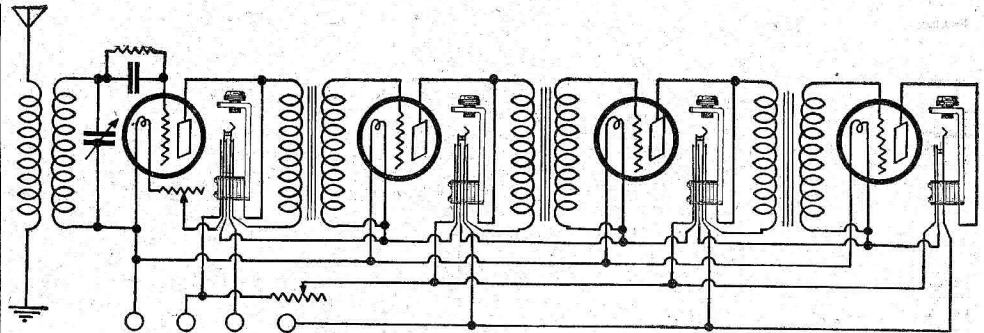


Figure 5

insulation such as bakelite or hard rubber. The phone circuit part of the jack is connected in the ordinary way that a jack is connected and is not affected by the presence of the filament control springs.

Filament control jacks are so arranged that when the phone plug is pushed in to make contact, a spring of the plate circuit pushes up the pillar of insulation which in turn closes or opens the springs which make up the filament circuit. As may be seen from the enlarged drawing figure 1, the jack is made up of a brass frame on which the springs and supporters are built up, and the frame, while holding all of the parts, also serves to make contact with the phone plug. At the end of the frame are small pieces of insulation between which are sandwiched the springs. At the other end is the collar by which the frame is held to the panel.

The ends of the springs nearest the panel have tungsten silver contact points, and since this metal is not attacked by the elements we can always depend upon a good contact at these points. In figure 1 can also be seen the pillar of insulation which is the key to filament control. The ends of the springs project a short way behind the separating pieces of insula-

tion and it is here that jack connections are made. The ends of the springs are usually coated with solder although some jacks are made up with a washer on the end which is tinned with solder and flux,

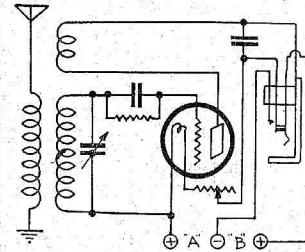


Figure 2

in which case the wire is merely held in place and the spot heated.

Simplest Filament Control

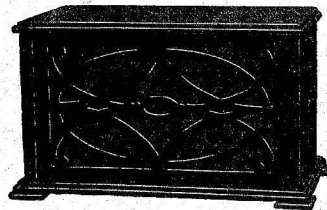
In figure 2 we have the simplest filament control arrangement. In this case

the single filament control jack is all that is necessary. All that it does is make and break the filament circuit. When the plug is pushed in the bulb lights and when it is withdrawn the filament goes out. This arrangement may be used for any one tube circuit, whether the single circuit, the three circuit, a super-regenerative or a reflex. The phone control part is connected as usual and the filament control part is in series with one of the filament leads.

In figure 3 we have the filament control jack arrangement used in a two tube hook-up, a detector and one stage of audio frequency amplification. However, this arrangement cannot be used in the usual two tube reflex as in this case both tubes are used at once and at all times. In the circuit shown one double filament control and one single filament control jacks are used. When the phone plug is in the first jack the detector tube alone is on, the amplifier is out. When the plug is in the second jack both tubes are on and ready for use. Pulling out the plug disconnects both tubes.

In figure 4 we have filament control jacks in the most popular arrangement. (Continued on page 18)

Getting Concerts WHOLE



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That roving disposition to tune in every station on the map is due, much more than is generally supposed, to a yearning for really sweet music.

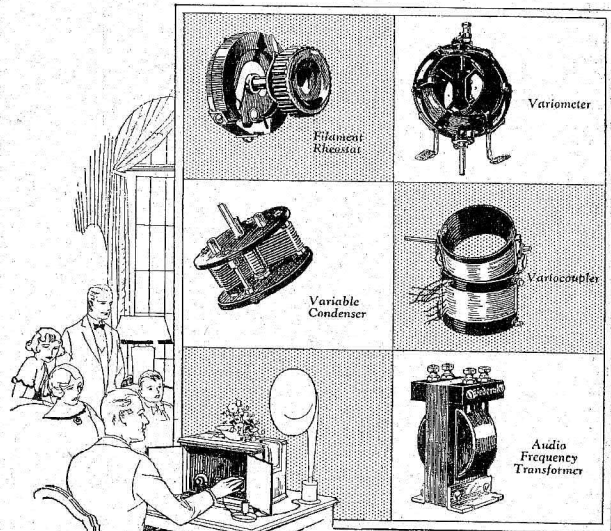
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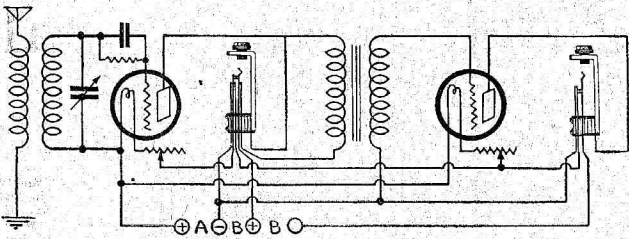


Figure 3

USE OF CONTROL JACKS

(Continued from page 17)

namely, the detector with two stages of audio frequency amplification. In this case, plugging the phones in and out does the same things as explained in the preceding paragraph except that it takes care of three tubes. In this arrangement two double filament control jacks, and one single filament control jack will be needed and this circuit is O.K. for either a soft or hard detector tube with two amplifiers. In figure 5 filament control jacks are presented in a circuit comprising a detector and three stages of audio frequency amplification. This combination came into some popularity with the Hotphon. It was not used much before that circuit because it was hard to get properly shielded transformers for this arrangement.

The use of these jacks is very useful when three stages are used. In this case,

bottom spring of one jack always goes to the middle spring of the next jack. If this is kept in mind, one will have no great difficulty with the rest of the wiring. In wiring filament control jacks, great care should be exercised to see that the filament wires make a good contact with the end of the springs. They should be soldered in every case, as this is the only way to make an absolute positive contact. Since the jacks usually have solder on the ends of the springs and since the wire used for connections is usually tin coated, there is seldom the necessity of using flux. Usually solder alone will do the work. If flux is used it should be some non-corrosive flux such as rosin, etc. It is advisable to cover the filament leads at least, with spaghetti tubing as this, while making the set look much neater and better, also protects the tubes from accidental short circuits which will burn out the tubes.

Filament control jacks as well as other

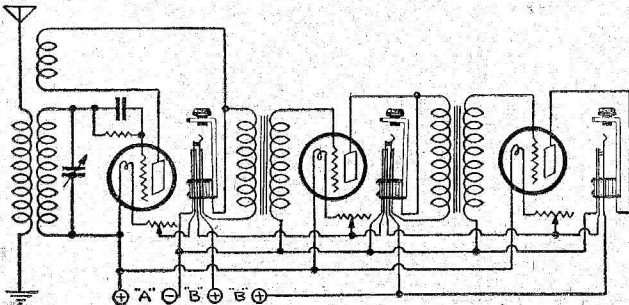


Figure 4

if the same type of tubes are used throughout, that is 201-A or all 199's, you can use a single rheostat, and set the voltage right with a voltmeter. The conveniences over the old arrangement where in some cases there was a rheostat for each tube can be plainly seen. Here we have only one rheostat yet all tubes are properly controlled and automatically go on or off whenever the plug is placed in the proper jack. With these, the most common arrangements, one can work out all sorts of combinations for filament control jacks such as detector and four stage, detector with one stage and push pull amplification, detector with a stage of transformer and two stages of resistance coupled, or detector and three stages of resistance coupled.

Secret of Correct Wiring

The whole secret of connecting filament control jacks can now be seen. It depends upon remembering that the

types should be placed near the bottom of the panel because it is here that the filament terminals are found inasmuch as the tube sockets rest on the baseboard. If jacks are not placed near the bottom various leads will not be as short as they might be and it will be found that the plugs are always in the way when tuning.

When jacks with filament control have been wired for the first time by an inexperienced reader, it is best to check the wiring at least twice before putting the set into operation. The reason for this being that since the phone circuit wire is so close to the filament circuit wiring and there is so much possibility for error, it would be very easy for the fan to make a costly mistake. Even though he did not make a mistake, he may have been a little careless with his soldering and a small drop of solder may have dripped and made contact between the filament and the phone circuit spring.

The Reader's View

Superstations

Being a subscriber of your good magazine and an ardent Radio fan I wish to say that I believe Mr. Kintner of the Westinghouse Electric company has discovered a plan that if worked out in its details will be the solution to the Radio problems that have for some time been puzzling the engineers over the country. What strikes me as the most favorable point in his plan is the locating of only 15 superstations in a certain band of wave lengths and as his plan is to give them each a difference of 20 kilocycles there would be no interference, though they should use as much as 50 kw.

I would also like to say a few words concerning the much talked about question, "Who is to pay for broadcasting?" To answer that intelligently, I think we should all first decide this question, "What is broadcasting for?" It is done by the broadcasters for advertising purposes to place him or his firm before the public, and to entertain the listener, for if there is no entertainment why should the public listen. As a whole, we can sum it all up as to who derives the benefit from it. I believe both parties are benefited, the people who are putting out the programs are putting their names before thousands of people who would otherwise never hear of them, the public who listens gets the entertainment and educational benefit, and as it is today, the

average fan is not asking for more stations, but a solution to the problem on how to prevent interference from so many closely allotted wave lengths, which subject goes back to our Mr. Kintner's plan. In closing allow me to thank you for such a splendid magazine at so reasonable a price.—W. A. Ault, chief engineer, Richmond, Ky.

One Good Station in Each State

Permit me to indorse your editorial, "Less Stations and Better Radio," in your recent number. It is timely and hits the nail on the head.

What is the use to "kid" ourselves about selectivity and keep on in an endless receiver building contest when at times stations as much as ten meters apart pile in right on top of one another. Recently WWJ, Detroit, and WJAD, Waco, Texas, both on 352.7 meters, were on at the same time (the department of commerce, Radio division, evidently consider them so far apart geographically as not to interfere) when they could not be tuned apart and had quite a dead spot between them. That is not selectivity in a receiver, but just poor broadcasting, or is it excellent broadcasting to deviate from an allocated wave length to find a channel of your own without regard for others?

It's about time for the BCLs, who, after all, pay the fiddler, if indirectly, to get together and demand some restriction on indiscriminate broadcasting. "One good station in each state and real enjoyment of Radio" is a good goal to work for.—H. Dittmer, El Reno, Okla.

The NEW Radio Book



How to understand radio, assemble circuits, improve reception, operate sets,

EVERY phase of Radio reception gathered into one book at last! Explanation of elementary principles, directions for constructing parts, detailed how-to-build articles for the assembly of sets, operating directions on popular manufactured outfits.

Haven't you often wondered what all the spirals, wriggly lines and zig-zag lines were about on diagrams? A big chart shows you a picture of the part as you see it and, beside the picture, the symbol used in diagrams. Other articles show clearly just what happens within the mysterious little vacuum tubes that glow hour after hour within your set, apparently without change, yet pass every note of a jazz orchestra or soprano.

Antennas, for whose erection there are seemingly no rules, are covered fully; the reason for a long wire in some locations and a short one in others, is readily grasped by anyone. Crystal sets, one tubers, two tube reflexes, three tube regenerative and reflex outfits, four tube R. F. and neutrodynes, five tube assemblies—all types are presented up to the nine tube "super," king of the air.

For the Man That Bought His Set

For the non-technically inclined there is a two-color broadcast map of the country, operating schedules of all the leading stations, call letters and power rating of every station on the air, suggestions for the care of batteries and tubes.

No matter what type of receiver you own, there are dozens of valuable suggestions on tuning, trouble shooting and operating. Your head receivers, loud speaker, antenna and certain parts within the set, require frequent cleaning, adjusting and care. Interference and its remedies are factors you should understand even though you care nothing about "what makes it go."

Compiled by the technical staff of Radio Digest, it represents the high lights of the past twelve months in the Radio field. All this data is indexed for ready reference and logically arranged. Only a few thousand have been printed and this offer will stand for a limited time. The only book of its kind and is FREE with one year's subscription to Radio Digest. This offer good only on subscriptions sent directly to this office, not through agents or agencies.

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A. B. C. Course in Radio Fundamentals

Chapter XIII—Storage Batteries

By David Penn Moreton

IN THE ordinary primary cell, when the negative plate is nearly consumed, it is necessary to replace it with another in order to keep the cell in an operating condition. If, instead of replacing the worn out negative plate, a current be sent through the cell in the reverse direction and the metal again deposited on the negative plate, the cell is then called a storage battery.

When a cell of this kind is producing a current in an electrical circuit of which it is a part the cell is said to be discharging; and, when a current is being sent through it in a reverse direction by an outside electrical pressure, the cell is said to be charging. Fundamentally there is no difference between a primary and a storage battery, as the primary battery may have its negative plate restored by sending a current through the cell, but this is not commercially economical to do this is any but a few cells which are especially constructed for this purpose.

Chemical, Not Electrical Energy Stored

The reader should not get the impression that electricity is stored in a storage battery. This is not the case. In the process of charging, electrical energy is converted into chemical energy which is stored in the cell and in discharging, this chemical energy is changed back into electrical energy. This change from one form of energy to another is not accomplished without some loss, or in other words the storage battery is not 100 per cent efficient. For example, when the cell is discharging, a part of the electrical pressure is used in overcoming the internal resistance of the cell. As a result only a part of the electrical pressure is available at the terminals of the cell. When the cell is being charged, the charg-

ing electrical pressure must overcome the electrical pressure of the cell and also the internal resistance of the cell. Representing the electrical pressure of the cell by E , the internal resistance by R and the

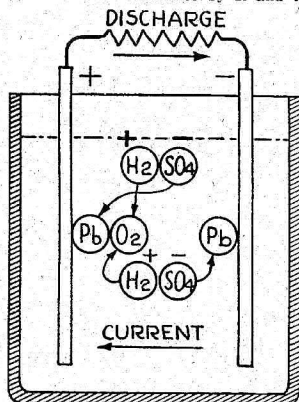


Figure 60

current by I , we may write the above relations in the following form.

$$\text{Charging pressure} = E + I \times R$$

$$\text{Discharging pressure} = E - I \times R$$

The charging and discharging pressures are different due to the fact that the electrical pressure in the cell is not a constant but depends upon the degree of

charge of the cell, growing less as the cell becomes discharged.

Two Main Classes

Storage cells may be divided into two main groups, according to the kind of materials used in the construction of the plates; namely, lead storage cells and non-lead storage cells. The best example of the non-lead storage cell is known commercially as the Edison cell and it will be described briefly a little later.

In the construction of the lead storage cell the negative plate is pure sponge lead, Pb, and the positive plate is lead peroxide, PbO_2 , one part lead and two parts oxygen. The electrolyte is diluted sulphuric acid, H_2SO_4 , two parts hydrogen, one part sulphur and four parts oxygen. The lead peroxide and sponge lead are poor conductors of electricity, and in addition, they are not hard enough to be made into plates; so it is necessary to attach them to metal frames of some

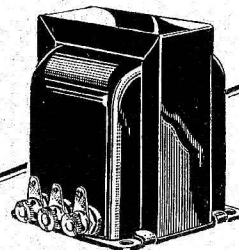
harder material which is a good electrical conductor. The material in this framework must also have the property of not acting as a third plate, as otherwise the electrolyte will produce local action between the framework and the lead peroxide or between the framework and the sponge lead wherever it touches them. The material usually used in the construction of this framework is an alloy of lead and antimony, which is mechanically strong. There is no local action between it and the other substances in the cell. The framework is called the grid, the sponge lead and lead peroxide are called the active materials and the combination of grid and active material is called a plate.

Action in Lead Storage Cell

The action taking place in the lead storage cell on discharge may be explained by reference to figure 60. The sulphuric acid, H_2SO_4 , acts chemically

(Continued on page 20)

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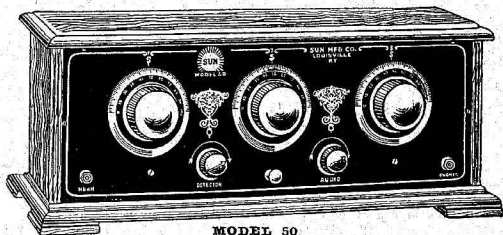
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A. B. C. RADIO COURSE

(Continued on page 19)

upon the negative plate of sponge lead, Pb, and it is broken up into positively charged hydrogen, H₂, and negatively charged SO₄. The SO₄ part of the acid unites with the lead plate, forming lead sulphate, PbSO₄, and gives up its negative charge. The hydrogen carries its positive charge to the positive plate of lead peroxide, where it gives it up, and unites with the oxygen of the lead peroxide, forming water, H₂O. The sulphuric acid in contact with the positive plate of lead peroxide, PbO₂, is also broken up into H₂ and SO₄. The H₂ part of the acid combines with some of the oxygen of the lead peroxide and forms more water. The SO₄ part of the acid unites with the lead, Pb, of the lead peroxide plate and forms lead sulphate on the positive plate. During the process of discharge both plates are being reduced to lead sulphate PbSO₄ and the cell will continue to deliver current until the surface of the plates are covered with the sulphate, when of course, all action will cease as there is only one kind of material, namely lead sulphate, in contact with the electrolyte. There must be two kinds in order that a cell may operate. The practical limits of discharge are, however, reached before the surface of both plates are completely covered.

The water formed during the discharge and the breaking up of the acid results in the acid continually growing weaker. The active materials, lead and lead peroxide, are replaced by lead sulphate which has a much higher electrical resistance and it is more bulky than the active materials which it replaces. The sulphate causes an increase in the material resistance, and since it takes up more space than the active material which it replaces there will be an expanding action due to the formation of the sulphate which usually bends the plates out of shape or "buckles" them, as it is commonly called.

Lead Cell Charging Action

The action taking place in the lead storage cell on charge may be explained by reference to figure 61. The cell is assumed to be in a discharged condition and both plates are covered with lead sulphate, PbSO₄. When a charging current is sent through a cell, it breaks up the water which was formed during the discharge into positively charged hydrogen, H₂, and negatively charged oxygen, O. Part of the positively charged hydrogen is now attracted to the negative plate

and unites with the SO₄ part of the lead sulphate, forming sulphuric acid, H₂SO₄, and leaving sponge lead at the negative plate. The negatively charged oxygen, O, passes through the electrolyte in the opposite direction to the current and is attracted to the positive plate, where it unites with the lead, Pb, of the lead sulphate, PbSO₄, and forms lead peroxide, PbO₂. The SO₄ part of the lead sulphate on the positive plate combines with the rest of the hydrogen liberated, when the electric current broke up the water, H₂O, into H₂ and O. The chemical action forms still more sulphuric acid and a positive plate of lead peroxide. The cell will be completely charged when all of the lead

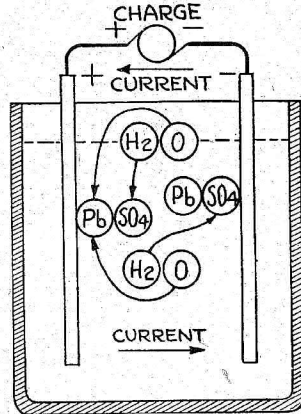


Figure 61

sulphate has been changed over to lead peroxide and pure lead, and the cell is then in such a chemical condition that it can produce a current in a closed electrical circuit.

During the charging process the acid grows denser and the electrical pressure increases. The internal resistance of the cell decreases as the charge is increased due to the removal of the sulphate from the surface of the plates.

Simplest Lead Cell; Ampere-Hours

The simplest form of lead cell consists of two plates immersed in sulphuric acid placed in a suitable container. The voltage of a storage cell, as in the case of

a primary cell, does not depend upon the area of the plates but upon the kind of material composing the plates and the kind of electrolyte that is used. The voltage of the ordinary storage battery when fully charged and on open circuit will be about 2.2 volts and the cell should not be discharged below an open circuit voltage of 1.7 volts. The ampere-hour capacity of a storage cell depends upon the area of the positive and negative plates. Small storage cells such as those used for B batteries have an ampere-hour capacity of a few thousand milli-ampere hours, while storage cells such as those used for A batteries have a much larger ampere-hour capacity the average being about 80 ampere-hours.

In order to get the increased ampere-hour capacity the area of the plates must be increased. Now if only two plates were used their dimensions would become excessive. To overcome this difficulty a number of positive and negative plates are used and they are arranged alternately. All of the positive plates are connected to a common terminal and, likewise all of the negative plates are connected to a common terminal. These positive plates are all insulated from the negative plates by sheets of insulating material, called separators. These separators are usually composed of wood which has been specially treated to remove any injurious impurities, especially the acetic acid, and in some cases sheets of rubber are used. The combinations of positive and negative plates are called elements.

Construction of Cell

The elements, one positive and one negative, are combined with the separators between the plates and placed in the jar which contains the acid electrolyte. The materials commonly used in the construction of the jars are glass and rubber as they are not acted upon by the electrolyte. Glass is usually used for stationary batteries and rubber when the battery is to be carried about. In some of the very large power cells, lead lined boxes are used.

The containing jars are provided with ribs or supports for the elements to rest upon and any sediment which accumulates in the bottom of the cell will not cause a short circuit between the elements. Several cells are usually mounted in a wooden containing case painted with acid resisting paint and provided with handles. Each cell is sealed with a lid through which the terminal lugs project and in which there is an opening through which water and acid may be added to

make up for the evaporation and the gas may escape from the cell particularly when it is on charge. The terminal lugs may be provided with binding posts or they may be connected together, positive to negative, by lead strips and binding posts or other suitable terminals provided at the outside ends of the group of cells.

A group of cells constitutes what is called a battery and the voltage of such a battery will be equal to the sum of the voltages of all the cells, or if all cells have the same voltage, the battery voltage will be equal to the voltage of a single cell multiplied by the number of cells. The current capacity of the cells in series is the same as that of a single cell. The current capacity of a battery may be increased by connecting the cells in parallel, but the electrical pressure or voltage remains the same as that of a single cell.

(The Edison storage battery will be described next issue. Professor Moreton will also give a few pointers on the care and charging of storage batteries.—Editor's Note.)

TUNED R.F. ADVANCES

(Continued from page 7)

each with as perfect control as one or two stages. In fact, as before stated, eliminate the physical limitations and

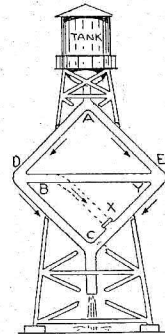


Figure 26

there remains no limit to the number of stages it is possible to cascade. Hence, (Continued on page 21)

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Kit Complete PRICE \$35

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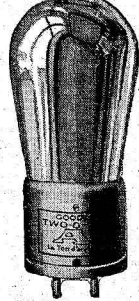
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GUARANTEED SATISFACTORY

All "GOODE" Tubes Sold Direct to the Consumer—No Dealer Profits

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The "Goode" Two-o-One A Tube amplifies or detects it a quarter ampere, 470 volts, standard base silvered tube.

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Finer Selectivity

Equip your receiving set with Apex Vernier Dials. They will greatly increase the efficiency of any set. Make tuning positive—bring in distant stations. Your dealer has them. If not, send \$2.00 for Royal Brass Finish—\$2.50 for Satin Silver Finish, or \$3.50 for DeLux Gold Plated (24k).

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Three Tube Set Free from Local QRM

Trap and Regeneration Give Good Selectivity

I am showing a wiring diagram of a particularly selective set that I have had very good luck with. The following facts are just as I found them. While WCCO and WAMD were transmitting and the

WORKSHOP KINKS EARN A DOLLAR—

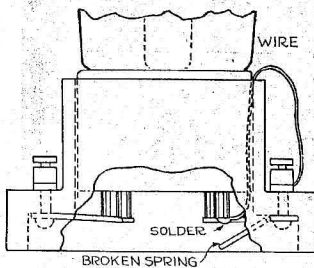
THERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material.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

latter station is just 100 yards away I received WHT, Chicago; WQJ, Chicago; WTAY, Oak Park; WDAF, Kansas City; WOAW, Omaha, and KYW, on a loud speaker, using just three tubes. I had absolutely no interference from either of the local stations and I assure that they are notable when it comes to "stepping on the loud pedal." C₂ is the trap arrangement which cut out much local QRM.

The adjustment of L₃ is very critical. L₂ and C₁ lag practically the same in picking up a station. If L₂ is advanced too far signals will be blocked. The constants are shown in the diagram. The set has real good volume on loud speaker up to 1,000 miles. I do not know what it will do on the phones as I never use them.—R. D. Lewis, Minneapolis, Minn.

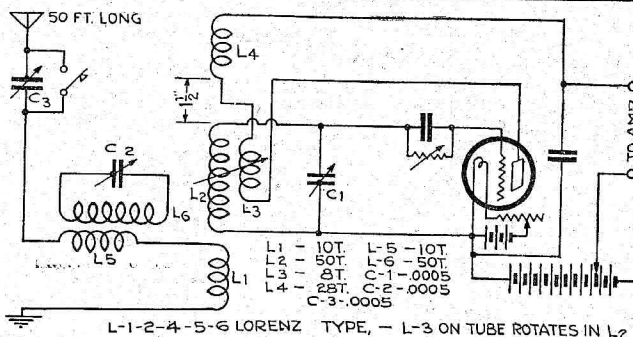
Repair for Socket Spring

When bending up springs of a socket while in the set a spring often breaks. In some sets to remove the socket is very difficult, but a repair may be made without removal.



Determine which tip of the tube should make the contact and solder a small insulated wire to it, replace the tube and connect the other end of the wire to the correct binding post on the socket. This will make a permanent repair.—A. H. Sime, Somerville, Mass.

DIAGRAM AND CIRCUIT CONSTANTS



TUNED R.F. ADVANCES

(Continued from page 20)

the way is now open for you scalawags who will never be satisfied with anything less than a twenty-four tuber with mudguards and a spotlight.

To illustrate the application of the Wheatstone bridge principle I again show the Rice circuit as figure 27, mentioned in a previous article as a capacitive feedback

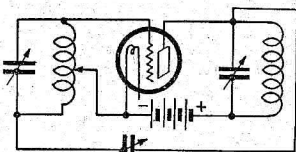


Figure 27

compensation method for the control of regeneration, and also refer to the Goodrich circuit as shown on page 17 of Radio Digest illustrated in the issue of May 23. This is not with the intention of discrediting Mr. Goodrich but rather to amplify the statement that, properly designed, there is no reason why it cannot be totally compensated or balanced by the application of the Wheatstone principle, as it is the counterpart of the Rice circuit with

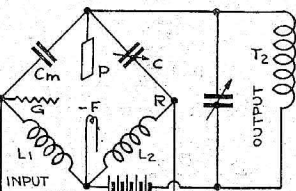


Figure 28

the addition of magnetic coupling in the detector circuit, and is well worth building.

Only the input of Mr. Goodrich's contribution is shown in figure 27 though pictured schematically in order that the capacitive feedback may be made more

clear, while figure 28 shows both Rice and the Goodrich as it is drawn into a balanced bridge.

Note particularly that G and R represent the input circuit, while terminals P and F are output. Each pair is at opposite points of the bridge. This bridge thus contains two arms which are capacitive and two which are inductive, the inductive arms representing the tuned input circuit L1 and L2.

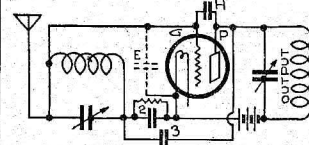


Figure 29

This interesting bridge in operation is balanced so that the L1 inductance bears the same relation to L2 that the capacitance C bears to the lumped capacity CM inherent between the grid and plate of the tube including the capacities within their circuit wiring; hence as it is possible to have C equal the value of CM through C being variable. Therefore Rice at once saw that the balance of L1 and L2 could be made permanent at the center of the input inductance.

Although it is reasonably certain that as he showed the value C as fixed in his patent application, he apparently missed the value of a Wheatstone arrangement through not making the value C variable. However the courts are now earning their salaries trying to decipher claims of infringements, as I understand no Wheat-

Try Trees for Static Free Aerials—Squier

Maj. Gen. George O. Squier, former chief signal officer of the U. S. army, believes an aerial placed a certain way in a tree may be free from static. He says:

"At this season of the year, where static is more pronounced and where the thousands of our people are going into the open spaces, it is highly desirable that this very simple and efficient type of antenna should be tried out practically in the field.

"We have found, in short, that a living vigorous tree becomes an efficient antenna for a receiving set by driving a nail about three inches into the tree at an optimum point, usually about two-thirds of the total height of the tree from the ground and well within the tree top, and attaching the antenna binding post of the set to the nail by a piece of wire, the other terminal of the set being connected to the earth, or sometimes without any earth.

The resistance between the nail and the tree through the trunk and root system may be high, but this is thought to be an advantage, since it retards the escape of the varying potential of the nail due to the broadcast message and divert it along the wire to the receiving set. Such an aerial gives a louder signal than wire alone and one apparently free in a large measure from external disturbances. There is no definite theory to put forward at present as much more data would have to be obtained from experience in the field.

"From a practical standpoint it makes it very simple to take set in the auto, or into camp anywhere, by merely carrying along a piece of insulated wire and a nail to drive into the tree. It is believed that the American boy, if informed of this interesting experiment, will soon find additional data during the summer which will be helpful to the fan."

stone structure was claimed by the many experimenters following Rice who made this value variable.

Action Creating Compensation

You may wonder whether you can explain from this bridge diagram just how a balanced or compensation is obtained. The balance is obtained, as previously explained, while the action is as follows: As TI is independent electrically from the all retroactive currents through the capacity CM are neutralized in TI by current of opposite phase through the capacity C while the compensation, in theory, is independent of the compensation.

It might be of interest at this point to caution the prospective builder that success with this method is measured primarily by, and with, his ability to eliminate radio frequency loops and foreign capacity coupling in the design and wiring of this circuit. Total interstage shield-

(Continued on page 22)

Static Loosens Its Strangle Hold When Your Receiving Set Goes Into Action WITH A KANE ANTENNAE

Whenever radio reception is bad during the summer months, the blame is usually placed on "Static."

A lot of this interference is not real static, but man-made interference coming from power lines, defective insulators, leaky transformers and similar causes.

Electricity is very largely used during the summer months for cooking purposes, and frequently this throws an overload on the power lines. This causes bad electrical interference with radio reception, and then "Static" gets all the blame.

Electrical power interference with good reception is responsible for more than half the noise you get during the summer months.

The Kane Antennae absolutely eliminates electrical interference, and cuts the squeals from reradiating sets and "real static" at least in two.

Mr. Geo. Howles of El Centro, Imperial Co., Calif., takes the stand and testifies as follows:

Gentlemen:—
May 12, 1925.
Your Antennae has made my Mohawk set very selective, and I consider the money well invested and would not be without your Antennae.
It has made many sit up and take notice when they heard my outfit going evenings, we sitting on the lawn and the radio running, and my neighbors can get nothing except one big roar.

Can you, too, sit on the lawn and enjoy your radio set? Or do you, like Mr. Howles' neighbors, "get nothing except one big roar"? With the Kane Antennae you, like Mr. Howles, will get just as much pleasure and enjoyment from your radio set during the summer months as you did during the winter.

See for Yourself How the Roar Is Overcome

A dollar bill brings you the working drawing of the Kane Antennae with full instructions for erecting it. If after looking over the drawing you decide that you would rather have a factory-built Antennae than build one yourself, we will take back the drawing and allow you full purchase price on an order for an Antennae.

The Special Kane Antennae for Radiola Super-Hets.....\$ 6.50
The Regular Kane Antennae for all other sets that use a ground connection.....\$ 10.00
Working Drawing with Instructions for Erecting, \$1.00

Postpaid to any part of the United States, or sent C. O. D. when 25% of purchase price accompanies order. Canadian Orders filled by The Kane Antennae Company of Canada, 1220 Seymour Street, Vancouver, B. C.

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Questions and Answers

Neutroformer Spacing

(13361) BTJ, Cresbard, S. Dak.
I have a neutrodyne which I made up of manufactured parts but I did not follow directions in this respect; the connections come in the back and I set the neutroformers 1 inch further apart than designated, all the works were placed on a 30-inch panel. My main trouble is that I fail on a medium or high wave length but squeal on the lower. I can stop that by reducing the filament current. It is quite good on distance. I can pick up both Los Angeles stations, Beaumont, Texas, Pittsburgh and have had Mexico City several times. I have heard you mention X wire or three condensers. You have an article in a previous issue. Would be pleased to have you enclose an addressed envelope and give me the dope on that.

A.—A great deal of the difficulty which you are having with your neutrodyne is due to the fact that you set the neutroformers one inch further apart than they should be. The 55 degree angle has been figured out for, and is only correct for coils of a certain size and diameter placed at a certain distance apart. If any of these three factors are changed the angle no longer holds good and there will be magnetic coupling between the neutroformers.

Under separate cover we are forwarding the issue of December 27, which contained the article on X wire, and we will appreciate your forwarding 10 cents to our circulation department, with a note stating what it is for. The X wire circuit however is good only when the neutroformers are properly spaced as mentioned above.

Super Regeneration

(13786) HAS, Hamilton, Ont., Can.
I received your answer to my questions I sent. The circuit I wanted information on was out of a small book entitled "One Hundred Radio Hook-ups" by F. F. Webb, figure 35. I have most of the parts for this set but will not attempt it for I am not sure that it would work.

Probably though you could publish a diagram of a super-regenerative for me that you know would work if properly constructed without honeycomb coils, or variometers if possible. I would like to use only one variable condenser, an eleven plate and able to work a loop fair. I have a Federal No. 95 variocoupler that I would like to use somewhere in the set if possible.

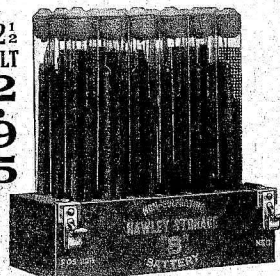
A.—In answer to your letter of May 15th we must advise that you ask the impossible. It would be an impossibility to construct a super-regenerative receiver along the lines you suggest as inductance and capacity must be present in the various circuits so that two wave lengths are present, one of them being the incoming signal and the other a very long wave length in the neighborhood of 19,000 to 18,000 meters which will break up the incoming signal at just the proper interval to prevent the tubes spilling over. The most honest advise we can give you is

Salesmen calling on radio dealers wanted to handle Radio Tubes as a side line. Thorcia Tube Company, Dept "D," Middletown, Ohio.

PATENTS

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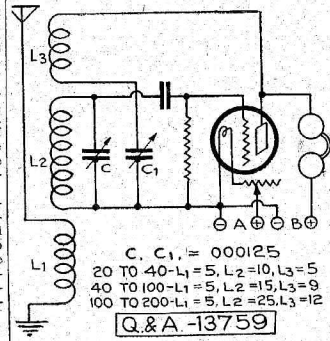


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to leave super-regeneration alone for the time being until some of the country's more advanced experimenters have had a chance to work out some simple and more stable circuits for you.

Short Wave Weagant Hoop-Up

(13759) JRF, N. Braddock, Pa.
I wish to use the Weagant X circuit for my short wave receiver which is to cover a range of 20 meters to 200 meters. What I wish is a sketch of said circuit giving the condenser capacities, grid leak capacity, number of turns on coils and size of wire. This is wanted for the primary, secondary and tickler coils. I plan using a VT-1 or DV-2 tube.



A.—As requested, we are showing here with the Weagant circuit. On it we have noted the values of the various units necessary. No one coil can be used to cover the entire range from 20 to 200 meters so it will be essential that these coils be constructed on some sort of a plug-in arrangement.

TUNED R.F. ADVANCES

(Continued from page 21)
ing with copper very materially increases its efficiency, and it should also be borne in mind that each input stage must be a repetition of the first input in that as the two inductive arms are adjusted permanently at their center, and as these two comprise the input or grid circuit inductance, it is therefore essential that for each stage added, the variable capacity C must be provided and the input inductance of each stage tapped at its center and brought to minus filament.

Caution in Wiring Circuit
Particular attention is called to the grid

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return, also the plate battery return in all balanced bridge methods of neutralization. It is quite permissible that the rheostat control be placed in either the minus or positive leg of the filament, the position selected being of no moment as the A battery's function in such circuits will be solely as a current supply to heat the filament in order to secure desired electron emission.

But it is not permissible and in such circuits you should never permit other than common returns for the grid and minus plate battery. In other words one leg of the filament, the grid return and the minus B battery should always be connected together. By so doing the filament and A battery resistance cannot become a part of the bridge, which is desirable.

Wholly Capacitive Bridge Circuit
I believe those engineers who are familiar with bridge circuits are in agreement that where possible it is quite desirable that one or two of the bridge arms be made inductive as, in practice, they become much easier to construct as a production product. However, a variance no doubt is possible and I offer for the first time, I believe, a wholly capacitive Wheatstone bridge circuit as designed by a prominent engineer, which circuit you will very likely see incorporated in one of the leading manufacturer's receivers this fall. It would be unfair for me to give the constants of this circuit prior to its introduction, while to the contrary, the giving of these constants no doubt would be superfluous to many of my readers as it is obvious that the usual input and output values would be nearly if not totally correct.

Here then, is a circuit wholly capacitive and very interesting, first, because of its originality, and second because it portrays a most unusual bridge arrangement. Figure 29 shows the circuit schematically as you should draw it, while figure 30 pictures it when compounded into a bridge. Note in particular that its only change from that of the Rice circuit is that of removing entirely the center tap grid return, and in its place inserting a choke or resistance with capacity, making it common to the low potential of the input circuit, just a mere juggling of wires as it were, yet entirely changing the whole bridge construction.

How many manufacturers paid dearly just to see this circuit would be of interest, but surely more than two enjoyed this privilege. In each of the diagrams a standard nomenclature is employed in

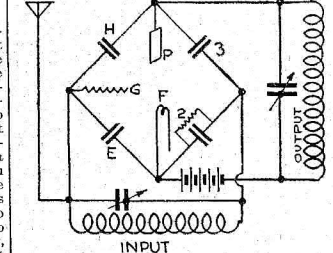
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order that one may more readily absorb the method used in compounding it into a Wheatstone bridge circuit. While it is of moment to note that two of the arms comprise capacities existent as inherent within the tube, viz, that between plate and grid and that between grid and filament, even greater interest is the fact that the remaining two arms are also the capacity and impedance existent between the plate and filament. This surely is a novelty in bridge structures.

If I may be permitted to, for the moment, revive my character of King Miloplex, not forgetting in the least Maggie, the cook, many of my readers will recall that statement I made in those circuit articles relative to the fact that in reality three



separate values of capacities met nightly when the filament was glow, three wise little fellows who well knew someone, sometime, and someplace would put them to work, and I believe the bridge structure shown in figure 30 keeps them on the job.

(Wiring is a secret of successful R.F. sets, and further details of the bridge circuit, will be discussed next issue by Mr. Gurney.—Editor's Note.)

Securing Wire Ends
To secure ends of the wire on narrow coils, drill three holes a little larger than the diameter of the wire used. Through one of these draw the end of the wire and put a piece of stiff spaghetti over it. Now bend the spaghetti over and thread the free end of the wire through the small holes, forming one or more loops around the spaghetti.

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Over the *entire* musical scale, from lowest to highest notes, on *any* instrument;
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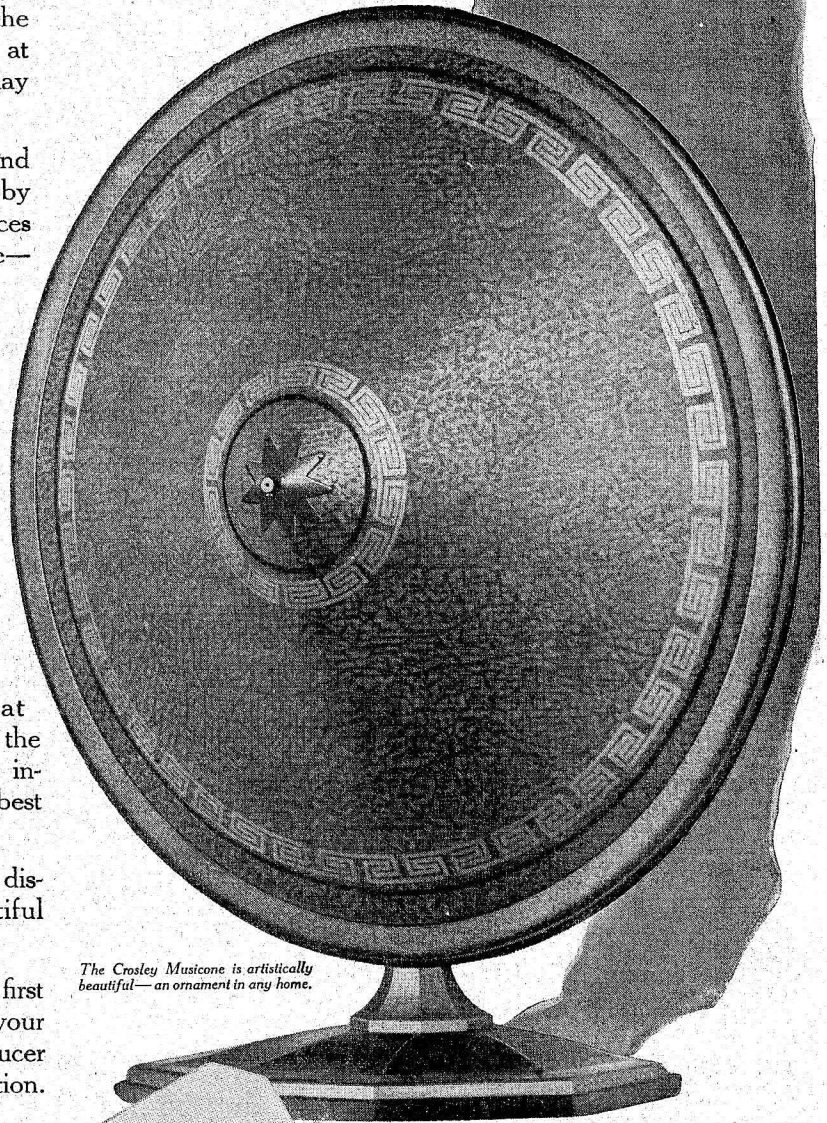
By all means hear it, and know for the first time what real radio music is. Then equip your set with this beautiful, compact reproducer and no other. Write for complete description.

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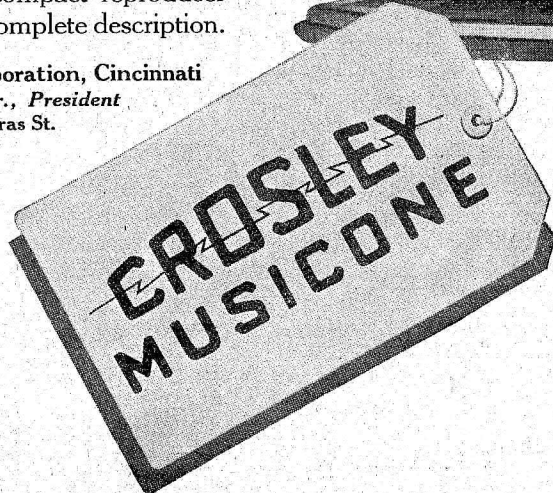
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Crosley manufactures receiving sets which are licensed under Armstrong U. S. Patent No. 1,113,149, and priced from \$14.50 to \$65, without accessories



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