

PUBLIC FOR NEW WAVES

STATIC ELIMINATED WITH SET IN GROTTO

SIXTY FEET UNDERGROUND BETTER THAN SURFACE

Demonstration in Ohio Cavern Proves Value of Subterranean Receiver—Many Witness Feat

By K. G. Lind

SPRINGFIELD, O.—A remarkable demonstration of Radio reception took place during a heavy electrical storm recently when programs were received 60 feet underground. Virtually no static nor interference distressed the operators.

The demonstration was held in a large grotto of the Ohio Caverns, twenty miles north of here. A super-heterodyne set was used with a loop aerial. Positively no connection was made with the surface. Radio waves were received through sixty feet of limestone roofing of the cave. The heavy rain and electrical storm on the surface had no effect upon reception underground.

Among the stations received were the following: WEBB, WEA, KDKA, WLW, WSAI, WQJ, WGY, WGR and WJZ.

The set was operated by M. R. Geyer and Frank Grimes, Urbana Radio dealers, and the demonstration was witnessed by about a dozen persons.

This is believed to be the first demonstration of Radio reception in a natural cavern, similar demonstrations having been made in mines and tunnels, but not in caves.

Code Amateurs Send Applause Via Radio

WEAF Tells of Receiving Commendation from "Hams"

NEW YORK.—Radiophans might think that Uncle Sam has the entire burden of delivering applause in written form to the various broadcasting stations. Such is not the case, as WEAF is continually receiving, either by phone or special messenger, word from the various members of the Amateur Radio Relay league residing in the vicinity of New York city.

Hardly a day passes but one of this organization's members communicates with WEAF, telling them that in the "wee small hours" of the morning their brother amateur out in Brooten, Minn., etc., asked that the following message be delivered to WEAF: "Your broadcasting of such and such an orchestra attracting considerable attention in this community."

HIGH POWER STUFF AT THIS RADIO CLUB

LONDON, Eng.—The Radio club here has just been raided by the police and thirty-one members have pleaded guilty to consuming alcoholic liquor after permitted hours. They were fined \$25 each and three of the club's officers were fined \$250 each, the total fines being \$5,640. The club has been struck off the register and the premises have been disqualified.



This charming young lady is Miss Rosario Duprez, who broadcasts frequently from Station WGSS. Her talks are regarding perfumes. Gallo Studio.

VOTE SHOWS CONGESTION UNBEARABLE

Kintner Plan Is Favored

Listeners Active in Campaign to Clarify Air—Conference Will Remedy Trouble

CHICAGO.—Ninety-five per cent of the present objectionable inter-station interference can be eliminated by the adoption of the Kintner plan of wave length allocation and station classification, according to authorities who have investigated and reported on the scheme.

In recognition of the overcrowded condition of the air, which has been bad for a number of months, and is steadily growing worse, Radio Digest has inaugurated a campaign to aid Secretary Herbert Hoover of the department of commerce in putting the Kintner plan, or some similar relief measure, into effect.

Will Help Secretary Hoover

Secretary Hoover has no law to work with, but has suggested that if some medium would assume the burden of obtaining a referendum from the listeners, he would do his best to abide by the decision of such a vote. Radio Digest is now taking that vote by means of the "Consensus of Opinion Vote" which is being published each week on page two of this publication.

The thousands of votes, received daily, show that the public is interested in this campaign, and it is hoped to collect and tabulate at least 2,000,000 of these votes so that the result can be called representative and authoritative.

What Kintner Plan Is

The Kintner plan, so named because S. M. Kintner, research engineer for the Westinghouse Electric and Manufacturing company, devised it, is simple and effective. It is best outlined by means of the table appearing on page two and entitled, "Proposed Wave Band Assignment for Broadcasters."

Its advantage over many other proposed plans is that it would mean that the receiving sets now in use would not have to be altered in any way. Some plans call for putting broadcasters on the

(Continued on page 2)

WAHG REACHES OUT AND HITS AUSTRALIA

NEW YORK.—First prize for the best broadcasting station to reach Australia was presented to Station WAHG recently. The test was to determine what effect the equinox might have upon Radio waves crossing the equator. Others heard were WOR, Newark; WLW, Cincinnati; WCCO, Minneapolis; WMAQ, Chicago; WOC, Davenport, and KFL, Los Angeles.

HAY TOPS HOT RACE IN GOLD CUP AWARD

STANDING OF 16 LEADERS SHOWN BY VOTES

Candidates Number 146—Worcester, Mass., Man Names Honolulu Announcer—Interest Is Keen

With a total of 3,003 votes to his credit at the close of last week, George D. Hay, the "Solemn Old Judge" of WLS, Sears-Roebuck station, consistently maintained his lead in the 1925 Radio Digest Gold Cup Award for the world's most popular announcer.

George Hay, it will be remembered, won the first gold cup when the competition was inaugurated, but "there's many a slip 'twixt the cup and the lip," and one of Mr. Hay's strong competitors may overtake him yet before the contest is ended with the August 22 issue.

Now before the complete standing with votes of the sixteen leading announcers is given, it is desired to emphasize the point that ONE nomination is necessary for any contestant. If more than one nomination is received, it will not add any VOTES to the credit of the announcer named. For the information of readers seeking to nominate their favorite "voice," the complete list of nominees to date is given below.

Standing of Sixteen Leaders

The standing of the sixteen leaders is changing from week to week as votes are received. While almost every week the same sixteen names top the list, the respective contestants are not always in the same position. Every week brings a new thrill. Who will be first, second, fifth or tenth next week? Watch the standings as they are given. The standing at the close of last week showed:

Position	Name and Station	Votes
1.	George D. Hay, WLS	3,003
2.	Graham McNamee, WEAJ	2,481
3.	The Hired Hand, WEAJ	2,240
4.	Henry Field, KFNL	1,428
5.	H. W. Arlin, WFLA	1,395
6.	N. Dean Cole, WHO	1,347
7.	W. G. "Bill" Hay, KFAX	1,243
8.	Gene Rouse, WOAW	1,242
9.	Stanley W. Barnett, WOC	1,181
10.	Charles Robinson, WTAS	1,182
11.	Adams Colburn, WFAA	1,184
12.	Robert Emery, WEEB	1,183
13.	Les Frensch, WDAF	1,146
14.	Lambdin Kay, WSBM	1,121
15.	Robert Bonnel, WEEB	1,121
16.	Jerry Sullivan, WJL	1,110

Complete List of Nominees

Exactly 146 announcers have been named as candidates for the 1925 Gold Cup Award. Twelve new names were added during the past week.

An interesting observation in last week's nominations was the naming of Homer Worley, of Station KGU, Honolulu, Hawaii, by a regular KGU listener at Worcester, Mass.

The complete list of nominees follows:

OPAL, Fred Carlton	KFRU, Frank S. Lane
OPAL, E. J. Dimeggi	KFWB, Charles Weisman
OPAL, Walter DeRue	KGO, Howard Milholland
OPAL, W. W. Grant	KOU, Roger Worley
CHIC, Ed. W. Jones	KOW, Richard Hater
CHIC, R. E. Gaudes	KEL, John Daggert
CHIC, N. S. Richards	KHO, Frank S. Bonhart
CHIC, J. N. Carder	KLS, Arthur Clouston
CAY, D. R. P. Coste	KLX, Sam Batley
CNRA, F. W. Harvey	KLZ, Mrs. W. D. Reno
CNRA, G. A. Whelan	KOH, H.
CNRA, A. W. Bala	KNX, The Town Crier
CNRA, Eddie Jackson	KOA, R. K. Clark
CNRY, R. H. Roberts	KOA, Ralph Crowder
KDKA, H. W. Arlin	KOA, G. R. C.
KFAE, George Baynes	KOA, Ralph Crowder
KFDM, Maureen Mike	KPD, Claire Morrison
KFL, Edna Anthony	KSD, Miss V. A. L. Jones
KFL, —, Hastings	KSL, C. H. Hayes
KFL, Harold Isbell	KTN, G. C. Arcaux
KFL, Paul Reese	KTY, Fred Hill
KFL, Roy P. Martin	KTY, Steve Trumbull
KPEX, Bill (W. G.) Hay	KWAM, J. H. Bailey
KPMT, George W. Young	KWAW, H. B. Bradford
KPNF, Henry Field	KWAW, H. B. Bradford
KPOA, W. K. Bert	WEAJ, Hired Hand
KPOA, C. E. Hammond	WEAJ, W. P. Branch
KPBU, Oke, Pepper Bird	WEAW, M. M. Carother

WBBO, Irvine Vernison	WORS, A. V. Lufrio
WBDM, Leslie Atlas	WON, Quin A. Ryan
WBDM, Clyde Hager	WON, V. E. Rickard
WBDM, Chas. Hughey	WOR, O. E. Becker
WBZ, H. L. Bach	WGV, L. J. B.
WBZ, Frank Ryan	WGT, William Fay
WBAE, A. G. S.	WGY, Keith Hager
WBAE, Joe Sartory	WHA, Fred Harris
WBAE, Jerry Wyman	WHAS, Harold A. Salzer
WBAE, Kenneth Onegard	WHAS, Rogerford Hayner
WBAE, Wm. T. Pierson	WHB, John Schilling
WBAE, Willie Williams	WHBO, J. P. Blisehook
WBED, J. H. DeFoe	WBR, Art Cook
WBGO, Paul Johnson	WBN, N. T. Granlund
WPK, Helen G. Hatfield	WHO, N. Dean Cole
WPK, Chester Gaylord	WHO, Wm. Marsh
WPK, C. D. Toney	WIP, Earl Bonagris
WDAF, Leo Fitzpatrick	WIP, Hank Gony
WDAF, Kenneth M. Hance	WIP, Charles Weir
WDAF, F. E. Maddox	WJAG, Earl Stefan
WDWF, Geo. Spink	WIAR, J. A. Riley
WEAF, Philip Carlin	WIAS, Bryan McDonald
WEAF, Graham McNamee	WJED, Jack Nelson
WEAF, Roly (S. L.) Rothafel	WJZ, Norman Hroksenshire
WEBS, Robert Bondel	WJZ, Milton Cross
WEAR, Gay C. Donaldson	WJZ, Herbert Glaser
WEAT, Kenneth Gamet	WJZ, J. Lewis Reid
WEEL, Bob Emery	WJZ, J. Andrew White
WEMC, John E. Peizer	WJZ, Jo Joquilo Acosta
WEAA, Adams Colburn	WEAR, Ralph C. Hodgkinson
WEFL, Ernest Chapell	WEAT, Harry Shebart
WFBM, John Trelby	WLS, George D. Hay

PROPOSED WAVE BAND ASSIGNMENT FOR BROADCASTERS

Station Class—(Waiting List)	Number of Chan-nets Available	Power Allowed	Wave Lengths	Number Stations on Same Band	Number Divisions	Number Assignments Possible
IV	4 of 10 kc.	100-w.	200-204	As required	As required	Unlimited
III	45 of 10 kc.	100-w.	205½-294	4	3	540
I	15 of 20 kc.	5-50 kw.	300-416.6	1	0	15
II	17 of 10 kc.	500-w.	425½-555	2	2	68

Radio relays on short wave channels in bands of 50 kc. width from reservations 50-55 meters, 60-65 meters and 70-75 meters.

WLS, Billy Knight	WPG, J. J. J.
WLV, Fred Smith	WJL, Jerry Sullivan
WMBF, H. J. Hay	WRC, George F. Ross
WMC, Jerry (G. L.) Dearlog	WRU, Elsworth Tompkins
WNAO, J. J. Fanning	WRO, Roy E. Davis
WOAI, J. G. Cummings	WSB, Lambdin Kay
WOAW, Leo Palmer	WSMB, Clyde R. Randall
WOAW, Gene Rouse	WTAG, A. R. Barak
WOC, S. W. Barnett	WTAM, Bernard Strang
WOL, Ernest H. Klosser	WTAS, Chas. E. Erbstein
WOR, Joseph Barnes	WTAS, Frank Morris
WORD, Len Rice	WTAX, N. B. Williams
WOS, Arthur Nelson	WVJ, E. W. Tyson

If your favorite announcer is not listed above, forward your nomination of him

at once to the Gold Cup Award Editor, care of this magazine. No nomination blank is necessary.

How to Vote and Get Bonus

Don't miss a single ballot, for when these are turned in to 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 23 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 8 consecutively numbered ballots your candidate 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.

ASK FOR BETTER WAVES

(Continued from page 1)
lower wave lengths. Hundreds of thousands of sets cannot receive stations with wave lengths lower than 200 meters, so that such plans would require the rebuilding or junking of millions of dollars worth of perfectly good receiving sets.

Allows for Promotion of Stations

The highest class of stations recognized by the Kintner plan is class I, the super-stations. Class II is for 500-watt stations of high class. Class III is for 100-watt stations of recognized standards, and class IV is the beginners' class. New stations must begin in class IV and take gradual promotion to class III, then class II and finally I, as vacancies occur in the higher classes and as the new station is qualified to serve according to the standards of the superior classifications.

In the Kintner plan is seen a panacea for present Radio ills. Heterodyning would not be known and the air would be clarified to such an extent that distance reception would once more be enjoyable. The ideas embodied may be modified, but the plan is worthy of consideration as a basis of a similar plan.

And Still More Stations Await

Considering the present condition of the air, it is interesting to know that in California alone thirty-two applications for licenses to broadcast have recently been turned down by W. D. Terrell, chief Radio supervisor, because no wave bands are available. Other prospective broadcasters might as well make up their minds to wait until there is room for them on the air.

The result of the Radio Digest "Consensus of Opinion" vote will be taken before the fourth Radio conference which will convene in Washington in September, or possibly August. It is being recommended to have the conference at the earliest possible date so as to bring remedial rulings into effect.

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Looking Ahead

Two Very Good Reasons for Reading Next Week's Issue are to keep in touch with the progress of the campaign for less congestion of the air, and the standing of the first sixteen announcers in the 1925 Gold Cup Award.

Among the Stations Soon to Be Described are KFI, Los Angeles, "The Radio Central Superstation"; KFAB, Lincoln, Neb., where Gayle Grubb holds forth; WAHG, Richmond Hill, N. Y., "Wait and Hear Grebe," and CKY, Winnipeg, "Manitoba's Own Station."

Radiola Regenoflex and Radiola Ten will be taken up as the basis for the next Operating and Trouble-Shooting Article. These are four-tube sets from which maximum efficiency is obtained by an unusual circuit.

The Next Chapter of the A. B. C. Course will show capacity and inductance in both parallel connections and series connections. Prof. Moreton shows clearly the varying results obtained when different combinations of these factors are used with A. C.

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SECRET MIC

KAY MACRAE TELLS HOW IT SELF ART

So Many in the...

By a... YORK... Radio... microphone... Kay Macrae...

...one may have a voice... Modulate Adequately... is, one of the most es-

...Chicago Youth Wins Contest First Prize... identifies singers whose performances were incognito...

...Kentucky Derby and Auto Races Will Be Featured by Chicago Broadcaster... CHICAGO.—Station WGN, famous for its big Radio features...

...Station KFNF Will Build Memorial Organ in Studio... SHENANDOAH, Iowa.—Station KFNF, located in this city will install a modern pipe organ in their studio...

SUCCESS PHONOLOGY

E TELLS HOW IT SELF ART

Sopranos Fail Not, But in Micro-Technique

A. T. Rogers... is not the general rule... the microphone with... the woods are full of sopranos...

...one may have a voice... Modulate Adequately... is, one of the most es-

...Chicago Youth Wins Contest First Prize... identifies singers whose performances were incognito...

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...Station KFNF Will Build Memorial Organ in Studio... SHENANDOAH, Iowa.—Station KFNF, located in this city will install a modern pipe organ in their studio...

ALLEGED MONOPOLY HEARING POSTPONED

WASHINGTON, D. C.—The Federal Trade commission has again postponed the taking of testimony in its case against the alleged Radio monopoly...

JAZZ MUSIC HELPS COWS SAYS FARMER

MINNEAPOLIS, Minn.—Cows appreciate music just as much as human beings. That is, they prefer jazz music to classical...

HAS OWN BROADCASTING SYSTEM



Miss Kay Macrae, coloratura soprano, well-known broadcasting star, who has perfected a system of her own for broadcasting. As a result of her tests, Miss Macrae is soon to write a book on this subject.

...develop sufficient knowledge of what I describe as 'microphonology' to improve his or her broadcasting perceptibly...

...develop sufficient knowledge of what I describe as 'microphonology' to improve his or her broadcasting perceptibly...

Chicago Youth Wins Contest First Prize

Identifies Singers Whose Performances Were Incognito

CHICAGO.—Lanyon, salesman and broker, was the recipient of the first prize in the contest...

SPORT CLASSICS AT STATION WGN

Kentucky Derby and Auto Races Will Be Featured by Chicago Broadcaster

CHICAGO.—Station WGN, famous for its big Radio features, will be on the air for four hours on Saturday afternoon...

STATION GLEANINGS AND NEWSY BRIEFS

BRUNSWICK HOUR CONTINUES NEXT TUESDAY

Wyoming's Woman Governor to Talk from KOA—WMCA Hardman Program Proves Popular

As the winter season draws near a close, the songbirds are fitting away to foreign shores, so that the next Brunswick hour of music, May 19, at 7 p. m. Central time...

Nelle Tayloe Ross, Wyoming, recently elected woman governor, is scheduled to make her first appearance before KOA's audience Monday, May 18, during a special program sponsored by the Cheyenne, Wyo., chamber of commerce...

An enjoyable hour of music can be heard every Friday from 8 to 9 p. m. Eastern time, by tuning to WMCA, New York, the Hotel McAlpin station...

The Vincent Lopez U. S. School of Music concerts continue at WOR. The next is scheduled for Wednesday evening, May 20, when a half-hour program of new music will be broadcast in the inimitable style of this internationally known orchestra...

WGBS, Gimbel Brothers store, New York, scored a very entertaining evening recently when the station broadcast the jubilee dinner and entertainment tendered by members of the theatrical profession...

Another of the series of grand operas in tabloid form was heard May 5 from WEAF, WEEL, WFL, WCAB, WEAF, WCR and WWJ when 'Aida' was presented from the New York and linked stations...

Every Tuesday at 8:30, Eastern time, WRN listeners are now treated to a concert by Strickland's Palisades Park orchestra, which made a name for itself last summer with these concerts...

One of the features of the recent dedication program of special Crosley WLW Radio organ was a trip through the organ with Powell N. Crosley, Jr., as the guide and an organist assisting him with descriptive playing...

Broadcasters Form Local Association in Chicago

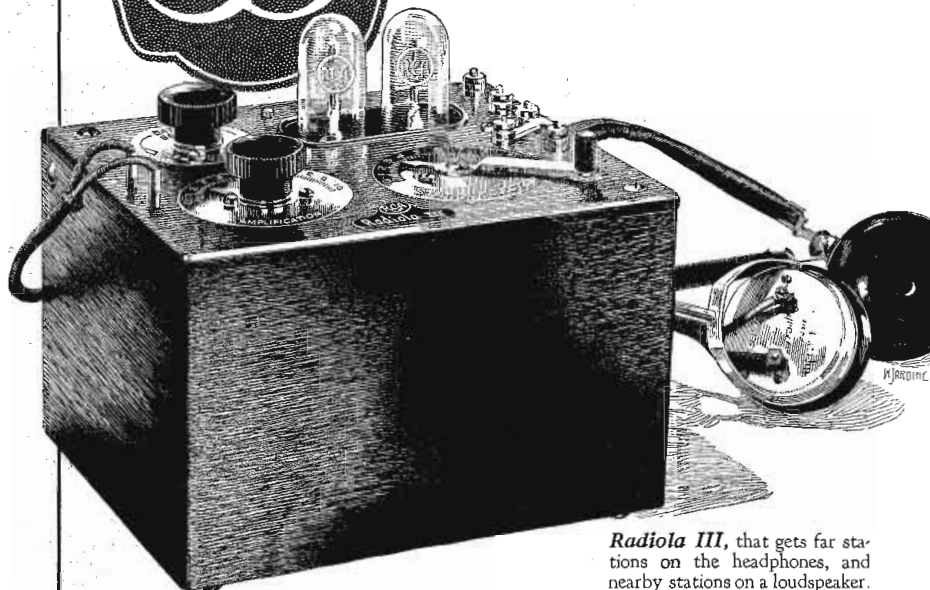
CHICAGO, Ill.—Broadcasters in this city have organized and formed the Chicago Broadcasters association, which will function solely as an organization to give aid to persons and institutions who do not now have an opportunity for enjoying Radio programs...

Station KFNF Will Build Memorial Organ in Studio

SHENANDOAH, Iowa.—Station KFNF, located in this city will install a modern pipe organ in their studio. The organ is being bought by popular subscription and will be built in memory of Mrs. Henry Field...

How Use Underground Antenna for Radio Beginners; Gold Cup

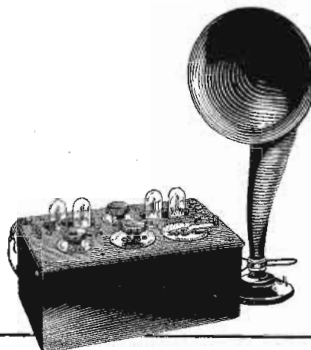
\$35



Radiola III, that gets far stations on the headphones, and nearby stations on a loudspeaker. With two Radiotrons WD-11, and headphones . . . \$35

Small price for big performance — achieved in Radiola III

Radiola III-a, for distance on the loudspeaker. With four Radiotrons WD-11, headphones and Radiola Loudspeaker \$83



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Responsibility of
Leadership**

It has made America the radio center of the world, through the high power radio telegraph circuits that link our country, by direct radio communication, with seven countries of Europe, with Asia and with South America.

. . . .

It has developed radio ship sets, and a ship-to-shore radio service that makes the high seas safer, and aids all marine commerce.

. . . .

It has the technical resources of laboratories for research that not only carry on unceasing experiment for the perfecting of Radiolas and Radiotrons, but study the problems of high power commercial transmission, and conduct research into every phase of radio, in every field in which it can serve the nation. It is one such study that has resulted in the transmission of pictures by radio.

. . . .

With its associates, the Radio Corporation of America maintains ten powerful broadcasting stations, whose programs serve the whole nation: WJZ, WJY, WGY, WBZ, WRC, KDKA, KOA, KFKX, KGO, KYW—from New York to California!

. . . .

By its extensive research in the development of Radiotrons, the standard vacuum tubes of radio, it has made contributions of inestimable value to radio progress.

. . . .

It has developed Radiola Super-Heterodyne and other Radiolas, for the improvement of the quality of home reception and the lowering of its cost.



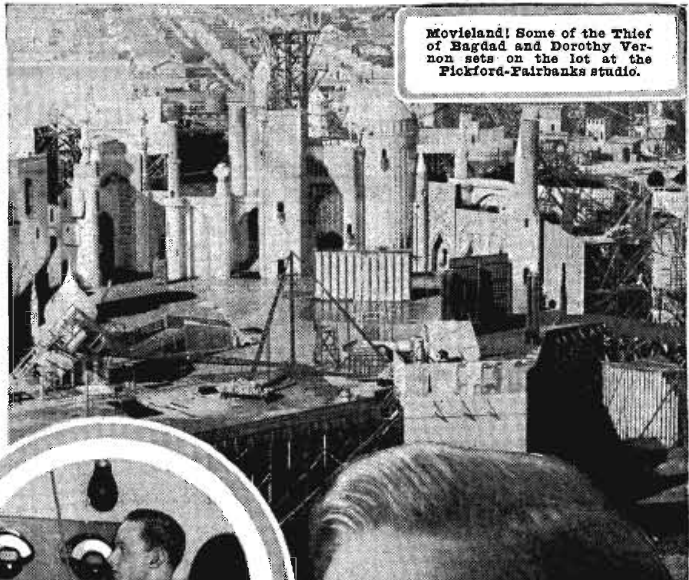
RADIO CORPORATION OF AMERICA

233 Broadway, New York
10 So. La Salle St., Chicago, Ill.
28 Geary St., San Francisco, Cal.

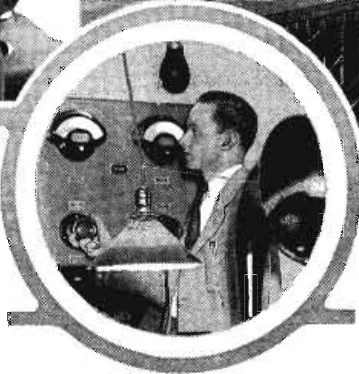
Station KNX—In the Heart of Movieland



Known wherever KNX has penetrated, the Town Crier is its spokesman. He knows the motion picture business thoroughly and at times gives brief talks on the movies. Insert circle, M. D. Garver, chief testing engineer of KNX.



Movieland! Some of the Thief of Bagdad and Dorothy Vernon sets on the lot at the Pickford-Fairbanks studio.



"HOLLYWOOD is the place," according to a prominent and somewhat dignified New Englander, where a bank president can work bareheaded, in knicker and a jazzy sweater and no start a run on his bank." But as it may, Hollywood is a different, idealistic, different, and apart from any other of the world's eyes upon it. Hollywood goes blithely about his business, real and make believe, and the world was Hollywood and Hollywood was the world. At the rate the ordinary sixteen-day boosting of its hundred or so inhabitants did not get to Hollywood, so measures were instituted to provide a station so that the world would know Hollywood better. That is why the Los Angeles Express installed a broadcast station in Hollywood, and because they did such a good job of it, radio fans, whose greatest thrill was to tune in on Los Angeles, now had a little farther to go to pick of KNX—in Hollywood—which is, to be exact, 6116 Hollywood boulevard,

and surrounded entirely by the life and heart, play and tragedy of movieland.

In Hollywood there are thousands of actors, entertainers and musicians of all kinds—enough talent to run a broadcast station indefinitely. To get a man to handle the microphone at KNX who knew hundreds of Hollywood's prominent citizens was no small job, for the panorama of movieland shifts rapidly, and movie people are clanish. To get a man who knew all these people intimately and who, in addition, had the address and ready wit necessary for the successful announcer was still another proposition.

But a newspaper has its ways and means, so we find at KNX the Town Crier, author, scenarist, traveler—a perfect man for a difficult place, who can discuss reactions and cuts with the director, the peculiarities of makeup with the stars, books and poems with the novelist, condensers, rheostats and potentiometers with the Radio huggers.

The Town Crier manages the microphone at most of the evening programs at KNX except on Tuesday nights, when he picks out a nice table in the famous Coconut Grove at the Los Angeles Ambassador hotel, is served with a wonderful meal by Rene, the noted chef, and enjoys the flutter and flurry of movie night at the Grove until 10 o'clock comes, when he must go to work. Between suites of numbers by Abe Lyman's orchestra he then must find prominent people to say a few words to listening fans. In the latter he is universally successful.

A word must be said about Abe Lyman's orchestra, one of the big features of the station. A hundred dance orchestras may play a song the same way—Abe Lyman plays it differently. Thousands of hotels, cafes and ballrooms have dance or-

chestras—from Podunk, Maine to Shanghai, China, but there is only one Abe Lyman. Movie stars travel the earth and they come back, they say, principally to hear Abe Lyman play dance music. Abe takes his band to Atlantic City for the summer and causes a riot in the so-called effete East with his California jazz—the Coconut Grove is not the same and business drops off. So Abe Lyman comes back to the Los Angeles Ambassador, part and fixture of the gay life of screen and Radioland. But we were talking of the Town Crier. When he is (Continued on page 6)



Forbes W. Van Why, head of the technical force.



Carrie Preston Rittmeister, program manager, receives a few telegrams. Above, Guy Earl, station manager of KNX, quite a handsome chap.



Abe Lyman's famous recording dance orchestra, one of KNX's big features, broadcasting from the show places of the Pacific coast, the

Coconut Grove of the Los Angeles Ambassador hotel, where any night in the week the fan will find movie folk gathered about chatting together.

EYE METER PROVES SIR LODGE'S THEORY

PERFECTED BY EMINENT LONDON SURGEON

Machine Developed After Seven Years' Patient Investigation—Proves Power of Human Eye

LONDON, England.—After seven years of patient investigation, Dr. Russ, one of the most eminent surgeons in London, has perfected his "eye-ray-meter," which measures the power of the human eye in electrical units.

Briefly, the instrument demonstrates that electricity generated in the brain is emitted from the eyes. Thus is vindicated the theory to this effect which has long been held by Sir Oliver Lodge, and also the numerous poetic figures—"sparkling eyes," "the eye's pure ray," "beaming glances," and so forth. In elaborating on his theory recently, it will be recalled that Sir Oliver Lodge went so far as to declare that the eye was the first Radio set used by man.

Eyes Clash in Battle

The idea is the eye ray meets rivals from other eyes. There is a battle in mid-air. The stronger wins. And the weaker eye drops a protective eyelid. Thus the power of the human eye is an actual fact and a physical explanation is provided for a number of things, as for example:

Why one feels uncomfortable when sitting in a street car facing the battery of eyes from the opposite seats.

Why one becomes conscious of being stared at, and instinctively turns around to see who it is.

Why two people find it impossible to meet each other's gaze for more than a few seconds.

How Lion-tamers triumph.

Indicator Moves Easily

Dr Russ's device moves as soon as it is looked at. In fact, the inventor declares that the celluloid rings of the instrument, with their tabs of metal foil, actually move around as the looker shifts his position. The stronger the ray, the greater the effect on the instrument. The average person moves the indicator fifteen degrees. But Dr. Russ has found that really brilliant people—airmen, actresses and journalists—send the needle whizzing around to 60 degrees.

If a man's health is bad, his ray becomes feeble, and he cannot move the indicator at all. But the ray is always there. Though it may get fainter and fainter, it never ceases until death.

KNX—AT HOLLYWOOD

(Continued from page 5)

through each night, exactly like the London cab driver, he goes home, hunts out his slippers and with his old reliable pipe, sits down in an easy chair and tunes in some DX. This Radio germ is incurable.

KNX is proud of being representative of Hollywood, proud of the Town Crier, proud of the nice shiny 500-watt Western Electric 1-B transmitter and the skilled operators who keep it going, but it is more proud of another thing than any else. That is, KNX is not worried over who is going to pay for broadcasting.

Carrie Preston Rittmeister, program director of KNX, is the woman responsible for that. Mrs. Rittmeister, while program director for another Los Angeles station, made the first experiments with paid programs in the West, and since the opening of KNX in November, 1924, has made it possible for the station and artists appearing to be paid for every evening performance except two. Truly a record to be envied. It has been done so successfully only by the application of sound principles—low cost to the advertiser, a minimum of direct advertising on programs, a high standard of music and good showmanship. KNX is operated without thought or hope of profit, but is being operated on a pay-as-we-go basis, without depleting the air with tiresome advertising talks. Carrie Preston Rittmeister of KNX, we take off our hats to you for that.

Although the influence of the films is nearly always present while KNX is on the air, Hollywood and the film colony have a special time to show off. Beginning at 11 p. m. on Saturday nights, Pacific time, of course, Hollywood night is in full swing, lasting until the players begin giving the announcer the "rights and lefts." To name those who have appeared on Hollywood night at KNX would be to read the register of screenland from producers to extras.

But Hollywood is not entirely composed of those engaged in the making of celluloid dramas, despite popular belief to the contrary. Hollywood is a city like Des Moines or Atlanta, or some other place—except, well, except that it is Hollywood. And KNX represents Hollywood as a whole very well, its musicians, actors and actresses, authors, hotels, cafes, shoemakers, butchers and candlestick makers.

SPANISH ANNOUNCER FOR STATION KFDM



This KFDM Spanish announcer is known to thousands of fans as "Statio."

PROMOTES SUPER FOR MIAMI BEACH

Carl G. Fisher Announces Construction of 2,500-Watt Broadcaster at Southern Resort

MIAMI, Fla.—Carl G. Fisher, multimillionaire builder of the Indianapolis Motor Speedway and developer of Miami Beach, Florida, has announced that work has started on a new super-power broadcasting station for Miami Beach.

The large station will have a maximum power of 2,500 watts and will duplicate the one recently announced for WSB, the Atlanta Journal, as in process of construction. A network of telephone wires will connect the new station with the nine following Miami Beach hotels: Fleetwood, Nautilus, Flamingo, Lincoln, Kingcloe, Roney Plaza, Wofford, William Penn and Fancoast.

Jesse H. Jay, director-announcer of WMBF, Fleetwood hotel, will be director of the superstation. WMBF, which closed recently for the summer season, has reopened and will continue broadcasting.

Make Announcement of WCCO Staff Changes

H. A. Bellows Director—E. S. Harrison Becomes New Manager

MINNEAPOLIS.—When H. A. Bellows, former editor of "The North-Western Miller," became director of Gold Medal Station WCCO here recently, several other changes were made in the executive staff.

Harry Wilber, ex-manager of WCCO, resigned to resume his publicity work and to act as public relations counsel. He was succeeded by E. S. Harrison, formerly assistant manager.

E. H. Gaunsons continues to direct all of WCCO's publicity. Mr. Bellows is in charge of all broadcasts and arrangements for same. Mr. Harrison will supervise all business affairs of the station and the contacts with the public.

Tennessee in Fourth District

WASHINGTON, D. C.—The State of Tennessee will be transferred to the Fourth Radio district from the Fifth district for convenience of administration.



Increase your summer range with an enameled aerial

WHEN summer comes, it will be harder to get the distant stations that entertained you during the winter months. The loud signals that came pounding in during cold, winter nights will be greatly weakened during the summer heat, and if you are using an inefficient aerial, the signals may not be audible.

Now is the time to take down your old corroded bare copper aerial and replace it with a Beldenamed stranded aerial. The smoke, grime, and corrosion on your bare copper aerial seriously interferes with the free flow of impulses to your set. A Beldenamed aerial is covered with a weatherproof, baked-enamel coating that protects the wire from corrosion and greatly increases its efficiency and range.

Try a Beldenamed aerial. It makes a world of difference.

Specify Belden

Magnet wire, battery cords, loop antenna wire, terminals, rosin-core solder, litz wire, hook-up wire, and a dozen other items. Send for booklet.

Send for this Free Booklet!



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

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

Name _____
Address _____



Belden Manufacturing Company

2310A South Western Avenue
CHICAGO, ILLINOIS

An Evening at Home with the Listener In

STATIONS IN ORDER OF WAVE LENGTHS USED

Meters	Call	Meters	Call	Meters	Call	Meters	Call
226	WBHM	275	KFKU	313	CNRA	361.2	KGO
233	WEAL	315.6	WBLB	406	WJAP	465.2	WOR
240	KFAB	275	WORD	315.6	WAHG	465.2	WBEI
240	WOAX	275.3	WJAS	319	WGR	370	CYB
243.8	WAMD	278	WCAU	319	WSMB	370.2	WEBB
244	WABN	278	WRBC	322.4	KOA	372	WON
248	WBGG	278	WLBK	325.9	WSAI	374.8	KTHS
250	WGES	280.2	WNAC	330	CYX	379.5	WGY
250	WMBB	285.5	WEMC	333.3	WBZ	379.5	WHAZ
252	KFWB	285.6	WKAR	333.9	KFMF	384.4	CKY
261	KSL	336.9	WCAJ	384.4	CKY	435	ATY
265.5	WMAK	285.5	WREO	336.9	WSAC	384.4	KJR
266	KPNF	283.3	KPKX	336.9	KNX	389.4	WTAM
266	WBON	293.9	WBAV	44.7	WKQAQ	394.6	KFRU
266	WBBY	293.9	WBAO	44.6	WLS	394.5	WFI
270	WGST	293.9	KFMQ	348.6	KFAE	394.5	WLIT
272.6	WBRR	293.8	WPG	348.6	KOB	394.5	WQAI
272.6	WBFB	302.8	WJLD	348.5	WVIC	399.8	WHJ
272.6	WVW	305.9	WJAS	354.9	CFCA	405.2	PWX
273	WRW	305.9	KDKA	356.9	CHNC	405.2	WJY

(FOR PACIFIC TIME)

Call	Met.	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Met.	Call
AT9	435	Silent	3:00-4:30	Silent	Silent	Silent	5:00-7:15	Silent	435	AT9
CFCA	356.9	Silent	4:00-5:30	Silent	5:15-6:15	Silent	5:15-6:15	Silent	356.9	CFCA
CFON	434.5	9:00-11:00	Silent	Silent	Silent	Silent	7:00-8:00	Silent	434.5	CFON
CICW	356.9	Silent	Silent	Silent	5:30-6:30	Silent	Silent	Silent	356.9	CICW
CKAC	410.7	8:00-10:00	0:30-7:30	6:30-7:00	5:00-7:00	5:00-7:00	7:00-11:00	5:15-6:15	410.7	CKAC
CKAK	410.7	4:30-9:30	1:30-3:30	Silent	4:30-9:30	Silent	4:30-9:30	Silent	410.7	CKAK
CKY	384.4	Silent	5:00-6:45	Silent	5:30-9:00	Silent	6:00-7:00	Silent	384.4	CKY
CNRA	313	Silent	Silent	Silent	4:30-6:30	Silent	Silent	Silent	313	CNRA
CRW	434.5	4:30-9:30	Silent	Silent	Silent	4:30-9:30	Silent	Silent	434.5	CRW
CYB	370	6:30-9:00	Silent	Silent	0:30-7:30	Silent	7:00-9:00	Silent	370	CYB
CYL	400	Silent	Silent	Silent	6:00-9:30	Silent	Silent	Silent	400	CYL
CYX	330	Silent	Silent	Silent	7:00-10:00	Silent	Silent	Silent	330	CYX
KDKA	309.1	4:45-6:55	12:00-4:30	4:45-6:55	5:00-9:30	4:45-6:55	4:15-9:30	4:15-9:30	309.1	KDKA
KFAB	240	9:00-10:30	2:00-3:00	Silent	5:30-8:00	Silent	5:30-8:00	Silent	240	KFAB
KFAE	384.6	Silent	Silent	Silent	7:30-8:00	Silent	7:30-8:00	Silent	384.6	KFAE
KFAU	275	Silent	Silent	Silent	7:00-8:00	Silent	Silent	Silent	275	KFAU
KFMF	316.6	Silent	Silent	Silent	6:00-7:00	Silent	Silent	Silent	316.6	KFMF
KFI	467	6:45-11:00	4:00-11:00	6:45-12:00	6:45-12:00	6:45-12:00	6:45-11:00	6:45-12:00	467	KFI
KFKU	276	Silent	Silent	Silent	6:45-6:45	Silent	Silent	Silent	276	KFKU
KFKX	283.3	Silent	Silent	Silent	7:00-9:00	Silent	Silent	Silent	283.3	KFKX
KFMQ	293.8	Silent	Silent	Silent	7:00-8:00	Silent	Silent	Silent	293.8	KFMQ
KFMF	336.9	Silent	Silent	Silent	8:00-9:00	Silent	Silent	Silent	336.9	KFMF
KFNF	268	5:30-6:30	4:30-7:30	Silent	Silent	Silent	5:30-6:30	Silent	268	KFNF
KFOA	454.3	6:00-11:30	Silent	6:00-11:30	6:00-11:30	6:00-11:30	6:00-11:30	Silent	454.3	KFOA
KFOU	545.1	5:00-10:00	5:00-10:00	Silent	5:00-10:00	5:00-10:00	5:00-10:00	Silent	545.1	KFOU
KFUB	252	7:45-11:00	6:30-1:00	7:45-1:00	7:45-1:00	7:45-1:00	7:15-1:00	7:15-1:00	252	KFUB
KGO	361.2	8:00-1:00	3:00-9:00	8:00-1:00	8:00-1:00	Silent	8:00-1:00	Silent	361.2	KGO
KHJ	485.2	6:00-10:00	8:00-9:00	8:00-9:00	8:00-12:00	8:00-12:00	8:00-12:00	8:00-12:00	485.2	KHJ
KIAF	421	Silent	3:00-9:00	7:00-8:00	Silent	7:00-8:00	Silent	7:00-8:00	421	KIAF
KJR	384.4	Silent	7:00-8:00	6:00-10:00	Silent	8:30-10:00	Silent	8:30-10:00	384.4	KJR
KJS	293.9	Silent	7:15-9:30	Silent	8:00-9:00	Silent	8:00-9:00	Silent	293.9	KJS
KLX	398.2	Silent	6:00-11:00	Silent	6:00-11:00	Silent	6:00-11:00	Silent	398.2	KLX
KOB	322.4	6:30-2:00	5:00-11:00	6:30-12:00	6:30-12:00	7:00-12:00	6:30-12:00	Silent	322.4	KOB
KOA	348.6	Silent	Silent	Silent	6:30-7:30	Silent	Silent	Silent	348.6	KOA
KPO	428.3	6:25-12:00	6:30-10:00	6:30-11:00	6:30-11:00	6:30-11:00	6:30-11:00	Silent	428.3	KPO
KSD	545.1	5:00-7:30	Silent	Silent	4:00-6:00	Silent	4:00-6:00	Silent	545.1	KSD
KST	467	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00	Silent	467	KST
KTRB	374.8	6:30-7:45	6:30-9:30	6:30-9:30	6:30-9:30	6:30-9:30	6:30-9:30	Silent	374.8	KTRB
KTW	455	Silent	7:00-9:30	Silent	Silent	Silent	Silent	Silent	455	KTW
KYW	535.4	4:00-10:30	1:00-5:00	Silent	4:00-8:30	4:00-10:30	4:00-10:30	Silent	535.4	KYW
NAA	434.5	Silent	Silent	Silent	4:45-5:00	Silent	4:45-5:00	Silent	434.5	NAA
NAB	275	5:00-8:00	Silent	Silent	Silent	5:30-8:00	Silent	Silent	275	NAB
WABL	275	5:00-8:00	Silent	Silent	Silent	5:30-8:00	Silent	Silent	275	WABL
WABN	244	Silent	Silent	Silent	4:00-9:00	Silent	4:00-9:00	Silent	244	WABN
WABO	316.6	9:00-11:00	Silent	Silent	4:00-10:00	Silent	4:00-10:00	Silent	316.6	WABO
WAMD	243.8	8:00-9:00	19:00-8:00	Silent	8:00-9:00	8:00-9:00	8:00-9:00	Silent	243.8	WAMD
WBAF	475.9	5:00-9:00	5:00-9:00	Silent	5:30-8:15	5:30-8:15	5:30-8:15	Silent	475.9	WBAF
WBAR	408	Silent	3:00-9:00	Silent	7:00-8:00	Silent	7:00-8:00	Silent	408	WBAR
WBAV	293.9	Silent	5:00-7:00	Silent	Silent	Silent	Silent	Silent	293.9	WBAV
WBBG	248	Silent	Silent	Silent	5:00-7:00	Silent	5:00-7:00	Silent	248	WBBG
WBBM	226	5:00-10:00	Silent	1:00-7:00	Silent	5:00-7:00	5:00-7:00	Silent	226	WBBM
WBBY	226	5:00-10:00	Silent	1:00-7:00	Silent	5:00-7:00	5:00-7:00	Silent	226	WBBY
WBCN	256	4:00-4:45	0:00-6:00	4:00-4:50	Silent	Silent	4:00-4:50	Silent	256	WBCN
WBCW	333.3	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00	6:00-10:00	Silent	333.3	WBCW
WCAE	461.3	4:00-5:00	6:30-8:00	4:30-5:00	4:30-5:00	4:30-5:00	4:30-5:00	Silent	461.3	WCAE
WCAL	336.9	10:00-11:00	6:30-8:00	6:00-10:00	Silent	Silent	7:00-9:00	Silent	336.9	WCAL
WCAR	488.5	10:00-11:00	6:30-8:00	6:00-10:00	Silent	Silent	7:00-9:00	Silent	488.5	WCAR
WCBA	278	Silent	1:00-5:00	4:00-8:30	Silent	3:00-9:00	Silent	Silent	278	WCBA
WCBO	344.6	Silent	6:00-7:00	5:00-7:30	Silent	5:00-7:30	Silent	Silent	344.6	WCBO
WCCO	416.4	6:00-9:00	5:45-8:15	4:00-9:00	4:00-9:00	4:00-9:00	4:00-9:00	Silent	416.4	WCCO
WCD	516.9	Silent	Silent	3:00-6:30	3:00-6:30	3:00-6:30	3:00-6:30	Silent	516.9	WCD
WDAF	365.6	4:00-11:00	2:00-3:00	4:00-11:00	4:00-11:00	4:00-11:00	4:00-11:00	Silent	365.6	WDAF
WDFW	421	Silent	1:00-2:45	Silent	3:30-5:30	Silent	3:30-5:30	Silent	421	WDFW
WEAF	491.3	Silent	2:00-9:00	2:00-9:00	2:00-9:00	2:00-9:00	2:00-9:00	Silent	491.3	WEAF
WEAR	293.9	Silent	Silent	Silent	Silent	5:00-6:00	5:00-6:00	Silent	293.9	WEAR
WEAR	389.4	Silent	Silent	Silent	4:00-8:00	3:45-4:45	4:00-8:00	Silent	389.4	WEAR
WEBS	332	4:30-9:30	4:00-8:00	Silent	4:30-8:30	4:30-8:30	4:30-8:30	Silent	332	WEBS
WEBW	288	Silent	2:25-3:45	6:30-7:45	Silent	6:30-7:45	Silent	Silent	288	WEBW
WEEI	475.9	Silent	3:00-6:30	4:00-7:00	4:00-7:00	4:00-7:00	4:00-7:00	Silent	475.9	WEEI
WEMC	285.3	Silent	6:15-7:15	6:15-7:15	Silent	6:15-7:15	Silent	Silent	285.3	WEMC
WFAB	475.9	6:30-9:00	4:00-9:00	4:30-7:30	4:30-10:00	Silent	4:30-10:00	Silent	475.9	WFAB
WFCA	374.8	6:30-9:00	1:00-8:30	7:30-9:30	7:30-9:30	7:30-9:30	7:30-9:30	Silent	374.8	WFCA
WFD	356.6	6:30-9:00	4:00-9:00	4:00-9:00	4:00-9:00	4:00-9:00	4:00-9:00	Silent	356.6	WFD
WGES	250	6:30-11:30	7:00-9:00	Silent	7:00-11:30	7:30-11:30	7:30-11:30	Silent	250	WGES
WGN	370.2	3:00-8:30	6:00-7:00	Silent	3:00-8:30	3:00-8:30	3:00-8:30	Silent	370.2	WGN
WGST	270	Silent	3:15-4:30	4:30-7:30	4:30-7:30	4:30-7:30	4:30-7:30	Silent	270	WGST
WGY	379.5	6:30-9:00	5:30-8:00	5:30-8:00	5:30-8:00	5:30-8:00	5:30-8:00	Silent	379.5	WGY
WHAS	535.4	Silent	5:45-6:45	Silent	Silent	7:00-8:00	Silent	Silent	535.4	WHAS
WHAD	275	Silent	Silent	Silent	4:00-8:00	Silent	4:00-8:00	Silent	275	WHAD
WHAS	293.8	5:30-7:00	Silent	3:00-3:30	Silent	5:30-7:00	5:30-7:00	Silent	293.8	WHAS
WHB	385.6	Silent	6:00-11:00	Silent	Silent	Silent	Silent	Silent	385.6	WHB
WHK	273	8:00-10:30	4:30-8:00	Silent	Silent	Silent	2:00-8:00	Silent	273	WHK
WHN	361.2	Silent	0:15-7:15	3:00-8:00	6:00-8:30	4:45-8:00	4:00-8:00	Silent	361.2	WHN
WHY	405.2	Silent	5:00-7:00	5:30-10:00	5:30-10:00	5:30-10:00	5:30-10:00	Silent	405.2	WHY
WRT	328	Silent	12:00-9:00	3:00-9:00	3:00-9:00	3:00-9:00	3:00-9:00	Silent	328	WRT
WVJ	508.2	4:00-9:00	Silent	Silent	4:00-9:00	Silent	4:00-9:00	Silent	508.2	WVJ
WJAR	305.9	Silent	3:20-6:15	4:00-6:00	4:00-6:00	4:00-6:00	4:00-6:00	Silent	305.9	WJAR
WJAS	275.3	Silent	Silent	Silent	5:30-8:00	5:30-8:00	4:30-7:00	Silent	275.3	WJAS
WJLD	302.8	4:15-10:00	10:00-12:00	4:15-10:00	4:15-10:00	4:15-10:00	4:15-10:00	Silent	302.8	WJLD
WJY	405.2	Silent	Silent	Silent	5:15-6:45	Silent	5:15-6:45	Silent	405.2	WJY
WKAQ	340.7	Silent	4:00-8:00	Silent	Silent	4:00-6:00	4:00-6:00	Silent	340.7	WKAQ
WKRC	285.3	9:30-11:00	9:30-11:00	Silent	Silent	5:00-6:15	Silent	Silent	285.3	WKRC
WLBK	278	9:30-11:00	3:45-9:00	Silent	5:00-7:00	5:00-7:00	5:00-7:00	Silent	278	WLBK
WLIT	344.5	Silent	4:45-10:50	Silent	Silent	Silent	Silent	Silent	344.5	WLIT
WLS	394.6	4:00-10:00	4:30-5:55	Silent	4:00-10:00	4:00-8:30	4:00-5:55	Silent	394.6	WLS
WMAK</										

An Evening at Home with the Listener

(FOR CENTRAL TIME)

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(FOR EASTERN TIME Or Cities Using Central Daylight Saving Time)

Station	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Call	Location	Met.	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Call	
AT9	6:00-6:00	Silent	Silent	Silent	7:00-8:35	Silent	AT9	Fort Bragg, N. C.	435	Silent	6:00-7:00	Silent	Silent	Silent	8:00-9:55	Silent	AT9	
CFCA	6:00-7:00	Silent	7:15-8:15	7:15-8:15	7:15-8:15	7:15-8:15	CFCA	Toronto, Ont.	356.9	Silent	7:00-8:00	Silent	8:15-9:15	Silent	8:15-9:15	Silent	CFCA	
CFNC	11:00-11:00	Silent	Silent	Silent	9:00-10:00	Silent	CFNC	Calgary, Alta.	434.5	12:00-2:00	Silent	Silent	Silent	Silent	10:00-11:00	Silent	CFNC	
CHNC	10:00-10:00	Silent	7:30-8:30	Silent	Silent	Silent	CHNC	Toronto, Ont.	356.9	Silent	Silent	8:30-9:30	Silent	Silent	Silent	10:00-1:00	Silent	CHNC
CKAC	6:30-6:30	Silent	Silent	6:30-11:30	Silent	6:30-11:30	CKAC	Montreal, Que.	410.7	7:30-12:30	4:30-5:30	Silent	7:30-12:30	Silent	7:30-12:30	Silent	CKAC	
CKY	6:30-6:30	Silent	Silent	7:30-10:00	Silent	7:30-10:00	CKY	Winnipeg, Man.	384.4	Silent	Silent	8:00-9:45	Silent	Silent	Silent	9:00-10:00	Silent	CKY
GNRA	6:30-6:30	Silent	6:30-7:30	Silent	6:30-7:30	6:30-7:30	GNRA	Moncton, Can.	813	Silent	Silent	Silent	7:30-8:30	Silent	7:30-8:30	Silent	GNRA	
CHRO	6:30-6:30	Silent	6:30-11:30	Silent	6:30-11:30	Silent	CHRO	Edmonton, Can.	434.5	7:30-12:30	Silent	Silent	Silent	7:30-12:30	Silent	7:30-12:30	Silent	CHRO
CNRA	6:30-6:30	Silent	Silent	Silent	9:00-11:30	Silent	CNRA	Mexico City, Mex.	370	Silent	6:30-10:00	Silent	Silent	9:30-10:00	Silent	10:00-12:00	Silent	CNRA
CYL	6:30-6:30	Silent	10:00-11:30	Silent	Silent	10:00-11:30	CYL	Mexico City, Mex.	480	Silent	Silent	Silent	11:00-12:30	Silent	Silent	11:00-12:30	Silent	CYL
CYX	6:30-6:30	Silent	9:00-12:00	Silent	Silent	8:00-10:00	CYX	Mexico City, Mex.	330	Silent	Silent	10:00-1:00	Silent	Silent	Silent	9:00-11:00	Silent	CYX
KDKA	6:00-6:00	6:45-8:55	7:00-11:30	6:45-8:55	6:15-11:00	6:45-8:55	KDKA	Pittsburgh, Pa.	309.1	7:45-9:55	3:00-7:30	7:45-9:55	8:00-12:30	7:45-9:55	7:15-12:00	7:45-9:55	KDKA	
KFAB	11:00-11:00	6:30-6:30	Silent	7:30-10:00	Silent	7:30-10:00	KFAB	Lynchburg, Va.	240	12:00-1:30	5:00-6:00	8:30-11:00	Silent	Silent	8:30-11:00	Silent	KFAB	
KFAE	6:30-6:30	Silent	Silent	6:30-12:00	Silent	6:30-12:00	KFAE	Pulaski, Wash.	348.8	Silent	Silent	10:30-12:00	Silent	Silent	10:30-12:00	Silent	KFAE	
KFAU	6:30-6:30	Silent	Silent	6:00-10:00	Silent	6:00-10:00	KFAU	Boise, Idaho	348.8	Silent	Silent	10:00-11:00	Silent	Silent	10:00-11:00	Silent	KFAU	
KFDM	6:30-6:30	Silent	Silent	8:00-9:00	Silent	8:00-9:00	KFDM	Baie, Texas	315.6	Silent	Silent	Silent	9:00-10:00	Silent	Silent	9:00-10:00	Silent	KFDM
KFI	6:30-6:30	8:45-2:00	8:45-2:00	8:45-2:00	8:45-2:00	8:45-2:00	KFI	Los Angeles, Calif.	467	9:45-2:00	7:00-2:00	9:45-3:00	9:45-3:00	9:45-3:00	9:45-3:00	9:45-3:00	KFI	
KFKF	6:30-6:30	Silent	Silent	8:30-9:45	Silent	8:30-9:45	KFKF	Lawrence, Kan.	275	Silent	Silent	7:50-9:45	Silent	Silent	7:50-9:45	Silent	KFKF	
KFKX	6:30-6:30	Silent	Silent	Silent	9:30-11:00	Silent	KFKX	Hatting, Kan.	288.3	Silent	Silent	10:30-11:00	Silent	Silent	10:30-11:00	Silent	KFKX	
KFMQ	6:30-6:30	Silent	9:00-10:00	Silent	7:30-8:30	Silent	KFMQ	Fayetteville, Ark.	298.8	Silent	Silent	Silent	10:00-11:00	Silent	8:50-9:30	Silent	KFMQ	
KFMX	6:30-6:30	Silent	10:00-11:00	Silent	10:00-10:00	Silent	KFMX	Northfield, Minn.	336.9	Silent	Silent	8:00-9:00	Silent	10:00-12:00	Silent	10:00-11:00	Silent	KFMX
KFNA	6:30-6:30	7:30-8:30	Silent	7:30-8:30	7:30-8:30	7:30-8:30	KFNA	Shenandoah, Ia.	286	8:30-9:30	7:30-10:30	8:30-9:30	Silent	8:30-9:30	8:30-9:30	8:30-9:30	KFNA	
KFNB	6:30-6:30	7:30-8:30	Silent	7:30-8:30	7:30-8:30	7:30-8:30	KFNB	Seattle, Wash.	454.3	9:00-2:30	Silent	9:00-2:30	9:00-2:30	9:00-2:30	9:00-2:30	9:00-2:30	KFNB	
KFNO	6:30-6:30	7:30-8:30	Silent	7:30-8:30	7:30-8:30	7:30-8:30	KFNO	St. Louis, Mo.	348.8	9:00-8:00	10:15-11:15	9:00-11:00	9:00-11:00	9:00-11:00	9:00-11:00	9:00-11:00	KFNO	
KFOD	6:30-6:30	9:15-10:15	Silent	9:15-10:15	Silent	9:15-10:15	KFOD	St. Louis, Mo.	545.1	Silent	10:15-11:15	Silent	Silent	Silent	11:30-12:30	Silent	KFOD	
KFOW	6:30-6:30	11:00-1:00	9:30-3:00	9:45-3:00	9:45-3:00	9:45-3:00	KFOW	Hollywood, Calif.	252	10:45-3:00	12:00-2:00	10:30-4:00	10:45-4:00	10:45-4:00	10:45-4:00	10:45-4:00	KFOW	
KGO	6:30-6:30	5:30-11:00	10:00-3:00	10:30-3:00	10:30-3:00	10:30-3:00	KGO	Oakland, Calif.	301.2	10:00-12:00	6:00-12:00	11:00-4:00	11:00-4:00	11:00-4:00	11:00-4:00	11:00-4:00	KGO	
KGW	6:30-6:30	8:00-9:00	8:00-9:00	8:00-9:00	8:00-9:00	8:00-9:00	KGW	Ottawa, Ont.	478.8	9:00-11:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	9:00-10:00	KGW	
KH	6:30-6:30	5:30-11:00	8:00-1:00	8:00-1:00	8:00-1:00	8:00-1:00	KH	Los Angeles, Calif.	405.2	9:00-5:00	9:30-1:00	Silent	Silent	10:00-11:00	9:00-2:00	9:00-2:00	KH	
KIAF	6:30-6:30	4:00-7:00	6:00-10:00	Silent	9:00-10:00	Silent	KIAF	Sittling, Minn.	421	Silent	8:00-4:00	8:00-9:55	Silent	Silent	8:00-9:55	Silent	KIAF	
KJR	6:30-6:30	9:00-10:00	8:00-12:00	Silent	10:30-12:00	10:30-12:00	KJR	Seattle, Wash.	384.4	Silent	10:00-11:00	9:00-1:00	Silent	11:30-1:00	Silent	11:30-1:00	KJR	
KJS	6:30-6:30	9:15-11:30	Silent	10:00-11:00	Silent	10:00-11:00	KJS	Los Angeles, Calif.	203.8	Silent	10:15-12:30	Silent	11:00-12:00	Silent	11:00-12:00	Silent	KJS	
KLX	6:30-6:30	Silent	Silent	8:30-1:30	Silent	8:30-1:30	KLX	Oakland, Calif.	508.2	Silent	Silent	9:00-2:00	Silent	9:00-2:00	Silent	9:00-2:00	KLX	
KMA	6:30-6:30	8:30-9:30	Silent	8:30-9:30	8:30-9:30	8:30-9:30	KMA	Hollywood, Calif.	421.5	9:00-2:00	Silent	8:30-9:30	8:30-9:30	8:30-9:30	8:30-9:30	8:30-9:30	KMA	
KNOA	6:30-6:30	8:30-9:30	Silent	8:30-9:30	Silent	8:30-9:30	KNOA	Denver, Colo.	322.4	11:00-2:00	6:30-10:30	Silent	Silent	Silent	9:30-10:30	Silent	KNOA	
KOB	6:30-6:30	8:30-9:30	Silent	8:30-9:30	Silent	8:30-9:30	KOB	State College, N. M.	348.8	Silent	Silent	9:30-10:30	Silent	Silent	9:30-10:30	Silent	KOB	
KPD	6:30-6:30	8:30-12:00	8:30-1:00	8:30-1:00	8:30-1:00	8:30-1:00	KPD	San Francisco, Calif.	428.3	9:25-3:00	9:30-1:00	6:30-2:00	9:30-2:00	9:30-2:00	9:30-2:00	9:30-2:00	KPD	
KPS	6:30-6:30	8:30-11:00	8:30-11:00	8:30-11:00	8:30-11:00	8:30-11:00	KPS	St. Louis, Mo.	545.1	10:00-12:30	9:00-11:00	8:30-12:30	8:30-12:30	8:30-12:30	8:30-12:30	8:30-12:30	KPS	
KQ	6:30-6:30	8:30-11:30	8:30-11:30	8:30-11:30	8:30-11:30	8:30-11:30	KQ	Los Angeles, Calif.	478.8	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	KQ	
KTHS	6:30-6:30	8:30-11:30	8:30-11:30	8:30-11:30	8:30-11:30	8:30-11:30	KTHS	Hart Springs, Ark.	374.8	9:30-10:45	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	9:30-12:30	KTHS	
KTW	6:30-6:30	9:00-11:30	Silent	Silent	Silent	Silent	KTW	Seattle, Wash.	455	Silent	10:00-12:30	Silent	Silent	Silent	Silent	Silent	KTW	
KYV	6:30-6:30	9:00-7:00	6:00-12:30	6:00-12:30	6:00-12:30	6:00-12:30	KYV	Chicago, Ill.	535.4	7:00-1:30	4:00-8:00	Silent	7:00-11:30	7:00-1:30	7:00-1:30	7:00-1:30	KYV	
NAA	6:30-6:30	8:45-7:00	6:15-7:40	6:15-7:40	6:15-7:40	6:15-7:40	NAA	Radio, Va.	434.5	Silent	7:45-8:00	7:45-8:00	7:45-8:00	7:45-8:00	7:45-8:00	7:45-8:00	NAA	
PWK	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	PWK	Havana, Cuba	275	Silent	Silent	Silent	8:30-11:00	Silent	Silent	Silent	PWK	
WABL	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WABL	St. Louis, Mo.	244	Silent	Silent	10:00-1:00	Silent	Silent	Silent	Silent	WABL	
WABN	6:30-6:30	8:00-12:00	Silent	8:00-12:00	Silent	8:00-12:00	WABN	La Crosse, Wis.	244	Silent	Silent	10:00-1:00	Silent	Silent	Silent	Silent	WABN	
WAGH	6:30-6:30	8:00-12:00	Silent	8:00-12:00	Silent	8:00-12:00	WAGH	Richmond, N. Y.	315.8	12:00-2:00	Silent	7:00-1:00	Silent	6:30-12:00	Silent	7:00-12:00	Silent	WAGH
WAMD	6:30-6:30	8:00-10:00	10:00-11:30	10:00-11:30	10:00-11:30	10:00-11:30	WAMD	Minneapolis, Minn.	243.6	11:00-12:00	5:00-11:00	Silent	11:00-12:00	11:00-12:00	11:00-12:00	11:00-12:00	11:00-12:00	WAMD
WAP	6:30-6:30	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	8:00-10:00	WAP	Fort Worth, Tex.	478.8	9:00-1:00	12:00-1:00	8:45-9:00	8:45-9:00	8:45-9:00	8:45-9:00	8:45-9:00	8:45-9:00	WAP
WBAR	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WBAR	Columbus, O.	293.9	Silent	11:00-12:00	10:00-11:00	Silent	Silent	9:00-9:00	Silent	9:00-9:00	WBAR
WBBG	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WBBG	Mattapoisett, Mass.	248	Silent	Silent	8:00-10:00	Silent	8:00-9:00	Silent	8:00-9:00	Silent	WBBG
WBBM	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WBBM	Chicago, Ill.	226	8:00-1:00	4:00-10:00	Silent	8:00-12:00	8:00-10:00	8:00-12:00	8:00-10:00	8:00-10:00	WBBM
WBBR	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WBBR	Spring Island, N. Y.	272.7	7:00-7:45	8:00-9:55	7:00-7:50	8:00-12:00	8:00-12:00	8:00-12:00	8:00-12:00	8:00-12:00	WBBR
WBCN	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WBCN	Winston-Salem, N. C.	206	9:00-1:00	6:00-12:00	6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	6:00-9:00	WBCN
WBZ	6:30-6:30	8:00-9:00	Silent	8:00-9:00	Silent	8:00-9:00	WBZ	Springfield, Mass.	333.3	6:30-8:55	6:00-9:00	6:30-8:55	6:30-8:55	6:30-8:55	6:30-8:55	6:30-8:55	6:30-8:55	WBZ
WCAC	6:30-6:30																	

Radio Digest

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Is Radio Advertising on the Wane?

IS RADIO advertising, that is advertising by means of broadcasting stations, on the wane? The question is highly discussed pro and con by newspapers, advertising agencies and advertisers. The general public seems to be the deciding factor, and, according to a recent report of a newspaper trade journal, the public are expressing their displeasure at what is being served them by certain advertising stations.

The newspaper trade journal claims that Secretary Herbert Hoover has a huge pile of letters from listeners, some of whom protest the vulgarity and others the advertising of several broadcasting stations. The stations complained of are located in or near New York, Chicago, Boston and San Francisco.

The conclusion of the newspaper journal is that as soon as a station engages in direct advertising it will lose prestige, its listeners will protest or tune it out, and that the result would be to discourage the advertising policy in a short time. "Good will," says the journal, "is the broadcaster's only real asset it seems, and as such should be preserved."

We do not entirely agree with the observations of this highly respected newspaper journal. The point of difference is the definition of what is direct and what is indirect advertising. It is our belief that nearly all forms of indirect advertising are suitable for broadcasting and, what is more, that the time is approaching when a special form of direct advertising will be broadcast.

In this connection it is interesting to note that a survey of broadcast advertising is now being made by the American Association of Advertising Agencies to determine whether it really pays to advertise—directly or indirectly—by means of Radio. The results of the survey will be made public for the benefit of advertisers in general, so that they may save their money if broadcast advertising proves wasteful. In the hands of this august body, we are sure, the study will be unbiased and worth while.

In this connection we note that destructive criticisms from the public are by far more easily obtained than comments endorsing any form of broadcasting. Human nature reacts thus. The Radio committee of the A. A. A. and the newspaper journal should take this fact into account when perusing the huge pile of communications in Secretary Hoover's possession.

Character Vs. Straight Announcing

NOT long ago several stories came to our desk portraying the work of the Radio Voice Technique committee, a more or less self-appointed body which delegated to itself the task of setting standards by which Radio announcers should be judged. After agreeing on a complete set of specifications, these were released through the press. They included everything an announcer should have, according to the committee, except the factor X, which was personality.

The committee agreed that the personality factor was one which could hardly be specified, but that it was absolutely necessary. In omitting the personality factor and its value to an announcer, the voice technique committee left out the chief requisite of the character—humorous or interesting—announcer, as opposed to the straight announcer.

Suffice to say, the most difficult kind of announcing to do is character announcing. Straight announcing does not require the extemporaneous wit, the quick thinking and the knowledge of human nature that character announcing does. The straight announcer might well be a parrot or machine. Very little thinking is required.

But both types of announcers have their place. The most heavy classic musical compositions and serious speeches can hardly be appropriately announced in character style. Here is where the character announcer scores, for, providing he is acquainted somewhat with the various musical compositions, he can usually discard his mantle of wit and humor, and draw a much closer picture for the listeners than the straight announcer at his best. The opening for the straight announcer comes when the character announcer cannot discard his mantle or does not know music sufficiently well to handle the heavier type of program material.

RADIO INDI-GEST

Famous Trio at BLAH



WALLA WALLA.—The three popular boys shown above are, reading from left to right: Willie Bazoo, tenor; Sam Umpah, baritone, and Jim Crow, bass. They were the first to broadcast on the program last night, and they rendered (look in the dictionary) a tear-bringing little ballad, entitled, "Properly Adjust Your Grid Bias with Your Potentiometer M'dear, for I'll Broadcast to You on Electromagnetic Waves When You're Gone." (A trust song! Wotta we care about the trust?)

The above picture was taken of the boys, just as Willie threw the dice on his parting shot. He parted with everything he had, but it's warm in Walla Walla. (Well, what do you know about that?) The Walla Walla chamber of commerce is planning a drive for a greater Walla Walla. Of course, the Indi-Gest broadcasting station will come in for a large part of the advertising campaign. C. F. Jenkin's invention, Radio movies, will be used to exploit and broadcast the beauties and grace of the unbleached and uneducated youthful maiden dancers.

A bottle of three star vanilla extract will be presented for the best slogan submitted for this station. To avoid unnecessary correspondence on "where didja get the vanilla?" let it suffice to say that the latter is still condensed by Dielectric. Send him all the orders and Indi-Gest, the cash remittance.

You Name It

The day was cold and dark and damp.
I'm sitting now by the Coleman lamp.
My Radio set will sing to me
Of life and times beyond the sea.
I'll hike my heels up on a chair
And let the old loud speaker blare.
Old time music or Jaek and Jill
Or any durned old thing it will.
And then at length my eyes will close
And I will glide into a doze.
And all the neighbors will declare
There's two loud speakers on the air.
And when they come to make complaint
And find one is and 't'her ain't,
It won't take long for them to plot
Which is the one they ought to swat.

A. M. GRAY.

A Letter to KSD

Please, if you know anything, will you tell me why I don't always sometimes get you so good like the Beachwater Edge hotel from Chicago, or the Easting-house Electric station by West Spitzberg, Pennsylvania. I don't see why it should be hardly at all, if any, as I am using a low-life very near condenser which the dealer told me was the best because it has got built-in Michael Farads and everything, if not more so. Of these condensers of which I speak there is one of each. Maybe it is because one of these condensers is more as two miles from my house.

The first dairy is just across the street, like the cow flies, but the dealer he told me I must put the condenser across the second dairy, which, as I am telling you, is two miles away. "Would it be better if I move closer to the second dairy? Maybe it would be better if I lived just across the road, as the hen walks. Anyway, I put the condenser across the second dairy, but it didn't seem to improve the cowstieks of my set.

Would the condenser work better across a second dairy where they make condensed milk? I wonder, like the feller said when the star twinkled. I have read in the Powder magazine, or somewhere, that maybe it would be better if I should have some radium frequency. Now I have asked one of our misleading osteopaths about this, and from what he tells me, radium is so expensive that I couldn't use it with frequency.

Another feller he said everything would be all right if I tapped my coil. Believe me, last night from 8 o'clock until Eastern Standard Time I sat in front of that set and tapped the coil with a tack hammer, but it didn't do any good. Would it have been better if I had used a beer mallet?

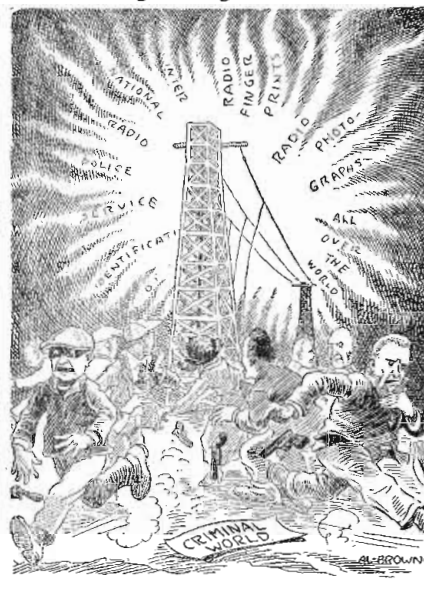
I have about reached the conclusion that all the self activity was in the dealer, and not in the set. If you are capable of thinking about this, please let me know the answer. W. H. J.

Why Announcers Go Crazy

The staff of WMC, Memphis, is enjoying a hearty laugh at the expense of Jerry Dearing, who announces all programs broadcast from the station. Fans are in the habit of forming opinions as to the appearance of announcers from the voices. How near they come to the truth can be guessed from the following incident which provided the laugh for the studio force.

WMC was broadcasting by remote control from a special studio in one of the downtown stores. The public had been invited to attend and the studio was packed with curious. Three women entered as a group and addressed Joe Kabakoff, assistant operator at WMC. "Is that," asked the first, indicating Jerry, who was announcing, "Jerry?" "Uh-huh," remarked Joe. "We've always wanted to see him, we've heard him so often," remarked the second of the trio. "We're so disappointed," was the comment of the third. Q. E. D.

Enlightening the World



Condensed

By DIELECTRIC

WTAM, the Willard storage battery station in Cleveland, presented a sort of allegorical number on a recent program, which may have brought pleasure to many listeners. The music was fairly descriptive and lines plainly spoken. This style of feature might bear repetition. Many are clamoring for a break from the "usual" programs.

Our old friend down in Atlanta, Georgia—WSB—manages to find some quartet of singers around closely where they can be called into the studio. The Critteron Harmony Four held the center of Mike with their popular songs for an entertaining program.

It is doubtful that listeners are impressed by the title, "little symphony orchestra," and certainly the music rendered by such styled musical bands often falls short of any suggestion of symphonic. However, it is the place here to record the excellent playing of the Little Symphony orchestra of Station WIP, in Philadelphia. The ensemble was good and the Victor Herbert numbers made a distinctive program.

KDKA, Pittsburgh, crosses the line separating good from indifferent features so gently as to be deceiving. You revel in the excellence of an instrumental number only to suddenly find yourself calmly listening to some male voice, stamped "tenor," reaching for notes unobtainable. Then, with no further reference to the incident, you are carried off into a blissful meditation inspired by the tones of a violin in capable hands. Not every number may be perfect, but you find a happy average.

An unusual feature on the program of WGN, Chicago, was a ladies' trio whose voices harmonized beautifully. Generally, one or another voice will rise above the chorus and spoil the effect, especially if it is a duet, trio or quartet. No such incident as this happened to mar the real beauty of a delightful program.

While tuned to WEEI, Boston, we had an opportunity to listen to the Howell entertainers with the ever faithful saxophone directing attention to the fact of a dance program on the air. If you felt inclined to choose a partner and swing to the rhythm of lively numbers, here was your chance.

If you tuned in to WOC, in Davenport, Iowa, during the contest of old fiddlers, you heard some "chunes" not often produced in these days of syncopation and dizzy glides. You heard music characteristic of a certain age and locale which it is just as well we Americans perpetuate, in order to keep fresh in mind the simplicity and ruggedness of early American stock.

WJZ, New York, broadcast from the Engineer's club a program of interest to music lovers when it put the Women's university glee club on the air with a splendid program artistically rendered. It is a real pleasure to be able to hand a bouquet to this R. C. A. station, since such are seldom donated by the writer.

There is still another glee club to register on the roll of honor, this one being the City club glee club of St. Louis, Mo., and heard through Station KSD. Music, voices and technical modulation are all praiseworthy so we hereby group them and bestow a single medal.

Underground Antennas for Summer Reception

How to Make Installation for Limited Space

By Edward Thomas Jones, A. I. R. E.

IT MAY not be possible for a great number of listeners to install long straight-away underground antennas which is why we are going to take up the author's work on underground antennas. The writer did experimental work during the war which resulted in eliminating the need for considerable area for using this type of antenna.

Details of First Experiment

My very first experiments were conducted in Lake Ponchartrain, La. In most of these experiments, two coils were employed—without direct ground connection. Two coils each 24 inches in diameter and composed of 200 feet of high-tension cable were lowered into the lake and rested on the mud bottom approximately four feet below the surface of the water. The water was slightly brackish but not salty enough to cause the system to work in any way different than when the coils were submerged in fresh river water. The coils were spaced 10 feet apart as shown in figure 1. No audio amplification is shown in this drawing for the sake of simplicity—however, the usual two stage amplifier was employed during the experiments.

An ordinary variocoupler serves as the tuner. Across the stator winding of the variocoupler a .0005 mfd. variable condenser is shunted. The rotor of the variocoupler is connected in the plate circuit in the usual way.

Second Experiment

My next experiment consisted of the same coils submerged to a depth of 12 feet in the Mississippi river. The coils were spaced 50 feet apart, that being the best distance of separation found by exhaustive experiments. With these coils buried in the river, and connected to the standard navy type receiver, it was possible to pick up numerous distant stations with exceptionally good volume accompanied by very little static.

These stations' wave lengths ranged from 600 to 4800 meters. No directional

effects were noticeable. Signals from all directions came in with what was considered equal intensity.

Increasing Size of Coils

Next we tried increasing the size of the coils. Coils 4 feet in diameter were built, lowered into the river and tested under the same conditions that the

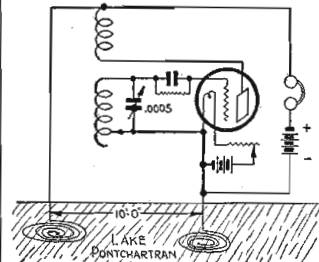


Figure 1

smaller 2-foot coils were. A marked increase in signal strength was noted. The signal-static ratio was very nearly the same. Of course, the larger the coil, everything else being the same, the poorer the signal-static ratio because of the increased pick-up area of the coils.

It was later determined that one of the coils could be eliminated from the circuit and even under those conditions the signal-static ratio held up very well (figure 2). Here, a one microfarad condenser is connected between the filament and the ground in place of the insulated coil. This increases the volume, but does not permit the same signal-static ratio.

In fact, it was determined very early that the very best results were only obtained when the system employed buried insulated wires for both the usual an-

tenna and ground connections. It is absolutely necessary that the coils be built with free-open ends. This is clearly shown in all the drawings. The open end is insulated by placing it in an ordinary clay tube and filling the same with molten wax or rosin, as pointed out in the issue of March 28.

Present Installation

The installation used by the author at the present time is one which anyone can make use of. Down here in New Orleans, where it is practically impossible in the summer months, such as June and July, to guarantee any reception from distant stations, the author accomplished exceptionally good results. This year, even better results will be obtained because the transmitters have increased their power and I have increased the sensitiv-

ity of my receivers, and have improved on the antenna installation.

However, those broadcast listeners who live but from 200 to 300 miles from a powerful station will find this system of great help throughout the year. It not only reduces the static considerably during the summer months, but improves the quality of reproduction, due to the lack of much of the parasitic noises picked up by the overhead antenna installation.

Coil Used

The coil buried by the author is clearly described in figure 3. Two pieces of wood, each 24 inches in length, were fastened together to form a cross. The number 14 rubber covered wire was fastened to the cross arms by insulated staples. The wires were run as close together as

(Continued on page 18)

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UNDERGROUND AERIAL

(Continued from page 17)

possible, the ninety feet of wire making a coil with a five-inch depth of winding as shown. There are sixteen complete turns.

The coil was buried under the house and two feet deep, placed directly under the refrigerator so that the water dripping through the floor would keep the soil surrounding the coil moist at all times.

The receiver used is connected to the coil through a .00025 condenser, the ground connection going directly to the water works.

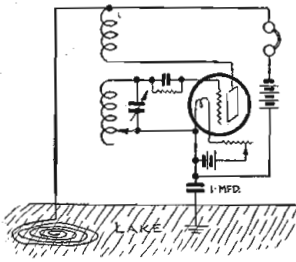


Figure 2

Some fans have tried using lead covered wire throughout the installation. This is not recommended because it increases the capacity of the antenna system to a point where it is hardly possible to maintain the tube in oscillation, especially where a single circuit receiver is used. Only use lead covered cable for the lead-in, that is, for that portion of the wire which is exposed and not buried.

Some experienced a considerable decrease in volume. For some locations that is true. However, the static was not bothersome at all on the underground system, when at the same time, it was not possible to enjoy the concerts on their overhead system.

Any type of receiver can be used on the underground antenna. Simply connect the ground in the usual way and the underground antenna to the antenna binding post of the receiver.

The condenser to be connected in series with the aerial and the receiver (see figure 4) is almost always found to be .00025 or very nearly .0005. The author has picked up the following stations (from New Orleans) on a 2-foot coil:

KDKA Pittsburgh, WHAS Louisville, WOS Jefferson City, WBAP Fort Worth, WLS Chicago, WSB Atlanta, WMC Memphis, WSAI Cincinnati, and KFKX Hastings. All of these stations were received with sufficient volume to operate a large loud speaker. The receiver employed throughout the tests comprised one stage of tuned radio frequency, detector and two stages of audio amplification (four tubes).

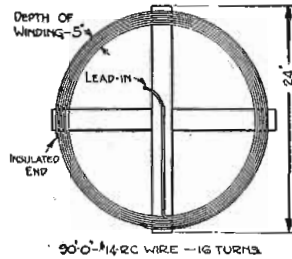


Figure 3

For those who have the space, it is suggested that a 4-foot loop (open ended) be constructed and "planted" instead of the smaller 2-foot loop. This larger loop, with the wires spaced approximately 1 inch apart, will give greater volume.

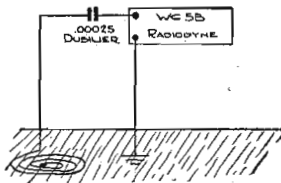


Figure 4

Instead of the .00025 fixed condenser in series with the coil and the receiver, a .0005 (23-plate) variable condenser was substituted. With this arrangement the best value of "series capacity" can be arrived at, at each installation. In my particular case, it was found to exceed .00025 because the .0005 condenser was very nearly at maximum, the scale reading 30 degrees. Once the best position of the condenser (capacity value) is found it is not necessary to move the

condenser again. Simply permit the condenser to remain at that setting and always see to it that it is at that particular setting before beginning to operate, because the settings of the receiver dials will be slightly off.

For those desiring to make a permanent installation let me suggest the use of Packard high tension cable, or a similar good grade of high tension cable. The Packard company made some of this "special" cable for the navy department during the war for underground installations and will no doubt be able to furnish this, or a similar grade wire, at this date.

It is best to make use of this high grade wire because the installation can be relied upon for a much greater length of time. There is very little possibility of a ground developing within a period of five years or longer.

Those with five tube receivers can expect much after reading what Mr. Parks Johnson, vice president and general manager, United Development company of Atlanta, Ga., wrote the author:

"The buried aerial is wound 21 turns instead of 16 and is 9 1/2 inches wide instead of 5 inches as you suggested. It is just 2 feet in the ground, constantly moistened by the refrigerator drain."

"I have used it but three nights, having heard WLW, WFAA, WSAI, WGY, KDKA, KFKX, and tonight PWX at Havana, Cuba. Each night the static was so bad as to make it impossible to distinguish a word even from KDKA, which is very strong here, when using the aerial. However, while static was still present, when using your buried coil, it was not sufficiently loud to cut out a single word in reception. Hence, I'm naturally grateful for your suggestion."

That is typical of the letters received. There is no doubt but that this system will receive widespread use this year and continually increase in favor among Radio fans.

Two Stages Amplification

Two stages of audio amplification should be quite sufficient for anyone, and the addition of the third stage may cause you a lot of trouble. Once in a while some experimenter will succeed in making the third stage work, but as a rule, failure is certain. Unless you have the time and money to do experimenting, it is advisable to stop with the second stage. At this point, if the amplifier is properly made, the resulting signal will be quite sufficient to work almost any loud speaker at capacity.

Soldering Leads to Tinfoil

It is difficult to solder leads onto tinfoil with ordinary solder, owing to the thin body of the foil, and its melting point being so near that of the solder used. If you have trouble in doing this, try the following: Clean your tabs by spreading them apart as shown at A, and dipping them for a moment in solder acid. Clean and dip the end of your lead wire also. Melt a little "fusible metal," the kind used in setting crystals, in an old tablespoon, and dip the end of the wire into this, tinning it to a distance a little greater than the width of the tabs.



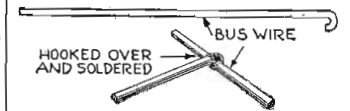
Press the tabs together tightly and roll the wire into them, as shown at B. Bend the wire back along the body of the condenser, so that it will be out of the way, dip the rolled end first into solder acid, then into the melted fusible metal deep enough to completely cover the rolled up part.

Leave it for a moment, to allow the tabs to get warmed to the same temperature as the liquid metal, which will insure a better "stick." Withdraw and you should find the whole roll coated and soldered together by the fusible metal. If the job is not thorough, moisten the surface with acid and dip again, having the metal barely melted.

In this way, an easy, neat and permanent joint is made, both mechanically and electrically. Chas. A. Pease, Monrovia, Calif.

Soldered Joint

For a quick and easily made connection that will be solid between the hook-up wires, either bus wire or flexible, the hook method is about the best. The terminal wire is hooked, slipped over the other wire



as shown and a firm pull is exerted while the joint is soldered. Such a joint has greater strength and less resistance and it gives a neat appearance.—F. L. Shelton, Galesburg, Ill.

"Last night we heard the sweetest voice!"

FEW boast of having heard a powerful voice. Radio has grown up. It is now something to listen to, not to marvel at. We are now in the cycle of TONE!

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A. B. C. Course in Radio Fundamentals

Chapter VIII—Action of Inductance and Capacity in A. C. Circuits

By David Penn Moreton

IN ONE of the previous chapters, the statement was made that capacity caused the current to lead the electrical pressure in phase and that inductance caused the current to lag the electrical pressure in phase. The following explanation may assist the reader in understanding why there is the above phase relations between the current and the electrical pressure and capacity.

Let us assume that there is an alternating current in a coil whose inductance is very large in comparison to its resistance, and we will then determine the alternating current pressure required to produce this current and the phase relation between the current and the pressure. As a result of the coil having inductance, there will be a magnetic field produced by the current in the coil. This magnetic field will vary in strength with the value of the current, and in direction as the direction of the current changes. The current in the coil may be represented by a curve such as the one shown by I in figure 41. The magnetic lines com-

ward and decreasing in number. The direction of the induced electrical pressure will also depend upon the direction of the magnetic field through the coil which depends in turn upon the direction of the current.

Magnetic Lines Control Current Intensity

An increase in the magnetic lines means an increase in current and likewise a decrease in magnetic lines means a decrease in current, and the electrical pressure in the coil will always be in such a direction as to tend to prevent the current in the coil changing in value. Thus if the current is increasing in value and the magnetic field is expanding, there will be an electrical pressure induced in the coil whose direction is opposed to the direction of the current and if the current is decreasing in value and the magnetic field is contracting there will be an electrical pressure induced whose direction is the same as the direction of the current.

In figure 41 the current is increasing in the positive direction during the part of the cycle represented by the distance A to B, decreasing in value in the positive direction from B to C, increasing in value in the negative direction from C to D, and decreasing in value in the negative direction from D to E. During the A-B portion of the cycle, the electrical pressure induced in the coil due to the change in magnetic lines through it caused by the change in the value of the current, will be in the opposite direction to the current or in the negative direction. During the B-C portion of the cycle the induced electrical pressure will be in the same direction as the current, or in the positive direction. For the part of the cycle C-D, the direction of the electrical pressure will be opposite to the current because the current is increasing in value, or it will be in the positive direction. The induced electrical pressure will be in the same direction as the current during the D-E part of the cycle, since the current is decreasing in value, or in the negative direction.

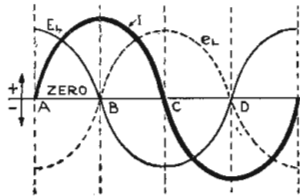


Figure 41

posing the magnetic field will cut the turns of the coil and produce in the windings of the coil an electrical pressure whose value will depend upon the rate at which the cutting of the lines takes place and whose direction at any instant will depend upon whether the lines are moving outward and increasing in number or whether the lines are moving in-

The value of the electrical pressure induced in the coil at any instant will depend upon how fast the magnetic lines are being cut by the wires in the coil at that instant and this in turn depends upon how fast the current in the coil is changing in value. The rate at which the current in the coil is changing in value at any time is proportional to the slope of the current curve at that particular time. The slope of the current curve shown in figure 41 is a maximum where the current is passing through its zero values and a minimum or zero when the current is passing through its maximum values. For values of current between the zero and maximum values the slope of the current curve varies from a maximum to zero value. The numerical value of the induced electrical pressure at any instant is equal to the inductance of the coil in henries multiplied by the rate in amperes per second at which the current in the coil is changing at the same instant.

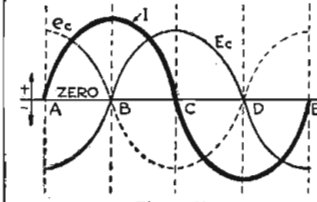


Figure 42

The induced electrical pressure may be represented by a curve such as the one marked e_L in figure 41. The ordinate, or heights, of the curve e_L at any instant

during the cycle of current represents the electrical pressure induced in the coil when it is carrying a current represented by the curve I. Now, in order that the current I may be produced in the coil, the electrical pressure induced in the coil must be overcome by some electrical pressure applied to the circuit from an outside source, such as an alternating-current generator. Neglecting, for the present, the resistance of the coil, the electrical pressure which must be applied to the circuit will at each instant be equal in value but opposite in direction (Continued on page 20)



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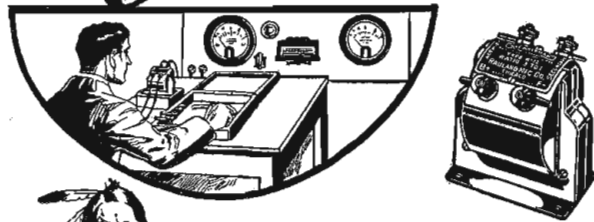
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HOW TO OPERATE SET

(Continued from page 7)

brilliance of the first two tubes. The small dial identified as 5 controls the brilliance of the remaining three tubes, namely the detector V and two audio amplifiers. Head receivers may be connected to this set by inserting a plug into the jack identified by the number 3.

Operating

Turn dial number 5, till the index mark points to about 75 degrees on the dial. Then turn dial number 4, till its index

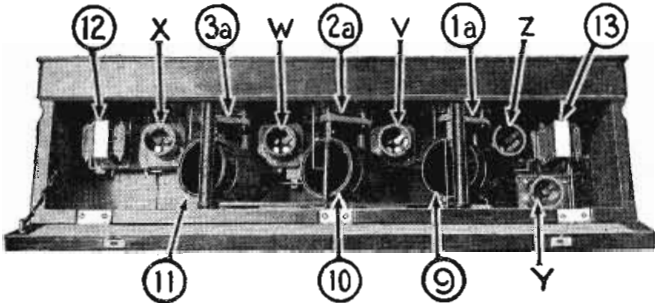


Figure 2

mark also points to about 75 degrees on the dial.

Set the "2nd neutrostage" dial, number 3, at, say 70 degrees, and the "1st neutrostage" dial, number 2, at 70 degrees. (This setting is approximately correct for receiving broadcasting on 492 meters. Move "antenna tuning" dial, number 1, slowly from about 0 degrees to 90 degrees. If there is any broadcasting on 492 meters, it will be heard at some setting of the "antenna tuning" dial.

If no broadcasting is heard, set each of the "neutrostage" dials at 63 degrees, and readjust "antenna tuning" dial, number 1. Continue this tuning operation, always commencing by setting the two "neutrostage" dials at the same setting and then rotating the "antenna tuning" dial. Because of the sharpness of tuning of this receiver, and the complete absence of "beat notes," new settings of the "neutrostage" dials should be only about 2 degrees apart, when picking up a station. Thus, if no broadcasting is heard with the "neutrostage" dials at 68 degrees, reset these dials to 66 degrees, then 64

degrees, then 62 degrees, etc., until a station is received. Then move each dial separately either up or down the scale, slightly, until the broadcast music or speech is loudest.

Dials 4 and 5 should be readjusted till broadcast reception sounds clearest and loudest. This adjustment need only be made once, during the receiving period.

The settings are always the same for a given station and can be received and tuned in again by merely setting the dials as shown by the log. When finished with

this set, be sure to push in the filament switch 6.

Possible Troubles

Broad tuning with considerable amplification is caused by the set picking up too much energy and is usually due to an antenna that is too large. This phenomenon, in most cases, can be entirely obviated by cutting down the length of the aerial to say one-half its length, which will have the result of sharp tuning; if a given station is heard within ten degrees on either side of its loudest point on the dial settings, shortening the aerial will cause it to be heard say within two or three degrees of its loudest point. Thus, broadcasting stations can be effectively separated from one another.

Loss of amplification and selectivity is usually due to a run-down storage battery or run-down B batteries, or to a reversed storage battery. Cracking noises on local stations is usually due to a noisy or defective dry battery or to a noisy or defective vacuum tube. There is absolutely nothing in this receiver which can pos-

(Continued on page 21)

A. B. C. RADIO COURSE

(Continued from page 19)

to the induced electrical pressure in the coil.

The applied electrical pressure may be represented by a curve E_c , figure 41. The applied electrical pressure is displaced in

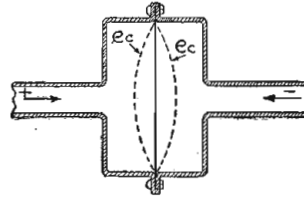


Figure 43

phase with respect to the current by 90 degrees, and the current lags the pressure, since the current passes through zero value in the positive direction after the pressure passes through zero value in the same direction.

Determining Phase Relation

The phase relation of the current and electrical pressure in a condenser may be determined as follows: The current through a condenser connected to an alternating-current source of electrical pressure may be represented by the curve marked I in figure 42. The relation between the current and the electrical pressure set up in the dielectric of the condenser may be investigated by making use of the hydraulic analogy of the condenser shown in figure 43. When the current in the condenser is zero, the dielectric has been strained to such an extent that the stress set up in the dielectric is equal to the applied pressure acting on the condenser.

Now assume that a movement of liquid to the right corresponds to a positive current and likewise a movement to the left corresponds to a negative current. The current will be positive in direction while the diaphragm is moving from its extreme left position to its extreme right position. Let us start with the diaphragm in the extreme left position, which corresponds to zero current and the point A on the current curve shown in figure 42. As the liquid moves to the right, the strain in the diaphragm is acting in the same direction as the current until the diaphragm reaches its mid position,

when the current is a maximum and the strain in the diaphragm is zero. Further movement of the liquid to the right results in the diaphragm being displaced to the right of its zero position and a strain will be produced in the diaphragm whose direction is opposite to the direction of the current. As this displacement of the diaphragm to the right continues, the strain increases, the current decreases and finally the current reaches zero value when the strain in the diaphragm is equal to the applied pressure.

The liquid then starts to move to the left or in the negative direction and the strain in the diaphragm acts with the current until the diaphragm reaches its zero position, where the strain is zero and the current is a maximum. Further movement of the diaphragm to the left results in a strain in the diaphragm opposite in direction to the current, the current decreases in value and finally becomes zero when the strain in the diaphragm is equal to the applied pressure. This completes one cycle and the operation is repeated as the applied electrical pressure changes in value and direction.

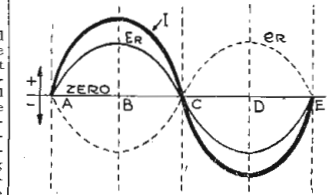


Figure 44

The strain set up in the diaphragm or dielectric, may be represented by the curve e_c in figure 42. Now in order to produce the current I in the condenser, neglecting any resistance in the circuit, an electrical pressure must be applied to the circuit whose value at each instant is equal to the ordinate of the curve e_c at that instant and whose direction is opposite to e_c . Such a pressure may be represented by the curve E_c in figure 42. The applied electrical pressure is displaced in phase from the current by 90 degrees and the current leads the pressure since the current passes through zero

(Continued on page 21)

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HOW TO

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The greatest assemblage of facts and hints, from actual everyday practice, ever gotten together. Edited by the technical staff of Radio Digest, it supplies the demand for a book covering every phase of Radio. Starts at the beginning with simple explanation of Radio reception, with technical explanations of the different parts and leads right on to the more advanced instruction. A complete handbook serving as a ready reference in the Radio field. It gives suggestions on parts and sets which will prove to be a money saver. Blue prints and diagrams are essentially an important part of this book. Special chapter is devoted on "How to Operate," which gives detailed information on the operation of many well known sets.

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5-16-25

Direction Finder for Loop Aerial

Indexing Dials to Set Loop on Your Station

The loop should be provided with a rotative standard, so that the loop can be turned without moving the base. The base should be of a fair size, to allow

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

RADIO KINKS DEPARTMENT
Radio Digest,
510 North Dearborn St., Chicago

room for the index circle or circles—12 inches will do, but 16 inches is better.

The base should preferably be square, merely because it is simpler then to orient it right by setting the side square with the room. If it is to be used with a portable outfit, a small, cheap pocket compass should be set into one corner, where it will not interfere with the circles, or some other means provided to set it "square with the world," with the north and south line pointing in the right direction, as upon this depends the entire efficiency of the direction index.

On the upper face of the base, describe a circle 1 inch less in diameter than the face of the base, thus leaving a 1/2-inch margin at edges. Of course this and any other circles, should have their centers at the center of the rotary loop-support.

It is necessary to have two "orientation lines," one running across the center for a north and south line, another running at right angles to the first, for an east and west line.

For a loop to be used mainly with a portable outfit, or in a room setting "square with the world," these orientation lines should run across the center parallel with the sides of the base, but if to be used mostly in a room where the walls are not square with the points of the compass, it is better to make these lines at the slight necessary angle to the sides of base so as to allow the sides of base to set square with walls of the room, when the north and south line points in the proper direction.

The best and simplest way is to lay out the index circle or circles on a large sheet of cardboard, also laying out at the center a circle large enough when cut out to fit over and snugly around the aerial loop-support socket, (but don't cut this out till later,) cementing this card to the face of the base when completed.

Place orientation lines on this card, as above directed, and draw your circle or circles.

If you have a fairly powerful set, it is well to make 2, 3, or more concentric circles, as your room will allow, decreasing the size so as to leave 1 inch to 1 1/2 inch between circles. You can then use the inner circle for local stations, say up to 100 miles, the second circle for stations 100 to 500 miles distant, and the outer circle for DX stations, over 500 miles, or such arrangement as you wish.



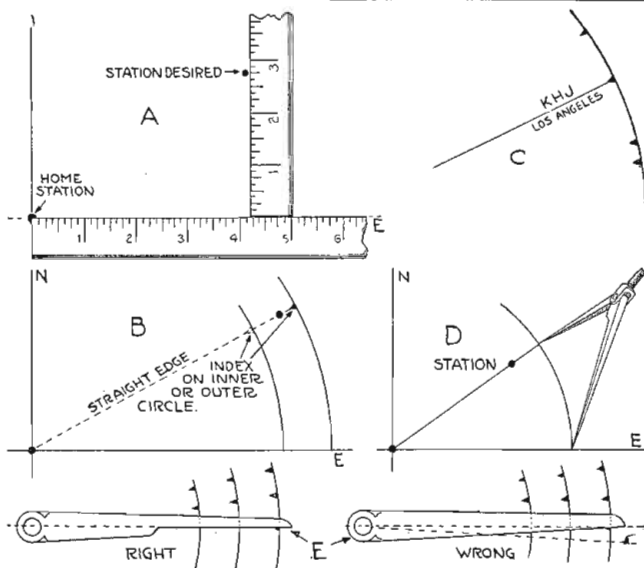
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SIMPLE METHOD TO SET LOOP



Now take a good Radio map, and rule a north and south, and an east and west line upon it, both passing through the point representing your own position.

From this map, you are to set off on your circles, the angle which each station you wish to record, bears to the orientation lines already drawn.

The quickest way to do this, is with a protractor, but if you do not have one handy, you can proceed in either of two different ways: You can make an emergency protractor, by drawing two lines at right angles on a piece of stiff cardboard; with their junction as a center, and with your compasses spread about 3 or 4 inches, strike an arc of a quarter circle between the two lines, and then mark off equal spaces, say of 1/4 inch, along the curve, numbering every 5th one, for convenience and to prevent mistakes. These divisions will not, unless by pure accident, represent any particular number of degrees, but this is immaterial, as it is the actual angle you are after, not how many degrees.

Cut the card to the two straight lines and curve, and use as you would any protractor.

The other way, of "coordinates," requires the use of two rulers, each graduated to 8ths, or better to 16ths, of an inch, (or, of course, any reasonably fine scale of equal parts.)

A little care is required in using this method, but it is not at all difficult, and gives with reasonable care, very accurate results.

Lay the first ruler along the orientation line nearest the desired station, with the end of the scale or ruler at the intersection of the orientation lines representing your own location.

Place the end of the second ruler square against the first, and slide it along the first ruler until the edge of the second ruler meets the desired station on the map, as shown in sketch A.

Note the position of the foot of second ruler on the first ruler, and position of the station on the second ruler; in the case shown, this is 4 1/4 inches east, and 2 1/2 inches north.

Transfer these measurements to the dial card, measuring from the center along, and up or down from the proper lines, as the case may be, and make a point at proper position of the station. Lay a straightedge to touch the station-point and center, and make an index mark where the desired circle is crossed by the straightedge, as shown at B. This is the index mark for this station.

Inside the circle, opposite this index mark, set down, preferably radially, the designating letters of the station; (and if you have room, it is nice to get down also, the location and name of the station.) The appearance of one index is shown at C.

Having transferred and indexed all the stations you desire, to the index card, trim the same to the outer circle, cut out the center for the antennae-support hub, place the card in position on the base, and glue or cement it down, taking care that the north and south line is properly oriented, as explained in the first part of this article.

Adding Stations Later
This may be done by a slight modification of the above indexing directions. Lay the angle out as before, but on a separate piece of paper. Set compasses to same radius as the circle on which it is desired to index the station. Be very careful that you get this radius the right length, as otherwise the result will be inaccurate.

With this radius, and with center at the junction of the angle, strike an arc. From the foot of this arc, strike the compasses to space to the index point on the paper, thus obtaining the "chord" of the angle.

Transfer this distance to the index card, being sure you start from the correct orientation line, and go in the right direction, as shown at D.

An index arm is now to be made and attached to the rotative loop-support, so that it will stand in line with windings of the loop.

If only one index circle is used, the index should come to a point, just inside the circle. If more than one circle is used, the index should reach across all the circles, and have a straightedge as a pointer, which edge should be in line with center of the support, as shown at E, not to one side of this line.—Chas. A. Pease, Monrovia, Cal.

HOW TO OPERATE SET

Continued from page 20

sibly produce noise. All soldering is done with rosin core solder and all condensers and transformers are tested.

If there is any noise, it is caused by something external to the receiver, such as B battery, tubes, local induction that is picked up from leaky telephone lines, or lighting circuits in the house, etc., etc.

Distortion in the loud speaker may be due to overloading the detector tube, and this overloading can be eliminated by detuning the detector and antenna circuits as explained in the instruction booklet under "Tuning."

If there is any mushiness, it is undoubtedly due to the fact that the two stages of radio frequency are so powerful on nearby broadcasting that you are overloading your detector tube. This may happen on stations even 250 miles away. If so, get all three dials in tune and then turn the right hand dial, number 3, slightly, to decrease the input into the detector tube.

If each circuit of your receiver tunes, and there is gain in amplification as you switch from one to two stages of amplification, the set is positively capable of receiving distant stations. When the dry batteries are run down and need replacement, a howl may sometimes be heard when the switch connects the 2nd radio stage and all tubes are lighted. To overcome this condition, use new B batteries.

A. B. C. RADIO COURSE

Continued from page 20

value in the positive direction before the pressure.

Phase Relation with Resistance Only

The phase relation of the current and electrical pressure in a circuit containing resistance only may be determined as follows: Assume there is a current I , as shown in figure 44, to be produced. The counter electrical pressure at each instant will be equal to the product of the current at that instant and the resistance of the circuit. This counter pressure may be represented by a curve E_r as shown in figure 44. Now in order to overcome this counter electrical pressure, or resistance drop, an electrical pressure must be applied to the circuit whose value at each instant is equal to the resistance drop at that instant and whose direction is opposite to the resistance drop. Such an applied pressure may be represented by the curve E_a in figure 44. In such a circuit the current and applied pressure are in phase since they pass through zero value in the same direction at the same time.

(Editor's Note.—The series and parallel alternating current circuits will be explained by Professor Moreton in his next installment.)

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Questions and Answers

Shielding Receiving Set

(13242) JH, San Jeronimo, Cuba.
I live 30 miles from PWY, a powerful spark government station, and when it is on the air it produces terrible disturbance. My set is a four tube inverse duplex, very sensitive with three steps of audio, crystal detector and three steps of audio. Sometimes I can tune it very broad but I made some experiments by adding regeneration using the method of a three-plate condenser from the plate of the first tube to movable plates of the variable condenser. As I wanted great selectivity I finally added an oscillatory circuit just like the heterodyne circuit and I improved the set, making it as selective as a super. I use an aerial system in my set, but when disconnecting the aerial and ground the coil picks up the interference from PWY. The signals do not come in but there is a disturbing hum. I am only able to get the signals from the distant spark stations. For this reason I am sure that this hum in my set is from some outside source. Let me know if there is any method to tune out these offending stations? I have tried out loop aerials and find it useless. I do not believe a wave trap will help. Please tell me if the selectivity of a super het will suffice to tune out PWY or any other spark station down here. I have in mind to build a super-het this year but the troubles coming in from Cuban government spark stations discourage me.

A.—Since the coils in your set are picking up the interference you mention the only possible solution with any type of receiver is to shield the set by putting a sheet of copper or aluminum on the back of the panel, and by lining the inside of the cabinet of this same material. The panel should have all holes around shafts or mounting fixtures cut at least 1/8 inch larger in diameter than the shaft itself. The shielding should be grounded.

Fading Signals in a Three Tube Set

(13242) RS, Stoughton, Wis.
I have an Echophone three tube receiver, Armstrong patents, and I have trouble in tuning, as the signals suddenly fade away, not entirely, but low enough to be only a whisper. At the stations above the wave length of WOS, Jefferson City, Mo., are the same, but all the stations with lower wave lengths are just as loud as ever, if not louder. What do you think is the trouble?

A.—The chances are that the trouble in your case is one of a worn out A or B battery. If the battery is low the set will refuse to oscillate on the higher wave, which will of course diminish the signal volume. On the lower waves the set always oscillates more easily, therefore you do not notice the low battery on the lower waves at once.

Reaching High Wave Lengths

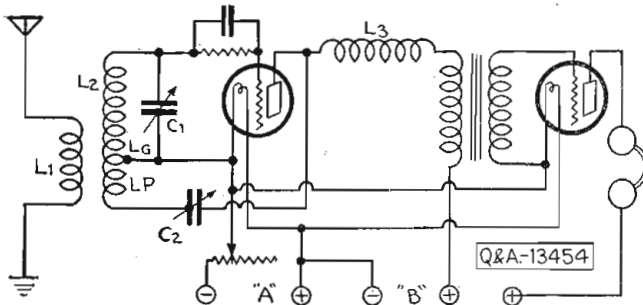
(13287) DK, Grand Rapids, Ohio.
I have a one tube set that gives good results but I cannot possibly get higher than 500 meters and not lower than 250 meters. I would like a hook-up using a 190 tube, 11 plate variable condenser and preferably a tapped coil with rotor to give results of from 530 meters to 180 meters.

A.—Your trouble is because you have too much inductance and not enough capacity. If you will lower the number of turns and increase the size of your condenser you will have no trouble in covering the range you desire.

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MacMillan 20-Meter Receiver

(13454) ER, Fort Worth, Texas.
In connection with the announcement of the Arctic expedition to be made by MacMillan and a party of explorers in the near future and their intention to use exclusively a 20-meter transmitter, I am very anxious to know if the Digest is to feature in coming issues an efficient and stable "MacMillan 20-meter receiver?" There are but few diagrams available of a receiver that will actually "work" efficiently on such a short wave length, and in view of the fact that the explorers are seeking the co-operation of amateur operators and others in connection with the communication feature, it seems that an article on such a receiver would not be amiss.

A.—The accompanying hook-up is now used for receiving these signals by the amateurs. The coil L2 consists of ten turns of number 18 wire wound in the basket fashion and it has a diameter of 3 inches. It is tapped three turns from one end. The part of the coil Lg is the grid coil and it is tuned by a low loss condenser C1. This condenser should consist of about seven plates. Since there are not so many of these condensers on the market it may be necessary to purchase a larger one and remove some of the plates to make four stationary and three rotary plates. The LP part of the coil consists of three turns and this is the plate coil. Condenser C2 controls the feed back and it should be a small condenser of not more than .00015 capacity. This condenser need not be a low loss condenser. It is very important that the condensers are connected as shown with respect to the rotary and the stationary plates. The coil L3 consists of about three to four turns of wire wound in the same fashion as coil L2 and of the same wire. This coil should be arranged so that it can be varied in its distance from coil L2. It should never be brought closer than 2 inches from coil L2. In the average amateur set it is about 4 inches from the coil L2. Coil L3 is a choke coil, which is necessary because this is a shunt fed affair. It consists of about 150 to 200 turns of number 30 wire on a 1-inch tube. Both

will buy or rent for the summer season, one 500-watt Western Electric Broadcast Set. Fred G. Smith, 302 S. Christina St., Sarnia, Ont.

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tubes should be either UV-201A's or UV-199A's. Only one rheostat is necessary. Since this is a shunt fed set there is no need for a by pass condenser. It may be of advantage to remove the base from the detector tube. At any rate both the detector tube and the amplifier should be mounted on either spring or cushion sockets. You will not need more than one stage to cover the country with this set well made.

Located where you are you can construct this receiver and you should have no trouble in getting stations such as 6TS and 1XAM in daylight. This set will not be of much use at night as the 20-meter signals do not travel as well at night as in the day time. You will, of course, need a knowledge of the code because these stations, as well as WNP, use code exclusively in their tests and otherwise.

Current from Farm Lighting Plant

(12514) LKP, Somerset, Ky.
I am a regular reader of your magazine and I prize it for the information, programs and "how to build" articles. I have made many of the sets described therein and all have worked good. I would like to use the direct current from a 32-volt storage battery farm lighting plant to furnish the filament current for my five tube set I am now using. Would you be kind enough to send me the proper way to do this. I desire to connect it to the socket the same as for a light bulb.

A.—How much and what kind of resistance should I use? I would like to do this the easiest and most economical way possible.
A.—You may use a lamp bank for a resistance to cut down the voltage to 6 volts. While this is a good way it is not economical. The best way is to tap off three cells of the battery for your Radio use. They will give you the desired 6 volts.

Harkness Circuit Using Dry Cell Tubes

(13432) JWM, Macon, Ill.
I am making up a two tube Harkness set and I would like to know the value or

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Time counts in applying for patents. Don't risk delay in protecting your ideas. Send sketch or model for instructions or write for FREE book, "How to Obtain a Patent" and "Record of Invention" form. No charge for information on how to proceed. Communications strictly confidential. Prompt, careful, efficient service. Clarence A. O'Brien, Registered Patent Attorney, 2005A Security Bank Bldg. (hardly across street from Patent office), Washington, D. C.

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capacity of all the parts, also what voltage B battery for each tube? I intend to use UV-199 tubes. Can I wind this coil for the receiver? My idea would be to commence at one end of the tube, a 2 1/2-inch tube or larger if necessary, and wind a wire two strands at a time until I get the right number of turns for the primary, then continue with the other wire until I get the right number of turns for the secondary. How many turns for the primary and secondary for each coil? What size wire is best for these transformers?

A.—We would discourage the use of 199 tubes in reflex sets of any kind. These tubes are very efficient when used as either radio or audio frequency amplifiers, but they will not handle very much energy and few builders of sets have found them very satisfactory when reflexed.

We have published the Harkness reflex circuit for use with 6-volt tubes including the data for the winding of the coils. However, it seems that this circuit requires critical value of inductance, transformer impedance and losses for stability and satisfactory operation. If you want to build a reflex we unhesitatingly recommend the Knox reflex which contains two tubes and for which complete data was given in the Issues of February 7, 14 and 21. In this, oscillation is completely under control and the selectivity is exceptional.

Resistance in Battery Charger

(13407) RKB, Wautoma, Wis.
What size lamp is usually employed with common glass jar rectifier for charging two 40-volt B battery, also for charging two 40-volt B batteries hooked together? The charger is a plain glass jar with one lead and one aluminum plate. Where do you place the lamp in the circuit?

A.—A 25-watt lamp is required for charging a 40-volt B battery. If you have two 40-volt batteries and wish to charge them at a higher rate it would be better to use a 40-watt lamp. The lamp can be placed before or after the rectifier as desired.

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Special Sloping Front 2-Tube Crosley 51
Same as Model 51, with cabinet holding all dry A and B batteries. \$23.50.

2-Tube Crosley 51 Portable

The Crosley 51 in a black leatherette case, with nickel trimmings. Space for batteries. \$23.50.

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A marvelous new development of loud-speaking principles. Diffusion of sound creates perfect reproduction of all tones. \$17.50.



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3-Tube Crosley 52
A larger set for those who want greater reception range on the loud-speaker. Operates on three tubes, using wet or dry batteries. Consistent loud-speaker range 1500 miles or more.

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Cabinet contains dry A and B batteries. Same efficient detection and reception as regular 52. \$35.

3-Tube Crosley 52 Portable.

Same as other 52 models, but in a black leatherette case. Easily carried. All batteries inside. \$35.

Prices quoted above do not include accessories. Add 10 per cent west of Rocky Mountains.

Crosley, the world's largest manufacturer of radio receiving sets, offers radio's wonder—the Crosley Model 50, one-tube genuine Armstrong regenerative receiver at \$14.50. With tube, phones, batteries, antenna wire complete, less than \$25.

This momentous announcement means that every home in America can at last have the enjoyment and the entertainment of high class radio—the thrill of long distance reception as well as local—on a basis of real economy.

It means a further tremendous stride toward achievement of the Crosley aim and ambition to build radio for the millions.

Already, with hundreds of thousands of Crosley receiving sets placed in American homes last year alone, Crosley is sweeping on toward that great goal.

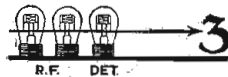
For all time, Crosley has taken the high cost out of quality radio by quantity production, the surest road to lower costs in a manufacturing plant.

But Crosley has gone even farther, by providing simplicity, certainty, reliability—reception as perfect and sure as it can be made in the present state of radio science.

This Crosley 50 is the latest refinement and perfection of the set which brought MacMillan's North Pole messages in to Leonard Weeks, at Minot, N. D., when all others failed though they cost ten times as much.

This is the set which gets the stations from coast to coast; which gives you more for your money by far, because it is the

genuine Armstrong circuit, built by Crosley.



This little diagram shows three tubes using the ordinary radio frequency and detector circuit. Signals pass straight through the three tubes without extraordinary increase in their strength. The tube value therefore is 3.



But Crosley's Armstrong regenerative set, with one tube, passes the signals several times through the single tube, each time increasing their strength and giving you much more than the three-tube ordinary circuit, or a tube value of 3+.

That is why the Crosley one-tube set is so much more satisfactory and efficient.

Already, with this perfected Crosley 50, Andie Edmondson, at Stella, Mo., heard 2BD, Aber-

deen, Scotland; Paul J. Hall, at Osceola, Neb., heard 2LO, London, England; Eugene Barnhouse, at Brookfield, Mo., hears Winnipeg and Montreal, Can., and Springfield, Mass.; James Gordon, at Fremont, Neb., hears them from coast to coast, from Canada to Texas, even picking up 10-watt KFNG at Coldwater, Miss., and 100-watt WFBL, at Syracuse, N. Y.; Mrs. J. E. Martin, at East Palestine, Ohio, hears KGO, Oakland, Calif.; O. W. Bryant, at Sunset, Tex., gets Hollywood, Calif., 1425 miles; Crosley Station WLW, Cincinnati, 1094 miles; Pittsburgh, Pa., 1361 miles.

These are only a few examples out of many. Can money buy you greater distance or wider range?

Get your Crosley 50 now and learn that fine radio is not costly and difficult, but low-priced, simple, easy and reliable. A Crosley dealer is near by.

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.

The Crosley Radio Corporation
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