

# DEPARTMENT OF COMMERCE

# RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION

Washington, December 1, 1924—No. 92

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## ABBREVIATIONS

The necessary corrections to the List of Radio Stations of the United States and to the International List of Radiotelegraph Stations, appearing in this bulletin under the heading "Alterations and corrections," are published after the stations affected in the the following order:

Name	= Name of station.
Loc.	= Geographical location. O=west longitude. N=north latitude. S=south latitude.
Call	= Call letters assigned.
System	= Radio system used and sparks per second.
Range	= Normal range in nautical miles.
W. l.	= Wave lengths assigned: Normal wave lengths in italics.
Service	= Nature of service maintained.
	PG=General public.
	PR=Limited public.
	RC=Radio compass station.
	FS=Fog signal.
	P=Private.
	O=Government business exclusively.
Hours	= Hours of operation:
	N=Continuous service.
	X=No regular hours.
F. T. Co.	=Federal Telegraph Co.
I. W. T. Co.	=Independent Wireless Telegraph Co.
K. & C.	=Kilbourne & Clark Manufacturing Co.
R. C. A.	=Radio Corporation of America.
S. O. R. S.	=Ship Owners' Radio Service.
W. S. A. Co.	=Wireless Specialty Apparatus Co.
C. w.	=Continuous wave.
I. c. w.	=Interrupted continuous wave.
V. t.	=Vacuum tube.
FX	=Fixed station.
U. S. L.	=After operating company denotes that the change applies only to the List of Radio Stations of the United States.
Ke.	=Kilocycles.
Fy.	=Frequency.
A. c.	=Alternating current.

RADIO SERVICE BULLETIN

ADDITION TO NEW STATIONS IN THE UNITED STATES

Commercial land stations, alphabetically by names of stations

[Additions to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave lengths	Service	Hours	Station controlled by—
Palm Beach, Fla. <sup>1</sup>	WOE	300, 600, 650	PG		Palm Beach Radio Co.

<sup>1</sup> Loc. O 80° 01' 55", N 26° 42' 00"; range, 300; system, R. C. A., 1000; hours, 12 midnight to 1 p. m. and 6 p. m. to 12 midnight; rates, ship service, 19 cents per word.

Commercial ship stations, alphabetically by names of vessels

[Additions to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Name of vessel	Call signal	Rates	Service	Hours	Owner of vessel	Station controlled by—
Bienville.....	KFSL		PG	N	Todd Dry Dock & Construction Co.	
Manistique <sup>1</sup>	KFRS		PG	X	Raid Towing & Wrecking Co....	R. C. A.
Mary Weems	WJEL	8	PG	X	Baltimore & Carolina S. S. Co....	Do.
Venus <sup>2</sup>	KZAV		PG	X	Ynchausti S. S. Co.....	Owner of vessel

<sup>1</sup> Range, 150; system, R. C. A., 450; w. l., 300, 600; rates, Great Lakes service, 4 cents per word.  
<sup>2</sup> W. L., 450, 600, 700, 900.

Commercial land and ship stations, alphabetically by call signals

[b=ship station; c=land station]

Call signal	Name of station	Call signal	Name of station
KFRS	Manistique.....	b	WJEL Mary Weems.....
KFSL	Bienville.....	b	WOE Palm Beach, Fla.....
KZAV	Venus.....	b	

Stations broadcasting market or weather reports, music, concerts, lectures, etc., alphabetically by call signals

Call signal	Location of station	Station operated and controlled by—	Power (watts)	Wave length	Frequency (kilocycles)
KFAB	Lincoln, Nebr.....	Nebraska Buick Auto Co.....	200	240	1,260
KFRP	Redlands, Calif.....	Trinity Episcopal Church.....	10	211	1,420
KFRQ	Portland, Oreg.....	Radio Market Service Co. (Harry M. Schultz).	5	213	1,410
KFRW	Olympia, Wash.....	United Churches of Olympia.....	100	220	1,360
KFRX	Pullman, Wash., Route 2.....	J. Gordon Klomgard.....	10	217	1,350
KZKZ	Manila, P. I., 109 Plaza Moraga.....	Electrical Supply Co.....	100	270	1,110
WBEM	Chicago, Ill., 7421 Sheridan Road.....	H. Leslie Atlas.....	200	228	1,330
WCAZ	Carthage, Ill.....	Carthage College.....	50	244	1,230
WCEE	Elgin, Ill. (near), R. F. D. No. 6, Box 75, Villa Road.....	Charles E. Erbstein.....	1,000	536	560
WCM	Austin, Tex.....	Texas Markets and Warehouse Department.....	250	268	1,120
WFBC	Knoxville, Tenn.....	First Baptist Church.....	50	250	1,200
WGBO	Memphis, Tenn.....	Co.....	10	268	1,120

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*Broadcasting stations, alphabetically by names of cities*

[Additions to the List of Radio Stations of the United States, edition of June 30, 1924]

City	Call signal	City	Call signal
Austin, Tex.	WCM	Manila, P. I.	KZKZ
Carthage, Ill.	WCAZ	Memphis, Tenn.	WGBC
Chicago, Ill.	WBBM	Minneapolis, Minn.	WLB
Elgin, Ill. (near)	WCEE	Olympia, Wash.	KFRW
Kansas City, Mo.	WOQ	Portland, Oreg.	KFRQ
Knorrville, Tenn.	WFBC	Pullman, Wash.	KFRX
Lincoln, Nebr.	KFAB	Redlands, Calif.	KFRP

*Government land stations, alphabetically by names of stations*

[Additions to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave lengths	Service	Hours	Station controlled by—
Cape Hatteras, N. C. (regular station). <sup>1</sup>	NDW	600, 667, 1817	O	N	United States Navy.

<sup>1</sup> Dec. O. 75° 31' 21", N 35° 15' 58"; range, 150; system, United States Navy, 1000.

*Government ship stations, alphabetically by names of stations*

[Additions to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave lengths	Service	Hours	Station controlled by—
Morgan-Lewis <sup>1</sup>	WYCR		O	X	United States Army.

<sup>1</sup>Range, 100; system, United States Army v. t. telephone and telegraph.

*Government land and ship stations, alphabetically by call signals*

[b=ship station; c=land station]

Call signal	Name of station	Call signal	Name of station
NDW	Cape Hatteras, N. C. (regular station).c	WYCR	Morgan-Lewis.....b

*Special land stations, alphabetically by names of stations*

[Additions to the List of Radio Stations of the United States, edition of June 30, 1924]

Station	Call signal	Station controlled by—
Bolinas, Calif.	6XI	R. C. A.
Carthage, Ill.	9YAU	Carthage College.
Charlottesville, Pa.	8XM	West Penn Power Co.
Gunnison, Colo.	9XC	Western State College of Colorado.
Kahuku, Hawaii.	6XO	R. C. A.
Los Angeles, Calif.	6XC	Times-Mirror Co.
	6VCI	Western Electric Co. 145 West Street New York N. Y.



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### Special land stations grouped by districts

Call signal	District and station	Call signal	District and station
1XAH 2XG	First district: Orono, Me. Second district: Ocean Beach, N. J. Sixth district:	8XAM	Eighth district: Charleroi, Pa.
6XAF	Salt Lake City, Utah.	9XD	Ninth district:
6XG	Los Angeles, Calif.	9YAU	Gunnison, Colo.
6XH	Bolinas, Calif.		Carthage, Ill.
6XQ	Kabuku, Hawaii.		

## ALTERATIONS AND CORRECTIONS

### COMMERCIAL LAND STATIONS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

**BUFFALO, N. Y.**—W. l., add 1764.  
**CASPER, WYO.**—System, De Forest v. t. telegraph.  
**CEBU, P. I.**—W. l., 750, 950, 1250.  
**FLINT, MICH.**—Loc. (approximately) O 83° 45' 00'', N 43° 00' 00''.  
**FRACKVILLE, PA.**—W. l., 137.  
**FRANKFORT, MICH.**—W. l., 600, 718, 1666; station operated and controlled by Ann Arbor R. R. Co.  
**HAUTO, PA.**—W. l., 137.  
**HAZLETON, PA.**—W. l., 137.  
**MANISTIQUE, MICH.**—W. l., 600, 625, 1666; hours, 8.30 to 11.30 a. m., 2 to 5 p. m., no regular hours on Sundays and holidays.  
**MARION, MASS. (Matapoisett-WRQ).**—W. l., 13380.  
**MIAMI, FLA.**—*Read* Miami Beach, Fla.  
**MINNEAPOLIS, MINN. (WLB).**—W. l., 1276-1304.  
**NEGLEY, OHIO**—System, De Forest v. t. telegraph.  
**SAN FRANCISCO, P. I. (Camotes).**—W. l., 378, 476, 756, 952.  
**WILLIAMSPORT, PA.**—W. l., 137.  
**WILSONVILLE, PA.**—W. l., 137.  
 Strike out all particulars of the following-named stations: Amuguis, P. I. (Tayabas Province); Davenport, Iowa.

### COMMERCIAL SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

**ARDMORE.**—Station operated and controlled by I. W. T. Co.; Ardmore S. S. Co. owner of vessel.  
**BOOBYALLA.**—W. l., 600, 706, 800; Pacific Motorship Co. owner of vessel.  
**CARABOBO.**—W. l., strike out 450.  
**CEBU.**—Call signal changed to KZAX.  
**CITY OF FREEPORT.**—W. l., add 706.  
**COLORADO.**—W. l., add 706.  
**CORA F. CRESSY.**—Charles Leavitt & Co. owner of vessel.  
**CRISTINA.**—Herman W. Falk owner of vessel.  
**DIO.**—W. l., add 706.  
**DORCHESTER.**—System, R. C. A., 1000; w. l., 300, 600, 706.  
**EDNA.**—Range, 150; system, R. C. A., 1000; w. l., 300, 600, 706; rates, 8 cents per word; station operated and controlled by owner of vessel.  
**ELKTON.**—Range, 300.  
**FOAM.**—Range, 300; system, R. C. A., 1000; w. l., 300, 600, 706.  
**GEORGE WASHINGTON (WFR).**—Range, 300; system, I. W. T. Co. arc and Lowenstein, 1000; w. l., 600, 706, 800, 875, 2100, 2400; rates, 8 cents per word; station operated and controlled by I. W. T. Co.  
**GLORIA WEST.**—B. Roy Anderson owner of vessel.  
**GLOUCESTER.**—W. l., 300, 600, 706, 875.

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- GRECIAN.—System, R. C. A., 1000; w. l., 300, 600, 706.  
 HANNAWA.—Columbia Pacific Shipping Co. owner of vessel.  
 HANDOVER.—W. l., strike out 706.  
 HUGUENOT.—B. L. Shipping Co. owner of vessel.  
 JEFFERSON (KOD).—System, I. W. T. Co. arc and Lowenstein, 1000; w. l., 300, 600, 706, 1800, 2100, 2400.  
 KALEEN.—Southern Transportation Co. owner of vessel.  
 KESHENA.—Southern Transportation Co. owner of vessel.  
 LAKE SAVUS.—Name changed to Ozark; Clyde S. S. Co. owner of vessel.  
 MALABAR.—System, I. W. T. Co., arc; w. l., 600, 706, 800, 1800, 2100, 2400; station operated and controlled by I. W. T. Co.; Malabar S. S. Co. owner of vessel.  
 MATINICOCK.—System, I. W. T. Co. arc; w. l., 300, 600, 706, 1800, 2100, 2400; Matinicoek S. S. Co. owner of vessel.  
 MONTGOMERY CITY.—W. l., add 706.  
 MUSKOGEE.—Station operated and controlled by I. W. T. Co.; Muskogee S. S. Co. owner of vessel.  
 OLEN.—W. l., 300, 600, 706; station operated and controlled by F. T. Co.; Union Oil Co. owner of vessel.  
 ONONDAGA.—W. l., Strike out 909, add 875.  
 ONTARIO.—System, R. C. A., 1000.  
 ORCUS.—Grace S. S. Co. owner of vessel.  
 PAMNBAY.—Station operated and controlled by S. O. R. S. (U. S. L.).  
 PATRICK HENRY.—Station operated and controlled by R. C. A.  
 PAUL LUCKENBACH.—W. l., add 706.  
 POINT JUDITH.—Range, 300; w. l., 600, 706, 800; station operated and controlled by R. C. A.; Swayne & Hoyt owner of vessel.  
 PRESIDENT CLEVELAND.—W. l., 300, 600, 706, 875, 1800, 2100, 2400.  
 PRESIDENT HARRISON.—Station operated and controlled by I. W. T. Co.  
 QUISTCONCK.—W. l., add 706.  
 RIPPLE (KDUN).—John W. Sullivan Co. owner of vessel.  
 ROSE CITY.—Rose City S. S. Co. owner of vessel.  
 SABOTAWAN.—Station operated and controlled by I. W. T. Co.  
 SECURITY.—Standard Transportation Co. owner of vessel.  
 SKAGWAY.—Skagway S. S. Co. owner of vessel.  
 STOCKTON.—W. l., add 706, 2400, 2400.  
 SUBOATCO.—Submarine Boat Corporation owner of vessel.  
 SUCUBACO.—Submarine Boat Corporation owner of vessel.  
 SUNELSECO.—Submarine Boat Corporation owner of vessel.  
 TAMARACK IV.—W. l., add 706; service, PG; rates, 8 cents per word.  
 TOILER.—Name changed to Thomas J. Howard; Thomas J. Howard owner of vessel.  
 TOPI.—Name changed to Gypsum Queen; J. B. King Transportation Co. owner of vessel.  
 TOPA TOPA.—W. l., add 706, 1800, 2100, 2400.  
 TUSITALA.—Range, 300; system, R. C. A., 1000; w. l., 300, 600, 706; station operated and controlled by owner of vessel.  
 VACOIL.—System, R. C. A. v. t. telegraph and R. C. A., 1000; Vacuum Oil Corp. owner of vessel.  
 VIZCAYA.—Call signal changed to KZAT.  
 VOLUNTEER.—Station operated and controlled by I. W. T. Co.  
 WALLULA.—Name changed to Humboldt; Humboldt Stevedore Co. owner of vessel.  
 WEST CAYOTE.—Station operated and controlled by R. C. A. (U. S. L.).  
 WESTERN OCEAN.—Station operated and controlled by S. O. R. S.  
 WEST IVAN.—Station operated and controlled by R. C. A. (U. S. L.).  
 WEST KATAN.—W. l., 300, 600, 706; station operated and controlled by F. T. Co. Frank C. Hill owner of vessel.  
 WEST LASHAWAY.—Station operated and controlled by I. W. T. Co.  
 WESTOIL.—Name changed to J. B. John; Petoskey Transportation Co. owner of vessel.  
 WHITEMARSH.—William L. Baum owner of vessel.  
 W. W. MILLS.—W. l., add 706.  
 Strike out all particulars of the following-named vessels: Alden Anderson, Elfay, Explorer, Kanawha, Kuwa, Lake Harney, Lake Otisco, Mars, Neusa, Paraguay

## COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS

KDOC, read KZAX; KIVP, read J. B. John; KOCB, read Ozark; KULP, read Gypsum Queen; WAX, read Miami Beach, Fla.; WPY, read Humboldt; WSQ, read KZAT; WTOO, read Thomas J. Howard; strike out all particulars following the call signals, KFKD, KGOE, KIVN, KLIA, KNG, KOVQ, KPB, KTT, KYA, WCEE, WLT, WJP, WOC, WSU, WTY, WTZ.

## BROADCASTING STATIONS, BY CALL SIGNALS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1924]

KDZR (Bellingham, Wash.).—W. l., 231; frequency, kc. 1,300.  
 KFAR (Hollywood, Calif.).—W. l., 227; frequency, kc. 1,320.  
 KFBB (Havre, Mont.).—W. l., 275; frequency, kc. 1,090.  
 KFBDX (Shreveport, La.).—W. l., 250; frequency, kc. 1,200.  
 KFI (Los Angeles, Calif.).—Power, 1,500.  
 KFIQ (Yakima, Wash.).—W. l., 256; frequency, kc. 1,170.  
 KFJR (Stevensville, Mont.).—Changed to Portland, Oreg.; address care of Ralph Schneeloch Co., Lumberman's Building; w. l., 263, frequency, kc. 1,140.  
 KFJX (Cedar Falls, Iowa).—W. l., 258; frequency, kc. 1,160.  
 KFLA (Butte, Mont.).—W. l., 258; frequency, kc. 1,160.  
 KFNV (Santa Rosa, Calif.).—Station operated and controlled by L. A. Drake Battery & Radio Supply Shop; w. l., 227; frequency, kc. 1,320.  
 KFQH (Hillsborough, Calif.).—Changed to Burlingame, Calif., 274 Middlefield Road; station operated and controlled by Radio Service Co. (Albert Sherman).  
 KFSY (Helena, Mont.).—Address 413½ North Beattie Street; w. l., 248; frequency, kc. 1,210.  
 KQV (Pittsburgh, Pa.).—W. l., 275; frequency, kc. 1,090.  
 KYW (Chicago, Ill.).—Power, 1,500.  
 WAAF (Chicago, Ill.).—W. l., 278; frequency, kc. 1,080.  
 WBBL (Richmond, Va.).—Power, 100; w. l., 229; frequency, kc. 1,310.  
 WBZ (Springfield, Mass.).—Power, 1,500.  
 WCAD (Canton, N. Y.).—W. l., 263; frequency, kc. 1,140.  
 WCAU (Philadelphia, Pa.).—Power, 500; w. l., 278; frequency, kc. 1,080.  
 WCBA (Allentown, Pa.).—Station operated and controlled by Charles W. Heimbach Cameragraph Repair Shop; w. l., 254; frequency, kc. 1,180.  
 WCBC (Ann Arbor, Mich.).—W. l., 229; frequency, kc. 1,310.  
 WDAE (Tampa, Fla.).—W. l., 273; frequency, kc. 1,100.  
 WDBQ (Salem, N. J.).—Power, 50.  
 WEAA (Flint, Mich.).—W. l., 234; frequency, kc. 1,280.  
 WEAJ (New York, N. Y.).—Power, 1,500.  
 WEAM (North Plainfield, N. J.).—Power, 250; w. l., 261; frequency, kc. 1,150.  
 WEAP (Mobile, Ala.).—W. l., 263; frequency, kc. 1,140.  
 WEB (St. Louis, Mo.).—Station operated and controlled by Benson Radio Co., 918 Pine Street.  
 WEBK (Grand Rapids, Mich.).—W. l., 242; frequency, kc. 1,240.  
 WEBW (Beloit, Wis.).—W. l., 266; frequency, kc. 1,120.  
 WGAQ (Shreveport, La.).—W. l., 263; frequency, kc. 1,140.  
 WHAG (Cincinnati, Ohio).—W. l., 233; frequency, kc. 1,290.  
 WHAV (Wilmington, Del.).—W. l., 266; frequency, kc. 1,130.  
 WJAK (Greentown, Ind.).—Power, 50.  
 WJAZ (Chicago, Ill.—portable).—Station operated and controlled by Zenith Radio Corp.  
 WMAC (Cazenovia, N. Y.).—W. l., 275; frequency, kc. 1,090.  
 WMAV (Auburn, Ala.).—Call signal changed to WSY.  
 WQAA (Parkersburg, Pa.).—W. l., 220; frequency, kc. 1,360.  
 WQAM (Miami, Fla.).—W. l., 268; frequency, kc. 1,120.  
 WQAN (Scranton, Pa.).—W. l., 250; frequency, kc. 1,200.  
 WRAO (St. Louis, Mo.).—W. l., 227; frequency, kc. 1,320.  
 WRK (Hamilton, Ohio).—W. l., 270; frequency, kc. 1,110.  
 WSAZ (Pomeroy, Ohio).—W. l., 244; frequency, kc. 1,230.  
 WTAM (Cleveland, Ohio).—Power, 1,500.  
 WTAR (Norfolk, Va.).—W. l., 261; frequency, kc. 1,150.  
 WTAW (College Station, Tex.).—W. l., 270; frequency, kc. 1,110.

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Strike out all particulars following the call signals KFFB (Boise, Idaho); KFFE (Pendleton, Oreg.); KFGL (Arlington, Oreg.); KFJC (Seattle, Wash.); KFJQ (Grand Forks, N. Dak.); KFLW (Missoula, Mont.); KFQF (Minneapolis, Minn.); KFQI (Culver City, Calif.); KFQJ (Oklahoma, Okla.); WBBT (Philadelphia, Pa.); WDAU (New Bedford, Mass.); WECO (New York, N. Y.); WFBU (Boston, Mass.); WGAN (Pensacola, Fla.); WNAW (Fort Monroe, Va.); WOQ (Kansas City, Mo.); WSY (Birmingham, Ala.).

## GOVERNMENT LAND STATIONS, ALPHABETICALLY BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations, published by the Bureau]

AMBROSE CHANNEL LIGHT VESSEL.—Call signal changed to WWAT.  
 ANACOSTIA, D. C. (regular station).—Regular station read aircraft station; w. l. 545.  
 BALBOA, CANAL ZONE.—W. l., 600, 952, 2100, 2250, 3950, 6663.  
 BAR HARBOR, ME. (NBD).—W. l., 600, 952, 2100, 2342, 3700, 3950.  
 BOSTON, MASS. (NAD).—W. l., 600, 952, 1363.  
 BROWNSVILLE, TEX.—W. l., 600, 952, 2254, 3950, 4997.  
 CAPE ELIZABETH, ME. (Portland).—W. l., 800, 1090.  
 CAPE MALA, PANAMA.—W. l., 600, 1910; hours, X.  
 CAVITE, P. I.—W. l., 600, 952, 2100, 2701, 3950, 5260, 15530.  
 CHARLESTON, S. C.—W. l., 600, 952, 2100, 2607, 3950, 4797.  
 COLON, CANAL ZONE.—W. l., 600, 952, 1817, 2726.  
 CORDOVA, ALASKA.—W. l., 600, 952, 2100, 2726, 3950, 5996.  
 DUTCH HARBOR, ALASKA.—W. l., 600, 952, 2254.  
 EUREKA, CALIF. (NPW).—W. l., 600, 952, 3039.  
 GALVESTON, TEX.—W. l., 600, 952, 1428.  
 GLOUCESTER, MASS. (RC).—Changed to Thatcher Island, Mass.; loc. O 70° 34' 45", N 42° 38' 10".  
 GREAT LAKES, ILL.—W. l., 600, 1986, 3950, 4685.  
 GUAM, GUAM ISLAND.—Read, Guam, Marianas Island; w. l., 600, 952, 2100, 2254, 3950, 5996, 9086.  
 GUANTANAMO BAY, CUBA.—W. l., 600, 952, 2100, 2701, 3950, 4543.  
 HILO, HAWAII.—W. l., 600, 952, 1999, 2100.  
 HONOLULU, HAWAII (Heeia Point).—W. l., 2100, 2653, 3950, 6379.  
 HONOLULU, HAWAII (Pearl Harbor).—W. l., 600, 952, 2254, 3950, 11490.  
 JUPITER, FLA. (regular station).—W. l., 600, 952, 1304.  
 KEY WEST, FLA. (regular station)—NAR.—W. l., 600, 952, 1463, 2100, 3905, 5757.  
 KODIAK, ALASKA.—W. l., 600, 952, 1684.  
 LAKEHURST, N. J. (regular station).—Regular station read aircraft station; w. l., 545; hours, X.  
 LA PALMA, PANAMA.—W. l., 600, 1817.  
 MANAGUA, NICARAGUA.—W. l., 952, 1874.  
 MARSHFIELD, OREG.—W. l., 600, 952, 1947.  
 MOREHEAD CITY, N. C.—W. l., 600, 952, 1817.  
 NAVASSA ISLAND, WEST INDIES (Windward Passage).—Loc. (approximately) O 75° 01' 00"; N 18° 24' 00".  
 NEW LONDON, CONN.—W. l., 600, 674, 952.  
 NEW ORLEANS, LA.—W. l., 600, 952, 2100, 2607, 3950, 6246.  
 NEWPORT, R. I.—W. l., 600, 952, 2607.  
 NEW YORK, N. Y.—W. l., 600, 952, 1538, 2100.  
 NORFOLK, VA. (NAM).—W. l., 600, 952, 1363, 2100, 2142, 3950, 5451.  
 NORFOLK, VA. (Virginia Beach).—W. l., 600, 952, 1395.  
 NORTH HEAD, WASH.—W. l., 600, 952, 2100, 2726, 3950, 4997.  
 OLONGAPO, P. I.—W. l., 600, 952, 1910.  
 PEKIN, CHINA.—W. l., 952, 1910, 3950, 4543.  
 PENSACOLA, FLA. (regular station).—W. l., 600, 952, 1333.  
 PORT AU PRINCE, HAITI.—W. l., 600, 952, 2100, 2254, 3748, 3950.  
 PORTSMOUTH, N. H.—W. l., 600, 952, 1333.  
 PUERTO OBALDIA, PANAMA.—W. l., 600, 1986; hours, X.  
 PUGET SOUND, WASH. (Keyport).—W. l., 600, 952, 2499, 3950, 5451, 8870.  
 QUANTICO, VA.—W. l., 545; hours, X.  
 ST. AUGUSTINE, FLA.—W. l., 600, 952, 2342; hours, 7 a. m.—6 p. m.  
 ST. CROIX, VIRGIN ISLANDS.—W. l., 450, 600; hours, X.

ST. PAUL, ALASKA.—W. l., *600, 952, 2653, 3950, 5657.*  
 SAN DIEGO, CALIF. (NPL).—W. l., *600, 952, 1538, 2100, 3950, 5169, 9798.*  
 SAN FRANCISCO, CALIF. (NPG).—W. l., *600, 952, 1333, 2100, 3950, 4522, 4836, 7005, 10520.*  
 SAN JUAN, P. R.—W. l., *600, 952, 2100, 2855, 3950, 4836, 8870.*  
 SAVANNAH, GA.—W. l., *600, 1428.*  
 SEWARD, ALASKA.—W. l., *600, 1428.*  
 SHANGHAI, CHINA (receiving only).—W. l., *952, 3950.*  
 SITKA, ALASKA.—W. l., *600, 952, 2653.*  
 TUTUILA, SAMOA.—W. l., *600, 952, 2100, 2254, 3950, 4543.*  
 WASHINGTON, D. C. (ARLINGTON, VA.—NAA).—W. l., *435, 2653, 2939, 3950, 5949.*  
 WASHINGTON, D. C. (SAYVILLE, N. Y.—NDD).—W. l., *9141.*  
 WASHINGTON, D. C. (ANNAPOLIS, MD.—NSS).—W. l., *17130.*  
 WASHINGTON, D. C. (NAVY YARD—NAL).—W. l., *952, 1199, 2653, 2939, 3950;* hours, X.

Strike out all particulars of the following-named stations: Portland, Me.; Tatocah, Wash. (regular station).

NOTE.—Wave lengths in italics are used for "listening" and "calling." The note at the head of the List of Government stations on page 81 of the list of "Commercial and Government Radio Stations of the United States" should be changed accordingly.

#### GOVERNMENT SHIP STATIONS, ALPHABETICALLY BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1924, and to the International List of Radiotelegraph Stations, published by the Berns bureau]

WAYANDA.—Correct call signal NUXB.

#### GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS

NAD, read Thatcher Island, Mass.; NPN, read Guam, Marianas Island; WWAQ read WWAT; strike out all particulars following the call signals NAB, NPD.

#### SPECIAL LAND STATIONS, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1924]

WASHINGTON, D. C. (3ZR).—Station operated and controlled by Harry H. Olmstead and Donald J. Detwiler.

Strike out all particulars of the following-named stations: Athol, Mass. (1XP); Atlanta, Ga. (4XS); Atlanta, Ga. (4XT); Atlanta, Ga. (4XV); Cincinnati, Ohio (SYX); Hastings, Nebr. (9XBL); Minneapolis, Minn. (9XAT); New York, N. Y. (2XN); Philadelphia, Pa. (3YI); Pittsburgh, Pa. (8XK); Savannah, Ga. (4XR); Tampa, Fla. (4XH); Urbana, Ill. (9XZ).

### MISCELLANEOUS

#### INTERFERENCE FROM HARMONICS

The attention of radio station owners and supervisors of radio is called to the following recommendations of the subcommittee of the Third Radio Conference on interference problems:

Interference from harmonics results from the emission of radio power on one or usually several frequencies higher than the fundamental frequency but at less intensity than the fundamental. Any transmitting set, including tube transmitters, is subject to this fault if oscillating directly in the antenna circuit, and tube transmitters show the same tendency in addition when pushed to maximum output. The trouble can be practically overcome by the use of master oscillator-power amplifier systems and greatly improved by the use of loose coupling between oscillating and radiating systems. An effective remedy is so comparatively simple and inexpensive that it ought to be compulsory. If the principle of licensing a station to use only one frequency per complete transmitting system were rigidly applied, stations radiating harmonics could be dealt with because they are actually radiating appreciable power on frequencies other than that for which licensed.

Harmonics of the carrier wave of stations operating in the lower frequency range of the broadcast band or in the marine frequency band will fall within the range of the broadcast frequency band and under certain conditions will prove to be a serious cause of interference. It is recommended that all possible steps be taken to minimize this trouble by technical means well known to the art and by careful enforcement



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The specifications governing Class B broadcasting stations prohibit harmonic emissions. Immediate action must be taken to eliminate the emission of harmonics. Supervisors will bring the above requirement to the attention of owners of stations failing to correct this source of interference.

### NEW STATION IN GREECE

The station near "Chios" (SXO) is opened permanently to general public correspondence. The rate is 40 centimes per word, minimum 4 francs.

### SWISSLORE BANK LIGHT VESSEL RADIO FOG SIGNAL TRANSMISSION CHANGED

Beginning November 8 last, the interval of transmission was changed at this fog signal station to groups of 2 dashes for 60 seconds, silent 30 seconds.

### SEAL ISLAND (NOVA SCOTIA) RADIO FOG SIGNAL TRANSMISSION CHANGED

The radio fog signal on Seal Island has been changed to transmit a series of groups, each consisting of two dots and two dashes, for a period of 2 minutes, followed by a silent period of 3 minutes. The wave length is 1,000 meters, and operation will be continuous in thick and foggy weather. Approximate location, 43° 23' 28" N., 66° 00' 53" W.

### LURCHER SHOAL LIGHT VESSEL (NOVA SCOTIA) FOG SIGNAL TRANSMISSION CHANGED

The radio fog signal on Lurcher Shoal Light Vessel has been changed to transmit a series of groups, each consisting of one dot and three dashes, for a period of 2 minutes, followed by a silent period of 3 minutes. In thick and foggy weather the automatic transmitter will be in operation on 1,000 meters continuously except when the operator is keeping watch. The operator will maintain watch on 600 meters during the first half hour of every odd hour from 7 a. m. to 7.30 p. m. and from 10 to 10.30 p. m. eastern standard time. Approximate location, 43° 48' 20" N., 66° 31' 54" W.

### TAIHOKU METEOROLOGICAL OBSERVATION, FORMOSA, JAPAN

Commencing September 1, last, the Keelung radio station began broadcasting weather forecasts daily at 4 p. m. (one hundred and twentieth meridian time) and storm warnings whenever and as soon as received from the Taihoku Observatory, repeating such at the beginning of the hour next following and again at 8.30 p. m. the same day.

Using a wave length of 600 meters, both the forecasts and warnings will be broadcast in English, twice repeated in succession after giving the signal "QST" three times. The forecasts will give the velocity and direction of the wind and general weather conditions for the following day for the North and East Taiwan (Formosa) seacoast areas and for the Formosan Channel, respectively. Wind directions will be indicated for eight points of the compass (light winds as "variable"). The Beaufort scale will be used for velocity. Warnings will state the day and hour of observation (from 1 to 24, beginning at midnight), whether typhoon or depression, position of the center, and the direction of its motion, together with explanatory remarks. Warnings for strong winter monsoons will be issued whenever a sudden threatening change is to be anticipated in these areas.

### PRICES OF RADIO PUBLICATIONS OF THE BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

The list of Commercial and Government Radio Stations of the United States, which includes broadcasting and special land stations, is published annually as of June 30. The price of this list is 15 cents per copy.

The list of Amateur Radio Stations of the United States, which includes special land stations, is published annually as of June 30. The price of this list is 25 cents per copy.

The Radio Service Bulletin is published monthly. This publication contains

governing radio communication, and short articles of interest to owners and operators of radio stations, but does not include new amateur stations. The price of this publication is 5 cents per copy or annual subscription price 25 cents per year.

Radio Communication Laws of the United States, the International Radiotelegraph Convention, and regulations governing radio operators and the use of radio apparatus on ships and land stations which are published in one volume may be purchased for 15 cents per copy.

**ALL ORDERS FOR THE ABOVE PUBLICATIONS AND INQUIRIES CONCERNING THEM SHOULD BE ADDRESSED TO THE SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C.**

Inquiries concerning the purchase of or subscription for the International List of Radio Stations of the World, the International List of Call Letters, and the supplements thereto, should be addressed to the *International Bureau of the Telegraph Union, Radiotelegraph Service, Bern, Switzerland*. These publications do not contain lists of broadcasting stations.

**DO NOT MAKE REMITTANCES TO THE BUREAU OF NAVIGATION OR TO SUPERVISORS OF RADIO.**

#### HOURS CHANGED ON FIVE FATHOM BANK LIGHT VESSEL

Five Fathom Bank Light Vessel fog signal is now operated daily from 9 to 9.30 a. m. and from 3 to 3.30 p. m., also continuously during thick or foggy weather.

#### USE OF EXCESSIVE POWER PROHIBITED

A number of complaints have been received by the bureau regarding the use of excessive power by coast and ship stations, causing interference to other stations. Operators are cautioned to use the minimum amount of power, as the use of excessive power is a violation of regulation 14 of the act of August 13, 1912, which is as follows: "In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired."

It is also a violation of article 7, paragraph 1, of the International Convention service regulations, which is as follows: "All stations are bound to carry on the service with the minimum of energy necessary to insure safe communication."

#### RADIO STATION AT ALMERIA, SPAIN

Information has been received by the bureau that the radio station owned by Cia Petrolifera Hispano Americana at Almeria, Spain, is now in operation, call letters "TNN." The hours of operation are from 10 to 10.30 a. m. and 12 to 12.30, 6 to 6.30, 8 to 8.30, and 11 to 11.20 p. m., G. M. T. Instructions as to stores, water, etc., will be received by this station. All water must be lightered across the harbor at this port.

#### STANDARD TIME CHANGED IN BRITISH HONDURAS

The standard time in British Honduras was advanced 30 minutes on the 12th of October, this year, for a period of four months. During the period specified the standard time adopted will therefore be 5 hours 30 minutes slow on G. M. T. Normal time will be resumed on February 15, 1925.

#### SUBMARINE SOUND SIGNALS AND RADIO FOG SIGNAL ESTABLISHED ON BORKUM RIFF LIGHT VESSEL, NORTH SEA, GERMANY

The submarine bell at Borkum Riff Light Vessel has been discontinued and replaced by a submarine sound transmitter which is automatically operated during fog or misty weather in conjunction with a wireless fog signal. These are described in detail below. In the event of the submarine sound transmitter failing the submarine bell with the same characteristics as heretofore will be

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*Submarine sound signals*

These consist of the transmission of the letters BR in the Morse code (— . . . —) by sound, *sight times every four minutes*, commencing at  $6\frac{1}{4}$  seconds after every fourth minute of the hour, thus:—

— . . . . — . . .	<u>Silent</u>	&c. (repeated for 4 min).
8.4 sec.	21.6 sec.	

*Radio fog signal.*

The transmission of the experimental wireless fog signal is automatically made on a wave length of 1,000 metres (C. W.) and commences at the 20th, 36th and 52d minute of every hour, each period being of *four minutes* duration, thus:—

57 dashes (— — — &c.) each of 0.31 sec. duration
<u>26.5 sec.</u>

<u>Silent</u>	(repeated 5 times) followed immediately by
3.5 sec.	

— . . . . — . . .	15 dots (. . . &c.) each of 0.1 sec. duration
6.5 sec.	<u>18.8 sec.</u>

<u>Silent</u>	(repeated 3 times).
4.7 sec.	

(Total duration 4 min.).

The first part of the radio signals is for the determination of the bearing of the light vessel by means of the ship's direction finding installation.

For the determination of the ship's distance from the light vessel the second part of these signals is used in conjunction with the submarine sound signals. This part comprises three series.

The first dash (—) of the submarine sound signal — . . . . — . . . is transmitted simultaneously with the final dot (.) of the radio signal — . . . . — . . . . The latter is followed by a group of 15 dots (. . . &c.), and, on the signals being received on board, the number of the dot which coincides with the commencement of the first dash of the former gives the distance from the light vessel in miles when this does not exceed 15 miles. The time occupied by any single dot and its interval is 1.253 second, approximately equivalent to the time taken for sound to travel through water 1 sea mile. Distances above 15 miles can also be calculated by this method, if the time of the subsequent portion of the signals is correctly noted.

If a ship requires the signals at times other than during fog or misty weather, Borkum Riff Light Vessel (call signal, KBR) should be called on the 600 meters wave (spark) during the time radio watch is kept, using the special signals QTM or QTO, abbreviations which denote whether a ship requires to take her bearing or determine her distance from the light vessel, respectively. This station is located in approximately  $53^{\circ} 34' 51''$  N.,  $6^{\circ} 41' 42''$  E.

## INCREASED RADIO POWER

The National Radio Conference, held October 6 to 10, 1924, at the Department of Commerce, recommended that a general increase in power over 1,000 watts was desirable in all stations in order to overcome static and give better service to the listeners. This is a question entirely apart from so-called super-power stations of 25 or 50,000 watts, which are not here dealt with.

In order to include increases up to a maximum of 5,000 watts the department feels that it should be proceeded upon an experimental basis under strict limitations which will insure that this development may be without interference with the service of other stations or with the reception now enjoyed by listeners. The department is receiving many inquiries as to the granting of licenses authorizing this use of increased power. Licenses for use in broadcasting of power to 5,000 watts on a purely experimental basis will be issued under the following conditions:

1. Experiments may be carried on only after due notice to the supervisor of radio of the district, and must be at all times under the control and regulations

2. Stations operating under experimental licenses may at the outset use a power input to the antenna not exceeding 1,500 watts. Whenever the radio supervisor of the district and the department are satisfied that the public interest is served by the use of such increased power, and that no undue interference with other stations or with receiving sets results, its use may be continued. All applicants for such licenses must agree in advance they will reduce the power used during the course of the experimentation whenever the department or the supervisor of radio deems such a course to be in the public interest and so directs.

3. If as a result of the experimentation above specified the use of the additional power is found to be in the public interest and the station desires to make a further increase, such increase will be allowed in successive steps of 500 watts, and experiments may be carried on at each of such increased stages under the same conditions and restrictions as are above specified for the first increase.

4. The department anticipates difficulty in laying down any general rule which will be of universal application to all such stations. It will therefore consider each station as a separate entity and deal with it according to the local conditions involved.

5. It is anticipated that the location of the station will be a factor of great importance, and that the amount of power that may be safely used will be in direct proportion to the distance of the station from congested receiving centers.

6. All such experimentation will be absolutely at the risk of the station conducting it, both as to location and power used, and notice is given in advance that these licenses will carry with them no permanent rights or privileges of any character, are entirely temporary and experimental in their nature, and are subject to withdrawal or revocation by the department at any time in its absolute discretion.

The prime consideration of the department is directed to the listening public. The operators of stations must necessarily take the same attitude, for broadcasting is finally dependent upon them for its support.

#### STANDARD RADIO FREQUENCY TRANSMISSIONS, DECEMBER, JANUARY, AND FEBRUARY

The Bureau of Standards transmits twice a month radio signals of definitely announced frequencies for use by the public in standardizing wave meters and transmitting and receiving apparatus. The signals are transmitted from the bureau's station (WWV) at Washington, D. C., and from station 6XBM, Stanford University, California.

The transmissions are by unmodulated continuous-wave telegraphy. A complete frequency transmission includes a "general call," a "standard frequency signal," and "announcements." The "general call" is given at the beginning of the 8-minute period and continuous for about 2 minutes. This includes a statement of the frequency. The "standard frequency signal" is a series of very long dashes with the call letters (WWV or 6XBM) intervening. This signal continues for about 4 minutes. The "announcements" are on the same frequency as the "standards frequency signal" just transmitted and contain a statement of the measured frequency. An announcement of the next frequency to be transmitted is then given. There is then a 4-minute interval while the transmitting set is adjusted for the next frequency.

The signals can be heard and utilized by stations equipped for continuous wave reception at distances within 500 to 1,000 miles from the transmitting stations. Information on how to receive and utilize the signals is given in Bureau of Standards Letter Circular No. 92, which may be obtained on application from the Bureau of Standards, Washington, D. C.

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The schedule of standard frequency signals from both the Bureau of Standards and Stanford University is as follows:

*Schedule of frequencies in kilocycles*

[Approximate wave lengths in meters in parentheses]

Time <sup>1</sup>	Dec. 5	Dec. 19	Jan. 5 <sup>2</sup>	Jan. 20	Feb. 5 <sup>2</sup>	Feb. 20
10 to 10.06 p. m. ....	800 (1,000)	550 (545)	2,000 (150)	1,500 (200)	3,000 (100)	125 (2,400)
10.12 to 10.20 p. m. ....	315 (932)	650 (461)	2,300 (136)	1,650 (182)	3,300 (91)	133 (2,254)
10.24 to 10.32 p. m. ....	345 (809)	750 (400)	2,500 (120)	1,800 (167)	3,600 (80)	143 (2,097)
10.36 to 10.44 p. m. ....	375 (800)	825 (351)	3,000 (100)	2,000 (150)	4,000 (75)	155 (1,984)
10.48 to 10.56 p. m. ....	425 (705)	1,000 (300)	3,500 (90)	2,200 (130)	4,400 (60)	165 (1,900)
11 to 11.06 p. m. ....	500 (600)	1,200 (250)	4,200 (71)	2,400 (122)	4,800 (61)	175 (1,652)
11.12 to 11.20 p. m. ....	600 (500)	1,350 (222)	5,100 (59)	2,700 (111)	5,400 (50)	185 (1,553)
11.24 to 11.32 p. m. ....	650 (450)	1,500 (200)	6,000 (50)	3,000 (100)	6,000 (50)	195 (952)

<sup>1</sup> Eastern standard time for WWV, Washington, D. C.; Pacific standard time for 6XBM, Stanford University, California.

<sup>2</sup> The schedules marked with this sign are tentative for station 6XBM, Stanford University; later announcement will be made if there is any change.

## BALANCED TRANSFORMER METHOD OF MEASUREMENT AT RADIO FREQUENCIES

In an article by Dr. A. Hund, of the Bureau of Standards, which appears in the November 8, 1924, issue of the *Electrical World*, under the title "Measurements at Radio Frequency," there is given a method for the rapid determination of effective resistance and inductance of coils or straight conductors. The measurement involves a balance between the test sample and a variable condenser in series with a variable resistor, the adjustment being secured by means of a balanced transformer. The method covers the range of frequencies used in radio work and has the advantage that the test sample is in the circuit at the same time as the standards, and that the indicating instruments are inserted in portions of the system where they have no effect on the measurements. The method is independent of the impressed electromotive force. The usefulness of the method is shown by actual measurements which are compared with results obtained by other methods. Practical hints as to shielding and essential details are given at the end of the paper.

## STANDARD FREQUENCY STATIONS

As a result of measurements by the Bureau of Standards upon the transmitted waves of a limited number of radio transmitting stations, data are given in each month's Radio Service Bulletin on such of these stations as have been found to maintain a sufficiently constant frequency to be useful as frequency standards. There may be many other stations maintaining their frequency just as constant as these, but these are the only ones which reached the degree of constancy shown among the stations upon whose frequencies measurements were made in the bureau's laboratory. There is, of course, no guaranty that the stations named below will maintain the constancy shown. As a means of maintaining constant frequency the high-power, low-frequency alternator stations listed below have speed regulators. Most of the broadcasting stations listed use frequency indicators (one-point wave meters) and maintain a maximum deflection of the frequency indicator throughout the transmission. These broadcasting stations, with rare exceptions, vary not more than 2 kilocycles from the assigned frequency. The transmitted frequencies from these stations can be utilized for standardizing wave meters and other apparatus by the procedure given in Bureau of Standards Letter Circular No. 92, *Radio Signals of Standard Frequencies and Their Utilization*. A copy of that letter circular can be obtained

Station	Owner	Location	Assigned frequency (kilo-cycles)	Period covered by measurements (months)	Number of times measured	Average deviation from assigned frequency	Greatest deviation from assigned frequency since Oct. 20, 1924
						Per cent	Per cent
NBS	United States Navy.....	Annapolis, Md.....	17.50	15	110	0.2	0.5
WGG	Radio Corporation of America.....	Tuckerton, No. 1, N. J.....	18.95	15	119	.2	.3
WII	Do.....	New Brunswick, N. J.....	22.04	14	101	.2	.1
WBO	Do.....	Marion, Mass.....	35.80	15	94	.3	.2
WWJ	Detroit News.....	Detroit, Mich.....	580	15	48	.1	.3
WCAP	Chesapeake & Potomac Telephone Co.....	Washington, D. C.....	640	14	65	.1	.2
WRC	Radio Corporation of America.....	.....do.....	640	11	44	.1	.2
WSB	Atlanta Journal.....	Atlanta, Ga.....	700	14	59	.2	.9
WGY	General Electric Co.....	Schenectady, N. Y.....	790	17	99	.2	.1
WBZ	Westinghouse Electric & Manufacturing Co.....	Springfield, Mass.....	800	7	17	.0	.1
KDKA	Do.....	East Pittsburgh, Pa.....	920	14	126	.1	.1

## REFERENCES TO CURRENT RADIO PERIODICAL LITERATURE

This is a monthly list of references prepared by the radio laboratory of the Bureau of Standards and is intended to cover the more important papers of interest to the professional radio engineer which have recently appeared in technical periodicals. The number at the left of each reference classifies the reference by subject, in accordance with the scheme presented in A Decimal Classification of Radio Subjects—An Extension of the Dewey System, Circular No. 138, a copy of which may be obtained for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. Further information about these lists, availabilities of previous lists, and of the several periodicals is contained in the extended statement preceding the early lists as published in the Radio Service Bulletin prior to April, 1923, and also in May and September, 1923.

## R000.—Radio communication

- R007.1 Third National Radio Conference. *Wireless Age*, 12, pp. 43-44, November, 1924.  
 R010 Broadbent, F. The work of the National Physical Laboratory (England). *World Power* (London), 2, pp. 204-209, October, 1924.  
 R010 Winters, S. R. The progress of radio (interview with Dr. Dellinger, of the Bureau of Standards radio laboratory). *Radio News*, 6, p. 902, December, 1924.  
 R065 The arrangement of wireless books and information (Dewey Decimal System, Bureau of Standards Circular No. 138). *Experimental Wireless* (London), 2, pp. 67-69, November, 1924.  
 R097 The life and work of Lee De Forest-III. *Radio News*, 6, pp. 912-913, December, 1924.

## R100.—Radio principles

- R113.6 Mix, D. H. My radio experience in the far North (transmission, reception, etc.). *QST*, 8, pp. 17-23, November, 1924.  
 R113 Lardry, M. Etude sur les irrégularités de propagation des ondes courtes. *L'Onde Electrique*, 2, pp. 502-513, October, 1924.  
 R113.4 Lodge, G. The behaviour of radio waves and their Heaviside layer. *Radio News*, 6, pp. 908-909, December, 1924.  
 R113.4 Howe, G. W. O. Notes on wireless matters (concluded from p. 283, October 2 issue). *Electrician* (London), 96, pp. 402-403, October 10, 1924.  
 R113.5 Caveney, M. J. The barometer and radio reception. *Radio News*, 6, p. 933, December, 1924.  
 R113.5 Dieckmann, M. Gewitter und atmosphärische Störungen. *Jahrbuch der drahtlosen Telegraphie*, 24, 1924.  
 R114 Manchley, S. J. Atmospheric electricity. *QST*, 8, pp. 27-40, November, 1924.  
 R120 Mason, H. F. Antennas for short waves. *QST*, 8, pp. 51-52, November, 1924.  
 R120 Mason, H. F. Some antenna pointers. *QST*, 8, pp. 55-58, November, 1924.  
 R124 Buchbinder, M. Uses and theory of the loop antenna. *Radio* (San Francisco), 6, pp. 25-26, November, 1924.  
 R125.1 Cheral, E. Recherches radiogoniométriques sur la marche des typhons. *L'Onde Electrique*, 2, pp. 491-501, October, 1924.  
 R125.6 Marconi beam system of wireless. *Radio News of Canada*, 2, pp. 17, 20, 21, 24, 41; October, 1924.  
 R125.6 Bown, R. Directive radio system. United States Patent No. 1514648, issued November 11, 1924.  
 R125.6 Fuller, L. F. Radiotelegraphy. United States Patent No. 1515670, issued November 13, 1924.

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- R134.45 Über das Verfahren der übertriebenen Dämpfung—verminderung. *Elektrotechnische Zeitschrift*, 48, pp. 1091-1092, October 9, 1924.
- R134.75 McLaughlin, J. L. The one-control superheterodyne. *QST*, 8, pp. 9-14, November, 1924.
- R134.75 Hanscom, A. T. How to build a six-tube second harmonic superheterodyne. *Radio Broadcast*, 6, pp. 40-47, November, 1924.
- R134.75 Wolf, P. I. Method of and means for receiving radio signals (superheterodyne). United States Patent No. 1514752, issued November 11, 1924.
- R142 Palmer, L. S., and Forshaw, H. W. Coupling between two oscillatory circuits, with some applications. *Journal Institution of Electrical Engineers (London)*, 62, pp. 295-303, October, 1924.
- R145.3 Hart, J. G. The inductance of lattice coils. *Wireless World and Radio Review*, 15, pp. 133-134, October 29, 1924.
- R145.5 Steinmetz, C. P. Overdamped condenser oscillations. *Post Office Electrical Engineers Journal (London)*, 17, pp. 233-233, October, 1924.
- R148.1 Distortionless amplification. *Wireless World and Radio Review*, 16, p. 58, October 15, 1924.
- R149 Lessev, O. Oscillating crystals. *Wireless World and Radio Review*, 15, pp. 96-96, October 22, 1924.

## R200.—Radio measurements and standardization

- R200 Nancarrow, F. E. The measurements of high frequencies. *Post Office Electrical Engineers Journal (London)*, 17, pp. 209-217, October, 1924.
- R220 Cramp, W. The measurement of capacity by analogy. *World Power (London)*, 2, pp. 267-273, November, 1924.
- R220 Clarkson, W. and Taylor, J. A neon lamp method of comparing capacities and high resistances. *Experimental Wireless (London)*, 2, pp. 97-101, November, 1924.
- R230 Nukiyama, H. and Kobayashi, K. On the measurement of the natural frequency of an inductance coil at audio-frequency. *Philosophical Magazine*, 48, pp. 962-971, November, 1924.
- R231 Hund, A. Measurements at radio frequency. *Electrical World*, 84, pp. 906-1000, November 8, 1924.
- R251 Claveux. Etalonnage d'un ampèremètre en haute fréquence. *L'Onde Electrique*, 2, pp. 513-515, October, 1924.
- R281 Barringer, L. E. Evaluation of insulating materials. *Electrical World*, 84, pp. 930-952, November 1, 1924.
- R281.38 Hirsch, W. C. Mica—its use in industrial industry. *Electrical Record*, 26, pp. 265-257, October, 1924.

## R300.—Radio apparatus and equipment

- R320 Lewis, G. Sensitive radio frequency relay. *Journal American Institute of Electrical Engineers*, 43, pp. 1031-1033, November, 1924.
- R321 Gelsey, G. L. Thermionic device. United States Patent No. 1514898, issued November 11, 1924.
- R331 La naissance d'une lampe de reception. *Radiodélicie*, 5, pp. 400-404, October 25, 1924.
- R332 Schroter, F. Gas relay. United States Patent No. 1513661, issued Oct. 28, 1924.
- R334 Rukop, H. Arrangement for producing electrical oscillations. United States Patent No. 1512010, issued October 28, 1924.
- R342.15 Dye, D. W. The performance and properties of telephonic frequency interval transformers. *Experimental Wireless (London)*, 2, pp. 74-84, November, 1924.
- R342.15 Armstrong, R. Intermediate frequency transformers. *Radio Journal (Los Angeles)*, 5, p. 9, October, 1924.
- R342.6 Starkey, H. E. Hassel's super-Zenith circuit. *QST*, 8, pp. 28-30, November, 1924.
- R343 Rugh, H. O. Wireless receiving system. United States Patent No. 1516061, issued November 18, 1924.
- R343 Conrad, F. Aperiodic receiver system. United States Patent No. 1515188, issued November 11, 1924.
- R343 La Bar, K. Solving the single circuit question (converting it into a nonradiating reflex circuit). *Radio (San Francisco)*, 6, pp. 17-18, November, 1924.
- R344 Local oscillation generators (recent Marconi patterns). *Electrician (London)*, 92, p. 406, October 10, 1924.
- R344.3 Turnbull, J. H. Parallel operation of power tubes. *QST*, 8, pp. 24-27, November, 1924.
- R344.5 Kintner, S. M. Polyphase plate circuit excitation system. United States Patent No. 1512324, issued October 28, 1924.
- R348 Kendall, B. W. Vacuum tube repeater. United States Patent No. 1514706, issued November 11, 1924.
- R348 Hartley, R. V. L. Current modifying relay system. United States Patent No. 1515109, issued November 11, 1924.
- R351 Gunn, R. A new oscillator for very short waves. *Radio News*, 6, p. 923, December, 1924.
- R357 Lubowsky, K. Frequency changers. *Electrician (London)*, 92, pp. 404-405, October 10; pp. 436-437, October 17, 1924.
- R360 Eddy, P. J. Electromagnetic signaling apparatus. United States Patent No. 1514732, issued November 11, 1924.
- R374 Lamphier, W. C. Radiodetector. United States Patent No. 1512326, issued October 28, 1924.
- R374 Bowman, A. W. Oscillation detector. United States Patent No. 1515994, issued November 18, 1924.
- R374 Everett, C. J. Detector for use in radio circuits. United States Patent No. 1515000, issued November 18, 1924.
- R375.2 Strachan, J. Coherers and contact detectors. *Wireless World and Radio Review*, 15, pp. 127-131, October 29, 1924.
- R376 Nukiyama, H., and Matudaira, M. Motional mutual impedance of telephone receivers. *Journal Institution of Electrical Engineers of Japan*, No. 431. Abstracted in *Electrical World*, 84 p. 1064, November 15, 1924.
- R381 Brown, R. C. Air condenser. United States Patent No. 1512358, issued October 21, 1924.
- R381 Bremer, H. A. Electric condenser. United States Patent No. 1514369, issued November 4, 1924.
- R381 Haub, M. W. Radio receiving and transmitting system. United States Patent No. 1514661, issued November 11, 1924.
- R381 Sess, A. H. Condenser. United States Patent No. 1514733, issued November 11, 1924.
- R381 Lindberg, J. F. Condenser. United States Patent No. 1514296, issued November 4, 1924.
- R382 Reeves, J. H. New coils of high efficiency. *Wireless World and Radio Review*, 15, pp. 73-77, October 15, 1924.

- R332.5 Bessy, R. D. Wireless telegraphy. United States Patent No. 1515999, issued November 18, 1924.
- R334.1 James, W. The construction of a heterodyne wave meter 60 to 230 meters. *Wireless World and Radio Review*, 13, pp. 152-157, November 8, 1924.
- R334.1 McGown, D. B. The construction and calibration of a wave meter and heterodyne oscillator. *Radio (San Francisco)*, 3, p. 26, November, 1924.
- R334.1 Wood, J. The heterodyne wave meter (continued from November issue). *Radio News*, 6, pp. 266-277, December, 1924.
- R336 Zobel, O. J. Transmission characteristics of electric wave filters. *Bell System Technical Journal*, 3, pp. 527-530, October, 1924.
- R336 Backhaus, H. Theorie der kurzen stromketten. *Jahrbuch der drahtlosen Telegraphie*, 24, pp. 53-65, 1924.

## R400.—Radio communication systems

- R400 Practical short wave transmitters. *QST*, 8, pp. 44-47, November, 1924.
- R412 Doolittle, F. M. Radiotelephony. United States Patent No. 1512973, issued November 4, 1924.
- R414 Weinberg, J. Radio signaling system. United States Patent No. 1512930, issued October 28, 1924.
- R431 deBellencize, H. J. M. de R. Wireless telegraph and telephone receiver. United States Patent No. 1512324, issued October 21, 1924.
- R431 Conrad, F. Receiving circuit for the elimination of static disturbances. United States Patent No. 1512223, issued October 28, 1924.
- R431 Elean, J. Static elimination system. United States Patent No. 1512286, issued October 28, 1924.
- R460 Eckersley, P. P. Duplex telephony. *Experimental Wireless (London)*, 3, pp. 101-104, November, 1924.
- R460 Hammond, J. H., jr. Transmission and receiving system. United States Patent No. 1513707, issued October 28, 1924.
- R460 Bethencot, J. Radio transmission system. United States Patent No. 1515331, issued November 11, 1924.
- R470 Slaughter, N. H. Carrier telephone equipment for high voltage power transmission lines. *Electrical Communications*, October, 1924. Abstracted in *Electrical World*, 84, p. 1664, November 15, 1924.
- R470 Cohen, L. Radio sur lignes (Line radio). *L'Onde Electrique*, 3, pp. 477-480, October, 1924.

## R500.—Applications of radio

- R530 Reilstab, L. Electric steering compass. United States Patent No. 1512951, issued October 21, 1924.
- R536 Report of the Committee on the "Application of Radio to Moving Trains." *Railway Electrical Engrs.*, 15, pp. 336-340, October, 1924.
- R536 Ribey, W. C. Prospecting by radio (development and possibilities of electrical investigations by this method). *Engineering and Mining Journal Press*, 118, pp. 723-734, November 8, 1924.
- R545 Corret, Dr. Lessons to be deduced from the transatlantic tests (amateurs) *Annales des Postes Tel. and Tel.*, 13, pp. 967-973, September, 1924.
- R579 Hanson, K. C. Method and apparatus for wireless control for torpedoes, etc. United States Patent No. 1514999, issued November 11, 1924.
- R582 Jacobsen, L. Das Elektrokardophon, eine Vorrichtung zur Hörbarmachung der Hertsbeine im Raum. *Die Antenne*, 4, pp. 61-63, October 1, 1924.

## R800.—Nonradio subjects

- 524.33 Haslow, J. B. Switching system. United States Patent No. 1514854, issued November 11, 1924.
- 524.33 Field, J. C. Switching system. United States Patent No. 1514844, issued November 11, 1924.
- 524.33 Walker, W. L. Signalling device. United States Patent No. 1513149, issued October 28, 1924.
- 535.3 Elwell, C. F. Photo-electric cells (high vacuum type—their applications). *Electrician (London)*, 93, pp. 430-433, November 7, 1924.
- 537.65 Isley, F. C. The relation between the mechanical and piezo-electrical properties of a Rochelle salt Crystal. *Physical Review*, 24, pp. 569-574, November, 1924.
- 621.385 Wright, S. B. Transmission circuits. United States Patent No. 1515642, issued November 18, 1924.

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