DEPARTMENT OF COMMERCE

RADIO SERVICE BULLETIN

ISSUED MONTHLY BY RADIO DIVISION

Washington, April 30, 1928—No. 133

CONTENTS

ABBREVIATIONS AND SYMBOLS

The necessary corrections to the list of Commercial and Government 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 following order:

Name = Name of station.
Loc. = Geographical location. O = west longitude. N = north latitude. S = south latitude.
Call = Call signal (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:
- FX = Point-to-point (fixed service).
- PG = General public.
- PR = Limited public.
- RC = Radio compass.
- AB = Aviation beacon.
- B = Beacon.
- P = Private.
- O = Government business exclusively.

Hours = Hours of operation:
- N = Continuous service.
- X = No regular hours.

F. T. Co. = Federal Telegraph Co.
I. R. T. Co. = Intercity Radio Telegraph Co.
I. W. T. Co. = Independent Wireless Telegraph Co.
K. & C. = Kilbourne & Clark Manufacturing Co.
M. R. T. Co. = Mackay Radio and Telegraph Co.
R. C. A. = Radio Corporation of America.
R. M. C. A. = Radiomarine Corporation of America.
T. R. T. Co. = Tropical Radio Telegraph Co.
U. R. Corp. = Universal Radio Corp.
W. S. A. Co. = Wireless Specialty Apparatus Co.
C. w. = Continuous wave.
I. c. w. = Interrupted continuous wave.

Kc. =Kilocycles.
Fy. =Frequency.
A. c. =Alternating current.
V. t. =Vacuum tube.
U. S. L. =Applies only to the list of Commercial and Government Radio Stations of the United States.
△ =Equipped with a radio compass (direction finder).

NEW STATIONS

Commercial land stations, alphabetically, by names of stations

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave lengths	Service	Hours	Station controlled by—
Honolulu, Hawaii (KYG)[1]	KYG	15.88, 26.39, 35.5	PG	N	Robert Dollar Co.
Los Angeles, Calif. (KSM)[1]	KSM	15.88, 26.39, 35.5	PG	N	Do.
New York, N. Y. (WPN)[1]	WPN	15.88, 26.43, 35.5	PG	N	Do.
Portland, Oreg. (KKB)[1]	KKB	15.88, 26.39, 35.5	PG	N	Do.
Portland, Oreg. (KPK)[2]	KPK	*600*, 630, 2013	PG	N	Merchants Exchange.
San Francisco, Calif. (KTK)[1]	KTK	15.88, 26.39, 35.5	PG	N	Robert Dollar Co.
Seattle, Wash. (KSA)[1]	KSA	15.88, 26.39, 35.5	PG	N	Do.

[1] System, composite v. t., c. w., and i. c. w.
[2] System, R. C. A. v. t., c. w., and i. c. w.; rates, 10 cents per word.

NOTE.—Construction permits only have been issued for the above-named stations.

Commercial ship stations, alphabetically, by names of vessels

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, 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—
A. D. McBeth [1]	KDXN	.....	PG	X	Buckeye S. S. Co	
Carnegie [2]	WSBS	.....	P	X	Carnegie Institution (of Washington).	Owner of vessel.
Curlew	WRBV	.....	.....	.....	Alaska Packers Association	
Frederick C	WRBR	.....	.....	.....	Nakat Packing Corporation	
John W. Weeks [3]	WRBN	.....	P	X	Upper Mississippi River Barge Line.	Do.
Petrel	WRBS	.....	.....	.....	Nakat Packing Corporation	
Point Arena	KUCD	.....	.....	.....	Swayne & Hoyt	
Samson	WRBO	.....	.....	.....	Commander Richard E. Byrd	Do.
Tong Yek [4]	KZBC	8	PG	X	Siy Cong Bieng & Co	Do.
Visayas [5]	KZCV	8	PG	X	Juan Sandoval Go Juan Co	Do.

[1] Rates, Great Lakes service, 4 cents per word.
[2] System, composite v. t., c. w.; w. l., 10.98, 16.4, 22.06, 45.63, 53.57, 65.6.
[3] System, Westinghouse v. t., c. w., and i. c. w.
[4] Range, 250; system, W. S. A. Co., 1,000; w. l., *600*.
[5] Range, 250; system, Navy-W. S. A. Co., 1,000; w. l., *600*, 800, 952.

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	
KDXN	A. D. MacBeth	b	KZCV	Visayas	b
KKB	Portland, Oreg	c	WPN	New York, N. Y	c
KSA	Seattle, Wash	c	WRBN	John W. Weeks	b
KSM	Los Angeles, Calif	c	WRBO	Samson	b
KTK	San Francisco, Calif	c	WRBR	Frederick C	b
KUCD	Point Arena	b	WRBS	Petrel	b
KYG	Honolulu, Hawaii	c	WRBV	Curlew	b
KZBC	Tong Yek	b	WSBS	Carnegie	b

Government land stations, alphabetically, by names of stations

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave length	Service	Hours	Station controlled by—
Cordova, Alaska [1]	WUAY	1099	PG		U. S. Army.
Haines, Alaska [2]	WUAZ	1056	PG		Do.
Petersburg, Alaska [3]	WUAV	1128	PG		Do.
Sitka, Alaska [4]	WXC	1200	PG		Do.
Skagway, Alaska [5]	WZC		PG		Do.
Wrangell, Alaska [6]	WUAO	1163	PG		Do.

[1] Loc. (approximately) 145° 45′ 45″ W., 60° 32′ 35″ N.; range, 200; system, General Electric Co. v. t. telegraph; hours, 8 a. m. to 7 p. m. daily, 9 to 10 a. m. and 5 to 6 p. m. Sundays and holidays; ship service last 10 minutes of each hour; rates, 12 cents per word.

[2] Loc. (approximately) 135° 26′ 00″ W., 59° 14′ 15″ N.; range, 200; system, General Electric Co. v. t. telegraph; hours, 8 a. m. to 5 p. m. daily, 10 to 11 a. m. and 6 to 7 p. m. Sundays and holidays; ship service last 10 minutes of each hour; rates, 12 cents per word.

[3] Loc. (approximately) 132° 57′ 05″ W., 56° 48′ 40″ N.; range, 200; system, General Electric Co. v. t. telegraph; hours, 8 a. m. to 10 p. m. daily, 9 to 11 a. m. and 6 to 7 p. m. Sundays and holidays; ship service last 10 minutes of each hour; rates 12 cents per word.

[4] Loc. (approximately) 135° 20′ 00″ W., 57° 03′ 00″ N.; range, 200; system, General Electric Co. v. t. telegraph; hours, 8 a. m. to 12 p. m. daily, 10 to 11 a. m. and 6 to 7 p. m. Sundays and holidays; ship service last 10 minutes of each hour; rates, 12 cents per word.

[5] Loc. (approximately) 135° 19′ 00″ W., 59° 27′ 10″ N.; range, 1,000; system, U. S. Army v. t. telegraph; hours, 8 a. m. to 5 p. m. daily, 6 to 7 p. m. Sundays and holidays; rates, 12 cents per word.

[6] Loc. (approximately) 132° 23′ 00″ W., 56° 28′ 20″ N.; range, 200; system, General Electric Co. v. t. telegraph; hours, 8 a. m. to 8 p. m. daily, 9 to 11 a. m. and 6 to 7 p. m. Sundays and holidays; ship service last 10 minutes of each hour.

Government ship stations, alphabetically, by names of stations

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave length	Service	Hours	Station controlled by—
Champlain △	NAFJ		O	X	U. S. Coast Guard.
Chelan △	NACD		O	X	Do.
Crane	NUDJ		O	X	Bureau of Fisheries, Department of Commerce.
Mendota △	NAGK		O	X	U. S. Coast Guard.
Pontchartrain △	NABP		O	X	Do.
Tahoe △	NADB		O	X	Do.

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	
NABP	Pontchartrain	b	WUAO	Wrangell, Alaska	c
NACD	Chelan	b	WUAV	Petersburg, Alaska	c
NADB	Tahoe	b	WUAY	Cordova, Alaska	c
NAFJ	Champlain	b	WUAZ	Haines, Alaska	c
NAGK	Mendota	b	WXC	Sitka, Alaska	c
NUDJ	Crane	b	WZC	Skagway, Alaska	c

Government aircraft stations, alphabetically, by names of stations

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Wave length	Hours	Owner
J-3	NAJC			U. S. Navy.
J-4	NAFB			Do.

Government aircraft stations, alphabetically, by call signals

Call signal	Name of station	Call signal	Name of station
NAFB	J-4	NAJC	J-3.

Special land stations, alphabetically, by names of stations

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927]

Station	Call signal	Wave length (meters)	Frequency (kilocycles)	Power (watts)	Station controlled by—
Portable: Locomotive No. 2724 and Caboose No. 19517.	2XBO	130.4-132.2, 113.1-113.8.	2,300-2,270, 2,653-2,635.	50	New York Central Railroad.

Special land stations, grouped by districts

Call signal	District and station
2XBO	Second district: Locomotive No. 2724 and Caboose No. 19517.

ALTERATIONS AND CORRECTIONS

COMMERCIAL LAND STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

CALIFORNIA (portable-KGGQ).—Call signal KGGP.
POINT WARDE, ALASKA—Loc. (approximately) 131° 58′ 00″ W., 56° 10′ 00″ N., system, composite v. t. telegraph; w. l., 105.2, 625, 700.
SANTA BARBARA, CALIF.—Loc. (approximately) 119° 41′ 00″ W., 34° 25′ 00″ N., range 50; system, add telegraph; w. l., 104.7; station controlled by Merritt-Chapman & Scott Corporation.
SANTA CRUZ ISLAND, CALIF.—Loc. (approximately) 119° 45′ 00′ W., 34° 04′ 00″ N., range, 50; system, add telegraph; w. l., 104.7; station controlled by Merritt-Chapman & Scott Corporation.
SURIGAO, P. I.—Range, 450; system, F. T. Co. arc; w. l., *600*, 825, 1,325.
Strike out all particulars of the following-named stations: Carlisle, Alaska, Iron Mountain, Mich., Mustang Island, Tex.

COMMERCIAL SHIP STATIONS, ALPHABETICALLY, BY NAMES OF VESSELS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

ADMIRAL MOSER.—Owner of vessel, Pacific S. S. Co.
BALDHILL.—Station controlled by R. M. C. A. (U. S. L.).
BENSON FORD.—W. l., add 1875.
CATALINA.—System, composite v. t. telegraph and telephone; w. l., 114.9; station controlled by owner of vessel.
CLINCHCO.—Name changed to Bafshe; owner of vessel, Sabine Towing Co.
DEWEY.—Owner of vessel, Oceanic & Oriental Navigation Co.
EASTERN COAST.—Owner of vessel, Pacific Coast S. S. Co.
ETHEL M. STERLING.—Owner of vessel, Nannie T. Bartlett.
HAITI.—Owner of vessel, Ocean Dominion S. S. Corporation.
HENRY FORD II.—W. l., add 1875.
LAKE ELLITHORPE.—Owner of vessel, Newtex S. S. Corporation.

LAKE GAITHER.—Owner of vessel, Newtex S. S. Corporation.
LEVIATHAN LIFEBOAT No. 67.—Changed to Leviathan Lifeboat No. 31.
LAVIATHAN LIFEBOAT No. 68.—Changed to Leviathan Lifeboat No. 32.
MID-WEST.—Range, 150; w. l., 109.1.
OPHIS.—Name changed to Bangu.
SUSANA II.—Owner of vessel, Manila Amoy Angkee S. S. Co.
THOMAS BRITT.—Name changed to J. E. Savage.
UNION LIBERTY.—Name changed to Wichita Falls.
WEST CARMONA.—Owner of vessel, Oceanic & Oriental Navigation Co.
WEST GRAMA.—Station controlled by R. M. C. A. (U. S. L.).
WHEATON.—Owner of vessel, American-Hawaiian S. S. Co.
Strike out all particulars of the following-named vessels: Apex, Indian, Niagara, Sutherland, United States.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

KENX, *read* Bafshe; KFNU, *read*, J. E. Savage; KGGP, *read* California (portable); KODZ, *read* Bangu; KUNG, *read* Wichita Falls; WSNA, *read* Leviathan Lifeboat No. 31; WSNB, *read* Leviathan Lifeboat No. 32; strike out all particulars following the call signals, KFEE, KFEK, KGUI, KOV, KZU, WDY, WNC, WTJ.

BROADCASTING STATIONS, BY CALL SIGNALS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927]

KGEN (El Centro, Calif.).—Power, 100.
KGHF (Pueblo, Colo.).—Owner of station, Curtis P. Ritchie and Joe E. Finch.
KSTP (Westcott, Minn.).—Power, 3,500.
KWG (Stockton, Calif.).—Power, 100.
KXL (Portland, Oreg.).—Power, 250.
WBAW (Nashville, Tenn.).—Power, 5,000.
WBCN (Chicago, Ill.).—Consolidated with WENR; power, 500 night, 5,000 day.
WBKN (Brooklyn, N. Y.).—Call changed to WCLB.
WCAH (Columbus, Ohio.)—Owner of station, Commercial Radio Service Co.
WCAU (Philadelphia, Pa.).—Changed to Byberry, Pa.; power, 1,000.
WCDA (Cliffside Park, N. J.).—W. l., 212.6, fy. kc., 1,410.
WCWS (Danbury, Conn.).—Call changed to WCON.
WENR (Chicago, Ill.).—Consolidated with WBCN; power, 500 night, 5,000 day.
WFBE (Cincinnati, Ohio).—Owner of station, Park View Hotel.
WHBD (Bellefontaine, Ohio).—Owner of station, First Presbyterian Church.
WKBV (Brookville, Ind.).—W. l., 218.8, fy. kc., 1,370.
WOKO (Peeksville, N. Y.).—Changed to Mount Beacon, N. Y.; power, 500.
WRBU (Gastonia, S. C.).—Should read Gastonia, N. C.
WRRS (Racine, Wis.).—Call changed to WRJN.
WRST (Bay Shore, N. Y.).—Call changed to WINR.
WTFI (Toccoa, Ga.).—Power, 500.
Strike out all particulars of the following-named stations: KXRO (Aberdeen, Wash.); WHBA (Oil City, Pa.); WAMD (Minneapolis, Minn.); KFOY (St. Paul, Minn.).

COMMERCIAL AIRCRAFT 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, 1927, and to the International List of Radiotelegraph Stations, published by the Berne Bureau]

DAWN (WMU).—Strike out all particulars.

GOVERNMENT LAND STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations, published by the Berne Bureau]

ASTORIA, OREG.—W. l., strike out 2,100.
FORT MILLS, P. I. (WUP).—W. l., add 1,350.
GUANTANAMO BAY, CUBA.—Service, O.
KEY WEST, FLA. (NAR).—W. l., strike out 2,100.
NORFOLK, VA.—W. l., strike out 2,100.

NULATO, ALASKA.—Loc. (approximately) 158° 00′ 00″ W., 64° 45′ 00″ N.; range, 400; w. l., 1,800, 3,202; service, PG; hours, 8 a. m. to 5 p. m. daily; 10 to 11 a. m. and 4 to 5 p. m. Sundays and holidays; rates, 12 cents per word.
PORT AU PRINCE, HAITI.—W.l., strike out 2,100.
SAN JUAN, P. R.—W.l., strike out 2,100.
TORO POINT, CANAL ZONE.—Call changed to NQB.
Strike out all particulars of the following-named stations: Cape Hatteras, N. C. (traffic station); Fort Mills, P. I. (WUAG); Fort Wayne, Mich.

GOVERNMENT SHIP STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

MOHAVE.—Strike out all particulars.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

NAX, changed to NQB; strike out all particulars following the call signals, NDW, NTO, WUAG, WUAO.

MISCELLANEOUS

CHANGES IN RADIOBEACON STATIONS OF THE UNITED STATES

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Cove Point Light Station, Md.—Beacon established. Will transmit every 180 seconds, groups of 1 dot and 1 dash for 60 seconds, silent 120 seconds, thus:

• — • — • — etc.	Silent
60 seconds	120 seconds

Will be operated on 984 meters (305 kc.) continuously during thick or foggy weather and daily in clear weather from 5 to 5.30 and 11 to 11.30 a. m. and p. m., seventy-fifth meridian time. Location 76° 22′ 55″ W., 38° 23′ 10″ N.

Jupiter Inlet Light Station, Fla.—Hours of operation, add 3 to 3.30 a. m. and p. m.

South Pass West Jetty Range Front Light Station, Miss.—Hours of operation, add 12.30 to 1 and 6.30 to 7, a. m. and p. m.

CHANGES IN WAVE LENGTHS OF NAVAL STATIONS TRANSMITTING WEATHER, HYDROGRAPHIC, AND ICE REPORTS AND TIME SIGNALS

Weather and hydrographic information heretofore transmitted from Brownsville (NAY) on 2,273 meters (132 kc.), i. c. w., is now transmitted on 2,885 meters (104 kc.), i. c. w.

Time, weather, and hydrographic information heretofore transmitted from New Orleans (NAT) on 2,830 meters (106 kc.), c. w., is now transmitted on 2,655 meters (113 kc.), c. w.

Weather information heretofore transmitted from Pensacola (NAS) on 2,679 meters (112 kc.), i. c. w., is now transmitted on 2,655 meters (113 kc.) i. c. w.

Ice information heretofore transmitted by Arlington (NAA) at 10 a. m., seventy-fifth meridian time, on 2,679 meters (112 kc.) and 18.68 meters (16,060 kc.), a. c. w., following the major weather bulletin will be transmitted at 12 noon, seventy-fifth meridian time on 2,679 (112 kc.), a. c. w., following the time signal and hydrographic information. The hydrographic and ice information heretofore transmitted at 10 p. m., seventy-fifth meridian time on 4,409 meters (68 kc.) and 2,679 meters (112 kc.), a. c. w., following the major weather bulletin, will be transmitted at 11 p. m., seventy-fifth meridian time on 2,679 meters (112 kc.), a. c. w.

DISTRIBUTION OF WEATHER INFORMATION, FORECASTS, AND WARNINGS BY RADIO FOR BENEFIT OF NAVIGATION ON THE GREAT LAKES

Weather forecasts and information for such States as are contiguous to the Great Lakes, and forecasts and warnings for the Great Lakes, are broadcast by radio from a number of broadcasting stations cooperating with the Weather

Bureau. The broadcasts of weather forecasts, warnings, and other pertinent information have been arranged so as to be of special benefit to navigation, shipping, and aviation interests of the Great Lakes region, and are made daily, except as noted, from stations at important lake ports. The daily forecasts of wind and weather are made separately for the upper and lower Lakes and are broadcast accordingly, as indicated in the following schedules:

Broadcasting stations and schedules

DULUTH, MINN.:

Station WEBC.—Head of the Lakes Broadcasting Co.

Radiophone: Wave length, 241.8 meters; 1,240 kilocycles per second; 1.15 p. m. and 7 p. m., ninetieth meridian time (except Sundays); 7 a. m., pressure, wind, and weather at Duluth, Port Arthur, Houghton, Marquette, and Sault Ste. Marie; 7 a. m., wind and weather at Portage and Whitefish Point; forecasts for Duluth-Superior and vicinity, Minnesota, and Wisconsin and upper Lakes; storm warnings whenever issued.

Station WME.—Intercity Radio Telegraph Co.

Radiotelegraph: Wave length, 715 meters, spark; 419 kilocycles per second; 10 a. m. and 4 p. m., ninetieth meridian time; 7 a. m., pressure, wind, and weather at Duluth, Port Arthur, Houghton, Marquette, and Sault Ste. Marie; 7 a. m., wind and weather at Portage and Whitefish Point; forecasts for the upper Lakes; storm warnings whenever issued.

Station WRL.—Radio Corporation of America.

Radiotelegraph: Wave length, 875 meters, i. c. w.; 343 kilocycles per second; 10 a. m. and 10 p. m., ninetieth meridian time; 7 a. m., pressure, wind, and weather at Duluth, Port Arthur, Houghton, Marquette, and Sault Ste. Marie; 7 a. m., wind and weather at Portage and Whitefish Point; forecasts for the upper Lakes; storm warnings whenever issued.

WEST DE PERE, WIS.:

Station WHBY.—St. Norbert's College.

Radiophone: Wave length, 249.9 meters; 1,200 kilocycles per second; 7.15 p. m., ninetieth meridian time (except Sundays and holidays); forecasts for Green Bay and Wisconsin and upper Lakes; storm warnings whenever issued.

MILWAUKEE, WIS.:

Station WHAD.—Marquette University.

Radiophone: Wave length, 270.1 meters; 1,110 kilocycles per second; 3.30 p. m., ninetieth meridian time (except Saturdays, Sundays, and holidays); forecasts for Milwaukee and Wisconsin and upper Lakes; storm warnings whenever issued.

Station WISN.—School of Engineering of Milwaukee.

Radiophone: Wave length, 270.1 meters; 1,110 kilocycles per second; 2.15 and 5 p. m., ninetieth meridian time (except Sundays and holidays); 7 a. m., pressure, wind, and weather at Chicago, Grand Haven, Milwaukee, Escanaba, and Sault Ste. Marie; wind and weather at Middle Island, Plum Island, and Whitefish Point; forecasts for Milwaukee and Wisconsin and upper Lakes; storm warnings whenever issued.

Station WTMJ.—Milwaukee Journal.

Radiophone: Wave length, 293.9 meters; 1,020 kilocycles per second; 10.30 a. m. and 12.30 p. m., ninetieth meridian time (except Sundays and holidays); 7 a. m., pressure, wind, and weather at Chicago, Grand Haven, Milwaukee, Escanaba, and Sault Ste. Marie; wind and weather at Middle Island, Plum Island, and Whitefish Point; forecasts for Milwaukee and Wisconsin and upper Lakes; storm warnings whenever issued.

GREAT LAKES, ILL.:

Station NAJ.—United States Navy.

Radiotelegraph: Wave length, 2,273 meters, i. c. w.; 132 kilocycles per second; 9.45 a. m. and 10 p. m., ninetieth meridian time; 7 a. m. and 7 p. m., pressure, wind, and weather at Chicago, Grand Haven, Milwaukee, Ludington, Escanaba, and Sault Ste. Marie; and wind and weather at Whitefish Point; 7 a. m., wind and weather at Beaver Island, Mackinaw, and Plum Island, at 9.45 a. m.; forecasts for upper and lower Lakes; storm warnings whenever issued; storm warnings issued in the afternoon are broadcast at 4 p. m., ninetieth meridian time.

CHICAGO, ILL.

Station KYW.—Westinghouse Electric & Manufacturing Co.

Radiophone: Wave length, 526 meters; 570 kilocycles per second; 11 a. m. (except Sundays and holidays), 11.55 p. m. (except 11 p. m. Sunday nights), ninetieth meridian time; 7 a. m. and 7 p. m. pressure, wind, and weather at Chicago, Grand Haven, Milwaukee, Ludington, Escanaba, and Sault Ste. Marie; and wind and weather at Whitefish Point; 7 a. m. wind and weather at Beaver Island, Mackinaw, and Plum Island, at 11 a. m.; forecasts for Illinois, Indiana, Wisconsin, Minnesota, and upper and lower Michigan; aviation forecasts for zones 4 and 8; forecasts for upper and lower Lakes; storm warnings whenever issued.

Station WAAF.—The Daily Drovers Journal.

Radiophone: Wave length, 389.4 meters; 770 kilocycles per second; 10.30 a. m. and 12.30 p. m., ninetieth meridian time (except Sundays and holidays); forecasts for Illinois, Indiana, Wisconsin, Minnesota, and upper and lower Michigan; aviation forecasts for zones 4 and 8; forecasts for upper and lower Lakes; general forecast; storm warnings whenever issued.

Station WCFL.—Chicago Federation of Labor.

Radiophone: Wave length, 483.6 meters; 620 kilocycles per second; 12.15 p. m., ninetieth meridian time (except Sundays and holidays); forecasts for upper and lower Lakes; general forecast; storm warnings whenever issued.

Station WEBH.—Edgewater Beach Hotel.

Radiophone: Wave length, 365.6 meters; 820 kilocycles per second; 10 a. m. and 10 p. m., ninetieth meridian time; forecasts for Chicago and vicinity and upper and lower Lakes; general forecast; storm warnings whenever issued.

Station WGN.—Chicago Tribune and Liberty Weekly.

Radiophone: Wave length, 416.4 meters; 720 kilocycles per second 10 p. m., ninetieth meridian time; forecasts for upper and lower Lakes; storm warnings whenever issued.

Station WGO.—Radio Corporation of America.

Radiotelegraph: Wave length, 890 meters, c. w.; 337 kilocycles per second; 11 a. m., 4 p. m., and 9 p. m., ninetieth meridian time; 7 a. m. and 7 p. m. pressure, wind, and weather at Chicago, Grand Haven, Milwaukee, Ludington, Escanaba, and Sault Ste. Marie; and wind and weather at Whitefish Point; 7 a. m. wind and weather at Beaver Island, Mackinaw, and Plum Island, at 11 a. m.; forecasts for Chicago and vicinity and upper and lower Lakes; storm and small craft warnings whenever issued.

Station WHT.—Radiophone Broadcasting Corporation.

Radiophone: Wave length, 305.9 meters; 980 kilocycles per second; 11.50 p. m., ninetieth meridian time (except Sundays and holidays); forecasts for Chicago, Illinois, Indiana, Wisconsin, Minnesota, and upper and lower Michigan; aviation forecasts for zones 4, 7, and 8; forecasts for upper and lower Lakes; general weather forecast; storm warnings whenever issued.

Station WJBT.—John S. Boyd (Inc.).

Radiophone: Wave length, 389.4 meters; 770 kilocycles per second; 5 p. m., ninetieth meridian time (except Sundays and holidays); forecasts for Chicago and vicinity and upper and lower Lakes; general weather forecasts; storm warnings whenever issued.

Station WLS.—Sears, Roebuck & Co.

Radiophone: Wave length, 344.6 meters; 870 kilocycles per second; 9 a. m. and 12.10 p. m., ninetieth meridian time (except Sundays and holidays); forecasts for Chicago, Illinois, Indiana, Wisconsin, Minnesota, and upper and lower Michigan; general forecast and weather conditions; aviation forecast for zones 4, 7, and 8; forecasts for upper and lower Lakes; storm warnings whenever issued.

Station WMAQ.—The Chicago Daily News.

Radiophone: Wave length, 447.5 meters; 670 kilocycles per second; 10.30 a. m. and 12.30 p. m., ninetieth meridian time (except Sundays and holidays; forecasts for Illinois, Indiana, Wisconsin, Minnesota, and lower Michigan; aviation forecast for zones 4 and 8; forecasts for upper and lower Lakes; general forecast; storm warnings whenever issued.

MACKINAC ISLAND, MICH.

Station WHQ.—Mackinac Radio Service.

Radiotelegraph: Wave length, 875 meters; tube (a. c. w.); 343 kilocycles per second; 10.15 a. m. and 4.15 p. m., ninetieth meridian time; forecasts for Lakes Huron, Michigan, and Superior; storm warnings whenever issued.

ROGERS, MICH.

Station WLC.—The Michigan Limestone & Chemical Co.

Radiotelegraph: Wave length, 715 meters; spark and c. w.; 419 kilocycles per second; 8.45 a. m., seventy-fifth meridian time, state of weather, and wind direction and velocity at Mackinaw, Middle Island, Alpena, Towas Point, Harbor Beach, and Port Huron; barometric pressure at Alpena and Port Huron; 10.45 a. m. and 10.30 p. m., seventy-fifth meridian time; weather forecast for upper Lakes; storm and advisory warnings whenever issued; 4.45 p. m. and 8.45 p. m., seventy-fifth meridian time; state of weather and wind direction and velocity at 4 and 8 p. m., respectively, at Middle Island and Alpena; storm and advisory warnings whenever issued.

DETROIT, MICH.

Station WCX.—Detroit Free Press.

Radiophone: Wave length, 440.9 meters; 680 kilocycles per second; 12.30 p. m. and 4 p. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Lower Michigan and Detroit and upper and lower Lakes; summary of weather conditions; storm warnings whenever issued.

Station WDI.—Intercity Radio Telegraph Co.

Radiotelegraph: Wave length 715 c. w.; 419 kilocycles per second; 11 a. m. and 4 p. m., seventy-fifth meridian time; 8 a. m., barometric pressure at Port Huron, Detroit, and Toledo; forecasts for the upper and lower Lakes; storm warnings whenever issued.

Station WGHP.—George H. Phelps (Inc.).

Radiophone: Wave length, 277.6 meters; 1,080 kilocycles per second; 6.45 p. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Detroit and Lower Michigan and upper and lower Lakes; summary of weather conditions; storm warnings whenever issued.

Station WJR.—WJR (Inc.).

Radiophone: Wave length, 440.9 meters; 680 kilocycles per second; 5.50 p. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Detroit and Lower Michigan and upper and lower Lakes; summary of weather conditions; storm warnings whenever issued.

Station WWJ.—Detroit Evening News.

Radiophone: Wave length, 352.7 meters; 850 kilocycles per second; 10.25 a. m., 11.55 a. m., and 3.50 p. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Lower Michigan and Detroit and upper and lower Lakes; summary of weather conditions; storm warnings whenever issued.

CLEVELAND, OHIO.

Station WCY.—Radio Corporation of America.

Radiotelegraph: Wave length, 375 meters c. w.; 343 kilocycles per second; 10.30 p. m., seventy-fifth meridian time; 8 p. m. pressure, wind, and weather at Cleveland, Toledo, and Erie; forecasts for the lower and upper Lakes; storm warnings for Lake Erie and advisory warnings for the Great Lakes whenever issued at night.

Station WEAR.—WTAM and WEAR (Inc.).

Radiophone: Wave length, 399.8 meters; 750 kilocycles per second; 12 noon and 4 p. m., seventy-fifth meridian time (except Sundays and holidays); 8 a. m. pressure, wind, and weather at Cleveland, Toledo, and Erie; forecasts for Ohio and Cleveland and lower and upper Lakes; summary of weather conditions; storm warnings whenever issued.

Station WTAM.—WTAM and WEAR (Inc.).

Radiophone: Wave length, 399.8 meters; 750 kilocycles per second; 6.55 p. m., seventy-fifth meridian time; 8 a. m. pressure, wind, and weather at Cleveland, Toledo, and Erie; forecasts for Cleveland and vicinity.

Station WTK.—Intercity Radio Telegraph Co.

Radiotelegraph: Wave length, 715 meters c. w.; 419 kilocycles per second; 11.05 a. m., 4 p. m., and 10.10 p. m., seventy-fifth meridian time; 8 a. m. pressure, wind, and weather at Cleveland, Toledo, and Erie, at 11.05 a. m. only; forecasts for the lower and upper Lakes; storm warnings for Lake Erie and advisory messages for the Great Lakes whenever issued.

EAST PITTSBURGH, PA.

Station KDKA.—Westinghouse Electric and Manufacturing Co.

Radiophone: Wave length, 315.6 meters; 950 kilocycles per second; 9.45 a. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Pennsylvania and Ohio; 12 noon, seventy-fifth meridian time (except Sundays and holidays); forecasts for Pennsylvania and Ohio; weather conditions; storm warnings for Great Lakes whenever issued; 3 p. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Pennsylvania and Ohio; 10 p. m., seventy-fifth meridian time (except Sundays); forecasts for Pennsylvania, New York, lower and upper Michigan, Ohio, and Indiana; storm warnings for upper and lower Lakes whenever issued.

BUFFALO, N. Y.

Station WAM.—Intercity Radio Telegraph Co.

Radiotelegraph: Wave length, 715 meters c. w.; 419 kilocycles per second; 11 a. m. and 10 p. m., seventy-fifth meridian time; 8 a. m. and 8 p. m. pressure, wind, and weather at Buffalo and Oswego; forecasts for the lower Lakes; storm warnings whenever issued.

Station WGR.—Federal Radio Corporation.

Radiophone: Wave length, 302.8 meters; 990 kilocycles per second; 12 noon, 7 p. m., and 11 p. m., seventy-fifth meridian time; forecasts for Buffalo and western New York and lower Lakes; summary of weather conditions; storm warnings whenever issued.

Station WMAK.—WMAK Broadcast Station.

Radiophone: Wave length, 545.1 meters; 550 kilocycles per second; 12 noon and 7 p. m., seventy-fifth meridian time (except Sundays and holidays); forecasts for Buffalo and western New York and lower Lakes; summary of weather conditions; storm warnings whenever issued.

VICTOR TOWNSHIP, N. Y.

Station WHAM.—Stromberg Carlson Telephone Manufacturing Co.

Radiophone: Wave length 280.2 meters; 1,070 kilocycles per second; 11.30 a. m. and 11 p. m., seventy-fifth meridian time (except 11.30 a. m. Sundays and holidays); 8 a. m. pressure, wind, and weather at Buffalo, Rochester, and Oswego; forecasts for western New York and lower Lakes; storm warnings whenever issued.

ROCHESTER, N. Y.

Station WHEC.—Hickson Electric Co.

Radiophone: Wave length, 254.1 meters; 1,180 kilocycles per second; 12 noon, seventy-fifth meridian time (except Sundays and holidays); 8 a. m. pressure, wind, and weather at Buffalo, Rochester, and Oswego; forecasts for western New York and lower Lakes; storm warnings whenever issued.

NOTE.—Certain State weather forecasts are broadcast from several radio stations, as indicated. These forecasts are for States contiguous to the waters of the Great Lakes and are applicable to navigation. Radio stations KDKA at East Pittsburgh and KYW, WAAF, WHT, WMAQ, and WLS at or near Chicago also broadcast on the same schedules forecasts for additional States not contiguous to the Great Lakes. Broadcasts are made throughout the year from the following radio stations: WEBC, WHBY, WHAD, WISN, WTMJ, KYW, WAAF, WCFL, WEBH, WGN, WHT, WJBT, WMAQ, WLS, WCX, WGHP, WJR, WWJ, WEAR, WTAM, KDKA, WGR, WMAK, WHAM, and WHEC. All other stations broadcast only during the season of navigation on the Great Lakes. Storm warnings, weather conditions at certain indicated Lake points, and the forecasts for the upper and lower lakes are broadcast only during the season of navigation.

GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION

Extension of broadcasting station licenses (General Order No. 27, April 20, 1928).—All existing licenses to broadcast, subject to such modifications and extensions as may be appended thereto, are hereby further extended for 30 days, to terminate at 3 a. m. June 1, 1928, unless otherwise modified.

Permission to move broadcasting station studios required (General Order No. 28, April 20, 1928).—Under the radio laws of 1928, approved by the President March 28, 1928, it is specified that "Allocations shall be charged to the State, district, territory, or possession wherein the studio of the station is located and not where the transmitter is located."

In this particular it is hereby ordered that no broadcasting station shall move its studio outside of the borders of the State, district, territory, or possession in which it is located without first making written application to the commission for authority to so move its studio, and securing written permission from the commission for such removal. This order does not apply to transfers or removals of studios within the borders of the State, district, territory, or possession.

RADIO OFFICE OPENED IN BUFFALO, N. Y.

The division has established a branch office in Buffalo, N. Y. Communications for that office should be addressed Radio Inspector, Post Office Building, Buffalo, N. Y.

KILOCYCLE-METER CONVERSION TABLE AVAILABLE FOR DISTRIBUTION

This table, computed by the division, gives approximate values, in meters, corresponding to any number of kilocycles, and vice versa. This table is based on the factor 300,000. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents per copy. Remittances should not be forwarded to the radio division.

MEXICAN BROADCASTING STATIONS

The list of these stations given on page 15 of the BULLETIN for last month should be corrected to show the subheading for the column following the wavelength column to be "Power (watts)" and not "Frequency (kilocycles)."

CHANGES IN LIST OF MASTER CONTROL AND ALTERNATE CONTROL STATIONS OF NAVAL COMMUNICATION RESERVE

The following change should be made to the list published in the January 31, 1928, No. 130, edition of this publication: Addition, Thirteenth naval district, NRRS, Seattle, Wash., amateur call, 7BQ, master reserve control station.

TIME SIGNALS TRANSMITTED BY TSINGTAO (CHINA) STATION

Time signals are now transmitted from this station located in longitude 120° 19′ E., latitude 36° 04′ N. (approximately), call signal XORT, on 44 meters, c. w. The signals, transmitted twice daily in accordance with the procedure shown hereunder, are preceded by the general call (CQ) followed by the words "Tsingtao time signals," repeated three times.

Time (G.M.T.).						Signal.
h.	m.	s.	h.	m.	s.	
00 } 10 }	25	00 to	00 } 10 }	25	50	— — — — — —, etc.
	26	00 to				. time signal.
	27	00 to		27	50	— — — — — —, etc.
	28	00 to				. time signal.
	29	00 to		29	50	— — — — — —, etc.
00 } 10 }	30	00 to				. time signal.

CHANGES IN SPANISH RADIOBEACON STATIONS

The beacon located at the Cape Villano Lighthouse, in longitude 9° 13′ W., latitude 43° 10′ N. (approximately), has been altered and now transmits as follows:

• • • — • • • — • • • — etc.	———	• • • —	Silent
47 sec.	10 sec.	3 sec.	4 min.

The beacon located at the Cape Finisterre Lighthouse, in longitude 9° 16′ W., latitude 42° 53′ N. (approximately), has been altered and now transmits as follows:

• • — • • • — • • • — • etc.	———	• • — •	Silent
47 sec.	10 sec.	3 sec.	4 min.

DAYLIGHT-SAVING TIME IN FOREIGN COUNTRIES

The legal time in the countries named hereunder has been advanced as follows: Belgium and Spain advanced one hour during the night of April 14 and 15, at 12 o'clock. France advanced one hour during the night of April 14 and 15, at 11 o'clock. Great Britain advanced one hour on April 22, at 2 a. m., until October 7, at the same hour. Portugal advanced one hour during the night of April 14 and 15, at 11 o'clock.

ACT CONTINUING FOR ONE YEAR THE POWERS AND AUTHORITY OF THE FEDERAL RADIO COMMISSION (S. 2317)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all the powers and authority vested in the Federal Radio Commission by the radio act of 1927, approved February 23, 1927, shall continue to be vested in and exercised by the commission until March 16, 1929; and wherever any reference is made in such act to the period of one year after the first meeting of the commission, such reference shall be held to mean the period of two years after the first meeting of the commission.

SEC. 2. The period during which the members of the commission shall receive compensation at the rate of $10,000 per annum is hereby extended until March 16, 1929.

SEC. 3. Prior to January 1, 1930, the licensing authority shall grant no license or renewal of license under the radio act of 1927 for a broadcasting station for a period to exceed three months and no license or renewal of license for any other class of station for a period to exceed one year.

SEC. 4. The term of office of each member of the commission shall expire on February 23, 1929, and thereafter commissioners shall be appointed for terms of two, three, four, five, and six years, respectively, as provided in the radio act of 1927.

SEC. 5. The second paragraph of section 9 of the radio act of 1927 is amended to read as follows:

"It is hereby declared that the people of all the zones established by section 2 of this act are entitled to equality of radio broadcasting service, both of transmission and of reception, and in order to provide said equality the licensing authority shall as nearly as possible make and maintain an equal allocation of broadcasting licenses, of bands of frequency or wave lengths, of periods of time for operation, and of station power, to each of said zones when and in so far as there are applications therefor; and shall make a fair and equitable allocation of licenses, wave lengths, time for operation, and station power to each of the States, the District of Columbia, the Territories and possessions of the United States within each zone, according to population. The licensing authority shall carry into effect the equality of broadcasting service hereinbefore directed, whenever necessary or proper, by granting or refusing licenses or renewals of licenses, by changing periods of time for operation, and by increasing or decreasing station power, when applications are made for licenses or renewals of licenses: *Provided,* That if and when there is a lack of applications from any zone for the proportionate share of licenses, wave lengths, time of operation, or station power to which such zone is entitled, the licensing authority may issue licenses for the balance of the proportion not applied for from any zone, to applicants from other zones for a temporary period of ninety days each, and shall specifically designate that said apportionment is only for said temporary period. Allocations shall be charged to the State, District, Territory, or possession wherein the studio of the station is located and not where the transmitter is located."

Approved, March 28, 1928.

Number and class of radio stations of the world, 1913 to 1927

Fiscal year ending June 30 [1]	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
AMERICAN STATIONS															
Merchant ships	[2] 483	555	585	604	836	1,478	2,312	2,808	2,978	2,773	2,723	2,741	1,901	1,954	2,092
Commercial transoceanic	1	7	7	7	5	5	5	6	6	12	12	12	20	22	26
Commercial ship to shore (general public)	44	49	58	59	7	7	7	17	23	35	45	53	59	61	69
Commercial point to point and commercial (private) ship to shore (limited public and limited commercial)	30	35	52	63	26	26	26	71	105	138	179	224	207	236	245
Experimental	11	35	56	72	[3]	[3]	[3]	63	147	227	261	331	241	193	185
Technical and training school	7	9	22	39	[3]	[3]	[3]	42	94	117	127	45	31	32	41
Special amateur	4	9	40	72	[3]	[3]	[3]	59	142	181	178	289	183	[4]	[4]
General and restricted amateur	1,224	2,796	3,805	4,870	[3]	[3]	[3]	5,922	10,809	15,504	16,570	15,545	14,928	14,902	15,926
Government land (all classes)	77	94	104	118	[5]	[5]	269	262	227	284	290	298	305	325	333
Government ship	229	291	317	324	[5]	[5]	1,580	1,312	1,158	1,194	1,009	951	1,218	1,155	1,203
Broadcasting										[6] 382	573	535	571	528	694
FOREIGN															
Commercial and Government land (all classes)	347	478	534	767	642	686	733	977	1,107	1,092	1,068	1,049	1,120	1,180	1,373
Government ship	1,237	1,397	1,424	1,018	1,469	1,454	1,516	705	1,229	1,671	1,779	2,015	2,111	2,164	2,172
Commercial ship	1,390	2,024	2,445	1,963	2,254	2,216	2,420	5,140	5,818	8,699	8,502	8,915	9,404	9,721	10,276

[1] Figures for foreign stations are as of various months for the years mentioned.
[2] In 1912 there were 367 American vessels equipped.
[3] War period, stations inoperative.
[4] Discontinued, combined with general and restricted amateur stations.
[5] No listing during war period.
[6] None prior to 1921.

Foreign short-wave stations in order of wave lengths

Wave length	Location	Call signal	Remarks
0–14	Mexican stations		
.75	Canadian amateur stations		
3	Norwegian amateur stations		
5	Tokio, Japan	JKZB	
	Montreal, Canada		
5.35	Canadian amateur stations		
9	Riga, Latvia	KCR	Other calls KCO, KCM, KCY, KCX; telegraph.
10	Toronto, Canada		500 watts.
	Lake Como, Italy (Rome)	IIRG	
11–58	Nauen, Germany	AGA	Other calls AGK, POF, AGB, AGC; phone and telegraph.
13.8	Buenos Aires, Argentina	LP	20,000 watts.
13.33	do	LP	Do.
14.28	Paris (Ste. Assise, Cie Radio)	FW	Traffic with Buenos Aires.
14–36	Konigswusterhausen, Germany	AFI	Other calls AFJ, AFU; phone and telegraph.
14.58	Buenos Aires, Argentina	LP	20,000 watts.
15–50	Quilicura, Chile	CH	
15	Brussels, Belgium		4,000 watts.
	Machelen (Ghent), Belgium	B2	Do.
	Drummondville (Montreal), Canada	CG	35,000 watts.
	Chelmsford, England	G 2BR	
	Curacao, Brazil	PVC	
15.7	Henlow, England	GLG	
	Dorchester, England	GLW	Beam station, South American circuit.
15.75	Ongar, England	GLS	
15–20	Quilicura, Chile		
15.58	Santa Cruz, Brazil	SPU	Beam station.
15.64	Lisbon, Portugal (Alfragide)	PQW	Do.
15.74	Henlow, England	GLG	
16.08	Klipheuval, South Africa	VNB	Do.
16.5	Drummondville (Montreal), Canada	CG	35,000 watts; beam station.
16.7	Toronto, Canada		2,000 watts.
16.14	Bodmin, England	GBJ	Beam station, South African circuit.
16.21	Grimsby, England	GBI	Beam station, Indian circuit.
16.29	Kirkee (Bombay), India	VWZ	Beam station.
16.57	Bodmin, England	GBK	Do.
16–60	Kootwijk, Holland	PCKK	Other calls PCLL, PCMM, PCPP, PCRR, PCTT. 10–40 kilowatts; broadcasts Wednesday, 1400–1600 G. M. T. and occasionally on Monday and Friday and on other wave lengths below 60 meters; power, 40 kilowatts.
16–73	Tokyo, Japan	JPP	Other calls JYB, JYZ.
17	Malabar, Java	PCG	
	Chelmsford, England	G 2BR	
	Rio de Janeiro, Brazil	SPI	
17.4	Bandoeng, Java	ANE	Phone and telegraph.
	Malabar, Java	ANH	Phone and telegraph; broadcasts Saturday 1200–1700 G. M. T. and at other times as then announced.
17.5	Leafield, England	GBL	Other calls GBM and GBO; postoffice station.
17.85	Pernambuco, Brazil		20,000 watts.
18	Coltano, Italy	ICC	
	Machelen, Ghent, Belgium	B2	4,000 watts.
	Riga, Latvia	KCR	Other calls KCO, KCM, KCY, KCX; telegraph.
	Lake Como, Italy (Rome)	I 1RG	
18.18	Praia, Cape Verde Islands	CRHB	8–19 G. M. T. daily; 10–11 G. M. T. Sundays and holidays.
18.27	Lisbon, Portugal (Alfragide)	PQS	Beam station.
18.36	Loanda, Angola, Portuguese East Africa	CRHC	9–10, 11–12, 13–14, 15–21 G. M. T. daily; 8–10 G. M. T. Sundays and holidays.
18.8	Buenos Aires, Argentina		20,000 watts.
18.36	Lourenco Marques, Portuguese East Africa.	CRHA	6–9, 14–15, 16–21 G. M. T. daily; 7–8, 17–18 G. M. T. Sundays and holidays.
18.8	Tjililin, Java	AND	Telegraph.
19	Dutch vessel Slamat	OLQ	
19.1	Buenos Aires, Argentina		20,000 watts.
19.4	Malabar, Java	ANK	Experimental tests.
20	Winchester, England	GFR	Royal Air Force School.
	Mukden, China	XOM	Communicates with Nauen, Germany, and Paris, France.
	British vessel Olympic	GLSQ	
	Tokyo, Japan	JIPP	
	Toulon, Mourillon, France	OCTN	
	Nauen, Germany	AGK	
	Curacao, Brazil	PVC	

Foreign short-wave stations in order of wave lengths—Continued

Wave length	Location	Call signal	Remarks
20–29.28	Scheveningen, Holland	PCH	Telegraph.
20.3	Tjililin, Java	ANF	Do.
20.5	Tokyo, Japan	JKZB	
21.2	Montreal, Canada		
21.4	Canadian amateur stations		
21.5	Leafield, England	GBL	Other calls GBM, GBO; post-office station.
21.5	Tokyo, Japan	JIPP	
21.5	Medan, Dutch East Indies	PKP	
21.7	Dollis Hill, England	G5DH	Post-office station.
21.8	Bogota, Colombia	HJG	
22	Formosa	JFBB	
	Perth, Australia	VIP	Telegraph.
	Townsville, Queensland, Australia	VIT	
	Sydney, Australia	VIS	
	Burham, England	GKT	Do.
	Rabaul, New Britain	VJZ	
22.09	Dorchester, England	GLH	Beam station, American circuit.
22.18	Rio de Janeiro, Brazil	SPR	Meteorological reports 1530 local time.
22.5	Dutch vessel Slamat	OLQ	
23	Mukden, China	XOM	Communicates with Nauen, Germany, and Paris, France.
	Australian amateur stations		
	Surabaya, Java	PKH	
23.25	Paris (St. Assise, Cie. Radio)		Traffic with Buenos Aires.
23.4	Ottawa, Canada		250 watts.
	Wakeham Bay, Canada		Do.
23.5	Formosa	JFBB	
23.98	Paugan Falls, Canada		
	Toronto, Canada		500 watts.
24	British vessel Dorsetshire	GDKB	
	Amboina, Dutch East Indies	PKE	
	Leafield, England	GBL	Other calls GBM, GBO; post-office station.
	Chelmsford, England	G 5SW	British Broadcasting Co.; experimental; broadcasting 1.30, 2.30, and 7.30 p. m. onward.
24.5	Ongan, England	GLQ	For communication with New York, Buenos Aires, and Rio de Janeiro.
24–71	Osaka, Japan	JES, JEW	
24.79	Drummondville (Montreal), Canada	CG	35,000 watts.
25	----do	CG	Do.
	Poldhu, England	G 2YT	
	Saigon, Indo-China	HZA	
	Paris (St. Assise, Cie. Radio)		Traffic with Buenos Aires.
	Nauen, Germany	POY	
	German vessel Cap Polonio		
25.5	Nauen, Germany	AGB	
25.9	Grimsby, England	GBH	Beam station.
26–51.5	Melbourne (Ballan), Australia	VIM	
26	Bengasi, Cyrenaica		Italian.
	Rabaul, New Britain	VJZ	
	Sydney, Australia	VIS	
	Drummondville (Montreal), Canada	CG	35,000 watts.
26.2	Tjililin, Java	ANC	Telegraph.
26.4	Mukden, China		Communicates with Nauen, Germany, and Paris, France.
26–51.5	Sydney, Australia	VIS	Telegraph.
	Perth, Australia	VIP	Do.
	Townsville, Australia	VIT	Do.
26–60	French vessel Jeanne d'Arc	FAMJ	French Navy.
26.18	Drummondville (Montreal), Canada	CG	35,000 watts.
26.27	----do	CG	Do.
27	Calgary, Alberta, Canada		750 watts.
	Malabar, Java	PKX	
	Nauen, Germany	AGB	
27.4	Casablanca (Ain Bordja), Morocco		
27.6	Dollis Hill, England		Post-office station.
28.4	Rio de Janeiro, Brazil	SPW	
28.8	Tjililin, Java	AND	Telegraph.
28.5	Sydney, Australia	A 2ME	Broadcasts Sunday 1830–2000 G. M. T.
	----do	2FC	1830–2030 G. M. T.
28–80	Beirut, Djedeide, Syria	FUL	
29	Sapporo, Japan	JPS	
29–72	Nogent-le-Rotrou, France	OCNG	
29.3	Rio de Janeiro, Brazil	SPW	
29.8	Melbourne, Australia	A 3LO	Broadcasts Sunday 1830–2030 G. M. T.

Foreign short-wave stations in order of wave lengths—Continued

Wave length	Location	Call signal	Remarks
30	Tuinucu, Cuba	6XJ	
	Chapultepec, Mexico		500 watts.
	Machelen (Ghent), Belgium	B 2	4,000 watts.
	Clichy, France	F 8GA	
	Leafield, England	GBL	Other calls GBM, GBO; post-office station.
	Kagoshima, Japan	JBK	
30–35	Norwegian vessel Norwegia	ARFS	Phone.
30.2	Malabar, Java	ANK	Experimental tests.
	Hilversum, Holland	PCJJ	Broadcasting (Philips Lamp Works).
30.5	Norwegian whaler Nielsen Alonso	ARCX	After 0700 G. M. T.
30.5	Quartel-General, Brazil	PTQ	
30.7	Madrid, Spain	EAM	
31	Stockholm, Sweden	SAD	Flottans Station.
	Dutch vessel Solderijk	TVE	
31.5	Medan, Dutch East Indies	PKP	
31.8	Guayra, Venezuela	AYG	
32	Australian amateur stations		
	Sydney, New South Wales	A 2FC	Broadcasting.
	Norwegian vessel C. A. Larsen	ARDI	
	Drummondville (Montreal), Canada	CF	Temporary (beam station).
	Poldhu, England	G 2YT	
	Berne, Switzerland	H 9OC	Relays Berne Monday, Thursday, and Saturday 2000–2100.
	San Paolo, Italy	IDO	
	Zurich, Switzerland	H 9XD	Radio Club.
	Hanoi, Tonkin	HVA	
	Johannesburg, South Africa	JB	Broadcasting.
	Hiroshima, Japan	JHL	
	Bordeaux, France (Lafayette)	LY	Eiffel Tower, Paris.
	Koepang, Java	PKD	
	Malabar, Java	PKX	
	Rabaul, New Britain	VJZ	
	Sydney, Australia	VIS	
32.5	Issy-les-Moulineaux, France	OCDJ	Time signal, 0756 and 0955.
	Paris	FL	Eiffel Tower; telegraph.
	Caterham, England	G 2NM	Broadcasting Tuesday, Thursday, Saturday, and Sunday 0600–0700, and Sunday 1600–1800 G. M. T.
	Amara, Italy	IDX	Italian.
32.12	Drummondville (Montreal), Canada	CG	Beam station.
32.38	Sarawak (Kudhing), Borneo	VQF	
32.39	Bodmin, England	GBK	Do.
33	Rome, Italy (Sao Paulo)	IDO	Italian.
	Oslo, Norway	LCHO	Telegraph administration.
	Conakry, French West Africa	OCCO	
	Rome, Italy	I IFC	Royal Frederico Cesi School.
	Australian vessel Jervis Bay	VZDK	
	Toulon, Mourillon, France	OCTN	
33.5	Norwegian vessel Sir James Clark Ross	AQE	
33.7	Klipheuval, South Africa	VNB	
33.33	Amsterdam, Holland	PCA	
34	German vessel Cap Polonio	DCP	
	Merida, Yucatan		50 watts.
	Rome, Italy	I IFC	Royal Frederico Cesi School.
	Buenos Aires, Brazil	LPI	
	The Hague, Holland	PCUU	Dutch Colonial Ministry.
	Mexico City, Mexico	XDXDA	
	do	XDA	Press, 0500 G. M. T.
34.01	Bodmin, England	GBJ	Beam station, South African circuit.
34.2	Berne, Switzerland	HBC	
34.16	Grimsby, England	GBI	Beam station, Indian circuit.
34.48	Kirkee (Bombay), India	VWZ	Beam station.
34.5	Toulon, Mourillon, France	OCTN	
35	Gibraltar, North Front	BWW	Naval.
	Seletar, Singapore, Malay Peninsula	BXW	Do.
	Stonecutters Island, Hong Kong, China	BXY	
	Whitehall, England	BYB	Do.
	Horsea, England	BYC	Do.
	Rinella, Malta	BYZ	Do.
	Matara, Ceylon	BZE	Do.
	Aden, Arabia	BZF	Do.
	Lake Como, Italy (Rome)	I IRG	
	Tokio, Japan	JIPP	
	Dakar, French West Africa	OCDA	
	Chapultepec, Mexico		250 watts.
	Merida, Yucatan		50 watts.
	Hermosillo, Sonora, Mexico		250 watts.
	Sydney, Australia (Garden Island)	VKQ	
35.3	Dollis Hill, England	G 5DH	

Foreign short-wave stations in order of wave lengths—Continued

Wave length	Location	Call signal	Remarks
35.5	Portsmouth, England	BZC	Signal school.
36	British vessel H. M. S. Renown	DS	
	Buenos Aires, Brazil	LPZ	
	Riga, Latvia	KCR	Other calls KCO, KCM, KCY, KCX; telegraph.
	Rabat, Morocco	OCRB	Meteo aviation.
36.5	Chapultepec, Mexico		250 watts.
	Tjililin, Java	ANF	Telegraph.
	Toulon, Mourillon, France	FUT	
	Goteborg, Sweden		
37	Chapultepec, Mexico		500 watts.
	Montebourg, France	FUM	Air station.
	Dutch vessel Slamat	OLQ	
	British vessel Derbyshire	GLYX	
	Paris		Radio vitus broadcasting Wednesday, Friday, Sunday, 2100–2245 G. M. T.
	Burham, England	GKT	Telegraph.
	Moskwa Sokoleniki Radio	SOK	
37.5	Tjililin, Java	AND	Do.
	Rome, Italy (Sao Paulo)	IDO	Italian.
	Kanasawa, Japan	JKV	Temporary.
	Swedish vessel Gripsholm	SKB	
38	Mexicali, Lower California		250 watts.
	Afgoi, Italian Somaliland	ISL	
	Chisimaio, Italian Somaliland	IST	
	Sapporo, Japan	JPS	
38.5	Malabar, Java	ANDIR	Military airdrome.
	Mengain, France	FUE	
39	Mukden, China	XOM	Communicates with Nauen, Germany, and Paris, France.
39.68	Norddeich, Germany	KAV	Phone and telegraph.
39	Mont Valerien, France	OCMV	French military station (Seine) at 1000, 1100, 1230, 1600, 1900, 2000, 2100, and 2200 G. M. T.
	Rufisque, French West Africa	OCRU	
39.5	Taipeh, Formosa	JFAB	0900 G. M. T.
	Vienna, Austria	OHK	
40	Uccle, Belgium	B 82	
	Tahiti	BAM	
40.2	Tjililin, Java	ANC	Telegraph.
40.5	Kagoshima, Japan	JBK	
	Iwatsuki, Japan	JIAA	
	Rio de Janeiro, Brazil	SPX	
40.6	Vienna, Austria	OHK	
41	Stockholm, Sweden	SMHA	
41.7	British vessel Dorsetshire	GDKB	
41.5	Bamako, Sudan	OCBA	
41.95	Paris (St. Assise, Cie Radio)	FW	Traffic with Buenos Aires.
42	Perth, Australia	VIP	Telegraph.
	Melbourne, Australia	VIM	Do.
	Townsville, Australia	VIT	
	Swedish vessel Suecia	SGT	
	Swedish vessel Masilia	SIC	
	Sydney, Australia	VIS	
	Rabaul, New Britain	VJZ	
42.5	Bizerta-Sidi-Abdallah, Tunis, Africa	FUA	
	Reykjavik, Iceland	TFA	
	German airplane	XEK	
		4AP	
43	Paris (St. Assise, Cie Radio)	FW	Traffic with Buenos Aires.
	Rome, Italy	I 1MA	Sundays 1700–1930 G. M. T.
	Otchiski, Japan	JOC	
	Bergen, Norway	LAIE	
	Canadian vessel Canadian Commander	VGJL	
44	Tsingtao, China	XQRT	C. W. time signals at 1030 G. M. T.
	London	GFA	Air Ministry.
	Mont Valerein, France		French military station (Seine), at 1000, 1100, 1230, 1330, 1600, 1900, 2000, 2100, 2200 G. M. T.
	Karlskrona, Sweden	SAA	
44.5	Rio de Janeiro, Brazil	SPI	
45	Tripoli, Turkey	ICK	
	Rome, Italy	I 1XAX	Broadcasts occasionally.
	Oslo, Norway	LAIM	Meteorological Institute.
	Toulon, Mourillon, France	OCTN	
45–47	Fort d'Isay, France	YZ, ZZ	
46	Mont Valerein, France		French military station (Seine), at 1000, 1100, 1230, 1330, 1600, 1900, 2000, 2100, 2200 G. M. T.
	Dartmouth, England	BVJ	Royal Naval College.
46.08	San Paolo, Italy	IDO	Ship service.
46.5	Norwegian vessel Helder	TSB	

Foreign short-wave stations in order of wave lengths—Continued

Wave length	Location	Call signal	Remarks
47	Copenhagen, Denmark	DNSC	Royal Danish dockyard.
	Dollis Hill, England	G 5DH	Post-office station.
	Massawa, Erythria	ICX	Italian.
	Nauen, Germany	POZ	
	Rio de Janeiro, Brazil	SPI	
	Helsingfors, Finland	SPM	Radio laboratory, Ministry of Posts.
	Cairo, Egypt (Abuzabal)	SUC	
48	Tunis la Casbah, Africa	OCTU	
49	Messina, Sicily	ICF	
49.5	Reykjavik, Iceland	TFA	
50	Tunis la Casbah, Africa	OCTU	
	Karlesborg, Sweden	SAJ	
	Swedish vessel Suecia	SGT	
51	Casablanca (Ain Bordja), Morocco		Weather reports, 0830 and 1930, G. M. T.
	Stockholm, Sweden	SAD	Flottans station.
	Norwegian vessel Helder	TSB	
51.5	Swedish vessel Masilia	SIC	
	Sydney, Australia	VIS	
52	Louisburg, Nova Scotia	VAS	Press.
53	Bremerhaven, Germany	ZWT	
	Bengasi, Cyrenaica		Italian.
53.5	Konigswusterhausen, Germany	AFJ	
	Catania, Italy	IHF	
53.16	Riga, Latvia	KCZ	Phone.
54	German naval vessel M. 81	AKA	
	German naval vessel M. 82	AKB	
	Tobruk, Cyrenaica	ICU	Italian.
	Swedish vessel Kiruna	SDK	
	Berna, Cyrenaica		Italian.
55	Riga, Latvia	KCR	Other calls KCO, KCM, KCY, KCX; telegraph.
56	Bizerta-Sidi-Abdallah, Tunis, Africa	FUA	
	Leafield, England	GBL	Other calls GBM, GBO; post-office station.
56.7	Nauen, Germany	AGJ	
57	Toulon, Mourillon, France	OCTN	
58	Hiroshima, Japan	JHL	
	Beirut, Syria	OCBV	French military station.
60	Drummondville (Montreal), Canada	CG	35,000 watts.
	Paris	F 8GC	Radio LL broadcasting.
	Poldhu, England	G 2YT	
	Sapporo, Japan	JPS	
60.98	Drummondville (Montreal), Canada		35,000 watts.
61	Dollis Hill (London), England	G 5DH	5,000 watts; post-office station.
	Paris		Radio LL broadcasting.
63	Rome, Italy (Cento Celle)	ICD	
64	Amara, Erythrea		Italian.
65	Lake Como, Italy (Rome)	I 1RG	
	Issy-les-Moulineaux, France		For correspondence with OCDB.
66.7	Montreal, Canada		
68	Norddeich, Germany	KAV	
70	Matagora, Spain		Cie Transatlantic Espagnola.
	Kagoshima, Japan	JBK	
72	Djibouti, French Somali Coast		Time signals, etc.
73	Merida, Yucatan		50 watts.
	Bizerta-Sidi-Abdallah, Tunis, Africa	FUA	
74	Reggu, Morocco	OCRF	2130–2145 G. M. T.
	Hiroshima, Japan	JHL	
73.5	Paris	FL	Eiffel Tower; also Issy-le Moulineaux OCDJ.
75	Tokio, Japan		500 watts.
	France vessel Jacques Cartier	FTJ	
	Paris (St. Assise)	F 8GB	Society France radio bulletins.
	Paris	SFR	
	Buenos Aires, Brazil	LPZ	
76	Henlow, England	GFY	Royal air force.
80	Havana, Cuba		10 watts.
	Winnipeg, Canada	HC	25 watts.
	Sakatoon, Canada	HG	Do.
	Calgary, Canada	HI	Do.
	Toronto, Canada	CS	Do.
	Vancouver, British Columbia	BA	Other calls BD, BF; 25 watts.
	Mexican experimental stations		
	White Island, New Zealand	VMDJ	
85	Florida, Cuba	7CX	10 watts; telegraph.
	Havana, Cuba	2MK	100 watts; telegraph.
	Paris	SFR	
	Zurich, Switzerland		Radio Club.
85.6	Montreal, Canada		
85.7	Canadian amateur stations		
90	Tacajo, Cuba	7DW	10 watts; telegraph.

Foreign short-wave stations in order of wave lengths—Continued

Wave length	Location	Call signal	Remarks
90.04	Geizers Hill, Nova Scotia	CA	8,000 watts.
92	Poldhu, England	G 2YT	
94	do	G 2YT	
99.94	Pine Ridge Post, Ontario, Canada		100 watts.
	Woman Lake, Ontario, Canada		Do.
	Red Lake, Ontario, Canada		Do.
	Sioux Lookout, Ontario, Canada		Do.
100	Brazilian vessel Jaquaro	SOJ	
105	New Zealand		
105.9	Red Deer, Alberta, Canada		30 watts.
115.3	Montreal, Canada		100 watts.
130	Vancouver, British Columbia, Canada	BA	Other calls BD, BF.
148.5	The Pas, Manitoba, Canada	CT	300 watts.
	Flin Flon Mine, Manitoba, Canada	CU	Do.
149.3	Montreal, Canada		100 watts.
150.7	do		750 watts.
150–225	Danish vessel Koldinghus	OIBQ	Phone and telegraph.
	Danish vessel Odin	OIBP	Do.
	Danish vessel Ydun	OIBN	Do.
	Danish vessel Vesterhavet	OIBI	Phone.
	Danish vessel Vestkysten	OIBH	Do.
	Thyboron, Denmark	OHF	Phone and telegraph.
158	Beziers Radio, France		500 watts.
160	German vessel Huxter		Phone.
	German vessel Kersten Miles	DSV	Do.
	German vessel Arkona		Do.
	German vessel Altenbruch	DAQ	Phone and telegraph.
	German vessel Walter Korte	ABC	Phone.
	German vessel Simon von Utrecht	DAAS	Do.
170.54	Tonning, Germany		Do.
180	Santiago, Cuba	8 KF	30 watts; telegraph.
	Ostend, Belgium		1,500–5,000 watts.
190	German vessel Huxter		Phone.
	Matanzas, Cuba	5 BY	10 watts; telegraph.
	Cienfuegos, Cuba	6 GT	5 watts, telegraph.
	German vessel Walter Korte	ABC	Phone.
	German vessel Arkona		Do.
	German vessel Altenbruch	DAO	Phone and telegraph.
	German vessel Kersten Miles	DSV	Phone.
	German vessel Simon von Utrecht	DAAS	Do.
192	Habana, Cuba	2 GF	10 watts; phone.
	Ciego de Avila, Cuba	7 HS	Do.
193	do	7 IR	20 watts; phone.
195	Sanctispiritus, Cuba	6 KP	Do.
	Camaguey, Cuba	7 GT	5 watts; phone.
196	Karlskrona, Sweden		125 watts.
197.2	Canadian Amateur stations		
198.6	British Columbia, Canada, stations		
	Tugs fitted for radiotelephony		Only on the west coast of Canada.
	Canadian vessel Rebac	CJJ	Phone.
	Canadian vessel Faultless	VGNS	Do.
	Canadian vessel Greta M	CFK	Do.
	Canadian vessel Ivanhoe	CJA	Do.
	Canadian vessel Lewac	CHZ	Do.
	Canadian vessel Lornet	CJN	Do.
	Canadian vessel Lorne	CJC	Do.
	Canadian vessel Mabel Dell	CFI	Phone and telegraph.
	Canadian vessel Massett	XVL	Phone.
	Canadian vessel Morsby	CFB	Do.
	Canadian vessel Norshore	VDI	Do.
	Canadian vessel Norvan	VGO	Do.
	Canadian vessel Achates	XWF	Do.
	Canadian vessel Amlac	CJL	Do.
	Canadian vessel Beatrice	CHT	Do.
	Canadian vessel Chakawana	VGJY	Do.
	Canadian vessel Columbia	CJB	Do.
	Canadian vessel Orion	CHK	Do.
	Canadian vessel Peerless	XVB	Do.
	Canadian vessel Projective	CHA	Do.
	Canadian vessel Pronative	CHB	Do.
	Canadian vessel Prospective No. 2	CFS	Do.
	Canadian vessel R. F. M	CJO	Do.
	Canadian vessel Coutli	CFQ	Do.
	Canadian vessel Czar	XWV	Do.
	Canadian vessel Dauntless	XWB	Do.
	Canadian vessel D B M	VDX	Do.
	Canadian vessel Le Roi	XVG	Do.
	Canadian vessel Oliver Clarke	VGJR	Do.
	Canadian vessel Salvage Princess	VGA	Do.
	Canadian vessel Sea Lion	XWJ	Do.
	Canadian vessel Sea Wave	XWK	Do.
	Canadian vessel Wireless	VGJZ	Do.

Foreign short-wave stations in order of wave lengths—Continued

Wave length	Location	Call signal	Remarks
200	British vessel Bempton	GDMB	Telegraph.
	Camajuani, Cuba	6 YR	20 watts; phone.
	Santa Clara, Cuba		20 watts.
	Canadian vessel Cottonwood	VGLP	Phone.
	Chinese vessel Hwah Ting	XSL	Telegraph.
	Canadian vessel Prosperitive	CFR	Phone.
	Canadian vessel Kiora	VGCK	Phone and telegraph.
	Canadian vessel Drumrock	VGLR	Phone.
	Canadian vessel Elmera	VGLD	Do.
	Canadian vessel Eunice B	VGFS	Do.
	Norwegian vessel Busen 5	AQBB	Phone and telegraph.
	Norwegian vessel Busen 6	AQBJ	Do.
	Norwegian vessel Hercules I	ARCC	Do.
	Norwegian vessel Alex Lange	AQBR	Do.
	Norwegian vessel Samson I	ARAU	Phone.
	Norwegian vessel Scott	AQAL	Do.
	Norwegian vessel Svend Foyn I	LEC	Do.
	New Zealand vessel Waitemata	VMDK	
	Dili, Portuguese, Timor	CRE	
210	Ausseneider Feuerschiff, Germany	KAJ	Phone.
220	Norwegian vessel A. W. Sorlie	ARCT	Phone and telegraph.
	Norwegian vessel Busen 4	AQAB	Do.
	British vessel Yezo	GKDC	Telegraph.
	British vessel Asama	GJPK	Do.
	British vessel Tamura	GKDM	Do.
	British vessel Suma	GMVX	Do.
	British vessel Oyama	GJSC	Do.
	British vessel Nogi	GJSB	Do.
	British vessel Nodzu	GJQF	Do.
	British vessel Mikasa	GFQY	Do.
	British vessel Kyoto	GJQL	Do.
	British vessel Hirose	GJQK	Do.
	British vessel Hatano	GLCD	Do.
	British vessel Fuji	GLCB	Do.
	British vessel Filey	GDRL	Do.
	British vessel Evesham	GDQS	Do.
	British vessel Everton	GFNZ	Do.
250	Hong Kong vessel No. 2, police launch	GVFZ	Do.
280	Hong Kong vessel Kau Sing	GVFR	Phone and telegraph.

NOTE.—The Radio Service Bulletin for Sept. 30, 1927, No. 126, contains a list of a short-wave relay (experimental) broadcasting stations of the United States. This list may be brought up to date by consulting subsequent editions of the Bulletin.

REFERENCES TO CURRENT RADIO 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 professional radio engineers which have recently appeared in periodicals, books, etc. 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, Bureau of Standards Circular No. 138, a copy of which may be obtained for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. The various articles listed below are not obtainable from the Government. The various periodicals can be secured from their publishers and can be consulted at large public libraries.

R000.—*Radio communication*

R007.9 Terrell, W. D. The International Radiotelegraph Conference of Washington, 1927. Proc. Inst. Radio Engrs., **16**, pp. 409–415; April, 1928.
Main points of conference given.

R100.—*Radio principles*

R110 Felix, E. H. Will new transmitting methods be the remedy? Radio Broadcast, **13**, pp. 5–8, May, 1928.
Discussion of ratio of interference range to service range of a broadcasting station.

R111 Ballantine, S. The Lorentz reciprocity theorem for electric waves. Proc. Inst. Radio Engrs. **16**, pp. 513–518; April, 1928.
Résumé of theorem based on an article by A. Sommerfeld in Zeitschrift für Hochfrequenz; technik, p. 93; 1925. Gives examples and applications of theorem.

R130 Brain, B. C. The approximate theory of the screen-grid valve. Experimental Wireless (London), **5**, pp. 179–183; April, 1928.

Characteristic curves and interelectrode capacity predicted from consideration of structural constants in a special type of 4-electrode valve (screen-grid valve).

R144 Wait, G.; Brickwedde, F.; and Hall, E. Electrical resistance and magnetic permeability of iron wire at radio frequencies (abstract). Physical Rev., **31**, p. 303; February, 1928.

Experiments of Wwedensky and Theodortschik on change in permeability of iron repeated by authors and no critical change found.

R145.3 Hartshorn, L. Mutual inductance in radio circuits. Experimental Wireless (London), **5**, pp. 184–188; April, 1928.

Properties of ordinary impure mutual inductance pointed out with their bearing on common forms of mutual inductance in variometers, tapped coils, and transformers.

R138 Castellain, A. P. The effect of residual gas in a valve. Wireless World and Radio Rev., **22**, pp. 385–388; April 11, 1928.

The dangers of reverse grid current are discussed.

200.—*Radio measurements and standardization*

R214 Cobbold, G. W. A., and Underdown, A. E. Some practical applications of quartz resonators. Experimental Wireless (London), **5**, pp. 215–219; April, 1928.

Advantages of quartz crystals as standards of frequency discussed.

R214 Crossley, A. Modes of vibration in piezo-electric crystals. Proc. Inst. Radio Engrs., **16**, pp. 416–423; April, 1928.

Nodes and antinodes on surface of oscillating crystals. Symmetrical arrangement of nodal points permits study of modes of vibration in the crystal. Formulas given for determination of velocity of sound through quartz.

R214 Watanabe, Y. Der piezoelektrische Resonator in Hochfrequenzschwingungskreisen. (The piezoelectric resonator in high frequency oscillation circuits.) Elektrische-Nachrichten Technik, **5**, pp. 45–64; February, 1928.

Modes of vibration of quartz crystals. Theory of crystals.

R214 Giebe, E. and Scheibe, A. Piezoelektrische Kristalle als Frequenznormale. (Piezoelectric crystals as frequency standards.) Elektrische-Nachrichten Technik, **5**, pp. 65–82; February, 1928.

Demonstration of modes of vibration in a quartz ring resonator.

R230 Coil calculations. Wireless World and Radio Rev., **22**, pp. 394–95; April 11, 1928.

Design data for coils having 2,000 to 3,000 microhenries inductance.

R270 Sreenivasan, K. A short survey of some methods of radio signal measurement. Experimental Wireless (London), **5**, pp. 205–210; April, 1928.

Describes various methods now in use for signal intensity measuring apparatus.

R300.—*Radio apparatus and equipment*

R320 Chireix, H., and Villem, R. Compensation des courantes induits entre antennes emettrices voisines. (Compensation of induced currents between near-by transmitting antennas.) Rev. Gen. de l'electricite, **23**, pp. 523–36; March 24, 1928.

Analysis of qualitative phenomenon concerning mutual induction between neighboring antennas.

R330 The UX250—CX350 tube. QST, **12**, p. 36, April, 1928.

Characteristics for this type tube—25 watt power.

R330 The Frenotron valve—A Vienna novelty. Experimental Wireless (London), **5**, p. 214; April, 1928.

New type of detector to be used as a stabilizer.

R330 Hanna, C. R.; Sutherlin, L.; and Upp, C. B. Development of a new power amplifier tube. Proc. Inst. Radio Engrs., **16**, pp. 462–75; April, 1928.

Description of the development of the power tube UX250. Properties and limitations as well as design information applicable to these tubes and their circuits are discussed.

R330 Wheeler, H. A. Measurement of vacuum tube capacity by a transformer balance. Proc. Inst. Radio Engrs., **16**, pp. 476–81; April, 1928.

Description of complete portable apparatus for measurement of direct capacities of electron tubes in laboratory or factory testing. Tube capacity compared with standard variable condenser by means of transformer-balance (Neutrodyne) circuit.

R330 Walsh, L. A direct-capacity bridge for vacuum tube measurements. Proc. Inst. Radio Engrs., **16**, pp. 482–486; April, 1928.

Bridge is described which permits the measurement at a single setting of a capacity associated with other capacities in a system having more than two terminals, such as grid-plate capacity of an electron tube.

R330 Hoch, E. T. A bridge method for the measurement of interelectrode admittance in vacuum tube. Proc. Inst. Radio Engrs., **16**, pp. 487–93; April, 1928.

Description of Colpitts-Campbell bridge as applied to measurement of direct admittances in electron tubes. Bridge circuit for measurement of direct capacity and conductance given. Data given on several tubes.

R334 Warner, J. C. Some characteristics and applications of 4-electrode tubes. Proc. Inst. Radio Engrs., **16,** pp. 424–446; April, 1928.

Theory, construction, and use of 4-electrode tubes.

R334 Hall, N. R. Characteristic curves of the 4-electrode valve. Experimental Wireless (London), **5,** pp. 198–200; April, 1928.

Curves given for British 4-electrode electron tubes.

R342 Marcus, A. A triode amplifier for small direct currents (abstract). Physical Rev., **31,** p. 302; February, 1928.

Measurement of ionization currents and piezoelectric currents of magnitudes considerably below range of galvanometer by use of electron tube amplifier.

R342 Terman, F. E. The inverted vacuum tube, a voltage reducing power amplifier. Proc. Inst. Radio Engrs., **16,** pp. 447–461; April, 1928.

By the interchange of functions of grid and plate of an electron tube a voltage reducing power amplifier is obtained. Theory given.

R342.15 Osborn, B. K. Data on the voltage amplification of r. f. transformers. Radio Engineering, **8,** pp. 24–25; April, 1928.

Apparatus used and operations involved for testing of r. f. transformers.

R348 Knowles, D. D. The grid-glow tube relay. Electric Jnl., **26,** pp. 176–78; April, 1928.

Description of a relay which has an amplification factor of 108 under certain conditions. Gives miscellaneous applications of this relay.

R376.3 Hanna, C. R. Abridgement of loud-speakers of high efficiency and load capacity. Jnl. Amer. Inst. Elec. Engrs., **47,** pp. 253–57; April, 1928.

Design of high quality horntype loud-speaker with moving coil-driving elements considered. Calculation of efficiency and maximum output capacity from this type of speaker.

R381 Smith, B. E. The relation of condenser ratings to filter design. Radio Engineering, **8,** pp. 33–34; April, 1928.

Explanation of voltage regulation in power supply units and its effect on the filter condensers.

R383 Hitchcock, R. C. Designing fixed resistors. QST, **12,** pp. 29–32; April, 1928.

Chart is given for rapid calculation of resistances of various kinds and sizes of wire, together with safe current rating of a resistor.

R386 Replogle, D. E. Notes on the design of iron-core reactances which carry d. c. QST, **12,** pp. 23–27; April, 1928.

Low pass type of filter for A and B battery substitutes described. Use of this type of filter for transmitting set plate supply.

R388 Improved Duddell oscillograph outfit. Jnl. Scientific Instruments (London), **5,** pp. 103–107; March, 1928.

Compact portable form of oscillograph. Applications in connection with electrical engineering practice.

R388 Bedell, F., and Reich, H. J. The stabilized oscilloscope. Radio Engineering, **8,** pp. 17–20; April, 1928.

A cathode-ray oscillograph with linear time axis—List of references included.

R400.—*Radio communications systems*

R402 Grzybowski, W. W. Some investigations of short waves at Nijni-Novgorod. QST, **12,** pp. 9–14; April, 1928.

Description of apparatus and exprimental work on high frequencies in the laboratory at Nijni-Novgorod, Russia.

R500.—*Applications of radio*

R520 Smith-Rose, R. L. Note on a special dial for timepieces to be used with rotating wireless or other beacons. Jnl., Scientific Instruments (London), **5,** pp. 93–96; March, 1928.

Description of especially designed compass card dials for watches and chronographs used in connection with radio beacons.

R520 Smith-Rose, R. L., and Chapman, S. R. Some experiments on the application of the rotating beacon transmitter to marine navigation. Jnl. Institution Elec. Engrs. (London), **66,** pp. 256–69; March, 1928.

Results of tests using rotating beacon transmitters for transmissions over land and sea. Beacon was calibrated.

R520 Gill, T. H., and Hecht, E. S. Rotating loop radio transmitters and their application to direction finding and navigation. Jnl. Institution Elec. Engrs. (London), **66,** pp. 241–255; March, 1928.

Method of directional transmission developed whereby the direction finding equipment is eliminated on the aircraft.

R520 Smith-Rose, R. L. A theoretical discussion of various possible aerial arrangements for rotating beacon transmitters. Jnl. Institution Elec. Engrs. (London), **66,** pp. 270–279; March, 1928.

The use of three systems of antennas; single coil, the double-spaced coil and the Adcock antenna for rotating beacons is discussed.

R531.2 Short-wave transmissions. Radio Broadcast, **13,** pp. 44–46; May, 1928.

List of stations throughout the world working below 100 meters.

R550 Dreher, C. Broadcast control operation. Proc. Inst. Radio Engrs., **16,** pp. 498–512; April, 1928.

Considerations of audio-frequency elements of broadcast control system discussed. Methods of measuring energy levels, equalizing lines, etc. Coordinative and regulative functions of technical staff of broadcast system, precaution against breaks in program continuity discussed.

R550 Eckersley, P. P. The design and distribution of wireless broadcasting stations for a national service. Experimental Wireless (London), **5,** pp. 189–197; April, 1928.

The history of the development of British Broadcasting Co. stations is traced; experimental station at Daventry is described.

R800.—*Nonradio subjects*

510 Barclay, W. A. Dimensionality in wireless equations. Experimental Wireless (London), **5,** pp. 211–213; April, 1928.

Points out practical use of the concept of dimensionality in checking the accuracy of equations developed in theoretical work, especially in the radio field.

537.1 Howe, G. W. O. Some further problems in potential difference. Experimental Wireless (London), **5,** pp. 175–178; April, 1923.

Treats some simple problems in the electric potential of dielectric rings. The questions which are considered are fundamental to a proper understanding of electric circuits.

537.65 Cady, W. G. Bibliography on piezo-electricity. Proc. Inst. Radio Engrs., **16,** pp. 521–535; April, 1928.

List of publications, patents, and books on piezo-electricity up to beginning of 1928.

NOTE.—In future it is proposed to eliminate the number given at the left of each reference. Before doing this, however, the radio division would appreciate receiving an expression from readers of the Bulletin as to the feasibility of this proposal.

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