WITH DECEMBER WAVE LENGTHS

RADIO INDEX

"THE TUNING BOOK"

RADEX shows the frequency to which set is tuned as dials are turned, gives exact location of dials for any station in America and identifies programs received without announcement. For any dial and any set.

The Non-Technical Radio Magazine

WHAT'S ON THE AIR TONIGHT?

A Weekly Calendar

Leading Features of the Network Programs

Time is given by Eastern Standard. For Central Time, subtract one hour, for Mountain Time, two hours and for Pacific Time, three hours.

Station lists beginning with WEAF and WJZ are the National Broadcasting Co. Inc., while those beginning with WABC and WOR are the Columbia Broadcasting System.

Sunday

1:30-2:00 Peerless Reproducers

WEAF	WLIT	WWJ	WOW	WTMJ
WEEI	WRC	WSAI	WDAF	WCCO
WTIC	WGY	WEBH	KVOO	WHAS
WJAR	WGR	KSD	WFAA	WSM
WTAG	WCAE	WHO	KPRC	WBT
WCSH	WTAM			

3:00-4:00 Symphonic Hour

WABC	WMAK	WAIU	WOWO	WSPD
WNAC	WCAO	WKRC	KMOX	WMAF
WEAN	WJAS	WGHP	KMBC	WICC
WFBL	WADC	WMAQ	KOIL	WHK

3:00-4:00 Young People's Conference

WJZ	WLW	KWK

4:00-4:30 Continentals

WJZ	WBAL	WHAM	KWK

4:00-5:00 Cathedral Hour

WABC	WMAK	WAIU	KMOX	WMAF
WNAC	WCAO	WKRC	KMBC	WICC
WEAN	WJAS	WGHP	KOIL	WHK
WFBL	WADC	WOWO	WSPD	

4:00-5:00 Dr. S. Parkes Cadman

WEAF	WEEI	WTIC	WJAR	WTAG
WHAS	WCSH	WLIT	WGY	WFAR
WGR	WCAE	WSAI	WOC	WHO
WOW	KVOO	WSM	WSB	WBT
KOA				

5:30-6:30 Acousticon Hour

WEAF	WEEI	WRC	KOA	WGY
WCAE	WTAM	WWJ	WSAI	WGN
WCCO	WOC	WHO	WOW	WDAF

5:30-6:00 Dr. Harry Emerson Fosdick

WJZ	WBZ	WBZA	WBAL	WLW
KWK	WREN			

6:00-7:00 The Stetson Parade

WEAF	WTIC	WJAR	WTAG	WCSH
WFI	WRC	WGY	WGR	WCAE
WTAM	WWJ	WSAI	WEBH	WEEI
WHO	KSD			

6:35-7:00 Arcadie Birkenholz, Concert Violinist

WEAF	WEEI	WJAR	WTIC	WFI
WRC	WLY	WGR	WCAE	KSD

7:00-7:30 Old Company's Program—Reinald Werrenrath

WEAF	WEEI	WTIC	WJAR	WTAG
WCSH	WLIT	WRC	WGY	WGR

6:30-7:00 Whittall Anglo-Persians

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WLW	WJR	KYW	KWK
WREN	KOA	WCCO	WTMJ	

7:30-9:00 Major Bowes' Family

WEAF	WTIC	WRC	WJAR	WGY
WCAE	WWJ	KSD	WHO	WOW
WHAS	WSM	WMC	WSB	KOA
WTAM				

8:00-8:15 The Enna Jettick Melodies

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WLW	WJR	KYW	KOA
WREN	WTMJ	WCCO	KWK	

8:15-9:15 Colliers Radio Hour

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WJR	WLW	KYW	KWK
WREN	KOA	WCCO		

8:30-9:00 La Palina Hour

WABC	WFBL	WADC	WOWO	WSPD
WFAN	WMAK	WKRC	KMOX	WMAF
WNAC	WKRC	WGHP	KMBC	WICC
WEAN	WJAS	WMAQ	KOIL	WHK

9:00-9:15 "Our Government" by David Lawrence

WEAF	WTIC	WJAR	WFAA	WMC
WSB	WTAG	WCSH	WRC	WGY
WGR	WCAE	WSAI	KSD	WOC
WHO	WOW	KVOO	WHAS	WSM

9:15-10:15 Atwater Kent Radio Hour

WEAF	WEEI	WRC	WGX	WGR
WCAE	WWJ	WSAI	WGN	KSD
WCCO	WOC			

9:15-9:45 Utica Jubilee Singers

WJZ	WBAL	KDKA	KWK	WREN

9:30-10:00 Majestic's Two Black Crows

WABC	WMAK	WAIU	KMOX	WMAF
WNAC	WCAO	WKRC	KMBC	WICC
WEAN	WJAS	WGHP	KOIL	WHK
WFBL	WADC	WOWO	WSPD	

9:45-10:00 El Tango Romantico

WJZ	KDKA	KWK	WREN

10:00-10:30 De Forest Audions

WABC	WCAU	WNAC	WEAN	WFBL
WMAK	WCAO	WJAS	WADC	WAIU
WKRC	WGHP	WBBM	WOWO	KMOX
KMBC	KOIL	WSPD	WICC	WHK
WLBW				

10:30-11:00 Come To The Fair

WABC WCAU WNAC WEAN WFBL
WMAK WCAO WJAS WADC WAIU
WKRC WGHP WBBM WOWO KMOX
KMBC KOIL WSPD WICC WHK
WLBW

Monday

6:00-6:25 Waldorf-Astoria Dinner Music

WEAF WRC WCAE WWJ WHO
WTAG

7:00-7:30 Savings Bank Hour

WEAF WEEI WTIC WJAR WTAG
WCSH WGY WGR

7:30-7:45 "The World Today" by James G. MacDonald

WEAF WLIT WGR WSAI WOC
KVOO WFAA

7:45-8:00 Physical Culture Prince

WEAF WLIT WGR WWJ KYW

7:30-9:00 Roxy and his Gang

WJZ WBZ WBZA WHAM KDKA
KYW KWK WJR WSM WSB
WEBC

8:00-8:30 Ceco Couriers

WOR WFAN WNAC WEAN WFBL
WMAK WCAO WJAS WADC WAIU
WKRC WGHP WMAQ WOWO KMOX
KMBC KOIL

8:30-9:30 A. & P. Gypsies

WEAF WEEI WTIC WJAR WCSH
WLIT WGY WCAE WTAM WWJ
WSAI WGN KSD WDAF WRC

8:30-9:00 United Choral Singers

WOR WFAN WNAC WEAN WFBL
WMAK WCAO WJAS WADC WAIU
WKRC WGHP WMAQ WOWO KMOX
KMBC KOIL

9:00-9:30 Lowney Radio Hour

WOR WCAU WNAC WEAN WFBL
WMAK WCAO WJAS WADC WAIU
WKRC WGHP WMAQ WOWO KMOX
KMBC WSPD WICC WHK WLBW

9:30-10:00 General Motors Family Party

WEAF WEEI WTIC WJAR WCSH
WLIT WTAG WRC WGY WGR
WCAE WTAM WWJ WSAI WGN
WTMJ KSD WCCO WOC WOW
WDAF KVOO WFAA KPRC WOAI
WHAS WSM WSB WBT WJAX

9:30-10:00 Warner Bros. Vitaphone Jubilee

WOR WCAU WNAC WEAN WFBL
WMAK WCAO WJAS WADC WAIU
WKRC WGHP WMAQ WOWO KMOX
KMBC WSPD WICC WHK WLBW

9:30-10:00 Real Folks

WJZ WBZ WBZA WBAL WHAM
KDKA WJR WLW KYW KWK
WREN

10:30-11:00 National Grand Opera

WEAF WEEI WTIC WFI WGY
WGR WCAE WWJ WTMJ KSD
WOC WHAS KOA WMC

Tuesday

6:00-6:55 Waldorf-Astoria Dinner Music

WEAF WEEI WTIC WRC WCAE
WWJ

7:00-7:30 Voter's Service

WEAF WTIC WJAR WTAG WCSH
WFI WRC WGY WGR WCAE
WTMJ KSD WOC WHO WHAS
WSM WBT WSAI WOC KOA
WEBC WMC WSM

7:30-8:00 Soconyland Sketches

WEAF WEEI WTIC WJAR WTAG
WCSH WGY WGR

7:30-8:00 In Memory's Garden

WJZ WJR WBZ WBZA WLW
KOA

8:00-9:00 The Mediterraneans

WJZ KWK WHAM KDKA

8:00-8:30 The Sealy Air Weavers

WJZ WBZ WBZA WBAL WHAM
KDKA WJR WLW KYW KWR
WREN KVOO WFAA KPRC WOAI
KOA WRAM

9:00-9:30 Three-in-One Theatre

WJZ WBZ WBZA WBAL WHAM
KDKA WLW KYW KWK WREN

9:00-10:00 Eveready Hour

WEAF WEEI WJAR WFI WRC
WGY WGR WCAE WTAM WWJ
WSAI WGN KSD WCCO WHO
WDAF WHAS WSM WMC WSB

9:30-10:00 Dutch Masters Minstrel

WJZ WTMJ WBZ WBZA WBAL
WHAM KDKA WLW KYW WREN

10:00-11:00 Works of Great Composers

WJZ KYW WRC

10:00-10:30 Clicquot Club Eskimos

WEAF WEEI WTIC WJAR WCSH
WFI WRC WGY WCAE WTAM
WWJ WSAI WGN WTMJ KSD
WCCO WOC WMC WHO WOW
WDAF KVOO WFAA KPRC WOAI
WHAS WSM WSB WBT KOA

11:00-12:00 Ben Bernie's Hotel Roosevelt Orchestra

WEAF WCAE WWJ WTMJ KOA

Wednesday

6:00-6:25 Waldorf-Astoria Dinner Music

WEAF WEEI WTIC WRC WCAE WWJ

7:30-8:00 La Touraine Tableaux

WEAF WEEI WTIC WJAR WTAG WCSH WGY WGR WCAE WWJ WTAM

7:45-8:00 Frederic William Wile

WRC WJZ WBAL KDKA WLW WJR KWK

8:00-9:00 American Magazine—Home Companion Hour

WEAF WEEI WTIC WJAR WTAG WCSH WGY WGR WCAE WLIT WRC WWJ WSAI KYW KSD WOC WHO WOW WDAF

8:30-9:00 Sylvania Foresters

WJZ KDKA KYW WBZ WBZA

9:00-9:30 Smith Brothers

WJZ WBZ WBZA WBAL WHAM WLW WJR KYW KWK WREN KDKA

9:00-9:30 Ipana Troubadours

WEAF WEEI WTIC WJAR WTAG WCSH WRC WGY WGR WCAE WTAM WWJ WSAI WLIB

9:00-9:30 NR Millionaires

WOR WCAU WNAC WEAN WFBL WMAK WCAO WJAS WADC WAIU WKRC WGHP WMAQ WOWO KMOX KMBC WSPD WICC WHK WLBW

9:30-10:00 La Palina Smoker

WOR WCAU WNAC WEAN WFBL WMAK WCAO WJAS WADC WAIU WKRC WGHP WMAQ WOWO KMOX KMBC WSPD WICC WHK WLB

9:30-10:30 Palmolive Hour

WEAF WJAX WSM WMC WSB WBT WEEI WRC WSAI WTIC WGY WGN WDAF WJAR WGR KSD KVOO WTAG WCAE WOC WFAA WCSH WTAM WHO KPRC WLIT WWJ WOW WOAI KOA WTMJ WCCO WHAS

10:00-10:30 Kolster Radio Hour

WOR WFBL WADC WOWO WMAF WCAU WMAK WKRC KMOX WICC WNAC WCAO WGHP KMBC WHK WEAN WJAS WMAQ WSPD

10:30-11:00 United Military Band

WOR WMAK WAIU WOWO WSPD WCAU WCAO WKRC KMOX WMAF WNAC WJAS WGHP KMBC WICC WEAN WADC WMAQ KOIL WHK WFBL

11:00-12:00 Hal Kemp's Hotel Manger Orchestra

WEAF WHO WOC KSD

Thursday

6:00-6:55 Waldorf-Astoria Dinner Music

WEAF WRC WCAE WWJ WEEI

7:30-8:00 Coward Comfort Hour

WEAF WEEI WTIC WJAR WTAG WCSH

8:00-8:30 The Song Shop

WEAF WTIC WJAR WTAG WCSH WFI WRC WGY WGR WCAE WTAM WWJ WSAI WTMJ WRHM WOC WHO WOW WDAF KOA

8:30-9:00 Hoover Sentinels

WEAF WEEI WTAM WFI WRC WGY WCAE WWJ WSAI WEBH KSD WOC WHO WOW KVOO WFAA WHAS WSM WMC WSB WDAF WEBC

8:30-9:00 Champion Sparkers with Vaughn de Heath

WJZ WBZ WBZA WBAL WHAM KDKA WLW WJR KWK KYW WREN

9:00-9:30 Milady's Musicians

WJZ WHAM KDKA KWK

9:00-9:30 Seiberling Singers

WEAF WEEI WTIC WJAR WTAG WCSH WFI WRC WGY WGR WCAE WTAM WWJ WSAI WEBH KSD WCCO WOC WHO WOW WDAF WFAA KPRC KVOO WOAI WHAS WSM WMC WSB

9:00-10:00 Sonora Phonograph Hour

WABC WFAN WNAC WEAN WFBL WMAK WJAS WADC WKRC WBBM WGHP WOWO KMOX KMBC WSPD WICC WHK WLBW

9:30-10:00 Swanee River

WEAF WTIC WJAR WTAG WCSH WFI WRC WCAE

9:30-10:00 Maxwell House Hour

WJZ WBZ WBZA WBAL WHAM KDKA WLW WJR KYW KSD WRHM WOC WHO WDAF KVOO WBAP KPRC WHAS WSM WSB WBT KOA WOW WEBC WJAX

10:00-10:30 Michelin Hour

WJZ WBZ WBZA WBAL WHAM KDKA WJR KYW KWK WREN WLW

10:00-11:00 Hank Simmons' Show Boat

WABC WFAN WEAN WNAC WFBL WMAK WJAS WADC WKRC WGHP WBBM WOWO KMOX KMBC WSPD WICC WHK WLBW KOIL

10:30-11:00 Palais D'Or Orchestra

WEAF WTIC WFI WGY WGR WWJ WHO WOW WMC

10:00-10:30 Halsey Stuart Hour

WEAF	WEEI	WTIC	WJAR	WTAG
WCSH	WFI	WRC	WGY	WGR
WCAE	WWJ	WTMJ	KSD	WRHM
WOC	WHO	WOW	KVOO	WFAA
KPRC	WOAI	WHAS	WMC	WSB
WBT	WDAF	KOA	WSAI	WGN

10:30-11:00 The Wayside Inn

WJR	WBZ	WBZA	WBAL	WHAM
KDKA	WJR	WLW	KYW	KWK

10:30-11:30 Palais d'or Orchestra

WEAF	WTIC	WFI	WGY	WGR
WWJ	WHO	WOW	WMC	

Friday

6:00-6:55 Waldorf-Astoria Dinner Music

WEAF	WEEI	WRC	WCAE	WWJ

6:30-7:00 Gold Spot Pals

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WJR			

7:30-8:00 Dixies Circus

WJZ	WBZ	WBZA	WBAL	KDKA
WJR	WLW	KYW	WBT	WSB
WMC	WSM	WHAS		

8:00-8:30 Interwoven Entertainers

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WLW	WJR	KYW	KWK
WREN	WBT	WSB	WMC	WSM
WHAS				

8:00-9:00 Cities Service Orchestra

WEAF	WEEI	WLIT	WRC	WGR
WCAE	WTAM	WWJ	WSAI	WEBH
WCCO	KSD	WOC	WOW	WDAF
KVOO	WFAA	KOA		

8:30-9:00 The Armstrong Quakers

WJZ	WBAL	WJR	KWK	WSB
WBZ	WHAM	WLW	WREN	WMC
WBZA	KDKA	KYW	WBT	WHAS
WRHM				

9:00-9:30 An Evening in Paris

WEAF	WEEI	WTIC	WRC	WGR
WCAE	WTAM	WWJ	WSAI	WEBH
WDAF	KSD	WJAR	WTAG	WCSH
WFI				

9:00-10:00 True Story Hour

WOR	WMAK	WAIU	WOWO	WSPD
WCAU	WCAO	WKRC	KMOX	WMAF
WNAC	WJAS	WGHP	KMBC	WICC
WEAN	WADC	WMAQ	KOIL	WHK
WFBL				

9:00-10:00 Wrigley Review

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WLW	WJR	KYW	WREN
WHAS	WHAS	WSM	WMC	WSB
WBT	WRVA	WJAX	WCCO	WEBC

9:30-10:00 Larry Brier's Tuneful Troupe

WEAF	WLIT	WRC	WCAE	KSD
WOC	WHO	WOW		

10:00-10:30 Stromberg-Carlson Sextette

WJZ	WBZ	WBZA	WBAL	WHAM
KDKA	WJR	WLW	KYW	KWK
WREN	KOA	WBT	WSB	WSM
WHAS	WOAI	KPRC	WFAA	KVOO
WCCO	WTMJ			

10:00-11:00 Concert Bureau Hour

WEAF	WEEI	WTIC	WTAG	WCSH
WLIT	WRC	WGY	WCAE	WWJ
WSAI	WGN	WOC	WHO	WOW
WDAF	WFAA	KOA	WTMJ	WHAS
WMC	KSD			

10:00-10:30 United Opera Company

WOR	WFBL	WADC	WMAQ	WSPD
WCAU	WMAK	WAIU	WOWO	WMAF
WNAC	WCAO	WKRC	KMOX	WICC
WEAN	WJAS	WGHP	KMBC	WHK

11:00-12:00 Hotel St. Regis Orchestra

WEAF	WCAE	WWJ	WHO	WOW
KOA				

11:00-12:00 Slumber Music

WJZ	WLW	WRC	WTMJ

Saturday

6:00-6:55 Waldorf-Astoria Dinner Music

WEAF	WEEI	WRC	WCAE	KOA
WWJ				

7:45-8:00 A Week of the World's Business

WJZ	WBAL	WHAM	KDKA	WLW
KYW	KWK	KOA	WMS	WHAS
WFAA	WOC	WTMJ	WRC	

8:00-8:30 Godfrey Ludlow, Violinist

WJZ	WBZ	WBZA	KDKA	KWK

8:00-8:30 Lew White Organ Recital

WEAF	WTIC	WCAE	WSAI	KSD

8:30-9:00 The Park Bench

WEAF	WEEI	WTIC	WGY	WCAE
WWJ	WSAI	KSD	WDAF	

9:00-10:00 Philco Hour

WJZ	KPRC	KVOO	WOW	WHO
WOC	WCCO	WTMJ	WHAM	KYW
KWK	WBAL	WHAS	WBZ	WBZA
KDKA	WJR	WREN	KOA	WBT
WSB	WMC	WSM	WOAI	KYW

10:00-11:00 Lucky Strike Dance Orchestra Hour

WEAF	WGY	WOC	KOA	WJAX
WEEI	WGR	WHO	WTMJ	KSL
WTIC	WCAE	WOW	WCCO	KHQ
WJAR	WTAM	WDAF	WHAS	KGO
WTAG	WWJ	KVOO	WMC	KFI
WCSH	WSAI	WFAA	WSB	KGW
WFI	WGN	KPRC	WBT	KOMO
WRC	KSD	WOAI		

11:00-11:30 Twin Pairs of Harmony

WEAF	WFI	WCAE	WTAM	WWJ
KSD	WHO	WOW		

When Your Set Goes Wrong

Where to Look for Trouble

By E. R. HAAN

This article tells you where you can find radio troubles, and how to cure them, whether you have an old or a new-style set, and whether the fault is in the batteries, battery eliminator, tubes, the aerial and ground system, or in the wiring and instruments of the receiver.

Keep Your A-Battery Up

Today most radio sets are still operated on a storage battery for filament supply, and the condition of this battery is often the cause of poor reception, so that it is necessary to examine it occasionally, in order to determine whether or not it is defective in any way. If you use a storage battery for your receiver, you should provide yourself with a battery hydrometer, which is used for testing the specific gravity of the liquid or electrolyte inside, in order to determine the condition of charge. Hydrometers used for this purpose have a weighted float inside, graduated from 1100 to 1300, the former reading indicating a completely discharged, and the latter a fully charged cell. It is best to keep the battery as fully charged as possible all the time, and it should never be allowed to drop below 1200, for it is then about half empty. Also be sure that you do not spill any of the electrolyte on the floor or get it on your clothes or hands, for it consists of a solution of sulphuric acid, which will ruin rugs and clothes, and also burn the flesh. A rubber mat should be provided under the battery to protect the floor in case some of the electrolyte runs out, which it sometimes does when the battery is being charged. The first symptom of a weak battery is usually the broadening of the signal on an otherwise sharp set. Reception becomes fainter and fainter until it dies out entirely, and your efforts to increase the volume by turning up the rheostats only help temporarily. The use of trickle charges is quite popular. Although they are intended to keep the battery in a fully-charged condition at all times, they may become defective, or perhaps you are using more current from the battery than the charger can compensate for. So when in doubt, remember that the only way of telling whether or not a battery is in a well charged condition, is to test it with a hydrometer. Every radio owner should have one; they cost only fifty cents or a dollar and can be had at almost any radio shop, garage or hardware store.

Excessive Battery Discharge

If your battery seems to discharge too rapidly, there may be an internal short circuit between the plates, and if you suspect this, take the battery to a reputable service station for examination and repair. However, before doing this, make sure that the short circuit is not in your receiver. Carefully look over the wiring and see if there is a place where two wires have been bent accidentally so that they touch each other. The cause of excessive discharge of a battery may also be due to letting the tubes burn when the set is not in use, a mistake which many radio owners make.

Neglected Water Level

While you are examining the storage battery, see if it contains enough distilled water. The water level should always be kept about ½ in. above the

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The Most Wonderful Lamp in the World

The Valve and How It Works

By **P. B. PRIOR, Sydney, Australia**

A valve is really a special kind of little electric lamp, which in the case of most types, lights up and glows quite brightly when in use.

Every valve consists of three parts:—

The Filament
The Grid
The Plate

The filament is exactly the same as the filament in an ordinary small electric lamp—the tiny, thin wire which the electric current causes to glow and give out light.

We must now, for a moment, study something of what is known as the Electron Theory.

First of all, let us try and understand what the filament really consists of. It, in common with all matter, is really composed of tiny particles called atoms; these atoms are so tiny that not even the most powerful microscope could detect them. The atom is so small that it would take more than ten millions of them, placed alongside one another, to extend one inch.

Every atom consists of thousands of still smaller particles called electrons, grouped around a nucleus or proton. The electrons are so inconceivably small that two thousand of them would weigh less than the weight of the smaller atom.

The proton, or central portion of each atom, is really a charge of positive electricity, whilst the electrons are infinitely tiny charges of negative electricity.

We next come to a remarkable phenomenon — the "evaporation" of electrons. If a metal is sufficiently heated, these electrons, or little charges of negative electricity, will "evaporate" from it. It was Edison who first discovered this phenomenon. In the early days of incandescent electric lamp manufacture he noticed a peculiar action that could not be satisfactorily explained at the time. In lamps that had been in use for some time it was often found that a portion of the lamp glass became blackened. Edison's investigations convinced him that this was due to the negative electrons being thrown off from the filament with such force that they could reach the glass of the lamp bulb, at the same time carrying with them tiny particles of carbon.

It was about twenty years before this "Edison Effect," as it was called, was applied to wireless use by the British scientist, Dr. J. A. Fleming, and from Dr. Fleming's experiments has grown the thermionic valve as we know it today.

Now let us consider the function of the plate. The plate is usually a sheath of metal curved in form of a cylinder round the filament, at a little distance from it. Now, it is a fundamental law of electricity that "like charges repel each other; unlike charges attract," that is, two negative or two positive charges would repel each other, whilst a negative charge would attract a positive charge, and a positive charge would attract a negative charge.

So you see that if we charge the plate with positive electricity by means of a battery, there will be a steady, constant stream of electrons (negative charges) from the filament to the plate. This is actually what happens in a thermionic valve; but instead of a steady stream we have a stream regulated by the grid, as I shall now explain.

The grid usually consists of a tiny spiral wire placed round the filament,

(*Continued on page 59*)

BREAKING DOWN THE BARS

What Radio Means to Men in Prison

There is a "town" in Franklin County, O., known to many of its residents as "Thomasville," that probably has more radio fans in proportion to its population of 4,000-odd than any other town in the state. The "town" is known to the general public as the Ohio Penitentiary.

Penitentiary officials estimate there are approximately 800 radio sets in the prison, or about one set to every five prisoners. These sets have made it possible for the inmates to realize to some extent what the poet meant when he wrote: "Stone walls do not a prison make."

To the prisoners radio has proved a godsend. As one long-termer put it:

"If radio had never done anything else for the world, the happiness it has brought the boys in the pen has made it worth while."

It has made for greater contentment among the prisoners, too, according to penitentiary officials, and those prisoners who are radio fans are rarely the ones who are involved in disturbances of any sort or get into any trouble. As soon as their day in the shops or the idle house is over, and they have had supper, they are locked in their cells for the night and then they begin their nightly prowls around the country via radio.

Crystals and Headphones

Most of the sets are crystal sets, but there are a number of tube sets, ones and twos predominating. Aerials are strung along the walls of the long, dark corridors, and short lead-ins run from the aerial into cells where sets are maintained.

In spite of these disadvantages — indoor aerials, sometimes very short aerials, crystal sets, and so on — and the added fact that the majority of sets are "home-made" by the prisoners themselves in their spare time, the reception is generally satisfactory, the prisoners say.

Since loud speakers are not permitted in the penitentiary all of the sets are equipped with headphones. But even with this comparatively primitive equipment, the boys can get "distance" very satisfactorily, they say — or at least comparative distance. Havana and Canadian stations are listed on the logs of the enthusiasts, as well as broadcasters in all sections of the United States.

And they have their favorites. Many of them like particularly their home town stations and will listen to no others. Others are "air wanderers" and flit from station to station. In some cells there are two sets and each inmate can pick his own station. In other cells there may be but one set, and then the two inmates divide the earphones and compromise on the stations.

But they have a great deal of pleasure out of it. Although some of them have not been outside the walls for years, they are able to whistle and even sing the latest musical hits, and they keep up with news of the outside world, too. Most of them "listen in" on the various broadcast religious services each Sunday.

Some have special fondness for lectures and educational broadcasts, others for music, and so on, but through the medium of the radio they are not only having much solace in their confinement but are keeping up with the world, as well.

But the radio does not always bring happiness to a prisoner. The story is

(*Continued on page 53*)

550 kilocycles 545.1 meters

CYY	100	Merida, Mexico	Socialist Party
KFDY	500	Brookings, S. D.	S. D. State College
KFJM	500	Grand Forks, N. D.	University of North Dakota
KFUO	500	St. Louis, Mo.	Concordia Theological Seminary
KFYR	500	Bismarck, N. D.	Hoskins-Meyer
KSD	500	St. Louis, Mo.	Pulitzer Publishing Co.
WEAO	750	Columbus, Ohio	Ohio State University
WGR	750	Buffalo, N. Y.	Federal Radio Corp.
WKRC	500	Cincinnati, Ohio	Kodel Radio Corp.

560 kilocycles 535.4 meters

KFDM	500	Beaumont, Texas	Magnolia Petroleum Co.
KFEQ	2500	St. Joseph, Mo.	Scroggin & Co. Bank
KLZ	1000	Denver, Colo.	Reynolds Radio Co., Inc.
KOAC	1000	Corvallis, Ore.	State Agricultural College
WFI	500	Philadelphia, Pa.	Strawbridge & Clothier
WLIT	500	Philadelphia, Pa.	Lit Brothers
WMBF	500	Miami Beach, Fla.	Fleetwood Hotel Corp.
WNOX	1000	Knoxville, Tenn.	Sterchi Bros.
WOI	3500	Ames, Iowa	Iowa State College

570 kilocycles 526.0 meters

KGKO	250	Wichita Falls, Tex.	Wichita Falls Brdcstg. Co.
KMTR	1000	Hollywood, Calif.	KMTR Radio Corp.
KPLA	1000	Los Angeles, Calif.	Pacific Development Radio Co.
KUOM	500	Missoula, Mont.	University of Montana
KXA	500	Seattle, Wash.	American Radio Tel. Co.
WHA	750	Madison, Wis.	University of Wisconsin
WKBN	500	Youngstown, Ohio	W. P. Williamson, Jr.
WMCA	500	New York City	Greeley Square Hotel Co.
WNYC	500	New York City	Dept. of Plants & Structures
WPCC	500	Chicago, Ill.	North Shore Congregational Church
WRM	500	Urbana, Ill.	University of Illinois
WSMK	200	Dayton, Ohio	Stanley M. Krohn, Jr.
WSYR	250	Syracuse, N. Y.	Clive B. Meredith
WWNC	1000	Asheville, N. C.	Chamber of Commerce

580 kilocycles 516.9 meters

CFCL	500	Toronto, Ont.	Dominion Battery Co., Ltd.
CHMA	250	Edmonton, Alta.	Christian and Missionary Alliance
CHNC	500	Toronto, Ont.	Radio Research Society
CJBC	500	Toronto, Ont.	Jarvis Street Baptist Church
CJCA	500	Edmonton, Alta.	The Edmonton Journal
CJSC	500	Toronto, Ont.	The Evening Telegram
CKCL	500	Toronto, Ont.	The Dominion Battery Co.
CKNC	500	Toronto, Ont.	Canadian National Carbon Co.
CKUA	500	Edmonton, Alta.	University of Alberta
CNRE	500	Edmonton, Alta.	Canadian National Railways
KGFX	200	Pierre, S. D.	Dana McNeil
KSAC	500	Manhattan, Kans.	State Agricultural College
WKAQ	500	San Juan, P. R.	Radio Corp. of Porto Rico
WOBU	250	Charleston, W. Va.	Charleston Radio Brdcstg. Co.
WSAZ	250	Huntington, W. Va.	McKellar Electric Co.
WSUI	500	Iowa City, Iowa	University of Iowa
WTAG	250	Worcester, Mass.	Telegram Publishing Co.

590 kilocycles 508.2 meters

KHQ	1000	Spokane, Wash.	Louis Wasmer, Inc.
WCAJ	500	Lincoln, Nebr.	Nebraska Wesleyan University
WEEI	500	Boston, Mass.	Edison Elec. Illuminating Co.
WOW	1000	Omaha, Nebr.	Woodmen of the World
WEMC	1000	Berrien Springs, Mich.	Emmanuel Missionary College

600 kilocycles 499.7 meters

CFCH	250	Iroquois Falls, Ont.	Abitibi Power & Paper Co.
KFBU	500	Laramie, Wyo.	Bishop N. S. Thomas
KFSD	500	San Diego, Calif.	Airfan Radio Corp.
WCAO	250	Baltimore, Md.	Monumental Radio Co., Inc.
WEBW	250	Beloit, Wis.	Beloit College
WOAN	500	Lawrenceburg, Tenn.	Vaughan School of Music
WREC	500	Memphis, Tenn.	WREC, Inc.
WTIC	250	Hartford, Conn.	Travelers Insurance Co.

610 kilocycles 491.5 meters

KFRC	1000	San Francisco, Calif.	Don Lee, Inc.
WDAF	1000	Kansas City, Mo.	Kansas City Star Co.
WFAN	500	Philadelphia, Pa.	Keystone Broadcasting Co., Inc.
WIP	500	Philadelphia, Pa.	Gimbel Bros., Inc.
WOQ	1000	Kansas City, Mo.	Unity School of Christianity

620 kilocycles 483.6 meters

KFAD	500	Phoenix, Ariz.	Electrical Equipment Co.
KGW	1000	Portland, Ore.	Oregonian Publishing Co.
WDAE	1000	Tampa, Fla.	Tampa Publishing Co.
WDBO	1000	Orlando, Fla.	Rollins College, Inc.
WLBZ	500	Dover-Foxcroft, Me.	Thompson L. Guernsey
WTMJ	1000	Milwaukee, Wis.	Milwaukee Journal

630 kilocycles 475.9 meters

CFCT	500	Victoria, B. C.	Victoria Broadcasting Ass'n.
CJGX	500	Yorkton, Sask.	Winnipeg Grain Exchange
CNRA	500	Moncton, N. B.	Canadian National Railways
CYR	250	Mazatlan, Mex.	Castulo Llamas
KFRU	500	Columbia, Mo.	Stephens College
WGBF	500	Evansville, Ind.	Evansville on the Air, Inc.
WMAL	250	Washington, D. C.	M. A. Leese Co.
WOS	500	Jefferson City, Mo.	State Marketing Bureau

640 kilocycles 468.5 meters

KFI	5000	Los Angeles, Calif.	Earle C. Anthony, Inc.
WAIU	5000	Columbus, Ohio	American Insurance Union

650 kilocycles 461.3 meters

WSM	5000	Nashville, Tenn.	National Life & Accident Ins. Co.

660 kilocycles 454.3 meters

WAAW	500	Omaha, Nebr.	Omaha Grain Exchange
WEAF	50000	New York City	National Broadcasting Co., Inc.

670 kilocycles 447.5 meters

WMAQ	5000	Chicago, Ill.	Chicago Daily News, Inc.

680 kilocycles 440.9 meters

KPO	5000	San Francisco, Cal.	Hale Bros. & The Chronicle
WPTF	5000	Raleigh, N. C.	Durham Life Insurance Co.

690 kilocycles 434.5 meters

CFAC	500	Calgary, Alta.	The Calgary Herald
CFCN	1800	Calgary, Alta.	W. W. Grant, Ltd.
CHCA	250	Calgary, Alta.	Alvertan Publishing Co., Ltd.
CJCJ	250	Calgary, Alta.	Radio Service & Repair Shop
CKCO	100	Ottawa, Ont.	Dr. G. M. Geldert
CNRC	500	Calgary, Alta.	Canadian National Railways
CNRO	500	Ottawa, Ont.	Canadian National Railways
NAA	1000	Arlington, Va.	U. S. Navy

700 kilocycles 428.3 meters

KFVD	250	Culver City, Calif.	W. J. & C. I. McWhinnie
WLW	50000	Cincinnati, Ohio	Crosley Radio Corp.

710 kilocycles 422.3 meters

CYO	100	Mexico City	M. Y. Zetina
WOR	5000	Newark, N. J.	L. Bamberger & Co.

720 kilocycles 416.4 meters

WGN	15000	Chicago, Ill.	Chicago Tribune
WLIB	15000	Chicago, Ill.	Liberty Weekly, Inc.

730 kilocycles 410.7 meters

CFCF	1650	Montreal, Que.	Canadian Marconi Co.
CHLS	50	Vancouver, B. C.	W. G. Hassell
CHYC	750	Montreal, Que.	Northern Electric Co.
CKAC	1200	Montreal, Que.	La Presse Publishing Co.
CKCD	50	Vancouver, B. C.	Vancouver Daily Province
CKFC	50	Vancouver, B. C.	United Church of Canada
CKMO	50	Vancouver, B. C.	Sprott-Shaw Radio Co.
CKWX	100	Vancouver, B. C.	A. Holstead & Wm. Hanlon
CNRM	1650	Montreal, Que.	Canadian National Railways

740 kilocycles 405.2 meters

KMMJ	1000	Clay Center, Neb.	The M. M. Johnson Co.
WSB	10000	Atlanta, Ga.	Atlanta Journal Co.

750 kilocycles 399.8 meters

CYJ	2000	Mexico City	
CYL	500	Mexico City	R. Ascarraga
PWX	500	Havana, Cuba	Cuban Telephone Co.
WCX	5000	Detroit, Mich.	Detroit Free Press
WJR	5000	Detroit, Mich.	WJR, Inc.

760 kilocycles 394.5 meters

WEW	1000	St. Louis, Mo.	St. Louis University
WJZ	30000	New York City	Radio Corp. of America, Inc.

770 kilocycles 389.4 meters

KFAB	5000	Lincoln, Nebr.	Nebr. Buick Automobile Co.
WBBM	25000	Chicago, Ill.	Atlas Investment Co.

780 kilocycles 384.4 meters

CKY	500	Winnipeg, Manitoba	Manitoba Telephone System
CNRW	500	Winnipeg, Man.	Canadian National Railways
KELW	500	Burbank, Calif.	Earl L. White
KNRC	500	Santa Monica, Calif.	Pickwick Brdcstg. Corp.
WBSO	100	Wellesley Hills, Mass.	Babson's Statistical Organization.
WMC	500	Memphis, Tenn.	Memphis Commercial-Appeal
WPOR	500	Norfolk, Va.	Reliance Electric Co.
WSEA	500	Portsmouth, Va.	Virginia Beach Brdcstg. Co.
WTAR	500	Norfolk, Va.	Reliance Electric Co., Inc.

790 kilocycles 379.5 meters

KGO	10000	Oakland, Calif.	General Electric Co.
WGY	50000	Schenectady, N. Y.	General Electric Co.

800 kilocycles 347.8 meters

CYH	100	Mexico City	C. de Tarnava
KTHS	1000	Hot Springs, Ark.	Chamber of Commerce
WBAP	50000	Fort Worth, Tex.	Carter Publications, Inc.
WSAI	5000	Cincinnati, Ohio	Crosley Radio Corp., Lessee

810 kilocycles 370.2 meters

WCCO	10000	Minneapolis-St. Paul	Washburn-Crosby Co.
WPCH	500	Jersey City, N. J.	Concourse Radio Corp.

820 kilocycles 365.6 meters

WHAS	10000	Louisville, Ky.	Courier-Journal & Times

830 kilocycles 361.2 meters

HHK	1000	Port au Prince, Haiti	Republic of Haiti
KOA	12500	Denver, Colo.	General Electric Co.

840 kilocycles 356.9 meters

CFCA	500	Toronto, Ont.	Star Publishing & Ptg. Co.
CHCT	1000	Red Deer, Alta.	C. F. Tull & Ardern, Ltd.
CJBC	500	Toronto, Ont.	Jarvis Street Baptist Church
CKLC	1000	Red Deer, Alta.	Alberta Pacific Grain Co.
CKOW	500	Toronto, Ont.	Nestle's Food Co.
CNRT	500	Toronto, Ont.	Canadian National Railways

850 kilocycles 352.7 meters

KFQZ	1000	Hollywood, Calif.	Taft Radio & Brdcstg. Co.
KWKH	20000	Shreveport, La.	W. K. Henderson
WWL	5000	New Orleans, La.	Loyola University

860 kilocycles 348.6 meters

CZE	500	Mexico City	Department of Education
WABC	5000	New York City	Atlantic Broadcasting Corp.
WBOQ	5000	New York City	Atlantic Broadcasting Corp.
2OK	100	Havana, Cuba	Merio G. Velez
7SR	500	Elia, Cuba	Salvador Rionda

870 kilocycles 344.6 meters

WENR	5000	Chicago, Ill.	Great Lakes Brdcstg. Co.
WLS	5000	Chicago, Ill.	Sears, Roebuck & Co.

880 kilocycles 340.7 meters

CHCS	10	Hamilton, Ont.	The Hamilton Spectator
CHML	50	Hamilton, Ont.	Maple Leaf Radio Co.
CHRC	5	Quebec, Que.	E. Fontaine
CKCI	22.5	Quebec, Que.	LeSoleil
CKCV	50	Quebec, Que.	G. A. Vandry
CKOC	100	Hamilton, Ont.	Wentworth Radio Supply Co.
CNRQ	50	Quebec, Que.	Canadian National Railways
KFKA	500	Greeley, Colo.	State Teachers College
KLX	500	Oakland, Calif.	Tribune Publishing Co.
KPOF	500	Denver, Colo.	Pillar of Fire, Inc.
WCOC	500	Columbus, Miss.	Crystal Oil Co.
WGBI	250	Scranton, Pa.	Scranton Broadcasters, Inc.
WQAN	250	Scranton, Pa.	Scranton Times
6KW	100	Tuinucu, Cuba	Frank H. Jones

890 kilocycles 336.9 meters

CFBO	50	St. John, N. B.	C. A. Munro, Ltd.
CYC	50	Vera Cruz, Mex.	M. A. Fernandez
KGJF	250	Little Rock, Ark.	Church of the Nazarene
WJAR	250	Providence, R. I.	The Outlet Co.
WMMN	250	Fairmont, W. Va.	Holt Rowe Novelty Co.
KFNF	500	Shenandoah, Iowa	Henry Field Seed Co.
KUSD	500	Vermillion, S. D.	University of South Dakota
WGST	250	Atlanta, Ga.	Georgia School of Technology
WMAZ	250	Macon, Ga.	Mercer University
WNAX	1000	Yankton, S. D.	Dakota Radio Apparatus Co.

900 kilocycles 333.1 meters

KGBU	500	Ketchikan, Alaska	Alaska Radio & Service Co.
KHJ	1000	Los Angeles, Cal.	Don Lee, Inc.
KSEI	250	Pocatello, Idaho	KSEI Broadcasting Assn.
WFBL	750	Syracuse, N. Y.	The Onondaga Co., Inc.
WFLA	1000	Clearwater, Fla.	Chamber of Commerce
WKY	1000	Oklahoma City	WKY Radiophone Co.
WLBL	1000	Stevens Pt., Wis.	Wisconsin Dept. of Markets
WMAK	750	Buffalo, N. Y.	WMAK Brdcstg. Station, Inc.
WSUN	1000	St. Petersburg, Fla.	Chamber of Commerce

910 kilocycles 329.6 meters

CFQC	500	Saskatoon, Sask.	The Electric Shop
CJGC	500	London, Ont.	Free Press Ptg. Co.
CJHS	250	Saskatoon, Sask.	Radio Service, Ltd.
CNRS	500	Saskatoon, Sask.	Canadian National Railways

920 kilocycles 325.9 meters

CYX	500	Mexico City	El Excelsior
KOMO	1000	Seattle, Wash.	Fisher's Blend Station
KPRC	1000	Houston, Texas	Houston Printing Co.
WAAF	500	Chicago, Ill.	Drovers Journal Publishing Co.
WWJ	1000	Detroit, Mich.	The Detroit News

930 kilocycles 322.4 meters

CHNS	500	Halifax, N. S.	Northern Elec. Co.-Halifax Herald
CYQ	100	Tampico, Mex.	Cipriano Sagaon S. en C.
KFWI	500	San Francisco, Calif.	Radio Entertainments, Inc.
KFWM	500	Oakland, Calif.	Oakland Educational Society
KGBY	500	Columbus, Nebr.	Ervin Taddiken
KGBZ	500	York, Nebr.	Federal Live Stock Remedy Co.
KGCH	500	Wayne, Nebr.	Farmers & Merchants Radio Corp.
KGDW	500	Humboldt, Nebr.	Frank J. Rist
KGEO	500	Grand Island, Nebr.	Hotel Yancey
KGES	500	Central City, Nebr.	Central Radio Electric Co.
KMA	500	Shenandoah, Iowa	May Seed & Nursery Co.
WBRC	500	Birmingham, Ala.	Birmingham Broadcasting Co.
WDBJ	250	Roanoke, Va.	Richardson-Wayland Elec. Corp.
WIBG	50	Elkins Park, Pa.	St. Pauls P. E. Church

940 kilocycles 319.0 meters

KFEL	250	Denver, Colo.	Eugene P. O'Fallon, Inc.
KFXF	250	Denver, Colo.	Pikes Peak Brdcstg. Co.
KGU	500	Honolulu, Hawaii	Marion A. Mulrony
KOIN	1000	Portland, Ore.	KOIN, Inc.
WCSH	500	Portland, Maine	Congress Square Hotel Co.
WFIW	1000	Hopkinsville, Ky.	The Acme Mills, Inc.

950 kilocycles 315.6 meters

KFWB	1000	Los Angeles, Calif.	Warner Bros. Broadcasting Corp.
KGHL	500	Billings, Mont.	Northwestern Auto Supply Co.
KLDS	1000	Independence, Mo.	Church of Latter Day Saints
KMBC	1000	Independence, Mo.	Midland Broadcasting Co.
KPSN	1000	Pasadena, Calif.	Pasadena Star-News
WHB	1000	Kansas City, Mo.	Sweeney Automobile School
WRC	500	Washington, D. C.	Radio Corp. of America
2RK	20	Havana, Cuba	Raoul Karman

960 kilocycles 312.3 meters

CFCY	100	Charlottetown, P. E. I.	The Island Radio Co.
CFRB	1000	Twp. of King, Ont.	Standard Radio Mfg. Corp.
CHCK	30	Charlottetown, P. E. I.	W. E. Burke
CHWC	15	Regina, Sask.	R. H. Williams & Sons
CJBC	5000	Toronto, Ont.	Jarvis St. Baptist Church
CJBR	500	Regina, Sask.	Cooperative Wheat Producers
CKCK	500	Regina, Sask.	Leader Pub. Co.
CKCW	5000	Bowmanville, Ont.	Gooderham & Worts
CNRR	500	Regina, Sask.	Canadian Nat'l. Railways
CYU	100	Puebla, Mex.	A. del P. Zaonz
CZF	250	Chihuahua, Mex.	State of Chihuahua

970 kilocycles 309.1 meters

KJR	5000	Seattle Wash.	Northwest Radio Service Co.
WCFL	50000	Chicago, Ill.	Chicago Federation of Labor

980 kilocycles 305.9 meters

KDKA	50000	Pittsburgh, Pa.	Westinghouse Elec. & Mfg. Co.

990 kilocycles 302.8 meters

WBZ	15000	Springfield, Mass.	Westinghouse Elec. & Mfg. Co.
WBZA	500	Boston, Mass.	Westinghouse Elec. & Mfg. Co.

1000 kilocycles 299.8 meters

CYA	500	Mexico City	E. R. Gomes
KGFH	250	Glendale, Calif.	Frederick Robinson
WHO	5000	Des Moines, Iowa	Bankers Life Co.
WOC	5000	Davenport, Iowa	Palmer School of Chiropractic

1010 kilocycles 296.9 meters

CFLC	50	Prescott, Ont.	Radio Association
CJRM	500	Moose Jaw, Sask.	Jas. Richardson & Sons
CJRW	500	Fleming, Sask.	Jas. Richardson & Sons, Ltd.
CKCR	50	Brantford, Ont.	John Patterson
CKSH	50	St. Hyacinthe, Que.	City of St. Hyacinthe
KGGF	500	Picher, Okla.	D. L. Connell, M. D.
KQW	500	San Jose, Calif.	First Baptist Church
WHN	250	New York City	George Schubel
WJBB	250	Sarasota, Fla.	Chamber of Commerce
WNAD	500	Norman, Okla.	University of Oklahoma
WPAP	250	Cliffside, N. J.	Palisades Amusement Park
WQAO	250	Cliffside, N. J.	Calvary Baptist Church
WRNY	250	New York City	Experimenter Publishing Co.

1020 kilocycles 293.9 meters

KFKX	5000	Chicago, Ill.	Westinghouse Elec. & Mfg. Co.
KYW	5000	Chicago, Ill.	Westinghouse Elec. & Mfg. Co.

1030 kilocycles 291.1 meters

CJOR	50	Sea Island, B. C.	G. C. Chandler
CNRV	500	Vancouver, B. C.	Canadian Nat'l Railways

1040 kilocycles 288.3 meters

KRLD	10000	Dallas, Texas	KRLD, Inc.
WFAA	5000	Dallas, Texas	Dallas Morning News
WKAR	500	East Lansing, Mich.	Michigan Agricultural College
WKEN	1000	Buffalo, N. Y.	Radio Station WKEN, Inc.

1050 kilocycles 285.5 meters

KNX	5000	Hollywood, Calif.	Western Broadcast Co.
WFBM	25000	Indianapolis, Ind.	Indianapolis Power & Light Co.
2MG	20	Havana, Cuba	M. y G. Salas

1060 kilocycles 282.8 meters

KWJJ	500	Portland, Ore.	Wilbur Jerman
WBAL	5000	Baltimore, Md.	Consolidated Gas, Elec. & Pwr. Co.
WJAG	500	Norfolk, Nebr.	Norfolk Daily News
WTIC	5000	Hartford, Conn.	Travelers Insurance Co.

1070 kilocycles 280.2 meters

WAAT	300	Jersey City, N. J.	Bremer Broadcasting Corp.
WCAZ	100	Carthage, Ill.	Carthage College
WDZ	100	Tuscola, Ill.	James L. Bush
WEAR	1000	Cleveland, Ohio	WTAM and WEAR, Inc.
WTAM	3500	Cleveland, Ohio	WTAM and WEAR, Inc.

1080 kilocycles 277.6 meters

WBT	10000	Charlotte, N. C.	C. C. Coddington
WCBD	5000	Zion, Ill.	Wilbur Glenn Voliva
WMBI	5000	Chicago, Ill.	Moody Bible Institute

1090 kilocycles 275.1 meters

CYB	500	Mexico City	J. J. Reynosa
KMOX	5000	St. Louis, Mo.	Voice of St. Louis
2UF	10	Havana, Cuba	Benito V. Ferro

1100 kilocycles 272.6 meters

KJBS	100	San Francisco, Cal.	Julius Brunton & Sons Co.
WLWL	5000	New York City	Missionary Society of St. Paul
WPG	5000	Atlantic City, N. J.	Municipality of Atlantic City

1110 kilocycles 270.1 meters

KSOO	1000	Sioux Falls, S. D.	Sioux Falls Broadcast Assn.
WRVA	5000	Richmond, Va.	Larus & Bros. Co., Inc.
2TW	20	Havana, Cuba	Roberto E. Ramirez

1120 kilocycles 267.7 meters

CFJC	15	Kamloops, B. C.	N. S. Dalgleish & Sons
CFMC	20	Kingston, Ont.	Monarch Battery Co.
CFRC	500	Kingston, Ont.	Queen's University
CHGS	25	Summerside, P. E. I.	R. T. Holman, Ltd.
CJOC	50	Lethbridge, Alta.	J. E. Palmer
CKPR	50	Midland, Ont.	E. O. Swan
KFSG	500	Los Angeles, Cal.	Echo Park Evang. Assn.
KMIC	500	Inglewood, Calif.	James R. Fouch
KRSC	50	Seattle, Wash.	Radio Sales Corp.
KUT	500	Austin, Texas	University of Texas
WBAK	500	Harrisburg, Pa.	Penna. State Police
WCOA	500	Pensacola, Fla.	City of Pensacola
WFBR	250	Baltimore, Md.	Baltimore Radio Shop
WHAD	250	Milwaukee, Wis.	Marquette University
WISN	250	Milwaukee, Wis.	Evening Wisconsin Co.
WTAW	500	College Station, Texas	Agricultural & Mech. College

1130 kilocycles 265.3 meters

CYF	100	Oaxaca, Mex.	F. Zonillo
KFKB	5000	Milford, Kansas	Dr. J. R. Brinkley
KSL	5000	Salt Lake City	Radio Service Corp. of Utah
WOV	1000	Secaucus, N. J.	International Brdcstg. Corp.

1140 kilocycles 263.0 meters

KVOO	5000	Tulsa, Okla.	Southwestern Sales Corp.
WAPI	5000	Auburn, Ala.	Alabama Polytechnic Institute

1150 kilocycles 260.7 meters

KGDM	10	Stockton, Calif.	E. F. Peffer
WHAM	5000	Rochester, N. Y.	Stromberg-Carlson Tel. Mfg. Co.
6BY	200	Cienfuegos, Cuba	Jose Ganduxe

1160 kilocycles 258.5 meters

WEAN	500	Providence, R. I.	The Shepard Stores
WOWO	5000	Ft. Wayne, Ind.	Main Auto Supply Co.
WWVA	5000	Wheeling, W. Va.	West Virginia Brdcstg. Corp.

1170 kilocycles 256.3 meters

KTNT	5000	Muscatine, Iowa	Norman Baker
WCAU	5000	Philadelphia, Pa.	Universal Broadcasting Co.
2OL	100	Havana, Cuba	Oscar C. Orta

1180 kilocycles 254.1 meters

KEX	5000	Portland, Ore.	Western Broadcasting Co.
KOB	5000	State College, N. M.	College of Agriculture
WGBS	500	New York City	Gimbel Bros., Inc.

1190 kilocycles 252.0 meters

WOAI	5000	San Antonio, Texas	Southern Equipment Co.
WRR	5000	Dallas, Texas	City of Dallas

1200 kilocycles 249.9 meters

KFHA	50	Gunnison, Colo.	Western College of Colorado
KFJB	100	Marshalltown, Iowa	Marshall Electric Co.
KFKZ	50	Kirksville, Mo.	State Teachers College
KFWC	100	Ontario, Calif.	James R. Fouch
KFWF	100	St. Louis, Mo.	St. Louis Truth Center, Inc.
KGCU	100	Mandan, N. Dak.	Mandan Radio Association
KGDE	50	Barrett, Minn.	Jaren Drug Co.
KGDY	15	Oldham, S. Dak.	J. Albert Loesch
KGEK	50	Yuma, Colo.	Beehler Elec. Equipment Co.
KGEN	100	El Centro, Calif.	E. R. Irey and F. M. Bowles
KGEW	100	Fort Morgan, Colo.	City of Fort Morgan
KGFK	50	Hallock, Minn.	Kittson County Enterprise
KGY	50	Lacey, Wash.	St. Martin's College
KMJ	100	Fresno, Calif.	The Fresno Bee
KPPC	50	Pasadena, Calif.	Pasadena Presbyterian Church
KSMR	100	Santa Maria, Calif.	Santa Maria Valley R. R. Co.
KVOS	250	Bellington, Wash.	L. Kessler
KWG	100	Stockton, Calif.	Portable Wireless Tel. Co.
WABI	100	Bangor, Maine	First Universalist Church
WABZ	50	New Orleans, La.	Coliseum Place Baptist Church
WBBW	100	Norfolk, Va.	Ruffner Junior High School
WBBY	75	Charleston, S. C.	Washington Light Infantry
WBBZ	100	Ponca City, Okla.	C. L. Carrell
WCAT	100	Rapid City, S. Dak.	State School of Mines
WCAX	100	Burlington, Vt.	University of Vermont
WCLO	100	Kenosha, Wis.	C. E. Whitmore
WEPS	100	Gloucester, Mass.	Matheson Radio Co., Inc.
WFBC	50	Knoxville, Tenn.	First Baptist Church
WFBE	100	Cincinnati, Ohio	Park View Hotel
WHBC	10	Canton, Ohio	St. John's Catholic Church
WHBY	50	West De Pere, Wis.	St. Norbert's College
WIBX	100	Utica, N. Y.	WIBX, Inc.
WJAM	100	Waterloo, Iowa	Waterloo Broadcasting Co.
WJBC	100	La Salle, Ill.	Hummer Furniture Co.
WJBL	100	Decatur, Ill.	Wm. Gushard Dry Goods Co.
WJBW	30	New Orleans, La.	Charles C. Carlson, Jr.
WKBE	100	Webster, Mass.	K. & B. Electric Co.
WKJC	100	Lancaster, Pa.	Kirk Johnson & Co.
WLAP	30	Louisville, Ky.	American Brdcstg. Corp. of Ky.
WLBG	100	Petersburg, Va.	Robert Allen Gamble
WMAY	100	St. Louis, Mo.	Kingshighway Pres. Church
WNBO	15	Washington, Pa.	John Brownlee Spriggs
WNBW	5	Carbondale, Pa.	Home Cut Glass & China Co.
WNBX	10	Springfield, Vt.	First Congregational Church
WPRC	100	Harrisburg, Pa.	Wilson Printing & Radio Co.
WQBJ	65	Clarksburg, W. Va.	John Raikes
WQBZ	60	Weirton, W. Va.	J. H. Thompson
WRAF	100	La Porte, Ind.	The Radio Club, Inc.
WRBL	50	Columbus, Ga.	R. E. Martin
WRJN	100	Racine, Wis.	Racine Broadcasting Corp.
WWAE	100	Hammond, Ind.	Dr. George F. Courrier
2BB	15	Havana, Cuba	Bernardo Barrie

1210 kilocycles 247.8 meters

CFCO	25	Chatham, Ont.	Western Ontario "Better Radio" club
CFNB	50	Fredericton, N. B.	James S. Neill & Sons
CHWK	5	Chilliwack, B. C.	Chilliwack Brdcstg. Co., Ltd.
CKMC	5	Cobalt, Ont.	R. L. MacAdam
CKPC	25	Preston, Ont.	Wallace Russ
KDLR	100	Devils Lake, N. D.	Radio Electric Co.
KFDX	100	Shreveport, La.	First Baptist Church
KFEY	10	Kellogg, Idaho	Union High School
KFOR	100	Lincoln, Nebr.	Howard A. Shuman
KFVS	100	Cape Girardeau, Mo.	Hirsch Battery & Radio Co.
KGCR	100	Brookings, S. D.	Cutler's Radio Brdcstg. Service
KGDP	10	Pueblo, Colo.	Boy Scouts of America
KPCB	100	Seattle, Wash.	Pacific Coast Biscuit Co.
KPQ	100	Seattle, Wash.	Archie Taft & Louis Wasmer
KWEA	100	Shreveport, La.	William E. Antony
WBAX	100	Wilkes-Barre, Pa.	John H. Stenger, Jr.
WCBS	100	Springfield, Ill.	H. L. Dewing & Chas. Messter
WCOH	100	Greenville, N. Y.	Westchester Brdcstg. Corp.
WCRW	100	Chicago, Ill.	Clinton R. White
WDWF	100	Cranston, R. I.	Dutee W. Flint
WEBE	100	Cambridge, Ohio	Roy W. Waller
WEBQ	50	Harrisburg, Ill.	Tate Radio Co.
WEDC	100	Chicago, Ill.	Emil Denemark, Inc.
WFCI	100	Pawtucket, R. I.	Frank Crook, Inc.
WGBB	100	Freeport, N. Y.	Harry H. Carman
WGCM	100	Gulfport, Miss.	Gulf Coast Music Co.
WHBF	100	Rock Island, Ill.	Beardsley Specialty Co.
WHBU	100	Anderson, Ind.	Citizens Bank
WIBA	100	Madison, Wis.	Capital Times-Strand Theatre
WINR	100	Bay Shore, N. Y.	Radiotel Mfg. Co., Inc.
WJBI	100	Red Bank, N. J.	Robert S. Johnson
WJBU	100	Lewisburg, Pa.	Bucknell University
WJBY	50	Gadsden, Ala.	Electric Construction Co.
WLBV	100	Mansfield, Ohio	Mansfield Broadcasting Assn.
WLCI	50	Ithaca, N. Y.	Lutheran Assn. of Ithaca
WLSI	100	Cranston, R. I.	The Lincoln Studios, Inc.
WMAN	50	Columbus, Ohio	W. E. Heskitt
WMBG	100	Richmond, Va.	Havens & Martin, Inc.
WMBR	100	Tampa, Fla.	F. J. Reynolds
WOCL	25	Jamestown, N. Y.	A. E. Newton
WOMT	100	Manitowoc, Wis.	Mikadow Theatre
WRBQ	100	Greenville, Miss.	J. Pat Scully
WRBU	100	Gastonia, N. C.	A. J. Kirby Music Co.
WSBC	100	Chicago, Ill.	World Battery Co., Inc.
WSIX	100	Springfield, Tenn.	638 Tire & Vulcanizing Co.
WTAX	50	Streator, Ill.	Williams Hardware Co.
WTAZ	150	Richmond, Va.	W. Reynolds & T. J. McGuire

1220 kilocycles 245.8 meters

KFKU	1000	Lawrence, Kans.	University of Kansas
WCAD	500	Canton, N. Y.	St. Lawrence University
WCAE	500	Pittsburgh, Pa.	Gimbel Bros., Inc.
WREN	1000	Lawrence, Kans.	Jenny Wren Co.

1230 kilocycles 243.8 meters

KFIO	100	Spokane, Wash.	North Central High School
KFQD	100	Anchorage, Alaska	Anchorage Radio Club
KYA	1000	San Francisco, Cal.	Pacific Broadcasting Corp.
WBIS	500	Boston, Mass.	The Shepard Stores
WCWK	500	Ft. Wayne, Ind.	Chester W. Keen
WFBM	500	Indianapolis, Ind.	Indianapolis Power & Light Co.
WNAC	500	Boston, Mass.	The Shepard Stores
WPSC	500	State College, Pa.	Pennsylvania State College
WSBT	500	South Bend, Ind.	South Bend Tribune

1240 kilocycles 241.8 meters

KFQB	1000	Ft. Worth, Texas	W. B. Fishburn, Inc.
WGHP	750	Detroit, Mich.	George Harrison Phelps, Inc.
WIOD	1000	Miami Beach, Fla.	Isle of Dreams Brdcstg. Co.
WJAD	1000	Waco, Texas	Frank P. Jackson
WQAM	750	Miami, Fla.	Electrical Equipment Co.
WRBC	500	Valparaiso, Ind.	Immanuel Lutheran Church

1250 kilocycles 239.9 meters

KEJK	500	Los Angeles, Cal.	R. S. MacMillan
KFAU	1000	Boise, Idaho	Independent School District
KFMX	1000	Northfield, Minn.	Carleton College
KFON	1000	Long Beach, Cal.	Nichols & Warinner, Inc.
KXL	500	Portland, Ore.	KXL Broadcasters
WAAM	250	Newark, N. J.	WAAM, Inc.
WCAL	1000	Northfield, Minn.	St. Olaf College
WGCP	500	Newark, N. J.	May Radio Broadcast Corp.
WGMS	1000	St. Paul-Minneapolis	Washburn-Crosby Co.
WLB	1000	Minneapolis, Minn.	University of Minnesota
WODA	1000	Paterson, N. J.	Richard E. O'Dea
WRHM	1000	Minneapolis, Minn.	Rosedale Hospital Co., Inc.

1260 kilocycles 238.0 meters

KOIL	1000	Council Bluffs, Iowa	Mona Motor Oil Co.
KRGV	500	Harlingen, Texas	Harlingen Music Co.
KWWG	500	Brownsville, Texas	Chamber of Commerce
WJAX	1000	Jacksonville, Fla.	City of Jacksonville
WLBW	500	Oil City, Pa.	Petroleum Telephone Co.

1270 kilocycles 236.1 meters

KFOA	1000	Seattle, Wash.	Rhodes Department Store
KFUM	1000	Colorado Spgs., Colo.	W. D. Corley
KGCA	50	Decorah, Iowa	Charles W. Greenley
KTW	1000	Seattle, Wash.	First Presbyterian Church
KWLC	50	Decorah, Iowa	Luther College
WASH	250	Grand Rapids, Mich.	Baxter Laundries, Inc.
WDSU	1000	New Orleans, La.	Joseph H. Uhalt
WEAI	500	Ithaca, N. Y.	Cornell University
WOOD	500	Grand Rapids, Mich.	Walter B. Stiles, Inc.
WRHF	150	Washington, D. C.	American Broadcasting Co.

1280 kilocycles 234.2 meters

KTAB	500	Oakland, Calif.	Associated Broadcasters
WCAM	500	Camden, N. J.	City of Camden
WCAP	500	Asbury Park, N. J.	Radio Industries Broadcast Co.
WDAY	1000	Fargo. N. Dak.	WDAY, Inc.
WDOD	1000	Chattanooga, Tenn.	Chattanooga Radio Co., Inc.
WEBC	1000	Superior, Wis.	Head of Lakes Brdcstg. Co.
WOAX	500	Trenton, N. J.	Franklyn J. Wolff
2LR	50	Havana, Cuba	Jose Lara

1290 kilocycles 232.4 meters

KDYL	1000	Salt Lake City	Intermountain Brdcstg. Corp.
KFUL	500	Galveston, Texas	Will H. Ford
KLCN	50	Blytheville, Ark.	Daily Courier-News
KTSA	1000	San Antonio, Texas	Alamo Broadcast Co.
WJAS	500	Pittsburgh, Pa.	Pittsburgh Radio Supply House
WNBZ	10	Saranac Lake, N. Y.	Smith & Mace

1300 kilocycles 230.6 meters

KFH	500	Wichita, Kansas	Hotel Lassen
KFJR	500	Portland, Ore.	Ashley C. Dixon & Son
KGEF	1000	Los Angeles, Calif.	Trinity Methodist Church
KTBI	1000	Los Angeles, Calif.	Bible Institute of Los Angeles
KTBR	500	Portland, Ore.	M. E. Brown
WBBR	1000	Roosville, N. Y.	Peoples Pulpit Association
WEVD	500	Woodhaven, N. Y.	Eugene V. Debs Memorial Fund
WHAP	1000	New York City	Defenders of Truth Society, Inc.
WHAZ	500	Troy, N. Y.	Rensselaer Polytechnic Institute
WIBW	1000	Topeka, Kansas	C. L. Carrell

1310 kilocycles 228.9 meters

KFBK	100	Sacramento, Calif.	Kimball-Upson Co.
KFCB	100	Phoenix, Ariz.	Nielson Radio Supply Co.
KFGO	10	Boone, Iowa	Boone Biblical College
KFIU	10	Juneau, Alaska	Alaska Elec. Light & Power Co.
KFJY	100	Ft. Dodge, Iowa	C. S. Tunwall
KFPL	15	Dublin, Texas	C. C. Baxter
KFPM	15	Greenville, Texas	The New Furniture Co.
KFUP	100	Denver, Colo.	Fitzsimmons General Hospital
KFXJ	50	Edgewater, Colo.	R. G. Howell
KFXR	100	Oklahoma City	Exchange Ave. Baptist Church
KGEZ	100	Kalispell, Mont.	Flathead Broadcasting Assn.
KGFI	100	San Angelo, Texas	San Angelo Broadcasting Co.
KGGH	50	Cedar Grove, La.	Bates Radio & Electric Co.
KGHG	50	McGeehee, Ark.	Chas. W. McCollum
KRMD	50	Shreveport, La.	Robert M. Dean
KWCR	100	Cedar Rapids, Iowa	H. E. Paar
WABY	50	Philadelphia, Pa.	John Magaldi, Jr.
WAGM	50	Royal Oak, Mich.	Robert L. Miller
WBMH	100	Detroit, Mich.	Braun's Music House
WBOW	100	Terre Haute, Ind.	Banks of Wabash Brdsctg. Assn.
WBRE	100	Wilkes-Barre, Pa.	Louis G. Baltimore
WCLS	100	Joliet, Ill.	WCLS, Inc.
WDAH	100	El Paso, Texas	Trinity Methodist Church
WEBR	100	Buffalo, N. Y.	H. H. Howell
WEHS	100	Evanston, Ill.	Victor C. Carlson
WFBG	100	Altoona, Pa.	Wm. F. Gable Co.
WFDF	100	Flint, Mich.	Frank D. Fallain
WFKD	50	Philadelphia, Pa.	Foulkrod Radio Engineering Co.
WGAL	15	Lancaster, Pa.	Lancaster Electric Supply Co.
WHBP	100	Johnstown, Pa.	Johnstown Automobile Co.
WHFC	100	Chicago, Ill.	Goodson & Wilson, Inc.
WIBU	100	Poynette, Wis.	William C. Forrest
WJAK	50	Kokomo, Ind.	J. A. Kautz-Kokomo Tribune
WKAV	50	Laconia, N. H.	Laconia Radio Club
WKBB	100	Joliet, Ill.	Sanders Bros.
WKBC	10	Birmingham, Ala.	H. I. Ansley
WKBI	50	Chicago, Ill.	Fred L. Schoenwolf
WKBS	100	Galesburg, Ill.	Permil N. Nelson
WLBC	50	Muncie, Ind.	Donald A. Burton
WLBO	100	Galesburg, Ill.	Fred A. Trebbe, Jr.
WMBL	100	Lakeland, Fla.	Benford's Radio Studios
WNAT	100	Philadelphia, Pa.	Lennig Bros. Co.
WNBH	250	New Bedford, Mass.	New Bedford Broadcasting Co.
WNBJ	50	Knoxville, Tenn.	Lonsdale Baptist Church
WNEW	100	Newport News, Va.	Virginia Brdcstg. Co., Inc.
WOBT	15	Union City, Tenn.	Tittsworth's Radio & Music Shop
WRAW	100	Reading, Pa.	Avenue Radio & Electric Shop
WRBI	20	Tifton, Ga.	Kent's Furniture & Music Store
WRBW	15	Columbia, S C.	Paul S. Pearce
WRK	100	Hamilton, Ohio	S. W. Doron & J. C. Slade
WSAJ	100	Grove City, Pa.	Grove City College
WSMD	100	Salisbury, Md.	Tom F. Little
WTHS	20	Atlanta, Ga.	Technical High School

1320 kilocycles 227.1 meters

KGHB	250	Honolulu, Hawaii	Radio Sales Co.
KGHF	250	Pueblo, Colo.	C. P. Ritchie & J. E. Finch
KGIO	250	Idaho Falls, Ida.	Jack W. Duckworth, Jr.
KGIQ	250	Twin Falls, Ida.	Stanley M. Soule
WADC	1000	Akron, Ohio	Allen T. Simmons
WSMB	750	New Orleans, La.	Saenger Theatre & Maison Blanche

1330 kilocycles 225.4 meters

CYM	1500	Torreon, Mexico	
KSCJ	1000	Sioux City, Iowa	Perkins Bros. Co.
WCAC	500	Storrs, Conn.	Conn. Agricultural College
WDRC	500	New Haven, Conn.	Doolittle Radio Corp.
WTAQ	1000	Eau Claire, Wisc.	C. S. Van Gorden

1340 kilocycles 223.7 meters

KFPW	50	Sulphur Spgs., Ark.	Rev. Lannie W. Stewart
KMO	500	Tacoma, Wash.	KMO, Inc.
KVI	1000	Tacoma, Wash.	Puget Sound Brdcstg. Co.
WSPD	500	Toledo, Ohio	Toledo Broadcasting Co.

1350 kilocycles 222.1 meters

KWK	1000	St. Louis, Mo.	Greater St. Louis Brdcstg. Corp.
WBNY	250	New York City	Baruchrome Corp.
WCDA	250	Brooklyn, N. Y.	Italian Educ. Brdcstg. Co.
WIL	1000	St. Louis, Mo.	WIL Broadcasting Corp.
WKBQ	250	New York City	Standard Canill Co., Inc.
WMSG	250	New York City	Madison Square Garden

1360 kilocycles 220.4 meters

KFBB	250	Havre, Mont.	F. A. Buttery Co.
KGB	250	San Diego, Calif.	Southwestern Brdcstg. Corp.
KGIR	250	Butte, Mont.	Symons Broadcasting Co.
WBET	500	Boston, Mass.	Boston Transcript Co.
WGES	500	Chicago, Ill.	Oak Leaves Broadcasting Corp.
WJKS	500	Gary, Ind.	Johnson-Kennedy Radio Corp.
WMAF	500	S. Dartmouth, Mass.	Round Hills Radio Corp.
WQBC	300	Utica, Miss.	Chamber of Commerce

1370 kilocycles 218.7 meters

KFBL	50	Everett, Wash.	Leese Bros.
KFEC	100	Portland, Ore.	Meier & Frank Co.
KFJI	50	Astoria, Ore.	George Kincaid
KFJZ	100	Ft. Worth, Texas	Henry C. Allison
KFLX	100	Galveston, Texas	George Roy Clough
KFUR	50	Ogden, Utah	Peery Building Co.
KGAR	100	Tucson, Ariz.	Citizens Publishing Co.
KGBX	100	St. Joseph, Mo.	Foster-Hall Tire Co.
KGCB	100	Enid, Okla.	Wallace Radio Institute
KGCI	100	San Antonio, Texas	Liberto Radio Sales
KGDA	15	Dell Rapids, S. D.	Home Auto Co.
KGER	100	Long Beach, Cal.	C. Merwin Dobyns
KGFG	50	Oklahoma City	Full Gospel Church
KGFL	50	Raton, N. M.	N. L. Cotter
KGGM	100	Albuquerque, N. M.	Jay Peters
KGKL	100	San Angelo, Texas	KGKL,Inc.,Oper. by Ragsdale Auto Co.
KGRC	100	San Antonio, Texas	Eugene Roth
KOH	100	Reno, Nevada	Jay Peters
KRE	100	Berkeley, Calif.	First Congregational Church
KVL	100	Seattle, Wash.	Arthur C. Dailey
KWKC	100	Kansas City, Mo.	Wilson Duncan Brdcstg. Co.
KZM	100	Hayward, Calif.	Leon P. Tenney
WBBL	100	Richmond, Va.	Grace Covenant Presbyterian Church
WCBM	100	Baltimore, Md.	Hotel Chateau
WEAM	100	Plainfield, N. J.	W. J. Butterfield
WFBJ	100	Collegeville, Minn.	St. John's University
WHBD	100	Bellefontaine, Ohio	First Presbyterian Church
WHBQ	100	Memphis, Tenn.	Broadcasting Station WHBQ, Inc.
WIAD	100	Philadelphia, Pa.	Howard R. Miller
WIBM	100	Jackson, Mich.	C. L. Carrell
WJBK	50	Ypsilanti, Mich.	Ernest F. Goodwin
WJBO	100	New Orleans, La.	Valdemar Jensen
WMBO	100	Auburn, N. Y.	Radio Service Laboratories
WRAK	30	Erie, Pa.	C. R. Cummins
WRBT	50	Wilmington, N. C.	Wilmington Radio Association
WSVS	50	Buffalo, N. Y.	Seneca Vocational School

1380 kilocycles 217.3 meters

KQV	500	Pittsburgh, Pa.	Doubleday-Hill Electric Co.
KSO	1000	Clarinda, Iowa	Berry Seed Co.
WCSO	500	Springfield, Ohio	Wittenberg College
WKBH	1000	La Crosse, Wisc.	Callaway Music Co.

1390 kilocycles 215.7 meters

KFPY	500	Spokane, Wash.	Symons Investment Co.
KLRA	1000	Little Rock, Ark.	Arkansas Broadcasting Co.
KOW	500	Denver, Colo.	Associated Industries, Inc.
KUOA	1000	Fayetteville, Ark.	University of Arkansas
KWSC	500	Pullman, Wash.	State College of Washington
WHK	1000	Cleveland, Ohio	Radio Air Service Corp.

1400 kilocycles 214.2 meters

WBAA	500	Lafayette, Ind.	Purdue University
WBBC	500	Brooklyn, N. Y.	Brooklyn Broadcasting Corp.
WCGU	500	Coney Island, N. Y.	U. S. Broadcasting Corp.
WCMA	500	Culver, Ind.	Culver Military Academy
WKBF	500	Indianapolis, Ind.	Noble Butler Watson
WLTH	250	Brooklyn, N. Y.	The Voice of Brooklyn, Inc.
WSGH	500	Brooklyn, N. Y.	Amateur Radio Specialty Co.

1410 kilocycles 212.6 meters

KFLV	500	Rockford, Ill.	A. T. Frykman
KGRS	1000	Amarillo, Tex.	Gish Radio Service
WDAG	1000	Amarillo, Texas	J. Laurence Martin
WDEL	250	Wilmington, Del.	WDEL, Inc.
WDGY	500	Minneapolis, Minn.	Dr. George W. Young
WHBL	500	Sheboygan, Wis.	Press Pub. Co. & C. L. Carrell
WHDI	500	Minneapolis, Minn.	Wm. Hood Dunwoody Indus. Institute
WSKC	500	Bay City, Mich.	World's Star Knitting Co.

1420 kilocycles 211.1 meters

KFIF	50	Portland, Ore.	Benson Polytechnic Institute
KFIZ	100	Fond du Lac, Wis	Commonwealth-Reporter
KFQU	100	Holy City, Calif.	W. E. Riker
KFQW	100	Seattle, Wash.	KFQW, Inc.
KFXD	50	Jerome, Idaho	Service Radio Co.
KFXY	100	Flagstaff, Ariz.	Mary M. Costigan
KFYO	100	Breckenridge, Tex.	Kirksey Bros. Battery & Elec. Co.
KGCN	50	Concordia, Kansas	Concordia Broadcasting Co.
KGCX	10	Vida, Mont.	First State Bank
KGFF	100	Alva, Okla.	Earl E. Hampshire
KGFJ	100	Los Angeles, Calif.	Ben S. McGlashan
KGFW	50	Ravenna, Nebr.	Otto F. Sothman
KGHD	50	Missoula, Mont.	Elmore-Nash Broadcasting Corp.
KGTT	50	San Francisco, Cal.	Glad Tidings Temple
KICK	100	Red Oak, Iowa	Atlantic Automobile Co.
KKP	15	Seattle, Wash.	City of Seattle
KMED	50	Medford, Ore.	W. J. Virgin
KOCW	100	Chickasha, Okla.	College for Women
KORE	100	Eugene, Ore.	Eugene Broadcasting Station
KTAP	100	San Antonio, Tex.	Robert B. Bridge
KTUE	5	Houston, Texas	Uhalt Electric
KXRO	75	Aberdeen, Wash.	KXRO, Inc.
WAAD	25	Cincinnati, Ohio	Ohio Mechanics Institute
WEDH	30	Erie, Pa.	Erie Dispatch-Herald
WHPP	10	New York City	Bronx Broadcasting Co.
WIAS	100	Ottumwa, Iowa	Poling Electric Co.
WIBR	50	Steubenville, Ohio	Thurman A. Owings
WKBP	50	Battle Creek, Mich.	Enquirer-News Co.
WLBF	100	Kansas City, Mo.	Everett L. Dillard
WLBH	30	Farmingdale, N. Y.	Joseph J. Lombardi
WLEX	100	Lexington, Mass.	Lexington Air Station
WMBC	100	Detroit, Mich.	Michigan Broadcasting Co., Inc.
WMBH	100	Joplin, Mo.	Edwin Dudley Aber
WMRJ	10	Jamaica, N. Y.	Peter J. Prinz
WQBZ	60	Weirton, W. Va.	J. H. Thompson
WSRO	100	Middletown, Ohio	Harry W. Fahrlander
WSSH	100	Boston, Mass.	Tremont Temple Baptist Church
WTBO	50	Cumberland, Md.	Cumberland Electric Co.

1430 kilocycles 209.7 meters

WBRL	500	Tilton, N. H.	Booth Radio Laboratories
WCAH	250	Columbus, Ohio	Commercial Radio Service Co.
WGBC	500	Memphis, Tenn.	First Baptist Church
WICC	500	Bridgeport, Conn.	Bridgeport Brdcstg. Station
WMBS	250	Lemoyne, Pa.	Mack's Battery Co.
WNBR	500	Memphis, Tenn.	John Ulrich

1440 kilocycles 208.2 meters

KLS	250	Oakland, Calif.	Warner Bros.
WABF	250	Kingston, Pa.	Markle Broadcasting Corp.
WABO	500	Rochester, N. Y.	Lake Ave. Baptist Church
WHEC	500	Rochester, N. Y.	Hickson Electric Co.
WMAC	500	Cazenovia, N. Y.	Clive B. Meredith

WMBD	500	Peoria Heights, Ill.	Peoria Heights Radio Laboratory
WNRC	500	Greensboro, N. C.	Wayne M. Nelson
WOKO	500	Peekskill, N. Y.	Harold E. Smith
WRAX	250	Philadelphia, Pa.	Berachah Church, Inc.
WTAD	500	Quincy, Ill.	Ills. Stock Medicine Brdcstg. Corp.

1450 kilocycles 206.8 meters

KSBA	1000	Shreveport, La.	W. G. Patterson
WBMS	250	Union City, N. J.	WBMS Broadcasting Corp.
WFJC	500	Akron, Ohio	W. F. Jones Broadcast, Inc.
WIBS	250	Elizabeth, N. J.	New Jersey Broadcasting Corp.
WJAY	500	Cleveland, Ohio	Cleveland Radio Brdcstg. Corp.
WKBO	250	Jersey City, N. J.	Camith Corp.
WNJ	250	Newark, N. J.	Radio Investment Co.
WSAR	250	Fall River, Mass.	Doughty & Welch Electric Co.
WTFI	500	Toccoa, Ga.	Toccoa Falls Institute

1460 kilocycles 205.4 meters

KSTP	10000	St. Paul, Minn.	National Battery Brdcstg. Co.
WTFF	10000	Washington, D. C.	Independent Publishing Co.

1470 kilocycles 204.0 meters

KFJF	5000	Oklahoma City	National Radio Mfg. Co.
KGA	5000	Spokane, Wash.	Northwest Radio Service Co.
WKBW	5000	Buffalo, N. Y.	Churchill Evangelistic Assn.
WRUF	5000	Gainesville, Fla.	University of Florida

1480 kilocycles 202.6 meters

WIBO	5000	Chicago, Ill.	WIBO Broadcasters, Inc.
WJAZ	5000	Chicago, Ill.	Zenith Radio Corp.
WORD	5000	Batavia, Ill.	People's Pulpit Association
WHT	5000	Chicago, Ill.	Radiophone Brdcstg. Corp.

1490 kilocycles 201.2 meters

WBAW	5000	Nashville, Tenn.	Waldrum Drug Co.
WLAC	5000	Nashville, Tenn.	Life & Casualty Insurance Co.

1500 kilocycles 199.9 meters

KFCR	100	Santa Barbara, Cal.	Santa Barbara Brdcstg. Co.
KFWO	100	Avalon, Calif.	Lawrence Mott
KGDR	100	San Antonio, Tex.	Joe B. McShane
KGKB	100	Goldthwaite, Tex.	Eagle Publishing Co.
KGHI	100	Little Rock, Ark.	Berean Bible Class
KGHX	50	Richmond, Texas	Ft. Bend County School Board
KPJM	100	Prescott, Ariz.	Frank Wilburn
KUJ	10	Longview, Wash.	Lovejoy & Kerfoot
KWBS	15	Portland, Ore.	Schaeffer Radio Co.
KWTC	100	Santa Ana, Calif.	Pacific Broadcasting Foundation
WAFD	100	Detroit, Mich.	Albert B. Parfet Co.
WALK	50	Willow Grove, Pa.	Albert A. Walker
WCBA	100	Allentown, Pa.	B. B. Musselman
WCLB	100	Brooklyn, N. Y.	Arthur Faske
WHBW	100	Philadelphia, Pa.	D. R. Kienzle
WIBZ	15	Montgomery, Ala.	Alexander D. Trum
WKBV	100	Brookville, Ind.	Knox Battery & Electric Co.
WKBZ	50	Ludington, Mich.	K. L. Ashbacker
WLBX	100	Long Island City, N. Y.	John N. Brahy
WLOE	100	Chelsea, Mass.	William S. Pote
WMBA	100	Newport, R. I.	LeRoy Joseph Beebe
WMBM	10	Memphis, Tenn.	Seventh Day Adventist Church
WMBQ	100	Brooklyn, N. Y.	Paul J. Gollhofer
WMES	50	Boston, Mass.	Mass. Educational Society
WMPC	30	Lapeer, Mich.	First M. E. Church
WNBF	50	Endicott, N. Y.	Howitt-Wood Radio Co.
WNBQ	15	Rochester, N. Y.	Gordon P. Brown
WOO	100	Philadelphia, Pa.	John Wanamaker
WPSW	50	Philadelphia, Pa.	School of Wireless Telegraphy
WRBJ	10	Hattiesburg, Miss.	Woodruff Furniture Co.
WSAN	100	Allentown, Pa.	Allentown Call Publishing Co.
WTBQ	100	Wilmington, Del.	E. Brandt Boylan
WWRL	100	Woodside, N. Y.	Wm. H. Reuman

ALABAMA		
Auburn K-20-b	WAPI	1140
Birmingham K-19-a	WBRC	930
	WKBC	1310
Gadsden K-20-a	WJBY	1210
Montgomery K-19-b	WIBZ	1500
ALASKA		
Anchorage	KFQD	1230
Juneau	KFIU	1310
Ketchikan	KGBU	900
ARIZONA		
Flagstaff J-7	KFXY	1420
Phoenix K-7	KFAD	620
	KFCB	1310
Prescott J-6	KPJM	1500
Tucson L-7	KGAR	1370
ARKANSAS		
Blytheville I-18	KLCN	1290
Fayetteville I-16	KUOA	1390
Hot Springs J-16	KTHS	800
Little Rock J-17	KGHI	1500
	KGJF	890
	KLRA	1390
McGehee K-17	KGHG	1310
Sulphur Springs I-16	KFPW	1340
CALIFORNIA		
Avalon K-3	KFWO	1500
Berkeley H-1-a	KRE	1370
Burbank J-4	KELW	780
Culver City K-3	KFVD	700
El Centro K-5	KGEN	1200
Fresno I-3	KMJ	1200
Glendale K-3	KGFH	1000
Hayward H-2	KZM	1370
Hollywood K-3	KFQZ	850
	KMTR	570
Holy City I-2	KFQU	1420
Inglewood K-4	KMIC	1120
Long Beach K-4-a	KFON	1250
	KGER	1370
Los Angeles K-3-b	KEJK	1250
	KFI	640
	KFSG	1120
	KFWB	950
	KGEF	1300
	KGFJ	1420
	KHJ	900
	KNX	1050
	KPLA	570
Oakland H-1-b	KTBI	1300
	KFWM	930
	KGO	790
	KLS	1440
	KLX	880
	KTAB	1280
Ontario	KFWC	1200
Pasadena J-4	KPPC	1200
	KPSN	950
Sacramento H-2-a	KFBK	1310
San Diego K-4-b	KFSD	600
	KGB	1360
San Francisco H-1-c	KFRC	610
	KFWI	930
	KGTT	1420
	KJBS	1100
	KPO	680
	KYA	1230
San Jose I-2	KQW	1010
Santa Ana K-4	KWTC	1500
Santa Barbara J-3	KFCR	1500
Santa Maria J-2-b	KSMR	1200
Santa Monica K-3	KNRC	780
Stockton H-2-b	KGDM	1150
	KWG	1200
COLORADO		
Colorado Springs H-10	KFUM	1270
Denver G-10-b	KFEL	940
	KFUP	1310
	KFXF	940
	KLZ	560
	KOA	830
	KOW	1390
	KPOF	880
Edgewater G-10	KFXJ	1310
Fort Morgan G-11	KGEW	1200
Greeley F-10	KFKA	880
Gunnison H-9	KFHA	1200
Pueblo H-11	KGDP	1210
	KGHF	1320
Yuma G-11	KGEK	1200
CONNECTICUT		
Bridgeport F-26	WICC	1430
Hartford E-26-d	WTIC	1060
Mansfield E-27-i	WCAC	1330
New Haven F-26-b	WDRC	1330
DELAWARE		
Wilmington G-25	WDEL	1410
	WTBQ	1500
DISTRICT OF COLUMBIA		
Washington G-24-c	WMAL	630
	WRC	950
	WRHF	1270
	WTFF	1460
FLORIDA		
Clearwater N-21	WFLA	900
Gainesville M-21	WRUF	1470
Jacksonville M-22	WJAX	1260

Red Oak F-15	KICK	1420
Shenandoah F-15-c	KFNF	890
	KMA	930
Sioux City E-15	KSCJ	1330
Waterloo F-17	WJAM	1200
KANSAS		
Concordia G-14	KGCN	1420
Lawrence G-15-a	KFKU	1220
	WREN	1220
Manhattan G-14-a	KSAC	580
Milford G-14	KFKB	1130
Topeka G-14	WIBW	1300
Wichita H-14-a	KFH	1300
KENTUCKY		
Hopkinsville I-19	WFIW	940
Louisville H-20	WHAS	820
	WLAP	1200
LOUISIANA		
Cedar Grove M-17	KGGH	1310
New Orleans M-17	WABZ	1200
	WDSU	1270
	WJBO	1370
	WJBW	1200
	WSMB	1320
	WWL	850
Shreveport K-16	KFDX	1210
	KRMD	1310
	KSBA	1450
	KWEA	1210
	KWKH	850
MAINE		
Bangor C-28-b	WABI	1200
Dover-Foxcroft C-28	WLBZ	620
Portland D-28-b	WCSH	940
MARYLAND		
Baltimore G-24-a	WBAL	1060
	WCAO	600
	WCBM	1370
	WFBR	1120
Cumberland G-23	WTBO	1420
Salisbury G-25	WSMD	1310
MASSACHUSETTS		
Boston E-27-c	WBET	1360
	WBIS	1230
	WBZA	990
	WEEI	590
	WMES	1500
	WNAC	1230
	WSSH	1420
Chelsea E-27	WLOE	1500
Fall River E-27	WSAR	1450
Gloucester E-27	WEPS	1200
Lexington E-27	WLEX	1420
New Bedford E-27-g	WNBH	1310
South Dartmouth E-27	WMAF	1360
Springfield E-26-b	WBZ	990
Webster E-27-d	WKBE	1200
Wellesley Hills E-27	WBSO	780
Worcester E-27-b	WTAG	580
MICHIGAN		
Battle Creek E-20	WKBP	1420
Bay City D-21	WSKC	1410
Berrien Springs E-19	WEMC	590
Detroit E-21-g	WAFD	1500
	WBMH	1310
	WCX	750
	WGHP	1240
	WJR	750
	WMBC	1420
	WWJ	920
East Lansing E-20-b	WKAR	1040
Flint E-21-a	WFDF	1310
Grand Rapids E-20-a	WASH	1270
	WOOD	1270
Jackson E-20	WIBM	1370
Lapeer E-21	WMPC	1500
Ludington D-19	WKBZ	1500
Royal Oak E-21-e	WAGM	1310
Ypsilanti E-21-f	WJBK	1370
MINNESOTA		
Barrett C-14	KGDE	1200
Collegeville C-15	WFBJ	1370
Hallock A-14	KGFK	1200
Minneapolis C-16-B	WCCO	810
	WDGY	1410
	WGMS	1250
	WHDI	1410
	WLB	1250
	WRHM	1250
Northfield D-16	KFMX	1250
	WCAL	1250
St. Paul C-16-c	KSTP	1460
	WCCO	810
	WGMS	1250
MISSISSIPPI		
Columbus K-18	WCOC	880
Greenville K-17	WRBQ	1210
Gulfport M-18	WGCM	1210
Hattiesburg L-18	WRBJ	1500
Utica L-17	WQBC	1360

MISSOURI		
Cape Girardeau H-18-c	KFVS	1210
Columbia G-16-b	KFRU	630
Independence G-16-c	KLDS	950
	KMBC	950
Jefferson City H-16-a	WOS	630
Joplin H-16	WMBH	1420
Kansas City G-15-b	KWKC	1370
	WDAF	610
	WHB	950
	WLBF	1420
	WOQ	610
Kirksville F-16-c	KFKZ	1200
St. Joseph G-15	KFEQ	560
	KGBX	1370
St. Louis H-18-a	KFUO	550
	KFWF	1200
	KMOX	1090
	KSD	550
	KWK	1350
	WEW	760
	WIL	1350
	WMAY	1200
MONTANA		
Billings C-8	KGHL	950
Butte C-7	KGIR	1360
Havre A-8	KFBB	1360
Kalispell A-5	KGEZ	1310
Missoula B-6	KGHD	1420
	KUOM	570
Vida B-10	KGCX	1420
NEBRASKA		
Central City F-13	KGES	930
Clay Center G-14	KMMJ	740
Columbus F-14	KGBY	930
Grand Island F-13	KGEO	930
Humboldt G-15	KGDW	930
Lincoln F-14-b	KFAB	770
	KFOR	1210
	WCAJ	590
Norfolk E-14-c	WJAG	1060
Omaha F-15-a	WAAW	660
	WOW	590
Ravenna F-13	KGFW	1420
Wayne E-14	KGCH	930
York F-13	KGBZ	930
NEVADA		
Reno G-3	KOH	1370

NEW HAMPSHIRE		
Laconia D-27	WKAV	1310
Tilton E-27	WBRL	1430
NEW JERSEY		
Asbury Park G-26	WCAP	1280
Atlantic City G-25	WPG	1100
Camden F-25-f	WCAM	1280
Cliffside F-26	WPAP	1010
	WQAO	1010
Elizabeth F-26-h	WIBS	1450
Jersey City F-26-d	WAAT	1070
	WKBO	1450
	WPCH	810
Newark F-25-h	WAAM	1250
	WGCP	1250
	WNJ	1450
	WOR	710
Paterson F-26-c	WODA	1250
Plainfield F-25	WEAM	1370
Red Bank G-26	WJBI	1210
Secaucus	WOV	1130
Trenton F-25	WOAX	1280
Union City F-26	WBMS	1450
NEW MEXICO		
Albuquerque	KGGM	1370
Raton I-11	KGFL	1370
State College K-9	KOB	1180
NEW YORK		
Auburn E-24	WMBO	1370
Bay Shore F-26-h	WINR	1210
Brooklyn F-26-f	WBBC	1400
	WCDA	1350
	WCLB	1500
	WLTH	1400
	WMBQ	1500
	WSGH	1400
Buffalo E-23-a	WEBR	1310
	WGR	550
	WKBW	1470
	WKEN	1040
	WMAK	900
Canton D-25	WSVS	1370
Cazenovia E-25-b	WCAD	1220
Coney Island F-26	WMAC	1440
Endicott E-25	WCGU	1400
Farmingdale F-26	WNBF	1500
Freeport F-26-i	WLBH	1420
Grand Island E-23	WGBB	1210
Greenville E-26	WCOH	1210
Ithaca E-24-d	WEAI	1270
	WLCI	1210

Jamaica F-26-f	WMRJ	1420
Jamestown E-23-b	WOCL	1210
Long Island City F-26	WLBX	1500
New York City F-26	WABC	860
	WBNY	1350
	WBOQ	860
	WEAF	660
	WGBS	1180
	WHAP	1300
	WHN	1010
	WHPP	1420
	WJZ	760
	WKBQ	1350
	WLWL	1100
	WMCA	570
	WMSG	1350
	WNYC	570
	WRNY	1010
Peekskill F-26-a	WOKO	1440
Rochester E-24-b	WABO	1440
	WHAM	1150
	WHEC	1440
	WNBQ	1500
Rossville F-26	WBBR	1300
Saranac Lake D-26	WNBZ	1290
Schenectady E-25-c	WGY	790
Syracuse E-24-c	WFBL	900
	WSYR	570
Troy E-21-a	WHAZ	1300
Utica E-25-a	WIBX	1200
Woodhaven F-26	WEVD	1300
Woodside F-26	WWRL	1500

NORTH CAROLINA

Asheville J-21	WWNC	570
Charlotte J-22	WBT	1080
Gastonia J-22	WRBU	1210
Greensboro I-22	WNRC	1440
Raleigh I-23	WPTF	680
Wilmington J-24	WRBT	1370

NORTH DAKOTA

Bismarck B-12	KFYR	550
Devils Lake A-13	KDLR	1210
Fargo B-14	WDAY	1280
Grand Forks A-14	KFJM	550
Mandan B-12	KGCU	1200

OHIO

Akron F-22-b	WADC	1320
	WFJC	1450
Bellefontaine G-21-a	WHBD	1370
Cambridge F-22	WEBE	1210
Canton F-22-d	WHBC	1200
Cincinnati G-20-e	WAAD	1420
	WFBE	1200
	WKRC	550
	WLW	700
	WSAI	800
Cleveland F-22-a	WEAR	1070
	WHK	1390
	WJAY	1450
	WTAM	1070
Columbus G-21-b	WAIU	640
	WCAH	1430
	WEAO	550
	WMAN	1210
Dayton G-21-e	WSMK	570
Hamilton G-20-d	WRK	1310
Mansfield F-21	WLBV	1210
Middletown G-20	WSRO	1420
Springfield G-21-c	WCSO	1380
Steubenville F-22	WIBR	1420
Toledo F-21-a	WSPD	1340
Youngstown F-22	WKBN	570

OKLAHOMA

Alva I-13	KGFF	1420
Chickasha J-14-b	KOCW	1420
Enid I-14	KGCB	1370
Norman J-14-a	WNAD	1010
Oklahoma City I-14-b	KFJF	1470
	KFXR	1310
	KGFG	1370
	WKY	900
Picher I-15	KGGF	1010
Ponca City I-14	WBBZ	1200
Tulsa I-15	KVOO	1140

OREGON

Astoria C-1-a	KFJI	1370
Corvallis D-1	KOAC	560
Eugene D-1	KORE	1420
Medford E-1	KMED	1420
Portland C-1-b	KEX	1180
	KFEC	1370
	KFIF	1420
	KFJR	1300
	KGW	620
	KOIN	940
	KTBR	1300
	KWBS	1500
	KWJJ	1060
	KXL	1250

PENNSYLVANIA

Allentown F-25-c	WCBA	1500
	WSAN	1500

Altoona F-24-c	WFBG	1310
Carbondale F-25	WNBW	1200
Elkins Park G-25-c	WIBG	930
Erie E-23	WEDH	1420
	WRAK	1370
Grove City F-23-b	WSAJ	1310
Harrisburg F-24-d	WBAK	1120
	WPRC	1200
Johnstown F-23-d	WHBP	1310
Kingston F-24	WABF	1440
Lancaster G-25-a	WGAL	1310
	WKJC	1200
Lemoyne G-24	WMBS	1430
Lewisburg F-24-b	WJBU	1210
Oil City F-23-a	WLBW	1260
Philadelphia G-25-d	WABY	1310
	WCAU	1170
	WFAN	610
	WFI	560
	WFKD	1310
	WHBW	1500
	WIAD	1370
	WIP	610
	WLIT	560
	WNAT	1310
	WOO	1500
	WPSW	1500
	WRAX	1440
Pittsburgh F-23-c	KDKA	980
	KQV	1380
	WCAE	1220
	WJAS	1290
Reading F-25-d	WRAW	1310
Scranton F-25-a	WGBI	880
	WQAN	880
State College F-24-a	WPSC	1230
Washington F-23	WNBO	1200
Wilkes-Barre F-25-b	WBAX	1210
	WBRE	1310
Willow Grove G-25	WALK	1500

PORTO RICO

San Juan	WKAQ	580

RHODE ISLAND

Cranston F-27-a	WDWF	1210
	WLSI	1210
Newport F-27	WMBA	1500
Pawtucket E-27	WFCI	1210
Providence E-27-h	WEAN	1160
	WJAR	890

SOUTH CAROLINA

Charlestown K-23	WBBY	1200
Columbia K-22	WRBW	1310

SOUTH DAKOTA

Brookings D-14	KFDY	550
	KGCR	1210
Dell Rapids D-14	KGDA	1370
Oldham D-14	KGDY	1200
Pierre D-12	KGFX	580
Rapid City D-11	WCAT	1200
Sioux Falls D-14	KSOO	1110
Vermillion E-14-b	KUSD	890
Yankton E-14-a	WNAX	890

TENNESSEE

Chattanooga J-20	WDOD	1280
Knoxville I-20	WFBC	1200
	WNBJ	1310
	WNOX	560
Lawrenceburg J-19	WOAN	600
Memphis J-18-a	WGBC	1430
	WHBQ	1370
	WMBM	1500
	WMC	780
	WNBR	1430
	WREC	600
Nashville I-19	WBAW	1490
	WLAC	1490
	WSM	650
Springfield I-19	WSIX	1210
Union City I-18	WOBT	1310

TEXAS

Amarillo J-12	KGRS	1410
	WDAG	1410
Austin L-14-b	KUT	1120
Beaumont M-16	KFDM	560
Breckenridge K-13	KFYO	1420
Brownsville O-14-b	KWWG	1260
College Station M-13	WTAW	1120
Dallas L-15-a	KRLD	1040
	WFAA	1040
	WRR	1190
Dublin K-14	KFPL	1310
El Paso L-10	WDAH	1310
Fort Worth L-14-a	KFJZ	1370
	KFQB	1240
	WBAP	800
Galveston M-15-b	KFLX	1370
	KFUL	1290
Goldthwaite L-13	KGKB	1500
Greenville K-15	KFPM	1310
Harlingen O-14	KRGV	1260
Houston M-15-a	KPRC	920
	KTUE	1420
Richmond M-15	KGHX	1500

San Angelo M-12	KGFI	1310
	KGKL	1370
San Antonio M-14-a	KGCI	1370
	KGDR	1500
	KGRC	1370
	KTAP	1420
	KTSA	1290
	WOAI	1190
Waco L-15-b	WJAD	1240
Wichita Falls K-14	KGKO	570
UTAH		
Ogden F-7-b	KFUR	1370
Salt Lake City F-7-c	KDYL	1290
	KSL	1130
VERMONT		
Burlington D-26-a	WCAX	1200
Springfield D-26-b	WNBX	1200
VIRGINIA		
Arlington G-24-d	NAA	690
Newport News	WNEW	1310
Norfolk I-24	WBBW	1200
	WPOR	780
	WTAR	780
Petersburg I-24	WLBG	1200
Portsmouth I-24	WSEA	780
Richmond H-24	WBBL	1370
	WMBG	1210
	WRVA	1110
	WTAZ	1210
Roanoke H-23	WDBJ	930
WASHINGTON		
Aberdeen B-1	KXRO	1420
Bellingham A-1	KVOS	1200
Everett A-2	KFBL	1370
Lacey B-2-b	KGY	1200
Longview B-1	KUJ	1500
Pullman B-4	KWSC	1390
Seattle B-2-a	KFOA	1270
	KFQW	1420
	KJR	970
	KKP	1420
	KOMO	920
	KPCB	1210
	KPQ	1210
	KRSC	1120
	KTW	1270
	KVL	1370
	KXA	570
Spokane A-4	KFIO	1230
	KFPY	1390
	KGA	1470
	KHQ	590
Tacoma B-1-a	KMO	1340
	KVI	1340
WEST VIRGINIA		
Charleston H-22	WOBU	580
Clarksburg G-22	WQBJ	1200
Fairmont G-23	WMMN	890
Huntington G-22	WSAZ	580
Weirton G-22	WQBZ	1420
Wheeling G-22	WWVA	1160
WISCONSIN		
Beloit E-18-b	WEBW	600
Eau Claire D-17	WTAQ	1330
Fond du Lac D-18-d	KFIZ	1420
Kenosha E-19	WCLO	1200
La Crosse E-17	WKBH	1380
Madison E-18-2	WHA	570
	WIBA	1210
Manitowoc D-19	WOMT	1210
Milwaukee E-19-a	WHAD	1120
	WISN	1120
	WTMJ	620
Poynette D-18-e	WIBU	1310
Racine E-19	WRJN	1200
Sheboygan C-18	WHBL	1410
Stevens Point D-18-b	WLBL	900
Superior B-17	WEBC	1280
West De Pere D-19	WHBY	1200
WYOMING		
Laramie F-10	KFBU	600
CANADA		
ALBERTA		
Calgary	CFAC	690
	CFCN	690
	CHCA	690
	CJCJ	690
	CNRC	690
Edmonton	CHMA	580
	CJCA	580
	CKUA	580
	CNRE	580
Lethbridge	CJOC	1120
Red Deer	CHCT	840
	CKLC	840
BRITISH COLUMBIA		
Chilliwack	CHWK	1210
Kamloops	CFJC	1120

Sea Island	CJOR	1030
Vancouver	CHLS	730
	CKCD	730
	CKFC	730
	CKMO	730
	CKWX	730
	CNRV	1030
Victoria	CFCT	630
MANITOBA		
Winnipeg	CKY	780
	CNRW	780
NEW BRUNSWICK		
Fredericton	CFNB	1210
Moncton	CNRA	630
St. John	CFBO	890
NOVA SCOTIA		
Halifax	CHNS	930
ONTARIO		
Bowmanville	CKGW	960
Brantford	CKCR	1010
Chatham	CFCO	1210
Cobalt	CKMC	1210
Hamilton	CHCS	880
	CHML	880
	CKOC	880
Iroquois Falls	CFCH	600
King Twp.	CFRB	960
Kingston	CFMC	1120
	CFRC	1120
London	CJGC	910
Midland	CKPR	1120
Ottawa	CKCO	690
	CNRO	690
Prescott	CFLC	1010
Preston	CKPC	1210
Toronto	CFCA	840
	CFCL	580
	CHNC	580
	CJBC	580
	CJBC	840
	CJBC	960
	CJSC	580
	CKCL	580
	CKNC	580
	CKOW	840
	CNRT	840
PRINCE EDWARD ISLAND		
Charlottetown	CFCY	960
	CHCK	960
Summerside	CHGS	1120
QUEBEC		
Montreal	CFCF	730
	CHYC	730
	CKAC	730
	CNRM	730
Quebec	CHRC	880
	CKCI	880
	CKCV	880
	CNRQ	880
St. Hyacinthe	CKSH	1010
SASKATCHEWAN		
Fleming	CJRW	1010
Moose Jaw	CJRM	1010
Regina	CHWC	960
	CJBR	960
	CKCK	960
	CNRR	960
Saskatoon	CFQC	910
	CJHS	910
	CNRS	910
Yorkton	CJGX	630
HAITI		
Port au Prince	HHK	830
MEXICO		
Chihuahua	CZF	970
Mazatlan	CYR	630
Merida	CYY	550
Mexico City	CYA	1000
	CYB	1090
	CYH	800
	CYJ	750
	CYL	750
	CYO	710
	CYX	920
	CZE	860
Oaxaca	CYF	1130
Puebla	CYU	960
Tampico	CYQ	930
Torreon	CYM	1330
Vera Cruz	CYC	890
CUBA		
Cienfuegos	6BY	1150
Elia	7SR	860
Havana	PWX	750
	2BB	1200
	2LR	1280
	2MG	1050
	2OK	860
	2OL	1170
	2RK	950
	2TW	1110
	2UF	1090
Tuinucu	6KW	880

FROM/TO	Albuquerque, N. Mex.	Atlanta, Ga.	Baltimore, Md.	Boise, Idaho	Boston, Mass.	Brownsville, Tex.	Buffalo, N. Y.	Chicago, Ill.	Cincinnati, Ohio	Cleveland, Ohio	Denver, Colo.	Des Moines, Iowa	Detroit, Mich.	El P. o, Tex.	Fargo, N. Dak.	Fort Worth, Tex.	Galveston, Tex.	Hastings, Nebr.	Hot Springs, Ark.	Houghton, Mich.	Jacksonville, Fla.	Kansas City, Mo.	Los Angeles, Calif.
Albuquerque, N. Mex.	----	1273	1670	774	1967	838	1577	1126	1248	1417	332	833	1360	228	968	561	803	588	773	1252	1492	717	6
Atlanta, Ga.	1273	----	575	1830	933	960	695	583	368	550	1208	738	595	1293	1112	750	688	901	498	947	286	675	1
Baltimore, Md.	1670	575	----	2055	358	1525	273	603	423	305	1505	913	398	1750	1143	1239	1245	1154	964	808	682	962	23
Boise, Idaho	774	1830	2055	----	2266	1610	1872	1453	1663	1754	637	1155	1671	969	975	1263	1538	934	1384	1367	2098	1158	6
Boston, Mass.	1967	933	358	2266	----	1881	398	849	737	550	1766	1159	613	2067	1304	1574	1598	1415	1302	922	1015	1250	25
Brownsville, Tex.	838	960	1525	1610	1881	----	1575	1234	1184	1402	1047	1102	1398	682	1445	471	287	1013	650	1543	1025	923	13
Buffalo, N. Y.	1577	695	273	1872	398	1575	----	454	392	175	1368	762	218	1690	923	1221	1289	1019	956	560	880	862	21
Chicago, Ill.	1126	583	603	1453	849	1234	454	----	249	307	918	310	236	1249	571	820	954	566	585	367	861	413	17
Cincinnati, Ohio	1248	368	423	1663	737	1184	392	249	----	218	1090	509	234	1333	818	839	897	742	569	589	628	541	18
Cleveland, Ohio	1417	550	305	1754	550	1402	175	307	218	----	1223	617	94	1521	838	1046	1116	871	787	518	768	700	20
Denver, Colo.	332	1208	1505	637	1766	1047	1368	918	1090	1223	----	607	1153	554	642	643	925	353	749	970	1468	555	8
Des Moines, Iowa	833	738	913	1155	1159	1102	762	310	509	617	607	----	545	980	397	640	851	256	488	458	1024	180	14
Detroit, Mich.	1360	595	398	1671	613	1398	218	236	234	94	1153	545	----	1475	745	1018	1111	800	761	427	832	643	19
El Paso, Tex.	228	1293	1750	969	2067	682	1690	1249	1333	1521	554	980	1475	----	1161	543	723	757	802	1422	1481	836	7
Fargo, N. Dak.	968	1112	1143	975	1304	1445	923	571	818	838	642	397	745	1161	----	973	1218	440	875	393	1400	548	14
Fort Worth, Tex.	561	750	1239	1263	1574	471	1221	820	839	1046	643	640	1018	543	973	----	283	544	273	1093	943	460	12
Galveston, Tex.	803	688	1245	1538	1598	287	1289	954	897	1116	925	851	1111	723	1218	283	----	808	375	1277	799	677	14
Hastings, Nebr.	588	901	1154	934	1415	1013	1019	566	742	871	353	256	800	757	440	544	808	----	513	666	1178	226	11
Hot Springs, Ark.	773	498	964	1384	1302	650	956	585	569	787	749	488	761	802	875	273	375	513	----	901	728	326	14
Houghton, Mich.	1252	947	808	1367	922	1543	560	367	589	518	970	458	427	1422	393	1093	1277	666	901	----	1216	633	17
Jacksonville, Fla.	1492	286	682	2098	1015	1025	880	861	628	768	1468	1024	832	1481	1400	943	799	1178	728	1216	----	952	21
Kansas City, Mo.	717	675	962	1158	1250	923	862	413	541	700	555	180	643	836	548	460	677	226	326	633	952	----	13
Los Angeles, Calif.	663	1935	2313	663	2590	1370	2195	1741	1892	2044	828	1433	1976	702	1426	1212	1423	1177	1437	1787	2153	1352	---
Louisville, Ky.	1174	317	498	1623	823	1093	483	268	92	309	1035	477	315	1253	818	751	807	693	480	636	595	480	18
Memphis, Tenn.	938	335	792	1806	1133	777	802	481	410	627	878	485	621	978	882	448	492	591	176	830	591	370	16
Miami, Fla.	1710	610	958	2368	1258	1100	1184	1190	957	1088	1732	1338	1156	1662	1721	1150	941	1468	983	1545	328	1247	23
Minneapolis, Minn.	980	905	948	1140	1125	1335	733	356	603	632	699	235	542	1156	219	870	1087	399	722	272	1192	413	15
Missoula, Mont.	895	1790	1947	252	2124	1706	1740	1348	1578	1640	670	1074	1552	1115	819	1312	1595	891	1385	1208	2070	1117	9
Nashville, Tenn.	1117	218	597	1631	941	952	626	394	239	456	1018	523	468	1169	900	643	666	697	370	760	502	472	17
New Orleans, La.	1080	427	1001	1713	1359	536	1087	831	708	922	1079	825	938	986	1221	470	288	870	358	1187	511	678	16
New York, N. Y.	1810	747	170	2153	188	1695	291	711	568	404	1628	1023	483	1902	1213	1398	1415	1275	1185	849	838	1097	24
Norfolk, Va.	1696	507	167	2137	467	1465	435	696	474	429	1562	983	523	1755	1258	1226	1195	1216	955	946	548	1009	23
Oklahoma, Okla.	518	753	1173	1138	1490	659	1117	683	755	946	503	469	905	578	786	188	456	357	260	926	988	293	11
Omaha, Nebr.	718	815	1026	1044	1280	1061	883	432	620	738	485	122	666	875	390	590	828	135	490	547	1098	165	13
Philadelphia, Pa.	1748	663	90	2113	268	1614	278	664	501	343	575	972	444	1834	1186	1324	1335	1222	1051	827	758	1037	23
Phoenix, Ariz.	330	1592	2002	733	2295	1023	1904	1451	1578	1745	585	1154	1685	347	1225	858	1035	901	1094	1550	1800	1045	35
Pittsburgh, Pa.	1498	520	194	1863	478	1424	178	411	258	115	1320	718	208	1592	952	1097	1140	967	825	630	703	784	21
Portland, Me.	2015	1022	446	2282	100	1961	438	892	802	603	1803	1197	657	2126	1313	1642	1678	1454	1371	924	1113	1300	26
Portland, Oreg.	1107	2172	2367	349	2553	1944	2167	1765	1987	2063	985	1479	1975	1286	1248	1612	1885	1271	1733	1638	2442	1397	8
Richmond, Va.	1628	470	128	2060	471	1428	375	618	399	353	1488	905	445	1695	1180	1170	1154	1142	897	870	953	937	22
St. Louis, Mo.	938	467	731	1339	1036	975	662	259	308	490	793	270	452	1033	658	568	697	455	325	591	755	238	15
Salt Lake City, Utah	483	1580	1858	292	2099	1317	1701	1260	1450	1567	372	952	1490	609	865	977	1249	708	1116	1242	1840	922	57
San Francisco, Calif.	893	2133	2451	516	2696	1675	2298	1855	2037	2163	946	1547	2087	993	1447	1454	1693	1297	1648	1833	2375	1500	34
Schenectady, N. Y.	1823	840	278	2120	150	1770	249	702	605	408	1618	1012	467	1930	1157	1445	1687	1267	1175	776	960	1107	24
Seattle, Wash.	1178	2180	2441	405	2508	2015	2130	1743	1974	2035	1020	1470	1945	1373	1206	1658	1938	1288	1759	1588	2450	1505	9
Shreveport, La.	764	548	1004	1433	1410	510	1080	725	688	904	799	624	891	752	1002	209	233	615	142	1043	733	326	14
Spokane, Wash.	1028	1960	2110	290	2279	1858	1900	1514	1746	1804	827	1243	1715	1238	976	1470	1753	1061	1552	1360	2239	1286	9
Springfield, Mass.	1889	863	282	2196	79	1805	325	774	659	473	1632	1085	540	1990	1240	1495	1524	1340	1224	860	957	1173	25
Vermillion, S. Dak.	742	917	1083	973	1314	1151	916	479	694	785	468	187	705	920	284	689	938	167	605	510	1203	280	12
Washington, D. C.	1648	542	33	2045	392	1493	290	594	403	303	1490	895	397	1726	1141	1210	1214	1139	936	813	647	943	22

HOW TO USE RADEX

If properly used RADEX will add immeasurably to the pleasure and success in tuning. In the "Index by Frequencies" note that the stations are arranged in groups according to their frequency or "beat." Each station in any of these groups must come in at exactly the same places on the dials as the others in that group. If it does not it is temporarily off its legal frequency and should not be logged.

Tune in any station and enter the dial readings in the spaces opposite the frequency or wave-length of that station as shown in the reproduction on this page. Now tune in another station and again enter the dial numbers as before. Continue doing this for as many stations as you can receive. You will notice that your dial numbers have either an ascending or

INDEX BY FREQUENCY

640 kilocycles 468.5 meters

KFI	5000	Los Angeles, Calif.
WOS	500	Jefferson City, Mo.
WRC	50*	Washington, D. C.

650 kilocycles 461.3 meters

KFNF	250	Shenandoah, Iowa
KRLD	500	Dallas, Tex.
WHAS	50*	Louisville, Ky.

660 kilocycles 454.3 meters

KFRC	1000	San Francisco, Calif.
WJZ	3000*	New York City

670 kilocycles 447.5 meters

KFOA	1000	Seattle, Wash.
WBZ	500	Boston, Mass.
WJAD	500	Waco, Tex.
WMAQ	1000	Chicago, Ill.
WQJ	500	Chicago, Ill.

680 kilocycles 440.9 meters

KFJI	100	Fort Dodge, Iowa
KFNH	100	Sioux City, Iowa
KFSD	500	San Diego, Calif.
WCX	5000	Detroit, Mich.
WFBG	50	Altoona, Pa.
WJR	5000	Detroit, Mich.
WSBF	250	St. Louis, Mo.

IN STATUTE MILES

Louisville, Ky.	Memphis, Tenn.	Miami, Fla.	Minneapolis, Minn.	Missoula, Mont.	Nashville, Tenn.	New Orleans, La.	New York, N. Y.	Norfolk, Va.	Oklahoma, Okla.	Omaha, Nebr.	Philadelphia, Pa.	Phoenix, Ariz.	Pittsburgh, Pa.	Portland, Me.	Portland, Oreg.	Richmond, Va.	St. Louis, Mo.	Salt Lake City, Utah	San Francisco, Calif.	Schenectady, N. Y.	Seattle, Wash.	Shreveport, La.	Spokane, Wash.	Springfield, Mass.	Vermillion, S. Dak.	Washington, D.C.
1174	938	1710	980	895	1117	1030	1810	1696	518	718	1748	330	1498	2015	1107	1628	938	483	893	1823	1178	764	1028	1889	742	1648
317	335	610	905	1790	218	427	747	507	753	815	663	1592	520	1022	2172	470	467	1580	2133	840	2180	548	1960	863	917	542
498	792	958	948	1947	597	1001	170	167	1173	1026	90	2002	194	446	2367	128	731	1858	2451	278	2341	1064	2110	282	1083	33
1623	1506	2368	1140	252	1631	1713	2153	2137	1138	1044	2113	733	1863	2282	349	2060	1389	292	516	2120	405	1433	290	2196	973	2045
823	1133	1258	1125	2124	941	1359	188	467	1490	1280	268	2295	478	100	2553	471	1036	2099	2696	150	2508	1410	2279	79	1314	392
1093	777	1100	1335	1706	952	536	1695	1465	659	1061	1614	1023	1424	1961	1944	1428	975	1317	1675	1770	2015	510	1858	1805	1161	1493
483	802	1184	733	1740	626	1087	291	435	1117	883	278	1904	178	438	2167	375	662	1701	2298	249	2130	1080	1900	325	916	290
268	481	1190	356	1348	394	831	711	696	689	432	666	1451	411	892	1765	618	259	1260	1855	702	1743	725	1514	774	479	594
92	410	957	603	1578	239	708	568	474	755	620	501	1578	258	802	1987	399	308	1450	2037	605	1974	688	1746	659	694	403
309	627	1088	632	1640	456	922	404	429	946	738	343	1745	115	603	2063	353	490	1567	2163	408	2035	904	1804	478	785	303
1035	878	1732	699	670	1018	1079	1628	1562	503	482	1575	585	1320	1803	985	1488	793	372	946	1618	1020	799	827	1692	468	1490
477	485	1338	235	1074	523	825	1023	983	469	122	972	1154	718	1197	1479	905	270	952	1547	1012	1470	624	1243	1085	187	895
315	621	1156	542	1552	468	938	483	522	905	666	444	1685	208	657	1975	445	452	1490	2087	467	1945	891	1715	540	705	397
1253	978	1662	1156	1115	1169	986	1902	1755	578	875	1834	347	1592	2126	1286	1695	1033	689	993	1930	1373	752	1238	1990	920	1726
818	882	1721	219	819	900	1221	1213	1258	786	390	1186	1225	952	1313	1248	1180	658	865	1447	1157	1206	1002	976	1240	284	1141
751	448	1150	870	1312	643	470	1398	1226	188	590	1324	858	1097	1642	1612	1170	568	977	1454	1445	1658	209	1470	1495	689	1210
807	492	941	1087	1595	666	288	1 5	1195	456	828	1335	1065	1140	1678	1885	1154	697	1249	1693	1487	1938	233	1753	1524	938	1214
693	591	1468	399	891	697	870	1275	1216	357	135	1222	901	967	1454	1271	1142	455	708	1297	1267	1288	615	1061	1340	167	1139
480	176	983	722	1385	370	358	1125	955	260	490	1051	1094	825	1371	1733	897	325	1116	1648	1175	1759	142	1552	1824	605	936
636	830	1545	272	1208	760	1187	849	946	926	547	827	1550	630	924	1638	870	591	1242	1833	776	1588	1043	1360	860	510	813
595	591	328	1192	2070	502	511	838	548	708	1098	756	1800	703	1113	2442	953	755	1840	2375	960	2450	733	2239	957	1203	647
480	370	1247	413	1117	472	678	1	1009	3	165	1037	1045	784	1300	1397	937	238	922	1500	1107	1505	326	1286	1173	280	943
1825	1602	2355	1522	910	1777	1675	2446	2352	1182	1312	2388	357	2135	2631	825	2283	1585	577	345	2445	956	1420	939	2515	1291	2295
----	319	923	605	1550	153	623	650	528	675	579	580	1513	345	892	1953	457	242	1400	1983	695	1945	598	1720	745	663	473
319	----	878	700	1483	195	358	953	778	422	529	878	1264	660	1205	1852	722	242	1250	1800	1010	1867	279	1652	1055	642	763
923	878	----	1516	2359	821	681	1095	802	1233	1402	1023	1998	1014	1357	2716	831	1067	2098	2603	1229	2740	950	2528	1210	1510	927
605	700	1516	----	1010	665	1050	1019	1047	692	291	985	1279	745	1145	1435	968	464	988	1585	975	1403	659	1173	1056	238	936
1550	1483	2359	1010	----	1582	1733	2030	2045	1162	978	1997	932	1754	2133	430	1967	1331	435	762	1978	395	1457	170	2060	887	1940
158	195	821	695	1582	----	470	758	586	602	604	683	1445	472	1015	1970	526	253	1390	1958	820	1973	470	1752	863	704	567
623	358	681	1050	1733	470	----	1173	932	575	845	1090	1318	923	1445	2063	899	599	1433	1923	1259	2098	280	1898	1287	960	968
650	953	1095	1019	2030	758	1173	----	293	1324	1144	83	2142	313	277	2455	287	873	1972	2568	142	2419	1230	2190	120	1189	204
528	778	802	1047	2045	586	932	293	----	1186	1095	220	2027	316	565	2458	79	771	1925	2510	426	2440	1037	2211	411	1166	145
675	422	1233	692	1162	602	575	1324	1186	----	405	1256	843	1013	1550	1488	1122	456	862	1386	1354	1523	297	1324	1412	502	1150
579	529	1402	291	978	604	845	1144	1095	405	----	1094	1032	837	1318	1373	1020	352	833	1425	1133	1372	617	1149	1205	115	1012
580	878	1023	985	1997	683	1090	83	320	1256	1094	----	2079	254	360	2419	205	808	1923	2518	805	2388	1153	2159	801	1143	122
1512	1264	1998	1279	932	1445	1318	2142	2027	843	1032	2079	----	1829	2345	1007	1960	1270	504	652	2152	1112	1067	1020	2220	1043	1980
345	660	1014	745	1754	472	923	313	316	1013	837	254	1829	----	545	2174	242	561	1670	2264	350	2145	939	1918	400	891	188
892	1209	1357	1145	2133	1015	1445	277	565	1550	1318	360	2345	545	----	2563	565	1094	2127	2725	197	2513	1484	2285	159	1345	480
1953	1852	2716	1435	430	1970	2063	2455	2458	1488	1373	2419	1007	2174	2563	----	2381	1723	636	536	2405	143	1783	295	2488	1293	2360
457	722	831	968	1967	526	899	287	79	1122	1020	205	1960	242	565	2381	----	699	1850	2436	406	2362	985	2133	407	1089	96
242	242	1067	464	1331	253	599	873	771	456	352	808	1270	561	1094	1723	699	----	1158	1738	898	1722	466	1500	958	450	710
1400	1250	2098	988	435	1390	1433	1972	1925	862	833	1923	504	1670	2127	636	1850	1158	----	592	1950	697	1155	548	2027	785	1845
1983	1800	2603	1585	762	1958	1923	2568	2510	1386	1425	2518	652	2264	2725	536	2436	1738	592	----	2548	680	1655	730	2525	1983	2437
695	1010	1229	975	1978	820	1259	142	426	1354	1133	205	2152	350	197	2405	406	898	1950	2548	----	2363	1290	2139	90	1165	313
1945	1867	2740	1403	395	1973	2098	2419	2440	1523	1372	2388	1112	2145	2513	143	2362	1722	697	680	2363	----	1820	229	2445	1282	2335
598	279	950	859	1457	470	280	1230	1037	297	617	1153	1067	939	1484	1783	985	466	1155	1655	1290	1820	----	1621	1333	726	1035
1720	1652	2528	1173	170	1752	1898	2190	2211	1324	1169	2159	1020	1918	2285	295	2133	1500	548	730	2139	229	1621	----	2216	1055	2105
745	1055	1210	1056	2060	868	1287	120	411	1412	1205	201	2220	400	159	2488	407	958	2027	2625	86	2445	1333	2216	----	1262	321
663	642	1510	238	887	704	960	1189	1166	502	115	1143	1043	891	1345	1293	1089	450	785	1383	1165	1282	726	1055	1242	----	1073
473	763	927	936	1940	567	968	204	145	1150	1012	122	1980	188	480	2360	96	710	1845	2437	913	2335	1035	2105	321	1073	----

S AND DIAL NUMBERS

71 70

Earle C. Anthony, Inc.
Sinair Marketing Bureau
Radio Corp of America

Henry Field Seed Co.
KRLD, Inc
Courier-Journal and Times

69 68

Iron Fee, Inc.
Radio Corp of America, Inc.

Rhodes Department Store
Edison Elec. Illuminating Co.
Frank P. Jackson
Chicago Daily News, Inc.
Calumet Broadcasting Co.

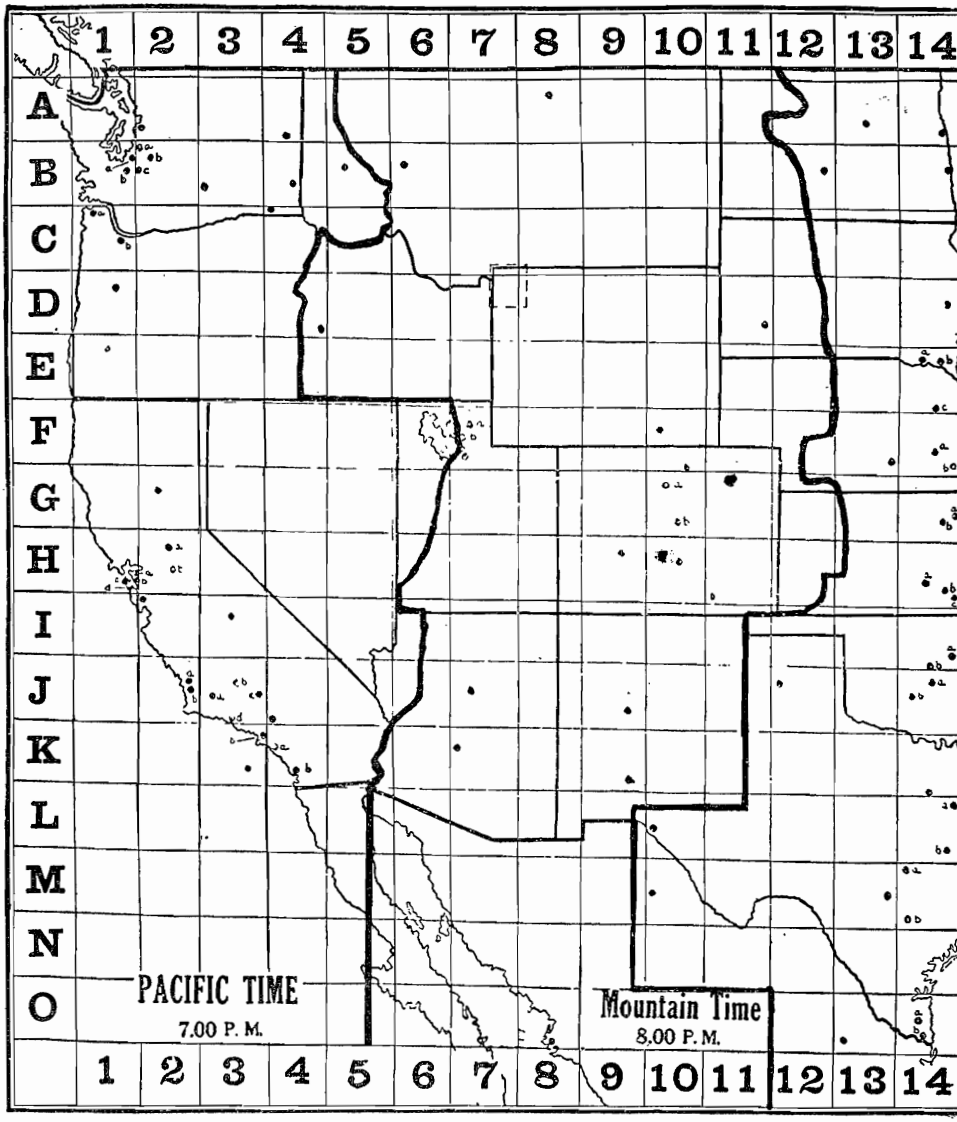
67 66

C. S. Russell
Morningside College
Marion Radio Corp
Detroit Free Press
St. Pauls P. E. Church
WJR, Inc.
Mississippi Valley Broadcasting Co.

a descending scale depending upon whether your dials read right to left or left to right. You will now find that you can tell at a glance where to set your dials for those stations you have not received by noting the dial readings for the group before and the group after.

For instance if you desire to tune in WHAS which has a frequency of 650 kcys. you will note in the illustration that it comes between 71-70 and 69-68 on the dials of the set used. Therefore if the dials of this set had been placed at 70-69 it would have been tuned to 650 kcys. and if WHAS were on the air and in range of the set it would have been tuned in.

To identify stations received without waiting for the call letters, compare the dial reading with the dial readings already entered and this will enable you to name the station you are hearing.



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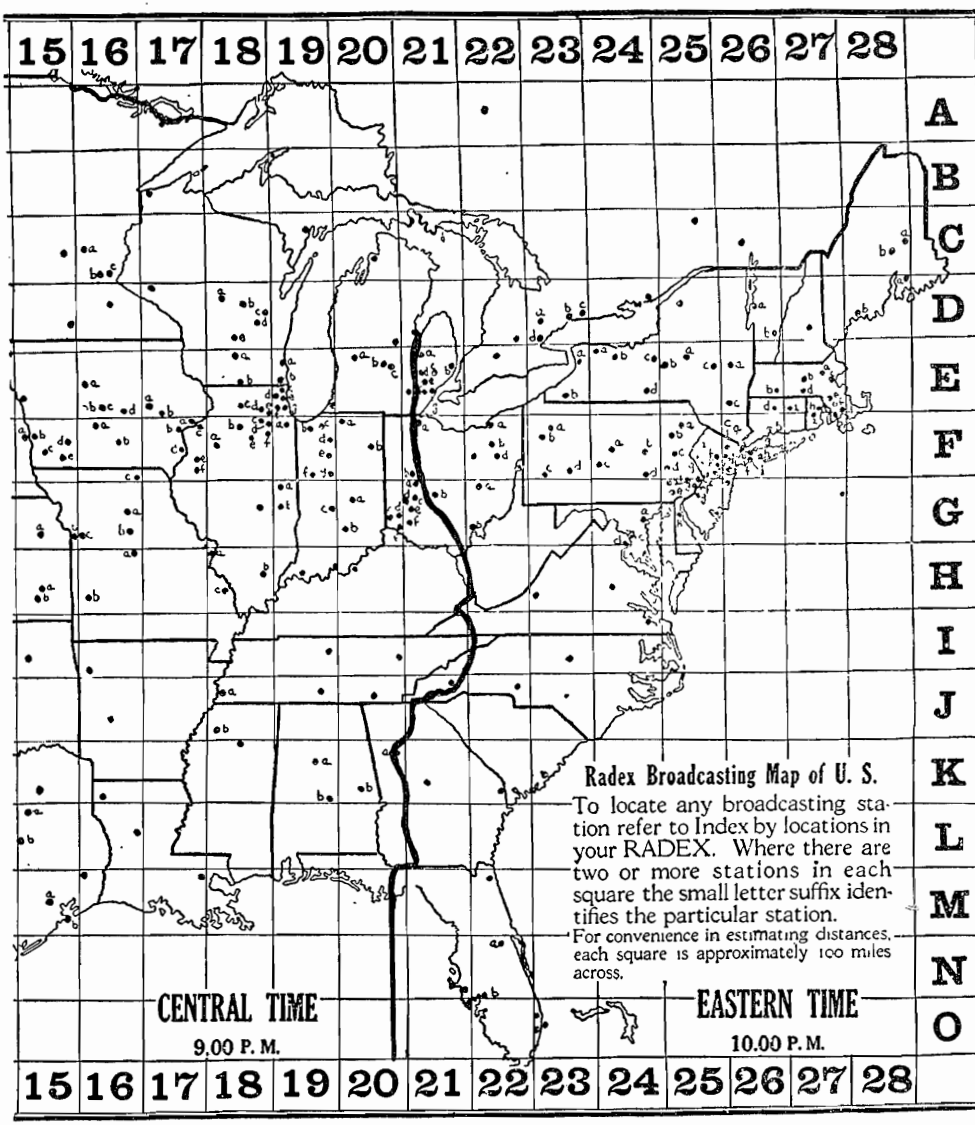
Street and No.....

City and State.....



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CFCL 580
Toronto, Ont.
CFCN 690
Calgary, Alta.
CFCO 1210
Chatham, Ont.
CFCT 630
Victoria, B. C.
CFCY 960
Charlottetown, P.E.I.
CFJC 1120
Kamloops, B. C.
CFLC 1010
Prescott, Ont.
CFMC 1120
Kingston, Ont.
CFNB 1210
Fredericton, N. B.
CFQC 910
Saskatoon, Sask.
CFRB 960
Twp. of King, Ont.
CFRC 1120
Kingston, Ont.
CHCA 690
Calgary, Alta.
CHCK 960
Charlottetown, P.E.I.
CHCS 880
Hamilton, Ont.
CHCT 840
Red Deer, Alta.
CHGS 1120
Summerside, P. E. I.
CHLS 730
Vancouver, B. C.
CHMA 580
Edmonton, Alta.
CHML 880
Hamilton, Ont.
CHNC 580
Toronto, Ont.
CHNS 930
Halifax, N. S.
CHRC 880
Quebec, Que.
CHWC 960
Regina, Sask.
CHWK 1210
Chilliwack, B. C.

CHYC 730
Montreal, Que.
CJBC 580-840-960
Toronto, Ont.
CJBR 960
Regina, Sask.
CJCA 580
Edmonton, Alta.
CJCJ 690
Calgary, Alta.
CJGC 910
London, Ont.
CJGX 630
Yorkton, Sask.
CJHS 910
Saskatoon, Sask.
CJOC 1120
Lethbridge, Alta.
CJOR 1030
Sea Island, B. C.
CJRM 1010
Moose Jaw, Sask.
CJRW 1010
Fleming, Sask.
CJSC 580
Toronto, Ont.
CKAC 730
Montreal, Que.
CKCD 730
Vancouver, B. C.
CKCI 880
Quebec, Que.
CKCK 960
Regina, Sask.
CKCL 580
Toronto, Ont.
CKCO 690
Ottawa, Ont.
CKCR 1010
Brantford, Ont.
CKCV 880
Quebec, Que.
CKFC 730
Vancouver, B. C.
CKGW 960
Bowmanville, Ont.
CKLC 840
Red Deer, Alta.
CKMC 1210
Cobalt, Ont.
CKMO 730
Vancouver, B. C.
CKNC 580
Toronto, Ont.
CKOC 880
Hamilton, Ont.
CKOW 840
Toronto, Ont.
CKPC 1210
Preston, Ont.

CKPR 1120 Midland, Ont.				**CZE** 860 Mexico City			
CKSH 1010 St. Hyacinthe, Que.				**CZF** 970 Chihuahua, Mex.			
CKUA 580 Edmonton, Alta.				**HHK** 830 Port au Prince, Haiti			
CKWX 730 Vancouver, B. C.				**KDKA** 980 Pittsburgh, Pa.			
CKY 780 Winnipeg, Man.				**KDLR** 1210 Devils Lake, N. D.			
CNRA 630 Moncton, N. B.				**KDYL** 1290 Salt Lake City			
CNRC 690 Calgary, Alta.				**KEJK** 1250 Los Angeles, Calif.			
CNRE 580 Edmonton, Alta.				**KELW** 780 Burbank, Calif.			
CNRM 730 Montreal, Que.				**KEX** 1180 Portland, Ore.			
CNRO 690 Ottawa, Ont.				**KFAB** 770 Lincoln, Nebr.			
CNRQ 880 Quebec, Que.				**KFAD** 620 Phoenix, Ariz.			
CNRR 960 Regina, Sask.				**KFAU** 1250 Boise, Idaho			
CNRS 910 Saskatoon, Sask.				**KFBB** 1360 Havre, Mont.			
CNRT 840 Toronto, Ont.				**KFBK** 1310 Sacramento, Calif.			
CNRV 1030 Vancouver, B. C.				**KFBL** 1370 Everett, Wash.			
CNRW 780 Winnipeg, Man.				**KFBU** 600 Laramie, Wyo.			
CYA 1000 Mexico City				**KFCB** 1310 Phoenix, Ariz.			
CYB 1090 Mexico City				**KFCR** 1500 Santa Barbara, Calif.			
CYC 890 Vera Cruz, Mex.				**KFDM** 560 Beaumont, Texas			
CYF 1130 Oaxaca, Mex.				**KFDX** 1210 Shreveport, La.			
CYH 800 Mexico City				**KFDY** 550 Brookings, S. D.			
CYJ 750 Mexico City				**KFEC** 1370 Portland, Ore.			
CYL 750 Mexico City				**KFEL** 940 Denver, Colo.			
CYM 1330 Torreon, Mex.				**KFEQ** 560 St. Joseph, Mo.			
CYO 710 Mexico City				**KFEY** 1210 Kellogg, Idaho			
CYQ 930 Tampico, Mex.				**KFGQ** 1310 Boone, Iowa			
CYR 630 Mazatlan, Mex.				**KFH** 1300 Wichita, Kansas			
CYU 960 Puebla, Mex.				**KFHA** 1200 Gunnison, Colo.			
CYX 920 Mexico City				**KFI** 640 Los Angeles, Calif.			
CYY 550 Merida, Mex.							

KFIF 1420
Portland, Ore.
KFIO 1230
Spokane, Wash.
KFIU 1310
Juneau, Alaska
KFIZ 1420
Fond du Lac, Wis.
KFJB 1200
Marshalltown, Iowa
KFJF 1470
Oklahoma City
KFJI 1370
Astoria, Ore.
KFJM 550
Grand Forks, N. D.
KFJR 1300
Portland, Ore.
KFJY 1310
Fort Dodge, Iowa
KFJZ 1370
Ft. Worth, Texas
KFKA 880
Greeley, Colo.
KFKB 1130
Milford, Kansas
KFKU 1220
Lawrence, Kans.
KFKX 1020
Chicago, Ill.
KFKZ 1200
Kirksville, Mo.
KFLV 1410
Rockford, Ill.
KFLX 1370
Galveston, Texas
KFMX 1250
Northfield, Minn.
KFNF 890
Shenandoah, Iowa
KFOA 1270
Seattle, Wash.
KFON 1250
Long Beach, Calif.
KFOR 1210
Lincoln, Nebr.
KFPL 1310
Dublin, Texas
KFPM 1310
Greenville, Texas
KFPW 1340
Sulphur Spgs., Ark.
KFPY 1390
Spokane, Wash.
KFQB 1240
Ft. Worth, Texas
KFQD 1230
Anchorage, Alaska
KFQU 1420
Holy City, Calif.
KFQW 1420
Seattle, Wash.
KFQZ 850
Hollywood, Calif.
KFRC 610
San Francisco, Cal.
KFRU 630
Columbia, Mo.
KFSD 600
San Diego, Calif.
KFSG 1120
Los Angeles, Calif.
KFUL 1290
Galveston, Texas
KFUM 1270
Colorado Spgs., Colo.
KFUO 550
St. Louis, Mo.
KFUP 1310
Denver, Colo.
KFUR 1370
Ogden, Utah
KFVD 700
Culver City, Calif.
KFVS 1210
Cape Girardeau, Mo.
KFWB 950
Los Angeles, Calif.
KFWC 1200
San Bernardino, Cal.
KFWF 1200
St. Louis, Mo.
KFWI 930
San Francisco, Calif.
KFWM 930
Oakland, Calif.
KFWO 1500
Avalon, Calif.
KFXD 1420
Jerome, Idaho
KFXF 940
Denver, Colo.
KFXJ 1310
Edgewater, Colo.
KFXR 1310
Oklahoma City
KFXY 1420
Flagstaff, Ariz.
KFYO 1420
Breckenridge, Texas
KFYR 550
Bismarck, N. Dak.
KGA 1470
Spokane, Wash.
KGAR 1370
Tucson, Ariz.

KGB 1360
San Diego, Calif.
KGBU 900
Ketchikan, Alaska
KGBX 1370
St. Joseph, Mo.
KGBY 930
Columbus, Nebr.
KGBZ 930
York, Nebr.
KGCA 1270
Decorah, Iowa
KGCB 1370
Oklahoma City
KGCH 930
Wayne, Nebr.
KGCI 1370
San Antonio, Texas
KGCN 1420
Concordia, Kans.
KGCR 1210
Brookings, S. Dak.
KGCU 1200
Mandan, N. Dak.
KGCX 1420
Vida, Mont.
KGDA 1370
Dell Rapids, S. D.
KGDE 1200
Barrett, Minn.
KGDM 1150
Stockton, Calif.
KGDP 1210
Pueblo, Colo.
KGDR 1500
San Antonio, Texas
KGDW 930
Humboldt, Nebr.
KGDY 1200
Oldham, S. Dak.
KGEF 1300
Los Angeles, Calif.
KGEK 1200
Yuma, Colo.
KGEN 1200
El Centro, Calif.
KGEO 930
Grand Island, Nebr.
KGER 1370
Long Beach, Calif.
KGES 930
Central City, Nebr.
KGEW 1200
Fort Morgan, Colo.
KGEZ 1310
Kalispell, Mont.
KGFF 1420
Alva, Okla.
KGFG 1370
Oklahoma City
KGFH 1000
Glendale, Calif.
KGFI 1310
San Angelo, Texas
KGFJ 1420
Los Angeles, Calif.
KGFK 1200
Hallock, Minn.
KGFL 1370
Raton, N. M.
KGFW 1420
Ravenna, Nebr.
KGFX 580
Pierre, S. Dak.
KGGF 1010
Picher, Okla.
KGGH 1310
Cedar Grove, La.
KGGM 1370
Albuquerque, N. M.
KGHB 1320
Honolulu, Hawaii
KGHD 1420
Missoula, Mont.
KGHF 1320
Pueblo, Colo.
KGHG 1310
McGehee, Ark.
KGHI 1500
Little Rock, Ark.
KGHL 950
Billings, Mont.
KGHX 1500
Richmond, Texas
KGIO 1320
Idaho Falls, Ida.
KGIQ 1320
Twin Falls, Ida.
KGIR 1360
Butte, Mont.
KGJF 890
Little Rock, Ark.
KGKB 1500
Goldthwaite, Texas
KGKL 1370
San Angelo, Texas
KGKO 570
Wichita Falls, Texas
KGO 790
Oakland, Calif.
KGRC 1370
San Antonio, Texas
KGRS 1410
Amarillo, Texas
KGTT 1420
San Francisco, Calif.

KGU 940
Honolulu, Hawaii
KGW 620
Portland, Ore.
KGY 1200
Lacey, Wash.
KHJ 900
Los Angeles, Calif.
KHQ 590
Spokane, Wash.
KICK 1420
Red Oak, Iowa
KJBS 1100
San Francisco, Calif.
KJR 970
Seattle, Wash.
KKP 1420
Seattle, Wash.
KLCN 1290
Blytheville, Ark.
KLDS 950
Independence, Mo.
KLRA 1390
Little Rock, Ark.
KLS 1440
Oakland, Calif.
KLX 880
Oakland, Calif.
KLZ 560
Denver, Colo.
KMA 930
Shenandoah, Iowa
KMBC 950
Independence, Mo.
KMED 1420
Medford, Ore.
KMIC 1120
Inglewood, Calif.
KMJ 1200
Fresno, Calif.
KMMJ 740
Clay Center, Nebr.
KMO 1340
Tacoma, Wash.
KMOX 1090
St. Louis, Mo.
KMTR 570
Hollywood, Calif.
KNRC 780
Santa Monica, Calif.
KNX 1050
Los Angeles, Calif.
KOA 830
Denver, Colo.
KOAC 560
Corvallis, Ore.
KOB 1180
State College, N. M.
KOCW 1420
Chickasha, Okla.

KOH 1370
Reno, Nevada
KOIL 1260
Council Bluffs, Iowa
KOIN 940
Portland, Ore.
KOMO 920
Seattle, Wash.
KORE 1420
Eugene, Ore.
KOW 1390
Denver, Colo.
KPCB 1210
Seattle, Wash.
KPJM 1500
Prescott, Ariz.
KPLA 570
Los Angeles, Calif.
KPO 680
San Francisco, Calif.
KPOF 880
Denver, Colo.
KPPC 1200
Pasadena, Calif.
KPQ 1210
Seattle, Wash.
KPRC 920
Houston, Texas
KPSN 950
Pasadena, Calif.
KQV 1380
Pittsburgh, Pa.
KQW 1010
San Jose, Calif.
KRE 1370
Berkeley, Calif.
KRGV 1260
Harlingen, Texas
KRLD 1040
Dallas, Texas
KRMD 1310
Shreveport, La.
KRSC 1120
Seattle, Wash.
KSAC 580
Manhattan, Kans.
KSBA 1450
Shreveport, La.
KSCJ 1330
Sioux City, Iowa
KSD 550
St. Louis, Mo.
KSEI 900
Pocatello, Idaho
KSL 1130
Salt Lake City
KSMR 1200
Santa Maria, Calif.
KSO 1380
Clarinda, Iowa

KSOO 1110
Sioux Falls, S. Dak.
KSTP 1460
St. Paul, Minn.
KTAB 1280
Oakland, Calif.
KTAP 1420
San Antonio, Texas
KTBI 1300
Los Angeles, Calif.
KTBR 1300
Portland, Ore.
KTHS 800
Hot Springs, Ark.
KTNT 1170
Muscatine, Iowa
KTSA 1290
San Antonio, Texas
KTUE 1420
Houston, Texas
KTW 1270
Seattle, Wash.
KUJ 1500
Longview, Wash.
KUOA 1390
Fayetteville, Ark.
KUOM 570
Missoula, Mont.
KUSD 890
Vermillion, S. Dak.
KUT 1120
Austin, Texas
KVI 1340
Tacoma, Wash.
KVL 1370
Seattle, Wash.
KVOO 1140
Tulsa, Okla.
KVOS 1200
Bellingham, Wash.
KWBS 1500
Portland, Ore.
KWCR 1310
Cedar Rapids, Iowa
KWEA 1210
Shreveport, La.
KWG 1200
Stockton, Calif.
KWJJ 1060
Portland, Ore.
KWK 1350
St. Louis, Mo.
KWKC 1370
Kansas City, Mo.
KWKH 850
Shreveport, La.
KWLC 1270
Decorah, Iowa
KWSC 1390
Pullman, Wash.
KWTC 1500
Santa Ana, Calif.
KWWG 1260
Brownsville, Texas
KXA 570
Seattle, Wash.
KXL 1250
Portland, Ore.
KXRO 1420
Aberdeen, Wash.
KYA 1230
San Francisco, Calif.
KYW 1020
Chicago, Ill.
KZM 1370
Hayward, Calif.
NAA 690
Arlington, Va.
PWX 750
Havana, Cuba
WAAD 1420
Cincinnati, Ohio
WAAF 920
Chicago, Ill.
WAAM 1250
Newark, N. J.
WAAT 1070
Jersey City, N. J.
WAAW 660
Omaha, Nebr.
WABC 860
New York City
WABF 1440
Kingston, Pa.
WABI 1200
Bangor, Maine
WABO 1440
Rochester, N. Y.
WABY 1310
Philadelphia, Pa.
WABZ 1200
New Orleans, La.
WADC 1320
Akron, Ohio
WAFD 1500
Detroit, Mich.
WAGM 1310
Royal Oak, Mich.
WAIU 640
Columbus, Ohio
WALK 1500
Willow Grove, Pa.
WAPI 1140
Auburn, Ala.
WASH 1270
Grand Rapids, Mich.
WBAA 1400
Lafayette, Ind.
WBAK 1120
Harrisburg, Pa.

WBAL	1060				**WCAL**	1250			
Baltimore, Md.					Northfield, Minn.				
WBAP	800				**WCAM**	1280			
Fort Worth, Texas					Camden, N. J.				
WBAW	1490				**WCAO**	600			
Nashville, Tenn.					Baltimore, Md.				
WBAX	1210				**WCAP**	1280			
Wilkes-Barre, Pa.					Asbury Park, N. J.				
WBBC	1400				**WCAT**	1200			
Brooklyn, N. Y.					Rapid City, S. D.				
WBBL	1370				**WCAU**	1170			
Richmond, Va.					Philadelphia, Pa.				
WBBM	770				**WCAX**	1200			
Chicago, Ill.					Burlington, Vt.				
WBBR	1300				**WCAZ**	1070			
Rossville, N. Y.					Carthage, Ill.				
WBBW	1200				**WCBA**	1500			
Norfolk, Va.					Allentown, Pa.				
WBBY	1200				**WCBD**	1080			
Charleston, S. C.					Zion, Ill.				
WBBZ	1200				**WCBM**	1370			
Ponca City, Okla.					Baltimore, Md.				
WBET	1360				**WCBS**	1210			
Boston, Mass.					Springfield, Ill.				
WBIS	1230				**WCCO**	810			
Boston, Mass.					Minneapolis-St. Paul				
WBMH	1310				**WCDA**	1350			
Detroit, Mich.					Brooklyn, N. Y.				
WBMS	1450				**WCFL**	970			
Union City, N. J.					Chicago, Ill.				
WBNY	1350				**WCGU**	1400			
New York City					Coney Island, N. Y.				
WBOQ	860				**WCLB**	1500			
New York City					Brooklyn, N. Y.				
WBOW	1310				**WCLO**	1200			
Terre Haute, Ind.					Kenosha, Wisc.				
WBRC	930				**WCLS**	1310			
Birmingham, Ala.					Joliet, Ill.				
WBRE	1310				**WCMA**	1400			
Wilkes-Barre, Pa.					Culver, Ind.				
WBRL	1430				**WCOA**	1120			
Tilton, N. H.					Pensacola, Fla.				
WBSO	780				**WCOC**	880			
Wellesley H'ls, Mass.					Columbus, Miss.				
WBT	1080				**WCOH**	1210			
Charlotte, N. C.					Greenville, N. Y.				
WBZ	990				**WCRW**	1210			
Springfield, Mass.					Chicago, Ill.				
WBZA	990				**WCSH**	940			
Boston, Mass.					Portland, Maine				
WCAC	1330				**WCSO**	1380			
Mansfield, Conn.					Springfield, Ohio				
WCAD	1220				**WCWK**	1230			
Canton, N. Y.					Fort Wayne, Ind.				
WCAE	1220				**WCX**	750			
Pittsburgh, Pa.					Detroit, Mich.				
WCAH	1430				**WDAE**	620			
Columbus, Ohio					Tampa, Fla.				
WCAJ	590				**WDAF**	610			
Lincoln, Nebr.					Kansas City, Mo.				

WDAG 1410
Amarillo, Texas
WDAH 1310
El Paso, Texas
WDAY 1280
Fargo, N. D.
WDBJ 930
Roanoke, Va.
WDBO 620
Orlando, Fla.
WDEL 1410
Wilmington, Del.
WDGY 1410
Minneapolis, Minn.
WDOD 1280
Chattanooga, Tenn.
WDRC 1330
New Haven, Conn.
WDSU 1270
New Orleans, La.
WDWF 1210
Cranston, R. I.
WDZ 1070
Tuscola, Ill.
WEAI 1270
Ithaca, N. Y.
WEAF 660
New York City
WEAM 1370
Plainfield, N. J.
WEAN 1160
Providence, R. I.
WEAO 550
Columbus, Ohio
WEAR 1070
Cleveland, Ohio
WEBC 1280
Superior, Wis.
WEBE 1210
Cambridge, Ohio
WEBQ 1210
Harrisburg, Ill.
WEBR 1310
Buffalo, N. Y.
WEBW 600
Beloit, Wisc.
WEDC 1210
Chicago, Ill.
WEDH 1420
Erie, Pa.
WEEI 590
Boston, Mass.
WEHS 1310
Evanston, Ill.
WEMC 590
Berrien Spgs., Mich.
WENR 870
Chicago, Ill.
WEPS 1200
Gloucester, Mass.
WEVD 1300
Woodhaven, N. Y.
WEW 760
St. Louis, Mo.
WFAA 1040
Dallas, Texas
WFAN 610
Philadelphia, Pa.
WFBC 1200
Knoxville, Tenn.
WFBE 1200
Cincinnati, Ohio
WFBG 1310
Altoona, Pa.
WFBJ 1370
Collegeville, Minn.
WFBL 900
Syracuse, N. Y.
WFBM 1050-1230
Indianapolis, Ind.
WFBR 1120
Baltimore, Md.
WFCI 1210
Pawtucket, R. I.
WFDF 1310
Flint, Mich.
WFI 560
Philadelphia, Pa.
WFIW 940
Hopkinsville, Ky.
WFJC 1450
Akron, Ohio
WFKD 1310
Philadelphia, Pa.
WFLA 900
Clearwater, Fla.
WGAL 1310
Lancaster, Pa.
WGBB 1210
Freeport, N. Y.
WGBC 1430
Memphis, Tenn.
WGBF 630
Evansville, Ind.
WGBI 880
Scranton, Pa.
WGBS 1180
New York City
WGCM 1210
Gulfport, Miss.
WGCP 1250
Newark, N. J.
WGES 1360
Chicago, Ill.
WGHP 1240
Detroit, Mich.
WGMS 1250
St. Paul-Minneapolis
WGN 720
Chicago, Ill.

WGR 550
Buffalo, N. Y.
WGST 890
Atlanta, Ga.
WGY 790
Schenectady, N. Y.
WHA 570
Madison, Wisc.
WHAD 1120
Milwaukee, Wisc.
WHAM 1150
Rochester, N. Y.
WHAP 1300
New York City
WHAS 820
Louisville, Ky.
WHAZ 1300
Troy, N. Y.
WHB 950
Kansas City, Mo.
WHBC 1200
Canton, Ohio
WHBD 1370
Bellefontaine, Ohio
WHBF 1210
Rock Island, Ill.
WHBL 1410
Sheboygan, Wisc.
WHBP 1310
Johnstown, Pa.
WHBQ 1370
Memphis, Tenn.
WHBU 1210
Anderson, Ind.
WHBW 1500
Philadelphia, Pa.
WHBY 1200
West De Pere, Wisc.
WHDI 1410
Minneapolis, Minn.
WHEC 1440
Rochester, N. Y.
WHFC 1310
Chicago, Ill.
WHK 1390
Cleveland, Ohio
WHN 1010
New York City
WHO 1000
Des Moines, Iowa
WHPP 1420
New York City
WHT 1480
Chicago, Ill.
WIAD 1370
Philadelphia, Pa.
WIAS 1420
Ottumwa, Iowa
WIBA 1210
Madison, Wis.
WIBG 930
Elkins Park, Pa.
WIBM 1370
Jackson, Mich.
WIBO 1480
Chicago, Ill.
WIBR 1420
Steubenville, Ohio
WIBS 1450
Elizabeth, N. J.
WIBU 1310
Poynette, Wisc.
WIBW 1300
Topeka, Kansas
WIBX 1200
Utica, N. Y.
WIBZ 1500
Montgomery, Ala.
WICC 1430
Bridgeport, Conn.
WIL 1350
St. Louis, Mo.
WINR 1210
Bay Shore, N. Y.
WIOD 1240
Miami Beach, Fla.
WIP 610
Philadelphia, Pa.
WISN 1120
Milwaukee, Wisc.
WJAD 1240
Waco, Texas
WJAG 1060
Norfolk, Nebr.
WJAK 1310
Kokomo, Ind.
WJAM 1200
Waterloo, Iowa
WJAR 890
Providence, R. I.
WJAS 1290
Pittsburgh, Pa.
WJAX 1260
Jacksonville, Fla.
WJAY 1450
Cleveland, Ohio
WJAZ 1480
Chicago, Ill.
WJBB 1010
Sarasota, Fla.
WJBC 1200
La Salle, Ill.
WJBI 1210
Red Bank, N. J.
WJBK 1370
Ypsilanti, Mich.
WJBL 1200
Decatur, Ill.
WJBO 1370
New Orleans, La.

WJBU 1210
Lewisburg, Pa.
WJBW 1200
New Orleans, La.
WJBY 1210
Gadsden, Ala.
WJJD 1180
Mooseheart, Ill.
WJKS 1360
Gary, Ind.
WJR 750
Detroit, Mich.
WJZ 760
New York City
WKAQ 580
San Juan, P. R.
WKAR 1040
East Lansing, Mich.
WKAV 1310
Laconia, N. H.
WKBB 1310
Joliet, Ill.
WKBC 1310
Birmingham, Ala.
WKBE 1200
Webster, Mass.
WKBF 1400
Indianapolis, Ind.
WKBH 1380
La Crosse, Wisc.
WKBI 1310
Chicago, Ill.
WKBN 570
Youngstown, Ohio
WKBO 1450
Jersey City, N. J.
WKBP 1420
Battle Creek, Mich.
WKBQ 1350
New York City
WKBS 1310
Galesburg, Ill.
WKBV 1500
Brookville, Ind.
WKBW 1470
Buffalo, N. Y.
WKBZ 1500
Ludington, Mich.
WKEN 1040
Grand Island, N. Y.
WKJC 1200
Lancaster, Pa.
WKRC 550
Cincinnati, Ohio
WKY 900
Oklahoma City
WLAC 1490
Nashville, Tenn.
WLAP 1200
Louisville, Ky.

WLB 1250
Minneapolis, Minn.
WLBC 1310
Muncie, Ind.
WLBF 1420
Kansas City, Mo.
WLBG 1200
Petersburg, Va.
WLBH 1420
Farmingdale, N. Y.
WLBL 900
Stevens Point, Wisc.
WLBO 1310
Galesburg, Ill.
WLBV 1210
Mansfield, Ohio
WLBW 1260
Oil City, Pa.
WLBX 1500
LongIslandCity,N.Y.
WLBZ 620
Dover-Foxcroft, Me.
WLCI 1210
Ithaca, N. Y.
WLEX 1420
Lexington, Mass.
WLIB 720
Chicago, Ill.
WLIT 560
Philadelphia, Pa.
WLOE 1500
Chelsea, Mass.
WLS 870
Chicago, Ill.
WLSI 1210
Cranston, R. I.
WLTH 1400
Brooklyn, N. Y.
WLW 700
Cincinnati, Ohio
WLWL 1100
New York City
WMAC 1440
Cazenovia, N. Y.
WMAF 1360
S. Dartmouth, Mass.
WMAK 900
Buffalo, N. Y.
WMAL 630
Washington, D. C.
WMAN 1210
Columbus, Ohio
WMAQ 670
Chicago, Ill.
WMAY 1200
St. Louis, Mo.
WMAZ 890
Macon, Ga.
WMBA 1500
Newport, R. I.

WMBC 1420
Detroit, Mich.
WMBD 1440
Peoria Heights, Ill.
WMBF 560
Miami Beach, Fla.
WMBG 1210
Richmond, Va.
WMBH 1420
Joplin, Mo.
WMBI 1080
Chicago, Ill.
WMBL 1310
Lakeland, Fla.
WMBM 1500
Memphis, Tenn.
WMBO 1370
Auburn, N. Y.
WMBQ 1500
Brooklyn, N. Y.
WMBR 1210
Tampa. Fla.
WMBS 1430
Lemovne, Pa.
WMC 780
Memphis, Tenn.
WMCA 570
New York City
WMES 1500
Boston. Mass.
WMMN 890
Fairmont, W. Va.
WMPC 1500
Lapeer. Mich.
WMRJ 1420
Jamaica, N. Y.
WMSG 1350
New York City
WNAC 1230
Boston. Mass.
WNAD 1010
Norman, Okla.
WNAT 1310
Philadelphia, Pa.
WNAX 890
Yankton, S. D.
WNBF 1500
Endicott, N. Y.
WNBH 1310
New Bedford, Mass.
WNBJ 1310
Knoxville, Tenn.
WNBO 1200
Washington, Pa.
WNBQ 1500
Rochester, N. Y.
WNBR 1430
Memphis, Tenn.
WNBW 1200
Carbondale, Pa.
WNBX 1200
Springfield, Vt.
WNBZ 1290
Saranac Lake, N. Y.
WNEW 1310
Newport News, Va.
WNJ 1450
Newark, N. J.
WNOX 560
Knoxville, Tenn.
WNRC 1440
Greensboro, N. C.
WNYC 570
New York City
WOAI 1190
San Antonio, Texas
WOAN 600
Lawrenceburg, Tenn.
WOAX 1280
Trenton, N. J.
WOBT 1310
Union City, Tenn.
WOBU 580
Charleston, W. Va.
WOC 1000
Davenport, Iowa
WOCL 1210
Jamestown, N. Y.
WODA 1250
Paterson, N. J.
WOI 560
Ames, Iowa
WOKO 1440
Peekskill, N. Y.
WOMT 1210
Manitowoc, Wis.
WOO 1500
Philadelphia, Pa.
WOOD 1270
Grand Rapids, Mich.
WOQ 610
Kansas City, Mo.
WOR 710
Newark, N. J.
WORD 1480
Batavia, Ill.
WOS 630
Jefferson City, Mo.
WOV 1130
Secaucus, N. J.
WOW 590
Omaha, Nebr.
WOWO 1160
Fort Wayne, Ind.
WPAP 1010
Cliffside, N. J.
WPCC 570
Chicago, Ill.
WPCH 810
Jersey City, N. J.

WPG 1100
Atlantic City, N. J.
WPOR 780
Norfolk, Va.
WPRC 1200
Harrisburg, Pa.
WPSC 1230
State College, Pa.
WPSW 1500
Philadelphia, Pa.
WPTF 680
Raleigh, N. C.
WQAM 1240
Miami, Fla.
WQAN 880
Scranton, Pa.
WQAO 1010
Cliffside, N. J.
WQBC 1360
Utica, Miss.
WQBJ 1200
Clarksburg, W. Va.
WQBZ 1420
Weirton, W. Va.
WRAF 1200
La Porte, Ind.
WRAK 1370
Erie, Pa.
WRAW 1310
Reading, Pa.
WRAX 1440
Philadelphia, Pa.
WRBC 1240
Valparaiso, Ind.
WRBI 1310
Tifton, Ga.
WRBJ 1500
Hattiesburg, Miss.
WRBL 1200
Columbus, Ga.
WRBQ 1210
Greenville, Miss.
WRBT 1370
Wilmington, N. C.
WRBU 1210
Gastonia, N. C.
WRBW 1310
Columbia, S. C.
WRC 950
Washington, D. C.
WREC 600
Memphis, Tenn.
WREN 1220
Lawrence, Kansas
WRHF 1270
Washington, D. C.
WRHM 1250
Minneapolis, Minn.
WRJN 1200
Racine, Wisc.

WRK 1310
Hamilton, Ohio
WRM 570
Urbana, Ill.
WRNY 1010
New York City
WRR 1190
Dallas, Texas
WRUF 1470
Gainesville, Fla.
WRVA 1110
Richmond, Va.
WSAI 800
Cincinnati, Ohio
WSAJ 1310
Grove City, Pa.
WSAN 1500
Allentown, Pa.
WSAR 1450
Fall River, Mass.
WSAZ 580
Huntington, W. Va.
WSB 740
Atlanta, Ga.
WSBC 1210
Chicago, Ill.
WSBT 1230
South Bend, Ind.
WSEA 780
Portsmouth, Va.
WSGH 1400
Brooklyn, N. Y.
WSIX 1210
Springfield, Tenn.
WSKC 1410
Bay City, Mich.
WSM 650
Nashville, Tenn.
WSMB 1320
New Orleans, La.
WSMD 1310
Salisbury, Md.
WSMK 570
Dayton, Ohio
WSPD 1340
Toledo, Ohio
WSRO 1420
Middletown, Ohio
WSSH 1420
Boston, Mass.
WSUI 580
Iowa City, Iowa
WSUN 900
St. Petersburg, Fla.
WSVS 1370
Buffalo, N. Y.
WSYR 570
Syracuse, N. Y.
WTAD 1440
Quincy, Ill.

WTAG 580 Worcester, Mass.				**WWL** 850 New Orleans, La.			
WTAM 1070 Cleveland, Ohio				**WWNC** 570 Asheville, N. C.			
WTAQ 1330 Eau Claire, Wis.				**WWRL** 1500 Woodside, N. Y.			
WTAR 780 Norfolk, Va.				**WWVA** 1160 Wheeling, W. Va.			
WTAW 1120 College Station, Tex.				**2BB** 1200 Havana, Cuba			
WTAX 1210 Streator, Ill.				**2LR** 1280 Havana, Cuba			
WTAZ 1210 Richmond, Va.				**2MG** 1050 Havana, Cuba			
WTBO 1420 Cumberland, Md.				**2OK** 860 Havana, Cuba			
WTBQ 1500 Wilmington, Del.				**2OL** 1170 Havana, Cuba			
WTFF 1460 Washington, D. C.				**2RK** 950 Havana, Cuba			
WTFI 1450 Toccoa, Ga.				**2TW** 1110 Havana, Cuba			
WTHS 1310 Atlanta, Ga.				**2UF** 1090 Havana, Cuba			
WTIC 600-1060 Hartford, Conn.				**6BY** 1150 Cienfuegos, Cuba			
WTMJ 620 Milwaukee, Wis.				**6KW** 880 Tuinucu, Cuba			
WWAE 1200 Hammond, Ind.				**7SR** 860 Elia, Cuba			
WWJ 920 Detroit, Mich.							

Are You a S. P. U. G.?

The Society for the Prevention of Useless Giving says:

"Give RADEX for Christmas"

What could be nicer than to remember your friends at Christmas with a copy of RADEX with a leatherette cover or a year's subscription? Think how much pleasure and help your present would bring them.

Make It a RADEX Christmas

We have provided an attractive Christmas card which we will mail to your friends bearing your greetings.

For 25c .....One Copy of RADEX
For 50c .....One Leatherette Cover
For 75c .....One RADEX and Cover
For $1.00 .....One year's Subscription
For $1.50 .....Subscription and Cover
For $2.00 .....Two subscriptions and one cover

The cover matches in beauty the finest set, protects the RADEX from wear and gives a solid writing surface for making entries. It is of imitation leather, blue, pebbled, with title stamped in gold.

Subscription Blank on Page 32

THE BIRTH OF THE VACUUM TUBE

Flickering of Gas Light Gave the Idea

From Radio Address by Dr. Lee De Forest

The birth of radio broadcasting took place in a hall bedroom in Chicago in 1900, according to a story of the invention of the vacuum tube by Dr. Lee De Forest, pioneer radio inventor, in the De Forest Audions opening broadcast given recently over the associated stations of the Columbia Broadcasting System.

In order that none of the facts in connection with this invention may be misconstrued, we are giving you the famous radio engineer's own account of how he discovered the small vacuum tube which plays such a large part in modern radio development:

"How did I come to invent the present-day vacuum tube? Was it just a lucky accident? Did I simply take the impractical two-element tube or Fleming Valve and add the grid to make that device really useful? Do I believe better vacuum tubes can be produced? What of the future of radio?

"So often are such questions asked that I shall take the five minutes alotted me on this program to answer them briefly.

"Follow me back to 1900. At that time I was engaged during the day as Associate Editor of the Western Electrician. Evenings found me in a hall bedroom in Chicago, experimenting with a toy called wireless telegraphy. Among proud possessions was a spark coil which gave vent to a wicked, crashing spark that never failed to thrill and spur me on to greater experimental efforts.

"Now a peculiar thing happened when I operated that spark coil in my hall bedroom. The Welsbach gas light would dim while the spark was on, only to resume full brilliancy the instant the spark ceased. A trivial occurrence, no doubt; but then an experimenter must ever be interested in trivial things that seem out of the ordinary. I was puzzled. What caused the dimming of that light? My first thought was the electromagnetic or wireless waves given off as the result of the spark discharge had a mysterious yet positive influence on the heated gas particles of the Welsbach burner. All of which led to further experiments. It was soon proven that the startling effect I had observed was only the result of sound waves, and not at all electric.

"However I had become convinced that this phenomenon of the gas flame might nevertheless be employed in the detection of wireless signals. At that time we had only crude wireless detectors and I was experimenting with an electrolytic type of detector as an improvement on the coherer. My first attempt at producing a new wireless detector based on my observations on the flickering gas flame took the form of two platinum wires placed at different points in the blue flame of a Bunsen gas burner. The platinum wires were connected with the antenna and the ground, respectively. Also, across the two wires, was a combination of sensitive telephone receivers and a battery. The arrangement worked — worked well enough, in fact, to encourage further experiments. This first heated gas wireless detector was constructed in 1903.

"But this gas flame detector was nothing more than a laboratory set-up. It could not be employed in commercial work. On shipboard, which was then the most promising sphere of wireless, we did not have gas for a gas burner. I thought of the electric arc, but that

proved too noisy. Finally, I decided to enclose my heated gas in a glass bulb, using a filament as the source of heat.

"No simple matter was it to secure the services of a good glassblower at that time. The big lamp companies were not interested in this far-fetched experiment. Finally, after long and patient search, I secured the co-operation of one Mr. McCandless, who manufactured miniature incandescent lamps in New York City. McCandless made up some experimental tubes for me, with carbon filaments and platinum plates.

"With the antenna connected to the platinum plate, and the ground to the filament, together with telephones and battery connected across plate and filament, I was confronted with the shunting or by-passing of much of the signal energy through the telephone and battery circuit, with considerable loss of efficiency. As a solution of this difficulty, I conceived of a third element. At first this took the form of a tinfoil band wrapped around the outside of the bulb, but that had little influence on the action of the tube. Next I tried a coiled wire inside the glass bulb. After various arrangements, I decided upon a zigzag length of wire, placed directly in the path between filament and plate. Because of its shape, I named it the grid. Three sets of battery were required to operate this device, and these I named A, B and C batteries, for want of better terms. And so I worked out the first practical vacuum tube or Audion. This first three-electrode vacuum tube dates from 1906.

"Simple as this device was, with its filament, grid and plate in an evacuated glass bulb, for we had learned then that it was a vacuum and not a gaseous content that was required, it soon displayed marvelous capabilities. For one thing, it was a relay of perfectly amazing performance. The slightest impulse could be made to control a powerful current accordingly, just as the slight tug on the lanyard of a giant gun may unleash a ton of destruction on a distant target.

"At first, I made use of the Audion as a super-detector for wireless reception. Soon its remarkable relay possibilities led me to develop the Audion Amplifier, first patented in 1907. In the fall of 1912, I demonstrated this device to the Bell System engineers, and gave permission to McCandless, my tube maker, to produce experimental Audions for the Bell System engineers. By 1915 utilizing Audions as repeaters or voice relays, these far-sighted engineers succeeded in establishing the first transcontinental telephone service between New York and San Francisco. Later in the same year, with the use of some 150 large Amplifier tubes, the Bell System engineers spoke by radio telephone from Arlington, near Washington, D. C., to the Eiffel Tower in Paris, and then to Pearl Harbor in Hawaii, almost 8000 miles away.

"Long before this, or ever since 1906, I had been undertaking wireless telephone experiments. With the troublesome and uncertain electric arc for producing the wireless or radio waves, I had succeeded in establishing wireless telephone service for the Navy, for commercial concerns and even for trains. In 1910 I undertook broadcasting on an experimental scale, from an office building near the Grand Central Terminal in New York City. Early in 1909 I essayed the broadcasting of an opera performance direct from the stage of the Metropolitan Opera House. I had the vision of broadcasting but, at that time, lacked the technical tools for practical success. It remained for the World War and the amazing mobilization of American scientific efforts to develop the Audion and its possibilities to the necessary degree for everyday purposes.

"The remainder of the story is too new and too familiar to require telling

at this time. With the advent of scheduled broadcasting, radio telephony became everybody's concern. The vacuum tube or Audion became an everyday commodity, soon found in every home. Radio programs became part and parcel of the life of the American people.

"And no one has received greater pleasure from the miraculous growth of broadcasting than myself. In the present-day achievements of this young art, I see reflected my fondest dreams come true.

"And so it is with keen and wholehearted interest that I have returned once more to my old playmate — the Audion. During the past few months I have delved once more into the intricacies of electrons and high vacuums and gases and rare metals. In company with my staff of research workers and engineers, we are digging down deep to the very foundations of matter, which are found in the vacuum tube. From our laboratory work we have gone to improved production methods. We have developed special filaments capable of long and more sustained life. We have obtained greater rigidity and uniformity through improved mechanical structure. We have developed improved exhausting and sealing methods, resulting in high vacuums heretofore believed unattainable in economic production. All of which has formed the basis for the new Audions, to which I have gladly lent my name, for I am convinced we have scored a decided step ahead in the radio art.

"And yet — well, we have hardly scratched the surface. All we have done has been by way of refinements and greater care. Yet daily we are learning more about what goes on within the glass bulb of this simple though marvelous mechanism. We are on the eve of important developments. New

(*Continued on page 53*)

LETTERS IN OUR MAIL BOX

A. Philip Bross of Asbury Park, N. J., writes us as follows:

"Received my RADEX this morning and within half an hour had secured two new subscriptions. Would be glad to get that leatherette slip cover you offer. RADEX cannot be beat and you may use my name freely."

* * * *

Beulah Sherwood Hagg of Little Rock, Ark., tells us "RADEX is the most complete and satisfactory method of logging radio and I am completely lost without my RADEX for constant reference while at the radio."

* * * *

From Chas. T. Phillipp of Columbus, Ohio, comes the following:

"Your publication, compact, neat, informative, correct and interesting, free from bunk and dollar-catching schemes is going to answer the question and fill a much-desired want." Evidently Mr. Phillipp likes RADEX.

* * * *

From an Ensign of the Salvation Army, Mr. Ira Frederick, comes this:

"I think RADEX is the most complete log I have ever been privileged to see — a very excellent tuning book."

* * * *

And here is a letter from a dealer, the Howard Radio Shop of Minneapolis: "We want you to know that we are very much pleased with RADEX. Our customers are enthusiastic about the very convenient arrangement."

* * * *

Here is an interesting letter from a good friend, Mrs. W. W. Alt, of Hyannis, Nebr.: "We are eagerly awaiting our next number of RADEX — it has

(*Continued on page 57*)

THOSE CHAIN PROGRAMS

A Few Misunderstandings

RADEX not long ago received a letter from a subscriber in Bath, New York which was interesting in many ways, one of which was the misunderstanding regarding chain programs which it contained and which seems to be rather wide-spread. We are reproducing this letter just as it was written:

"I received the October number of your RADEX O. K. I certainly like your RADEX. I would not be without it. Say, as I read the new ruling about kilocycles and cutting down all broadcasting stations to a lower wave length or less kilocycles, I thought by myself this new ruling is cutting out the listeners from getting far-off stations as a smaller amount of kilocycles allowed to each station, the music broadcast won't reach far enough to far-off listeners. I think this is a trick to benefit only chain stations and not the independent broadcaster. It's the same song as played by the chain-groceries to put out independent grocery stores. That's the way I understand it.

"Here let me tell you; there are different bands of chain-broadcasters, called the Red, the Blue, etc. Now if you would please explain to the RADEX subscriber what certain stations are connected with each Red or Blue station it would be a great help to listeners when they pick up some newspaper to look over the radio programs. It only tells some certain music to be played at certain times by the Red network and so on. I never could tell to save my head what network that certain stations belong to and what stations were connected with it. I think it would be very convenient to listeners to know all the stations that are connected to a chain station separately.

"I believe this short wave length is a trick of the chain stations. We use tod get mighty good music toward morning from southern states, jolly, very good music — now it's all cut out — dead — no good! Nothing but dinner music or some uninteresting music. Well this is what I happen to find out with this new ruling. I only thought I wanted to tell you how I feel about it."

Thousands of valued subscribers and readers of RADEX have almost no technical knowledge of radio and it is not strange that this modern miracle should confuse them. For this reason RADEX publishes no technical articles and endeavors to present its stories regarding radio in simple and non-technical language. Many articles have already appeared in our pages describing the operation of a radio set in elementary terms and more will follow.

In answer to our subscriber and to others who do not understand the "why" of radio, let us say: The number of kilocycles has nothing to do with the distance a program will carry except that signals seem to carry slightly better toward the middle of the dial, that is toward the center or upper parts of the broadcasting band. The distance is governed almost entirely by the *power* of the station. This is expressed in watts. Some stations use as low as five watts while others use 50,000. There are more than 600 stations in the United States and only 90 separate channels or wave-lengths. So there is a vast crowding with division of time and other make-shifts to distribute them as best we can. Just as each different key of the piano has a different frequency, so has each wave-band. Just as each piano wire must vibrate a different number of times per second (frequency) to produce a different key, so must each

broadcasting station have a different vibration or beat called frequency. Stations are each assigned a certain frequency. The faster (or higher) the frequency the less the distance between the crest or wave of one beat and the next and consequently the LOWER the wave length. The lower the frequency, the greater or higher the wave length.

Several companies have undertaken the task of providing radio programs and make them available to many stations just as some companies provide vaudeville talent and make it available to a "chain" or theatres. Usually the talent employed is of a much greater calibre than any one theatre or station could afford to furnish itself. The National Broadcasting Company or NBC as it is called, has built up two such chains.

One of these programs is released through station WEAF of New York to a group of stations who buy that particular program. The other is released through WJZ of New York to another group. These are no longer called the Red and the Blue as they were formerly. Then the Columbia Broadcasting System also releases programs some of them through station WOR of Newark and some through WABC of New York. All these programs are published each month in RADEX under the heading, "What's on the Air Tonight?" and following each feature is a list of the stations which have contracted to send out that particular feature. The first station in this list is either WEAF, WJZ, WOR or WABC and this indicates which particular program it is.

Smaller cities find it difficult to supply enough different talent to keep up a constant series of interesting and worthwhile programs. But owing to the position of New York City in the theatrical and lyceum world, this is fairly easy in the metropolis. So instead of one station trying to pay the high price demanded by Whiteman's Band for instance, this is divided between as many as forty stations through the NBC or the Columbia syndicates. Independent stations may buy these programs or furnish their own — that is for each station to decide for itself. Hence there is in the chain broadcasting nothing at all resembling the competitive condition in chain groceries as our good friend fears.

BREAKING DOWN THE BARS

(*Continued from page 9*)

told, by his cellmate, of one Ohio young man confined there. He was of good family and was engaged to marry a vocal soloist prominent in musical circles in their home city. As they sometimes do, the young man of good family made a mistake and was sent to the "pen." Shortly after his arrival he installed a radio set to while away the monotonous hours in the evening. His favorite stations were those of his home town, and nightly he tuned them in.

Then, one night, he heard the piano play the opening bars of his favorite song — "Love's Old Sweet Song" — and the name of his former fiancee was announced as the soloist. He listened to the song, with tears streaming down his cheeks, and when it was finished he turned off his set and cried himself to sleep. He did not touch his radio again for two weeks, and when he finally did, his home town stations were carefully avoided.

BIRTH OF VACUUM TUBE

(*Continued from page 51*)

Audions or vacuum tubes of untold possibilities are within sight in our research laboratories. Indeed, the radio of tomorrow promises to be just as far ahead of today as today is ahead of the wireless days when my Welsbach gas lamp grew dim in that hall bedroom back in Chicago."

ANTENNA CHARACTERISTICS

By FRANK S. SAUNDERS

No chain is stronger than its weakest link; neither is a radio set any better than its aerial and ground system. It is absolute folly to purchase an expensive set, then throw up an aerial regardless of insulative properties and hitch a ground wire either to the steam radiator or twist it around the water faucet with the fingers and expect perfect reception. Too much emphasis cannot be placed on this subject, for at its best the antenna picks up very weak impulses of electromagnetic waves. If we induce leakage in our aerial system by careless erection and resistance in our ground through leaded joints and loose contacts we certainly decrease the efficiency of our set, besides inducing needless noises.

Opinions differ somewhat as to which is the better type of antenna, the T-type or the inverted L. For general all-around reception I believe the inverted L is preferable as it is not quite as directional, although it will receive signals from the free end somewhat better than the lead-in end. The T-type receives signals equally well from either end; but is more troublesome to erect.

The loop type of inside antenna is very directional. This is one of its chief advantages as it greatly reduces static and interference from undesired stations. When one edge of the loop is pointed toward a sending station, signals are received with maximum intensity. By slowly rotating the loop the signals decrease and at right angles, practically cease. This is caused by the wave cutting both sides of the loop simultaneously. Although the amount of energy received by this type is often very small, when amplified it produces the clearest signals of any other antenna. So reliable is this device, especially on short waves, that it is the controlling factor of the radio compass.

The electric light service wires may be utilized for a temporary antenna but care must be exercised so that direct connection will be made only on the grounded side. Otherwise a small series condenser must be used. By using a 110 volt test lamp one may easily ascertain the live from the grounded wire. I can detect no appreciable difference in signal strength in either case. This make-shift is not recommended for permanent operation.*

Erect a good antenna in the open, insulate it well from all foreign objects and connect a ground wire to the cold water pipe with a reliable ground clamp and you have done much toward giving your set a fair chance of producing loud clear programs.

* * *

*Editor's Note: Novices are urged to make connection with the electric light system only through one of the devices for that purpose which may be obtained at any good radio store. These eliminate all danger of shock or short circuit.

Radio and the Religious Life

A Statement by Dr. S. Parkes Cadman

To relate the circumstances leading to my present relation to Radio work, I have to go back several years when the invitation was extended to me to place the morning service of the Central Congregational Church "on the air." The outcome of that (for me) memorable incident was that the Bedford Branch of the Y. M. C. A., Brooklyn, undertook to broadcast through WEAF the Men's Conference I had held there for twenty years previously. Within a few weeks I discovered the seemingly infinite possibilities of the novel venture.

It passed at a bound beyond the experimental stage, and challenged the best endeavors of all engaged in it. For a prolonged period before the National Broadcasting Company began to universalize religious privileges, church leaders had lamented the comparative failure of the normal means for the transmission of those privileges.

It was frequently said by church authorities that the vital spark was no longer kindled in the pulpit. The lessening of popular interest in institutional religion, the decreased attendance upon divine services, the increased pursuit of recreation and pleasure, the break-down of the observance of the Lord's Day, and the falling off of multitudes of young people from Bible Schools and kindred organizations troubled countless devout and sincere souls.

The cry went up from numerous quarters: "What can be done to arrest this decay in the nation's spiritual development?"

At so critical a juncture radio broadcasting was introduced and the scene was changed. That latest marvel of science showed that, rightly used, science was still the hand-maiden of religion. Never since time began, has a more influential agency appeared than this near-miracle of invisible audition. It arouses wonder in the dullest and most inert minds, and goes beyond the highest expectations of the brightest and most alert. Through its mysterious agency the songs, prayers, readings, meditations and utterances of selected men were placed at the command of every household in the land. Sixty-three thousand letters on file, and quite as many more which have been otherwise disposed of demonstrated the deep and indeed, the passionate allegiance of the American people to what has been finely phrased as "the things of the Spirit."

At least sixty-five percent of these letters dealt with major matters which have fascinated thought from the birthday of human consciousness. These were the being and nature of God, the mediatorship of Jesus, the immortality of the soul, the life beyond the grave, and equally grave and momentous questions.

They came as a revelation to some of us who had been living in a somewhat circumscribed world, hedged about by erroneous ideas. Moreover, they not only asserted beyond successful contradiction the widespread desire for religious instruction, but the imperative necessity for it. Without for a moment disregarding the conscientious differences existing between creeds and denominations, it was clear that outworn and superfluous barriers separated them from mutual sympathy and understanding and from that co-operative service which is the world's chief good today.

As these experiences, gained by actual radio contacts, grew from more to more, it dawned upon me that I ought to dedicate all I am or can hope

to be to so providential an opportunity. Musicians, educators, scientists, statesmen and dramatists were quick to seize its skirts. Their concerts, addresses and plays speedily won millions of constituents. Surely religion, which is the first business of a free people, should be placed where it belongs in radio's splendid Realm—at the front.

Thanks to the generous provisions of the broadcasting authorities, it has had an unprecedented hearing in the past decade. And its future is so radiant with promise, that moderate forecasts would sound like wild predictions. Space forbids me to quote extracts from the correspondence mentioned above. Suffice it to say that their gist can be expressed in the repetitious line of an old negro exhorter's hymn—

"Go on! go on! go on! go on!"

Had not men and women of every rank and condition thus written from near and far, I might have retreated before the solemn responsibilities which radio broadcasting imposes on those who employ its vast medium. The vision of the throngs awaiting the moment for "tuning in" has often risen before me. Roman Catholics, Jews, Protestants, and those of no particular religious persuasion were ever present in one's heart. Their multiform necessities, sorrows, joys, beliefs or nonbeliefs were clamant and stormy in my ears. Truly in order to reach so complex a mass the message must be basic, comprehensive, pertinent and alive with the ideals and sentiments which register humanity at its best. Anything merely peculiar or personal or eccentric or segmental was plainly out of place here.

The paramount demand evidenced by the unseen audience was for light rather than heat, conference rather than controversy, and above all, constructive helpfulness and not chronic fault finding. I therefore resolved that wherever I could fan the spark of faith to a flame, burn on what alter it may, I was obligated so to do.

Allow me to herewith acknowledge the inexpressibly valuable help and guidance a radio audience gives. Any speaker gets back what he gives. It is returned to him pressed down and running over. If he is bitter, bigoted and denunciatory, he reaps as he has sown. If he is brotherly, magnanimous and considerate, there is no nation more hospitably inclined to reciprocate in kind than our nation.

At the same time, the American people are quick to detect sooth-saying, lack of moral courage or infirmity of purpose in a radio speaker. They require that he or she shall be bold, and again bold, and yet not too bold. Their courtesy, patience and ability to "go along" with the speaker at the microphone are nothing short of remarkable. But he must not take unfair advantage of an issue, nor blink the argument to floor the man. They like to feel that he can put himself in the other person's place, get under his skin, see life as he sees it, and then do all possible to exchange with him the conceptions which illuminate the dark path and ease the heavy load.

The famous clergyman and author, Ian Maclaren, said to me just before his death: "What people really need today is relief and succor, and if I had to recommence my ministry tomorrow I should strive to give these to them."

I go to my new duties with his words ringing in my memory. Pursuant to a great call I shall undertake my Lord's Day Radio Addresses and Answers to Questions with those advantages the past has conferred, and by a strict observance to those principles I have briefly outlined here.

The Federal Council of the Churches of Christ in America has given its approval to this larger public service and the services themselves will be under the sponsorship of this nation-

wide organization. But I earnestly solicit the sanction and support of citizens of every faith who crave the moral ascendency of the American Republic. Not in clever politics, nor in actual statesmanship; not in material possessions nor in scientific learning, but in the will of our beloved nation to fulfill the Highest Will, are her safety and her strength. That the tendency toward that Will is more prevalent than surface indications suggest, I for one, firmly believe.

Therefore, for these reasons I have set forth so imperfectly, I propose on and after the second Lord's Day in October (October 14) to identify my radio ministry more directly and completely with the National Broadcasting Company, and pray that God's blessing may hallow the enterprise.

OUR MAIL BOX

(*Continued from page 51*)

helped us more than anything else to pick up stations; it has also helped wonderfully in getting acquainted with our Radiola which was rather new to us when I started my subscription to your valuable little RADEX. I wish I could get you some new subscribers but we live on a ranch in the sandhills where neighbors are few and far apart. If ever I have the opportunity I surely will introduce RADEX."

* * * *

Just one more letter this month. This is from Mr. M. A. Detter of the American Trust and Banking Co. of Chattanooga, Tenn.: "I have purchased several kinds of log-books but I like RADEX better than any other on account of the neat appearance, handy size and convenient arrangement of information."

We are always glad to hear from our readers and to furnish them any information we can. We also want to receive suggestions for the betterment of your "Tuning Book."

MECHANICAL MUSIC

All broadcasting stations using phonograph records, piano rolls or other mechanical reproducing means will be required to announce that fact before each selection, under the terms of an order issued by the Federal Radio Commission.

The order requires that "all broadcasting stations shall announce clearly and distinctly the character of all mechanical reproductions broadcast by them, the announcement to precede each such program item. In such announcements each phonograph record used, whatever its character, shall be described as a 'phonograph record'; each piano player selection used shall be described as played by 'mechanical piano player'; every other mechanical reproduction shall be similarly described by the term generally used and understood by the public as meaning such mechanical reproduction."

There has been a somewhat amusing protest against the use of phonograph records notwithstanding the fact that it is practically impossible to tell whether the music is coming from a record or from the orchestra itself. As for us we would much rather listen to a record by a good orchestra than the original efforts of a poor or mediocre one.

The phonograph companies go to enormous expense in providing the very finest talent available for their records and RADEX can see no possible objection to their use in radio programs. As a matter of ethics the use of records ought to be announced but from the standpoint of good entertainment no possible objection within reason can be advanced. If one has already heard that particular record, he can do just what he does when he hears another radio program he doesn't care for—turn

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Pictures of Current Events by Radio

Coming but not for a long time says R. P. Clarkson

Not for many years will it be possible to send radio pictures of events as they happen, it is predicted by R. P. Clarkson, prominent radio author in a review of an exhaustive investigation of the television situation just completed by the Radio Manufacturers Association.

At present, four distinct methods are being employed to carry visual matter through the ether by radio communication, two of them providing permanent records at the receiving end in the form of photographic prints, the other two producing transient images lasting but the fraction of a second. The first group are utilized largely for commercial purposes by communications companies, news associations and individual newspapers or newspaper chains. The latter, or transient methods, are for public entertainment and now available in a few sections of the country for the experimental radio fan.

The transient images are produced by methods called television but should be divided into television and radio images. Television applies only where objects or scenes which are before the televisor can be observed at the receiving set. This is the hoped for development now in a very crude and unsatisfactory state.

Radio images on the other hand, are transmitted from a film at the station studio and are received as transient images at the receiver. At the present time this is done by only one station and that on short waves, but it is expected that one or more stations in the broadcast spectrum may experiment during the coming months with something of this kind. From the receiving standpoint, the method differs in no way from television receiving but at the transmitting end there is a vast difference. The films are not of the ordinary movie variety but are made by photographing a succession of drawings especially for radio transmission. These drawings are simple cartoons, shadowgraphs, or silhouettes, in plain black and white. Direct illumination is possible by passing light beams through the film to the photo-electric cell, while in television the object must be illuminated and only the reflected light therefrom reaches the photocell. The scanning method with film is simpler, also, in that the light beam need only oscillate to and fro while the film itself is moved lengthwise.

Of the two visual broadcasting methods which produce permanent records at the receiving end, the best known is that in which an actual photograph or photographic negative is employed at the transmitter. This film or print may be scanned in numerous ways, both electrically and mechanically. It is even possible to scan the print or film long previous to the broadcast period and to record on a phonograph record the resulting electrical impulses and variations. Then at any time the phonograph record may be played before the microphone and those impulses go out over the radio channels to produce light variations at the receiver. These light variations are focused on sensitized paper which moves beneath the light source at a predetermined speed until its entire surface has been affected or "printed." The print is then developed and fixed by ordinary photographic methods. The entire action is called phototelegraphy and differs materially from any form of television, both as to the apparatus used, the system employed, and the results achieved.

Facsimile transmission most closely resembles phototelegraphy. A written or printed message or diagram, a maga-

zine cover or a fashion sketch, is sent over the wire or through the ether just as though it were a photograph, and at the receiver may be reproduced in photographic form as described above, or traced by chemical action or even by a moving pen or pencil as well known in the telautograph used in banks and railroad terminals. This is a form of visual broadcasting which lends itself largely to commercial use.

The method of scanning in facsimile transmission does not differ greatly from that employed in television, except as to the important matter of time. Where television requires a completed job in a tenth of a second or less, facsimile transmission may even take hours, if need be, and still have great value.

MOST WONDERFUL LAMP

(*Continued from page 8*)

but insulated from it. This grid is directly in the path to the plate.

Now if we charge this grid with negative electricity it will repel the electrons passing from the filament electrons which try to pass from filament to plate—for like charges repel each other. According to the strength of the negative charge on the grid, more or less electrons will pass through it to the plate. Sometimes it will allow a lot of the electrons to pass, at other times only a few.

Now electrical oscillations — rapid changes from positive to negative and negative to positive, picked up by the receiving aerial—form into groups at the broadcasting station. Now, if we connect the grid in the aerial circuit of a valve set these oscillations will act exactly as described above, in allowing a greater or less number of electrons to pass from the filament to the plate.

This changing flow, by connecting the phones in the plate circuit, is transmitted to the phones themselves, the electric current operating tiny electro magnets which vibrate the discs in the phones and change the electrical impulses into vibrations in the air, which we can hear.

This, briefly, is the way in which the wireless valve works. So far I have only spoken of it as a detector or "rectifier." But a valve can also be used as an "amplifier."

There are two kinds of amplifiers—High Frequency Amplifiers and Low Frequency Amplifiers—or Radio Frequency and Audio FrequencyAmplifiers, as they are sometimes called. The difference is this: A Radio Frequency Amplifier increases the strength of the oscillations before they reach the rectifier (detector); an Audio Frequency Amplifier increases the strength of the impulses after they have been rectified. Thus you will see that Radio Frequency amplification is used in picking up distant stations or weak signals, but adds very little, if at all to the loudness of signals in the phones, whilst Audio Frequency amplification increases the loudness of signals picked up by the detector, but will not pick up any signals that the detector alone will not.

Amplifiers can be used in conjunction with both crystal and valve detectors. Where one valve is added to a crystal set it is usually as an Audio Frequency Amplifier. This is the best use to which you can put one valve if you wish to add to your crystal set.

The little explanation I have given you of Radio Frequency and Audio Frequency amplification will enable you to understand the meaning of the abbreviations often used in connection with valve sets. When you see, for instance, a four-valve set described as "Det., 1 R. F., 2 A. F.," it simply means that one valve is used as Detector or Rectifier, one as Radio Frequency Amplifier, and two as Audio Frequency Amplifiers.

One of the most wonderful things about the Thermionic Valve is its use

for transmitting messages. It is certainly a most wonderful little thing, and the name someone has given it is a most suitable one, for they called it "The little lamp which speaks and hears."

MECHANICAL MUSIC

(*Continued from page 57*)

the dials! There is a vast library of records available and how much better to listen to some of the masterpieces of the past than to listen over and over to "Old Man Sunshine." We for one would welcome hearing the now silent voices of Bryan and Roosevelt and Wilson as recorded during their life times as well as the songs of Caruso and others who will never sing for us in life again. Why has no broadcasting station ever tapped this reservoir of interesting and touching features for its programs?

WHEN SET GOES WRONG

(*Continued from page 7*)

plates and you will ruin the battery if you do not observe this carefully. For, if the water level is neglected and falls below the top of the plates, they may become sulphated. If you have had this happen give the battery a slow overcharge, at a low rate, for four or five days. Furthermore, only distilled water should be added, and it should be kept in a glass or porcelain container, as a metal container gives off particles of metal in the water, and other impure water, containing salts or minerals, deposits a thin coating on the plates, and prevents them from working properly.

Faulty Connections on A-Battery

See that the wires connected to the storage battery are tight and make a good electrical contact. It often happens that the spray caused by charging ruins the insulation and also eats away the wire. Around the positive pole, which is marked P. pos. or +, you will often find a collection of green-colored corrosion, either in the form of a chalky substance or a paste. This soon corrodes the wire and makes renewal necessary. Often the cause of crackling and spluttering noises is found right at this point, and by cleaning the terminal, cutting off the corroded end of the wire and making a new connection, the trouble can be eliminated. Corrosion here is also apt to set up high resistance, due to the smaller diameter of the corroded wire, and then it will be impossible to pass enough current to permit the tubes to function efficiently. Less trouble of corrosion is, however, experienced with the negative post, which is marked N. neg. or —, although this one should also be gone over carefully. When wires are removed from the battery, be sure to get them on again correctly, for the proper operation of the set depends on this. However, you do not have to be afraid of blowing the tubes by having the storage-battery connections reversed. The wires from the storage battery to the receiver should preferably be No. 14 gauge, stranded, rubber-covered wire. After the wires are securely connected to the battery, cover the whole terminal, including the wire, with a coating of vaseline; this will prevent much of the corrosion which may otherwise take place.

Precautions for Examining and Charging

Two more points must be remembered when examining and charging a storage battery; never hold a lighted match over the cells to inspect the level of the electrolyte, for the hydrogen fumes produced by charging are highly combustible, and there may be a serious accident. Also, be sure to remove the

caps of the battery while charging for it sometimes happens that the little vent holes in these caps become clogged, and the gas inside, setting up a considerable pressure, may finally force out the obstruction, with the result that a stream of electrolyte will squirt out of the battery, causing damage to rugs and furniture. A storage battery should always be kept in a place having a moderate temperature, where there is no danger of extreme heat or cold. In case you suspect that there is serious internal trouble in your battery, take it to a competent battery-service station.

Dry-Cell A-Batteries

Many radio sets, especially those of a portable type, use dry-cell A-batteries instead of storage A-batteries. Although convenient and lighter in weight, dry cells can only be used on the small type of tubes, which do not have the amplification value that the large tubes have. Besides, a dry-cell A-battery is more expensive than a storage A-battery, for dry cells are not rechargeable, and when exhausted, they have to be replaced with new ones. The length of time they will give service depends of course, on how much the set is used. If reception gets weak you should test each cell separately. The method of doing this is to touch both terminals of a cell with the testing points of a dry-cell ammeter having a 0 to 30 reading. A good, new dry cell usually reads from 25 to 30 amperes when the ammeter is applied, which is only done for a moment and is therefore called "flashing." When the cells do not give more current than 10 to 15 amperes, they should be discarded. If they have begun to swell and a white or green-colored pulp comes out, you can be sure that they are worthless and it is not even necessary to test them. Always throw them out before they reach this condition.

Testing B-Batteries

B-batteries provide plate voltage for the tubes, and this voltage must be kept fairly constant to permit the proper operation of the tubes. Each B-battery consists of a number of small 1½-volt cells, connected in series to provide a greater voltage. An 0 to 50-reading voltmeter is the proper instrument to use for testing B-batteries. An amperage test on B-batteries is meaningless as only an extremely small current is required. One well known battery manufacturer recommends using B-batteries until they have dropped to one half of their original value, although this does not mean that the plate voltages on the tubes should be allowed to drop to one half of their normal values. To do this a number of old B-batteries of decreased voltage are connected together to obtain the proper voltage for the tubes, provided of course, none of the batteries are noisy or otherwise defective.

Noisy B-Batteries

B-batteries are, however, apt to become noisy when their voltage drops lower than two-thirds of their original value. This trouble is especially likely to occur in poorly constructed B-batteries, having no moisture-proof insulation. Irregular fluctuations in the volume of reception, sometimes accompanied by more or less noise, can often be traced to noisy B-batteries. The trouble can be detected by using a pair of headphones and holding the cord tips across the battery terminals. Be sure to hold the tips immovably and then listen for noise. Sometimes the voltage fluctuations are so violent that they can even be seen on the needle of a voltmeter.

When your receiver suddenly ceases to operate with the tubes lighting properly, the source of the trouble may be found to be a broken internal con-

nection in a B-battery. As the cells are all connected in series, such a break would render the entire battery inoperative. Even newly purchased B-batteries sometimes have this trouble. Changing weather conditions affect B-batteries so you should never keep them in an exposed place as on a window sill. Proximity to a radiator will also injure them.

Correct and Incorrect Plate Voltages

Be sure that the B-batteries are hooked up correctly; detectors usually have a plate voltage of 18 to 45 volts; r. f. amplifiers customarily require from 45 to 90 volts and a. f. amplifiers take from 90 to 135 volts, depending on the types of tubes used and their method of coupling. Anyway, be sure to follow the specific instructions furnished with your set when hooking up the B-batteries, and be sure to remove all the tubes first, for many radio owners have blown their tubes by accidentally short-circuiting the wires, or allowing them to drag over some of the instruments. Too much plate voltage on the detector produces harsh-toned reception and may even cause a constant whistle. Too much plate voltage on the r. f. tubes causes uncontrollable oscillations, and excessive plate voltage on the a. f. tubes will cause harshness and perhaps howling. The life of the B-battery can be prolonged and a better tone quality can be obtained by inserting a C-battery in the A-negative line to the F. posts of the a. f. transformers.

Storage B-Batteries

Storage B-batteries have never met with a widespread popular approval. They are clumsy and bulky; their use entails all the undesirable features connected with storage batteries in general, as for instance, fumes and spray when charging, harmful effects of acid, inconvenience due to testing and charging. The results also are inferior to those obtained with the use of dry-cell B-batteries, as they frequently have a tendency to become noisy. Furthermore, the breakdown of one cell makes the whole bank of 24 cells useless, unless of course the defective cell is shorted out.

Hum of B-Eliminators

Perhaps you keep right up to date in your radio accessories and have a B-eliminator installation. Of course, this is better than bothering with batteries, but there are very few B-eliminators on the market that have overcome the hum effect of the a. c. current. Excessive hum in a B-eliminator can often be reduced by bridging by-pass condensers across the output terminals. However, it is sometimes possible to reduce the hum by reversing the plug connected to the electric-light circuit; by connecting the B-negative output terminal of the B-eliminator to the ground, or by removing the eliminator a few feet away from the receiver. Usually a B-eliminator is enclosed in a metal case, which acts as a shield and tends to reduce interference from induction.

Adjusting Controls on B-Eliminator

Improper adjustment of the B-eliminator controls often produces fuzziness and distortion. These should be carefully readjusted until the trouble disappears. The resistance controlling the detector-plate voltage will be found most sensitive and both resistances, if there are two, will often exert a mutual influence on each other. No accurate voltage test of the output can be made on a B-eliminator with an ordinary voltmeter as its winding has too low a resistance. Only a high-resistance voltmeter should be used for this purpose.