

RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

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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 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. I. = Wave lengths assigned: Normal wave lengths in italics.
Service = Nature of service maintained.
PG=General public.
PR=Limited public.
RC=Radio compass station.
P=Private.
O=Government business exclusively.
Hours = Hours of operation:
N=Continuous service.
X=No regular hours.
m=a. m. (12 m=midday).
s=p. m. (12 s=midnight).
Rates = Ship or coast charges in cents: c.=cents. (The rates in the international list are given in francs and centimes.)
I. W. T. Co. = Independent Wireless Telegraph Co.
R. C. A. = Radio Corporation of America.
S. O. R. S. = Ship Owners' Radio Service.
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.

CERTIFICATE: By direction of the Secretary of Commerce this publication is issued as an administrative report and is required for the proper transmission of the public business.

NEW STATIONS.

Commercial land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berns bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Davenport, Iowa ¹	WOC	750.....	O	X	Palmer School of Chiropractic.
Frankville, Pa. ²	WBI	1650.....	P	X	
Hauto, Pa. ³	WDS	1650.....	P	X	Pennsylvania Power & Light Co.
Hastleton, Pa. ⁴	WCJ	1650.....	P	X	Do.
Jualin, Alaska ⁵	KJA	300, 600, 1080.....	P	X	Do.
San Francisco, Calif. ⁶	KEB	300, 550, 600.....	P	N	Jualin Bearers Mining Co.
					Marine Exchange.

¹ Loc. (approximately) 0.90° 38' 00", N. 41° 30' 00"; range, 150; system, composite, v. t. telegraph; this station was placed under the heading of Government stations in the Bulletin for last month, whereas it is a privately owned station handling traffic for the Government.

² Loc. 0.76° 15' 06", N. 40° 46' 50"; range, 100; system, composite, v. t. telephone and telegraph.

³ Loc. 0.75° 54' 00", N. 40° 50' 40"; range, 100; system, composite, v. t. telephone and telegraph.

⁴ Loc. 0.75° 59' 04", N. 40° 57' 30"; range, 100; system, composite, v. t. telephone and telegraph.

⁵ Loc. (approximately) 0.133° 00' 00", N. 58° 58' 00"; range, 400; system, Marconi, 240.

⁶ Range, 200; system, Kilbourne & Clark, 1000.

Commercial ship stations, alphabetically by names of vessels.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berns bureau.]

Name of vessel.	Call signal.	Rates.	Service.	Hours.	Owner of vessel.	Station controlled by—
Alyona ¹	KFCU	8	PG	X	Henry W. Putnam....	Owner of vessel.
Champlain.....	KFCR	8	PG	N	U. S. S. B.....	
President Buchanan.....	KFGN	8	PG	X	Quincy S. S. Co.....	E. C. A. Owner of vessel.
Quincy.....	KFBF	8	PG	X	Lewis & Cocks.....	
Robert Lewers.....	KFDQ	8	PG	X	Portland Trawling Co.....	
Selner.....	KFDE	8	PG	X	Atlantic & Caribbean Steam Navigation Co.	
Tachira ²	KDEI	8	PG	X		

¹ Range, 150; system, R. C. A., 1000; w. l., 300, 450, 600.

² Range, 150; system, Cutting & Washington, 1000; w. l., 300, 450, 600.

Commercial land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name.	Call signal.	Name.
KDEI	Tachira.....b	KFGN	President Buchanan.....b
KEB	San Francisco, Calif.....c	KJA	Jualin, Alaska.....c
KFCR	Champlain.....b	WBI	Frankville, Pa.....c
KFCU	Alyona.....b	WCJ	Hastleton, Pa.....c
KFDE	Selner.....b	WDS	Hauto, Pa.....c
KFDQ	Robert Lewers.....b	WOC	Davenport, Iowa.....c
KFBF	Quincy.....b		

Commercial airplanes stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berns bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Balboa ¹	KFBA	300, 525, 600.....	P	X	Aeromarine Airways (Inc.).
Gov. Cordoux ¹	KFBF	300, 525, 600.....	P	X	
Nina ¹	KFBJ	300, 525, 600.....	P	X	
Ponce de Leon ¹	KFBM	300, 525, 600.....	P	X	
Santa Maria ¹	KFBZ	300, 525, 600.....	P	X	

¹ Range, 100; system, composite, v. t. telephone.

Broadcasting stations, alphabetically by names of cities.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

City.	Call signal.	City.	Call signal.
Ann Arbor, Mich.	WQAJ	Memphis, Tenn.	WMC
Bangor, Me.	WPAZ	Miami, Fla.	WQAM
Boise, Idaho.	KFFB	Muncie, Ind.	WQAB
Cape Girardeau, Mo.	WSAB	New York, N. Y.	WQAO
Charleston, W. Va.	WPAZ	Ogden, Utah.	KFCP
Colorado Springs, Colo.	KFFQ	Pittsburgh, Pa.	WRAJ
Denver, Colo.	KFEL	Pueblo, Colo.	KFCF
Galesburg, Ill.	WRAM	Sandusky, Ohio.	WQAF
Houston, Tex.	KFCV	Scranton, Pa.	WQAN
Lexington, Ky.	WQAH	St. Louis, Mo.	WRAO
Marletta, Ohio.	WSAA	Waterbury, Conn.	WQAD
Marion, Kans.	WRAD	Yellow Springs, Ohio.	WRAV
Mayville, N. Dak.	WRAC		

Stations broadcasting market or weather reports (485 meters) and music, concerts, lectures, etc. (360 and 400 meters), alphabetically by call letters.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Call signal.	Station operated and controlled by—	Location of station.	Wave lengths.	Power to antenna (watts).
KFCP	Ralph W. Flygare	Ogden, Utah	360	25
KFCV	Fred Mahaffey, Jr.	Houston, Tex.	360	50
KFEL	Winner Radio Corp.	Denver, Colo.	360	150
KFFB	Jenkins Furniture Co.	Boise, Idaho	360	10
KFFQ	Markshaffel Motor Co.	Colorado Springs, Colo.	360	10
KFOB	Lowenthal Bros.	Pueblo, Colo.	360	10
WMC	Commercial Appeal	Memphis, Tenn.	400, 485	500
WPAZ	Bangor Radio Laboratory	Bangor, Me.	360	20
WPAZ	Dr. John R. Koch	Charleston, W. Va.	360	20
WQAD	Whitall Electric Co.	Waterbury, Conn.	360	10
WQAF	Sandusky Register	Sandusky, Ohio	360	5
WQAH	Brock-Anerson Electrical Eng. Co.	Lexington, Ky.	360	20
WQAJ	Ann Arbor Times News	Ann Arbor, Mich.	360	200
WQAM	Electrical Equipment Co.	Muncie, Ind.	360	250
WQAN	Scranton Times	Scranton, Pa.	360	100
WQAO	Calvary Baptist Church	New York, N. Y.	360	100
WQAR	Press Publishing Co.	Muncie, Ind.	360	10
WRAC	State Normal School	Mayville, N. Dak.	360	50
WRAD	Taylor Radio Shop	Marion, Kans.	360	10
WRAJ	M. H. Pickering Co.	Pittsburgh, Pa.	360	500
WRAM	Lombard College	Galesburg, Ill.	360	100
WRAO	Radio Service Co.	St. Louis, Mo.	360	100
WRAV	Antioch College	Yellow Springs, Ohio	360	200
WSAA	B. S. Sprague Electrical Co.	Marletta, Ohio	360	25
WSAB	Southeast Missouri State Teachers College	Cape Girardeau, Mo.	360	100

Government land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Douglas, Ariz. ¹	WZM	1100, variable	O	X	U. S. Army.
Fort Ethan Allen, Vt.	WUAI		O	X	Do.
Fort Ringgold, Tex. ²	WZI	1100, variable	O	X	Do.
Nogales, Ariz. ¹	WZL	1100, variable	O	X	Do.
South Pass, La. ²	NBX	800	RC	N	U. S. Navy.

¹ Range, 100; system, Army v. t.

² Loc. 0.89° 09' 32", N. 29° 59' 43"; range, 100; system, Navy.

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.
NBX	South Pass, La. (R. C.).....c	WZL	Nogales, Ariz.....c
WUAI	Fort Ethan Allen, Vt.....c	WZM	Douglas, Ariz.....c
WZI	Fort Ringgold, Tex.....c		

Special land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Station.	Call signal.	Wave lengths.	Station controlled by—
Amston, Conn.....	1XAI...	Variable.....	Newsprieter Corporation, care of Courtland Smith, 522 Fifth Avenue, New York, N. Y.
Asheville, N. C.....	4ZI.....	300, 375.....	Edmond A. Jackson, 11 Plagah Avenue.
Boise, Idaho.....	7ZN.....	300, 375.....	Bird B. Bliss, jr., 417 Bannock Street.
Brunswick, Me.....	1ZA.....	300, 375.....	Bowdoin College.
Cedar Rapids, Iowa.....	9YAS.....	300, 375.....	Coe College.
Connellsville, Pa.....	8XAP.....	Variable.....	West Penn Power Co.
Connellsville, Pa. (portable).	8XAQ.....	300, 225, variable	Do.
Davenport, Iowa.....	9YAP.....	300, 375.....	St. Ambrose College.
Detroit, Mich.....	8XAR.....	1-250.....	Tecla Co., 1507 Cass Avenue.
Eagle Rock, Calif.....	6XAT.....	Variable.....	Oliver S. Garretson, 118 Fairmont Avenue.
Helena, Mont.....	7ZQ.....	300, 375.....	Vivion K. Roberts, 40 Olive Street.
Iowa City, Iowa.....	9YA.....	300, 375.....	State University of Iowa.
Los Angeles, Calif.....	6XABA.....	Variable.....	Harold A. Duvall, 4965 Wadsworth Street.
Do.....	6ZAO.....	300, 375.....	Do.
Mobile, Ala.....	5ZAEA.....	300, 375.....	George L. Barnett, 165 Chatham Street.
New Orleans, La.....	5XAO.....	300, 375.....	L. J. N. du Tress, 490 Audubon Street.
Do.....	5ZAF.....	300, 375.....	Interstate Electric Co., 356 Barronne Street.
New York, N. Y.....	2XAT.....	Variable.....	Donald J. Pierl, 154 East One hundred and seventy-fifth Street.
Omaha, Nebr.....	9XAR.....	Variable.....	Central High School.
Philadelphia, Pa.....	3YI.....	300, 375.....	Knights of Columbus School.
Richmond, Va.....	3XAL.....	210, 250, 375.....	James A. Steere and Walter R. Selden, 201 East Franklin Street.
Rushville, Nebr.....	9YAT.....	300, 375.....	St. Mary High School.
San Francisco, Calif.....	6XACA.....	Variable.....	Ralph M. Heintz, 606 Mission Street.
Washington, D. C.....	3XAK.....	Up to 125.....	Robert Jordan, 2716 Wisconsin Avenue.
Waterbury, Conn.....	1XAJ.....	Variable.....	Bureau Fire Alarm and Police Telegraph.
Yellow Springs, Ohio.....	8YY.....	300, 375.....	Antioch College.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
1XAI	First district:	7ZN	Seventh district:
1XAJ	Amston, Conn.	7ZQ	Boise, Idaho.
1ZA	Waterbury, Conn.		Helena, Mont.
2XAT	Brunswick, Me.	8XAP	Eighth district:
3XAK	Second district: New York, N. Y.	8XAQ	Connellsville, Pa.
3XAL	Third district:	8XAR	Connellsville, Pa. (portable).
3YI	Washington, D. C.	8YY	Detroit, Mich.
4ZI	Richmond, Va.		Yellow Springs, Ohio.
5XAO	Philadelphia, Pa.	9XAR	Ninth district:
5ZAEA	Fourth district: Asheville, N. C.	9YA	Omaha, Nebr.
5ZAF.....	Fifth district:	9YAP	Iowa City, Iowa.
6XABA	New Orleans, La.	9YAS	Davenport, Iowa.
6XACA	Mobile, Ala.	9YAT	Cedar Rapids, Iowa.
6XAT	New Orleans, La.		Rushville, Nebr.
6ZAO	Sixth district:		
	Los Angeles, Calif.		
	San Francisco, Calif.		
	Eagle Rock, Calif.		
	Los Angeles, Calif.		

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, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

AMUGUIS, P. I.—System, R. C. A., w. l., 600, 1000.

CHICAGO, ILL.—Strike out all particulars.

CLEVELAND, OHIO.—Strike out all particulars.

ENSENADA, P. R.—W. l., 300, 450, 600, 1800; service, PG and PR; rates, from Ensenada to Santo Domingo, 14 c. per word; from Santo Domingo to Ensenada, 14 c. per word; from Ensenada to Venezuela, 11 c. per word; from Venezuela to Ensenada, 6 c. per word; from Ensenada to St. Martins, Curacao, and Haiti, 13 c. per word; from St. Martins, Curacao, and Haiti to Ensenada, 6 c. per word; ship traffic, 6 c. per word. The land line rate, provided the origin or destination is at any given point in Porto Rico except Ensenada, is included in the rates given above, such land line charge being subject to a minimum of 25 c. per message.

LAZY BAY, ALASKA.—Rates, station to station, 6 c. per word; minimum, 60 c. domestic count; station to station night letter, 60 c. for 50 words, 12 c. each additional 10 words; station to station night message, 5 c. per word, minimum, 50 c. domestic count.

LUDINGTON, MICH.—Range, 300.

NEW YORK, N. Y. (WBC).—Range, 200-500; system, Independent arc and Marconi, spark, 1000.

SEATTLE, WASH. (KPE).—Service, PG and PR; rates, 6 c. per word.

SUPERIOR, MICH.—W. l., 1625.

COMMERCIAL SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

AGWIMEX.—Range, 200; system, I. W. T. Co., 1000; w. l., 300, 600.

ARCHER.—System, Navy-Wireless Specialty Apparatus Co., 1000.

ASTORIA.—Station operated and controlled by R. C. A.

ATLANTIC SUN.—Sun Oil Co. owner of vessel.

BRADDOCK.—System, Navy-R. C. A., 1000; w. l., 300, 450, 600.

BRADFORD.—System, R. C. A., 1000.

BRILLIANT.—Standard Transp. Co., owner of vessel.

BRUSH.—Walter P. Tobey, owner of vessel.

CAPILLO.—System, Navy-Wireless Specialty Apparatus Co., 1000.

CARRABULLE.—Range, 300; system, Navy-Marconi, 1000; w. l., 300, 450, 600; Curtis Bay Copper & Iron Works, owner of vessel.

C. A. SNIDER.—W. l., 300, 450, 600.

CATAHOULA.—Curtis Bay Copper & Iron Works, owner of vessel.

CATHWOOD.—Union Oil Co., owner of vessel.

CHARLES H. CRAMP.—Nautilus S. S. Corp., owner of vessel; station operated and controlled by S. O. R. S.

CHARLES L. HUTCHINSON.—System, R. C. A., 1000.

CHARLTON HALL.—Range, 300; system, R. C. A., 1000.

CHEROKEE.—Name changed to Tampa; Gulf & Southern S. S. Co., owner of vessel.

CHINA ARROW.—System, R. C. A., 1000; w. l., 300, 450, 600.

CITY OF ATLANTA.—Range, 300; system, R. C. A., 1000.

CITY OF MIAMI.—Rates, 8 c. per word.

CITY OF MONTGOMERY.—System, R. C. A., 1000.

CITY OF SPOKANE.—W. l., 300, 450, 600.

CLEARWATER.—W. l., 300, 450, 600.

COAXET.—Station operated and controlled by S. O. R. S.

COMMERCIAL TRAVELER.—Station operated and controlled by R. C. A.

COWANSHANNOCK.—Name changed to H. W. Baxter; Horace X. Baxter S. S. Co., owner of vessel.

COWICHE.—Name changed to Brookings.

CRISFIELD.—Range, 200; system, Navy-Kilbourne & Clark, 1000.

CROFTON HALL.—Hours, X.

CUBA (KDLK).—Station operated and controlled by R. C. A.

DELIVERY No. 5.—Standard Transp. Co., owner of vessel.

DELPHINE.—Anna T. Dodge, owner of vessel.

DEWEY (KODT).—W. l., 300, 600.

DIRECTOR.—Southgate Export Coal Co., owner of vessel.

DIX.—Range, 500; system, Navy-Marconi, 1000; w. l., 300, 450, 600; station operated and controlled by R. C. A.

- EASTERN DAWN.—W. l., 300, 450, 600, 1800.
 EASTPORT.—System, Navy-R. C. A., 1000.
 EDWARD LUCKENBACH.—Range, 300; w. l., 300, 450, 600.
 EGERIA.—F. H. Ransom, trustee, owner of vessel.
 ELABETO.—Los Angeles Lumber Co., owner of vessel.
 EL CAPITAN (WNB).—System, R. C. A., 1000.
 EL CID.—Range, 150; system, Marconi, 1000.
 ELECEDRO.—Los Angeles Lumber Products Co., owner of vessel.
 EL CICUTA.—Los Angeles Lumber Products Co., owner of vessel.
 FAIRFIELD CITY.—System, R. C. A., 1000.
 FISHER.—Range, 300; system, R. C. A., 1000; w. l., 300, 450, 600.
 FLORENCE OLSON.—Hart-Wood Lumber Co., owner of vessel.
 FOREST KING.—Station operated and controlled by owner of vessel.
 FORTUNA.—System, Western Electric, v. t. telephone and telegraph; service P.
 GENERAL O. H. ERNST.—W. l., 300, 450, 600.
 GLENDARUEL.—Glendaruel S. S. Corp., owner of vessel.
 GULFLAND.—System, Navy-Lowenstein, 1000.
 GULF OF MEXICO.—Range, 150; system, R. C. A., 1000.
 GULF QUEEN.—System, Navy-Lowenstein, 1000.
 HALAKALA (KFEU).—Range, 150; system, R. C. A., 1000; w. l., 300, 450, 600; service, PG; hours, N., station operated and controlled by R. C. A.; rates 8 c. per word.
 HOBOKEN.—Name changed to Commercial Spirit.
 HORACE LUCKENBACH.—Station operated and controlled by owner of vessel.
 HOVEN.—Range, 300; system, Navy-R. C. A., 1000; w. l., 300, 450, 600.
 HUMRICK.—Range, 200; system, Navy-R. C. A., 1000.
 I. C. WHITE.—System, R. C. A., 1000.
 IMLAY.—System, Navy-Lowenstein, 1000.
 JACOB LUCKENBACH.—Station operated and controlled by S. O. R. S.
 LAKE CAYUGA.—Pacific Securities Co., owner of vessel.
 LAKE FRANCES.—System, Navy-Marconi, 1000; w. l., 300, 450, 600, Pacific Securities Co., owner of vessel.
 LAKE GADSDEN.—System, Navy-Simon, 1000.
 LAKE GUNNI.—Whitney-Central Trust Savings Bank, owner of vessel.
 LATOUCHE.—W. l., 300, 450, 600.
 LIBERTY.—System, Navy-Marconi, 1000; w. l., 300, 450, 600; hours, X.
 LILLIAN.—System, Navy-National Electric Signalling Co., 1000.
 LYDONIA.—Range, 150; system, R. C. A., 1000; rates, 8 c. per word; station operated and controlled by R. C. A.
 MAHUKONA.—System, Navy-International Radio Telegraph Co., 1000; w. l., 300, 450, 600.
 MAINE.—Frank V. Bards, owner of vessel.
 MAKAWELL.—System, Navy-R. C. A., 1000; w. l., 300, 600.
 MAKENA.—W. l., 300, 600.
 MUNAMAR.—System, I. W. T. Co., arc and spark, 1000; w. l., 300, 600, 1800; station operated and controlled by I. W. T. Co.
 NOCCALULA. W. l., 300, 450, 600.
 OHONKARA.—Range, 150; system, R. C. A., 1000; w. l., 300, 600; service, PG; hours, X; rates, 4 c. per word; station operated and controlled by owner of vessel.
 ONEIDA (KYP).—International Film Service Co., owner of vessel.
 OWEGO.—Range, 150; system, Simon, 1000; S. F. Cottle, owner of vessel.
 PAUL H. HARWOOD.—W. l., 300, 450, 600.
 PETREL.—Range, 300; system, R. C. A., 1000; w. l., 300, 450, 600.
 PLAINFIELD.—Baltimore & Carolina S. S. Co., owner of vessel.
 RADIANT.—Standard Transpn. Co., owner of vessel.
 SAGUA.—Sagua S. S. Corp., owner of vessel.
 SANGAMON.—W. l., 300, 450, 600.
 SANTA ANA (WBX).—System, R. C. A., 1000.
 SANTA INEZ.—Andrew F. Mahony, owner of vessel.
 SANTA OLIVIA.—System, Navy-R. C. A., 1000.
 SANTA PAULA.—W. l., 300, 600.
 SANTA RITA.—Thomas Crowley, owner of vessel.
 SAUGERTIES.—System, Navy-Wireless Speciality Apparatus Co., 1000; w. l., 300, 450, 600.
 SCANTIC.—System, Navy-Wireless Speciality Apparatus Co., 1000; w. l., 300, 450, 600.
 SCHROON.—System, Navy-Wireless Speciality Apparatus Co., 1000; w. l., 300, 450, 600.
 S. O. Co. No. 95.—Range, 150; system, R. C. A., 1000.
 SOCONY 82.—Standard Transpn. Co., owner of vessel.

- STEEL AGE.—System, R. C. A., 1000.
 STOCKTON.—W. I., 300, 600, 1800.
 SUBOATCO.—Range, 300; system, Navy, 1000; w. l., 300, 450, 600.
 SUDORCO.—Station operated and controlled by R. C. A.
 TANAMO.—Tanamo S. S. Corp., owner of vessel.
 THOMAS H. WHEELER.—W. I., 300, 450, 600.
 TOLOSA.—W. I., 300, 450, 600; station operated and controlled by I. W. T. Co.
 TREFF.—Range, 200; system, Kilbourne & Clark, 1000; w. l., 300, 450, 600.
 UNDAUNTED (KYR).—Name changed to Dauntless; Herbert W. Hanan, owner of vessel.
 UTACARBON.—Union Oil Co., owner of vessel.
 VICTORIA.—W. I., 300, 550, 600.
 WAUKEGAN.—Range, 250; system, Navy-Marconi, 1000; w. l., 300, 450, 600; station operated by S. O. R. S (U. S. L.).
 WAWALONA.—Station operated and controlled by R. C. A.
 WEST ARROW.—System, Navy-R. C. A., 1000.
 WEST CADDOA.—System, Navy-Liberty, 1000.
 WEST CAHOKIA.—System, Navy-R. C. A., 1000.
 WEST CALUMB.—Station operated and controlled by I. W. T. Co. (U. S. L.).
 WEST CAMAK.—System, Navy-R. C. A., 1000.
 WEST CAVANAL.—Station operated and controlled by R. C. A. (U. S. L.).
 WEST CAWTHON.—Station operated and controlled by R. C. A. (U. S. L.).
 WEST COBALT.—Station operated and controlled by I. W. T. Co.
 WESTERNER.—Range, 200; system, Navy-R. C. A., 1000.
 WEST ERRAL.—Station operated and controlled by I. W. T. Co. (U. S. L.).
 WEST HAVEN.—Hours, X.
 WEST ISLAY.—Name changed to William Perkins.
 WEST JENA.—Station operated and controlled by I. W. T. Co. (U. S. L.).
 WEST JESTER.—Range, 300; system, Navy-R. C. A., 1000; w. l., 300, 450, 600.
 WEST LOQUASSUCK.—System, Navy-R. C. A., 1000; w. l., 300, 450, 600.
 WEST NORRANUS.—Range, 300; system, Navy-R. C. A., 1000; w. l., 300, 450, 600.
 W. H. MCGEAN.—System, R. C. A., 1000.
 WILLIAM H. DOHENY.—System, R. C. A., 1000.
 WOGO.—Claude Nolan owner of vessel.
 Strike out all particulars of the following-named vessels: Buckhannon, City of Para, Gulfport, Mahanna, San Marcos, and Socony 83.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDEQ, read Commercial Spirit, KICP, read William Perkins, KVK, read Tampa, KYR, read Dauntless, WMAE, read H. W. Baxter, WXOA, read Brookings, strike out all particulars following the call signals, KEK, KELG, KKP, KREE, KVAO, WCT, WGO, and WWF.

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, 1922.]

- KFAW (Santa Ana, Calif.).—Station operated and controlled by the Radio Den (W. B. Ashford & T. White).
 KFDF (Casper, Wyo.).—W. I., add 485.
 KFI (Los Angeles, Calif.).—W. I. 400.
 KLN (Del Monte, Calif.).—Changed to Monterey, Calif.
 KPO (San Francisco, Calif.).—W. I., 400.
 WCAU (Philadelphia, Pa.).—Station operated and controlled by Durham & Co.
 WCK (St. Louis, Mo.).—Station operated and controlled by Stix-Baer & Fuller Dry Goods Co.
 WDT (New York, N. Y.).—Changed to Stapleton, N. Y.
 WEAU (Sioux City, Iowa).—W. I., add 485.
 WHAM (Rochester, N. Y.).—Station operated and controlled by University of Rochester (Eastman School of Music).
 WKAA (Cedar Rapids, Iowa).—Address, 1444 Second Avenue east.
 WNAK (Manhattan, Kans.).—Manhattan Radio Supply Co. (E. B. Paslay).
 WPE (Kansas City, Mo.).—Changed to Independence, Mo.
 WPG (New Lebanon, Ohio).—W. I., add 485.
 Strike out all particulars of the following-named stations: KDYO, San Diego, Calif.; KDZP, Los Angeles, Calif.; KDZW, San Francisco, Calif.; KFAC, Glendale, Calif.; KFBM, Astoria, Oreg.; KFBN, California (portable); KFBQ, Prescott, Ariz.; KFC, Seattle, Wash.; KJC, Los Angeles, Calif.; KVQ, Sacramento, Calif.; KYY,

San Francisco, Calif.; KZY, San Francisco, Calif.; WAAX, Crafton, Pa.; WBAB, Syracuse, N. Y.; WBAJ, Toledo, Ohio; WBAQ, Mishawaka, Ind.; WDAQ, Brownsville, Pa.; WDAV, Muskogee, Okla.; WGAS, Chicago, Ill.; WHW, East Lansing, Mich.; WJAC, Joplin, Mo.; WJAL, Portland, Me.; WJAU, Yankton, S. Dak.; WKAZ, Wilkes-Barre, Pa.; WLAO, Scranton, Pa.; WNAG, Cresco, Iowa; WNAH, Wilkes-Barre, Pa.; WNAJ, Chicago, Ill.; WPAG, Independence, Mo.; WPJ, Philadelphia, Pa.; WSN, Norfolk, Va.; and WSX, Erie, Pa.

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, 1922, and to the International List of Radiotelegraph Stations, published by the Bernese bureau.]

AFOGNAK, ALASKA.—Loc. (approximately) $0.158^{\circ} 00' 00''$, N. $58^{\circ} 00' 00''$; range, 150; system, Kilbourne & Clark, 1000.
 CIRCLE, ALASKA.—Service, PR.
 DETOUR POINT, MICH.—Loc. $0.83^{\circ} 54' 54''$, N. $45^{\circ} 57' 20''$.
 FAIRBANKS, ALASKA.—Service, PR.
 FOLLY ISLAND, S. C.—Loc. $0.79^{\circ} 53' 22''$, N. $32^{\circ} 41' 00''$.
 FORT GIBBON, ALASKA.—Service, PR.
 GRAND MARIAS, MICH.—Loc. $0.85^{\circ} 58' 26''$, N. $46^{\circ} 40' 29''$.
 JUPITER, FLA. (regular station).—Service, O.
 KEY WEST, FLA. (regular station).—W. l., add 2250 spark.
 POINT ISABEL, TEX.—W. l., add 1988 spark.
 NORTH ISLAND, S. C.—Loc. $0.79^{\circ} 11' 10''$, N. $33^{\circ} 13' 18''$.
 PORT ANGELES, CALIF.—Read Port Angeles, Wash.
 QUANTICO, VA.—Loc. $0.77^{\circ} 30' 00''$, N. $38^{\circ} 49' 00''$.
 SANDY HOOK, N. J. (R. C.).—Loc. $0.73^{\circ} 59' 50''$, N. $40^{\circ} 27' 54''$.
 SAN FRANCISCO, CALIF. (regular station).—Loc. $0.122^{\circ} 15' 57''$, N. $37^{\circ} 05' 03''$.
 SURFSIDE, MASS.—Loc. $0.70^{\circ} 05' 53''$, N. $41^{\circ} 14' 32''$.
 WHITEFISH POINT, MICH.—Loc. $0.84^{\circ} 57' 22''$, N. $46^{\circ} 46' 19''$.

The following-named naval radio stations will charge 12 c. per word for ship service, effective April 1, this year: Balboa, Canal Zone; Baltimore, Md.; Bar Harbor, Me.; Cape Hatteras, N. C.; Cape Mala, Panama; Cavite, P. I.; Charleston, S. C.; Colon, Canal Zone; Cordova, Alaska; Dutch Harbor, Alaska; Eureka, Calif.; Galveston, Tex.; Guam, Guam Island; Guantanamo, Cuba; Juneau, Alaska; Ketchikan, Alaska; Key West, Fla.; Kodiak, Alaska; La Palma, Panama; Miami, Fla.; Mobile, Ala.; Morehead City, N. C.; Navassa Island, West Indies; Norfolk, Va.; North Head, Wash.; Parris Island, S. C.; Pensacola, Fla.; Point Isabel, Tex.; Port au Prince, Haiti; Puerto Obaldia, Panama; Puget Sound, Wash.; San Diego, Calif.; San Domingo City, Dominican Republic; San Juan, P. R.; San Pedro, Calif.; Savannah, Ga.; Seattle, Wash.; Seward, Alaska; Sitka, Alaska; St. Augustine, Fla.; St. Croix, Virgin Islands; St. George, Alaska; St. Paul, Alaska; St. Thomas, Virgin Islands; Tatoosh, Wash.; Tutuila, Samoa. This list comprises all naval stations open to PG traffic.

GOVERNMENT 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, 1922, and to the International List of Radiotelegraph Stations, published by the Bernese bureau.]

GENERAL ROBERT W. SWARTOUT.—Correct call letters WYAU.
 HOUSTON.—Strike out all particulars.
 POMPEY.—Strike out all particulars.
 PRESIDENT.—Range, 150; system, Navy, 1000; w. l., 310, 525, 600; service, O; hours, N.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

Strike out all particulars following the call signals, NAQ, NGZ, and NQF.

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, 1922.]

BAKERSFIELD, CALIF. (6ZS).—Changed to Los Angeles, Calif.
 BEAR CREEK, MONT. (7ZG).—Changed to Douglas, Wyo.
 CINCINNATI, OHIO (8XB).—W. l., 200, 250, 375.
 DALLAS, TEX. (5ZC).—Address, 1101 East Eighth Street.
 DOVER, OHIO (8ZX).—Address, 1113 Walnut Street.

- HUMACONNA.—Station operated and controlled by Merrill & Ring Lumber Co.
 KANSAS CITY, MO. (9XAB).—W. I., variable.
 LOS ANGELES, CALIF. (6XL).—W. I., variable.
 LOS ANGELES, CALIF. (6XW).—Correct call signal 6XAW.
 MADISON, WIS. (9XM).—W. I., 200, 240, 375, variable.
 NEW ROCHELLE, N. Y. (2ZK).—Address, 183 Drake Avenue.
 OAKLAND, CALIF. (6XAM).—Station operated and controlled by Warner Bros.
 PORTLAND, OREG. (7YG).—Station operated and controlled by Oregon Institute of Technology (Y. M. C. A.).
 QUINCY, ILL. (9XQ).—Address, 1033 Maine Street.
 RICHMOND HILL, N. Y. (2XE).—W. I., 460, 2250.
 SALT LAKE CITY, UTAH (6ZA).—Address, 243 East Seventh South Street.
 SALT LAKE CITY, UTAH (6ZM).—Erroneously given in November Bulletin as 6ZZ.
 SAN DIEGO, CALIF. (6XZ).—Address, 3443 Fifth Street.
 SOUTH PASADENA, CALIF. (6XAS).—Address, 1707 Camden Court.
 SPRINGFIELD, OHIO (8XAK).—W. I., 200, 375, variable.
 WOODSIDE, N. Y. (2XAC).—Changed to Stapleton, N. Y.
 WOODSIDE, N. Y. (2ZD).—Changed to Stapleton, N. Y.
 Strike out all particulars of the following-named stations: Clinton, Md. (8XE); Omaha, Nebr. (9XAA); Oxford, Ohio (8YR); St. Marys, Ohio (8ZL); Toledo, Ohio (8XAC); Toledo, Ohio (8ZB); Vancouver, Wash. (7ZJ); Washington, D. C. (3XF); and Woodmere, N. Y. (2XH).

MISCELLANEOUS.

COMPARATIVE STATEMENT OF NUMBER OF RADIO STATIONS AND OPERATORS.

Number of licensed radio stations on June 30, 1913, and on January 1, 1923.

	1913	1923
Broadcasting class A.....		544
Broadcasting class B.....		25
Amateur.....	1,312	16,808
Special amateur.....	8	201
Experimental.....	10	291
Technical and training schools.....	7	128
Point to point inland.....	14	167
Coast stations communicating with ships.....	64	39
Transoceanic.....	1	12
Ship stations.....	479	2,762
Total.....	1,890	21,065

Number of operators licensed during fiscal years 1913 and 1922.

	1913	1922
Commercial.....	1,832	3,136
Experimental and instruction.....	8	43
Cargo.....	1	14
Amateur, first class.....	1,075	4,530
Amateur, second class.....	766	4,390
Total.....	3,682	12,113

INCREASE IN RATES FOR NAVAL STATIONS.

Effective April 1, next, the coastal radio rate for all United States naval radio stations, except those on the Great Lakes, open to commercial shiophore traffic will be increased to 12 cents per word.

HOW AND WHERE TO SEND FOR COAST GUARD CUTTERS IN CASE OF VESSELS IN DISTRESS.

Southern Division.—This division of the Coast Guard extends from Cape Blanco, Oreg., to the Mexican border and has its headquarters at 418 Customhouse, San Francisco, Calif., where the division commander is located. Telegrams addressed

to "Coast Guard Division, San Francisco, Calif.," will be delivered to the above-named office.

The following-named Coast Guard cutters are attached to the southern division:

Cutter.	Stationed at—	Radio call.
Mojave.	Honolulu, Hawaii.	NIXB.
Cabokia.	Eureka, Calif.	NITV.
Shawnee.	San Francisco, Calif.	NIZJ.
Tamaroa.	San Pedro, Calif.	NIVR.
Tingard.	San Diego, Calif.	NISB.

These vessels can be reached by radio direct when cruising and through the nearest naval radio station or through the office of the division commander, by land wire, radio, or telephone when they are in port. The cutters are charged with the assistance of vessels in distress and are kept in readiness to respond to calls. While cruising at sea they are required to keep the division commander informed as to their locations. Vessels not equipped with radio and being in need of assistance can communicate by flag signal with any Coast Guard station or with any lighthouse, and the message will be transmitted by telephone or telegraph. Persons other than masters of vessels having knowledge of disasters may communicate with the office of the division commander at San Francisco by telephone or telegraphy or with the nearest Coast Guard station or naval radio station.

INFORMATION FROM THE BERNES BUREAU.

British Indies.—The coast station Diamond Island has been closed since January 15 last.

Norway.—Beginning the first day of the current month, the rate for all Norwegian coast stations will be reduced to 80 centimes per word, minimum 3 francs.

LICENSES OF AMATEUR OPERATORS SUSPENDED.

The department has recently suspended the licenses of a number of amateur operators for violation of the act of August 13, 1912, section 4, regulations 3, 4, and 15. Similar action may be taken against any other operator reported for violation of the radio law. The above-cited regulations read as follows:

Regulation third. At all stations if the sending apparatus, to be referred to hereinafter as the "transmitter," is of such a character that the energy is radiated in two or more wave lengths, more or less sharply defined, as indicated by a sensitive wave meter, the energy in no one of the lesser waves shall exceed ten per centum of that in the greatest.

Regulation fourth. At all stations the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto.

Regulation fifteenth. No private or commercial station not engaged in the transaction of bona fide commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wave length exceeding two hundred meters, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce contained in the license of the station: *Provided*, That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third or fourth regulations to the penalties of one hundred dollars or twenty-five dollars, respectively, provided in this section unless the person maintaining or operating such station shall have been notified in writing that the said transmitter has been found, upon tests conducted by the Government, to be so adjusted as to violate the said third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

Operators are also warned that any change in the characteristics of the radio apparatus or service of their station must be authorized by the Secretary of Commerce as required by regulation 70. This authority is given in the form of a new license showing the new characteristics of the station.

NEW YORK STATION (WNY) USING I. C. W. AND C. W.

The New York station of the R. C. A. is using, as far as practicable, I. C. W. or C. W. for communicating with ships. All vessels calling this station and capable of receiving C. W. signals on 600 meters should indicate that they will stand by for the acknowledgment of their call on 600 meters C. W. by transmitting after their call letters "Ans 600 CW" and should adjust their receiver accordingly. All vessels not equipped with C. W. receivers should tune carefully on 600 meters I. C. W., which will be used unless C. W. is requested. This station will call ships for which it has traffic at frequent intervals and also on schedule at the following hours or as soon thereafter as practicable: 1, 5, and 9 a. m. and 1, 5, and 9 p. m., 75th meridian. The use of C. W. and I. C. W. transmission by this station is being inaugurated in the interest of reducing interference and the full cooperation of all ship operators is desired.

DISTRIBUTION OF PUBLICATIONS OF THE BUREAU OF NAVIGATION.

All orders and inquiries concerning the publications named below should be forwarded to the Superintendent of Documents, Government Printing Office, Washington, D. C. *Do not make remittances to the Bureau of Navigation or to other agencies of this bureau.*

List of Commercial, Government, and Special Radio Stations (annual), 15 cents.

List of Amateur Radio Stations (annual), 25 cents.

Radio Service Bulletin (monthly), annual subscription, 25 cents; single copies, 5 cents.

Radio Communication Laws of the United States (occasional), 15 cents.

List of Merchant Vessels of the United States (annual), \$1.25.

Code List of Seagoing Vessels with Name of Owners (annual), 25 cents.

American Documented Seagoing Merchant Vessels of 500 Gross Tons and Over (monthly), annual subscription, 75 cents.

Navigation Laws of the United States (quadrennial), \$1.

Amendments to Navigation Laws (occasional), 10 cents.

Measurement of Vessels (occasional), 15 cents.

The prices quoted above are for the last editions of the publications and do not apply to future issues, as the prices fluctuate from year to year.

INFORMATION FROM THE HYDROGRAPHIC OFFICE.

RADIO FOG SIGNAL, INCHKEITH, FIRTH OF FORTH.—An experimental radio fog signal has been established on the island of Inchkeith, in the Firth of Forth, and this signal is a substitute for the fog siren heretofore used.

The device may be described as an apparatus for sending out short radio waves, which may be picked up by a simple apparatus on board vessels at a distance of about 10 miles from the station, the waves when received indicating the exact direction in which the transmitting station lies. The transmitting apparatus has been erected on a slightly protected site on Inchkeith. Its most conspicuous feature is a metal framework tower rising to a height of 30 feet and supporting an overhead framework in shape something like a letter X placed horizontally. The circular base of the tower supports extended arms corresponding with the arms of the framework overhead, and between each upper and lower arm is arranged a series of vertical wires placed about a foot apart. The whole of this elaborate framework revolves on a circular base, being driven by an ordinary geared driving wheel electrically operated. This framework constitutes a pair of electricity reflectors and represents the solution of the difficulty in transmitting short radio waves such as can be caught by the short aerial carried on vessels. Signals are transmitted every minute. The two transmitters, which are contained in boxes affixed to the traveling base of the apparatus, send out their radio waves, which are caught and reflected by the wire screens, in a given radial direction. As the reflector revolves the radio waves are projected in such a way as to sweep around the horizon, just as the beam of a revolving light would do. The reflector is timed to revolve once in two minutes. It is furnished, however, with two transmitters, sending out a radio beam at opposite points of the compass, so that at any given point in the Firth of Forth the signal will be received every minute.

Calibrated arcs of naval compass stations on Great Lakes and Atlantic Coast.

Station.	Call letters.	Position.	Arc of calibration (degrees).
Grand Marais, Mich.	NZT	46° 40' 29" N., 86° 58' 29" W.	270-70
Whitefish Point, Mich.	NZT	46° 46' 19" N., 84° 57' 22" W.	275-180
Detour Point, Mich.	NZU	45° 57' 20" N., 83° 54' 54" W.	100-280
Bar Harbor, Me.	NBD	44° 18' 36" N., 68° 11' 27" W.	70-235
Cape Elizabeth, Me.	NAB	43° 33' 59" N., 70° 11' 59" W.	50-210
Gloucester, Mass.	NAD	42° 35' 19" N., 70° 41' 08" W.	90-180
Deer Island, Mass.	NAD	42° 21' 15" N., 70° 57' 30" W.	15-150
Fourth Cliff, Mass.	NAD	42° 09' 40" N., 70° 42' 22" W.	345-110
North Truro (Cape Cod), Mass.	NAR	42° 02' 23" N., 70° 03' 37" W.	310-130
Surfside Nantucket, Mass.	NBS	41° 14' 32" N., 70° 05' 53" W.	30-270
Prices Neck, R. I.	NAF	41° 27' 06" N., 71° 20' 15" W.	80-270
Sandy Hook, N. J.	NAH	40° 27' 34" N., 73° 59' 50" W.	50-160
Manasquan, N. J.	NAH	40° 07' 05" N., 74° 01' 57" W.	25-170
Cape May, N. J.	NSD	38° 55' 53" N., 74° 58' 35" W.	80-235
Cape Henlopen, Del.	NSD	38° 47' 35" N., 75° 05' 26" W.	10-160
Bethany Beach, Del.	NSD	38° 32' 45" N., 75° 03' 22" W.	10-160
Hog Island, Pa.	NCZ	37° 22' 36" N., 75° 42' 37" W.	40-190
Virginia Beach, Va.	NCZ	36° 51' 10" N., 75° 58' 35" W.	10-150
Poyners Hill, N. C.	NCZ	36° 17' 16" N., 75° 47' 45" W.	0-140
Cape Hatteras, N. C.	NDW	35° 14' 22" N., 75° 31' 42" W.	20-230
Cape Lookout, N. C.	NAN	34° 36' 11" N., 76° 32' 18" W.	50-260
North Island, S. C.	NZW	33° 13' 18" N., 79° 11' 10" W.	30-190
Folly Island, S. C.	NZV	32° 41' 00" N., 79° 53' 22" W.	30-230
Jupiter, Fla.	NAQ	26° 56' 50" N., 80° 04' 57" W.	10-160
Port Eads, La.	NBX	29° 00' 43" N., 80° 09' 32" W.	120-240

NOTE.—The arc of calibration is a sector of the circle of which the compass coil at the radio station is the center; the bearings are from the station. Compass bearings are reliable only when they fall within the calibrated arc.

Radio weather reports, Key West and Point Isabel.—Beginning January 15 last, weather reports, forecasts, and warnings broadcasted from the naval stations at Key West, Fla., and Point Isabel, Tex., are transmitted as follows: Key West (NAR), 10 p. m., seventy-fifth meridian time, wave length 5,700 meters C.W. and 1,988 meters spark; Point Isabel, Tex. (NAY), midnight, noon, and 7 p. m., seventy-fifth meridian time, wave length 5,000 meters C.W. and 2,250 meters spark. Hurricane warnings are broadcast whenever issued and repeated at two-hour intervals until midnight on both wave lengths.

Ice signals, Swinemunde and Norddeich radio stations.—In the future radio ice warnings will be broadcast only by the Norddeich and Swinemunde radio stations, at 11 hours 15 minutes and 11 hours 30 minutes, respectively, immediately after the weather report, according to the following code:

JK JK JK	JK JK JK	JK JK JK	JK JK JK
1 2 3	4 5 6	7 8 9	10 11 12
1st group	2d group	3d group	4th group
JK JK JK	JK JK JK	JK JK JK	
13 14 15	16 17 18	19 20 21	
5th group	6th group	7th group	

J = Ice conditions.

K = Effect on navigation.

0—Open water.	0—Conditions not known owing to fog, snow, etc.
1—Thin loose ice.	1—Navigation practicable.
2—Drift ice.	2—Navigation difficult for sailing vessels.
3—Thin covering of ice.	3—Navigation difficult but practicable for sailing vessels assisted by tugs.
4—Close pack ice.	4—Navigation very difficult; closed to sailing vessels.
5—Difficult drift ice.	5—Navigation only practicable for large steamers.
6—Thick covering of ice.	6—Navigation only practicable with the assistance of ice breakers.
7—Heavy drift ice.	7—Navigation closed.
8—Heavy masses of ice.	8—Navigation channel kept open by ice breakers.
9—Not known.	9—Not known.

Stations.

1. Norddeich, 11.15 a. m.

- | | | |
|----------------|---|---|
| 1st group..... | { | 1. List. |
| | | 2. Husum. |
| | | 3. Tønning. |
| 2d group..... | { | 4. Cuxhaven—Off-lying area in the Elbe. |
| | | 5. Cuxhaven—Harbor and entrances. |
| | | 6. Brunsbüttelkoog—Canal entrance. |
| 3d group..... | { | 7. Glückstadt. |
| | | 8. Hamburg. |
| | | 9. Harburg. |
| 4th group..... | { | 10. Hohenweg. |
| | | 11. Bremerhaven. |
| | | 12. Bremen. |
| 5th group..... | { | 13. Ätzen Jade (Outer Jade). |
| | | 14. Innen Jade (Inner Jade). |
| | | 15. Wilhelmshaven—Harbor entrances. |
| 6th group..... | { | 16. Borkum, Westerems. |
| | | 17. Neerland—Off-lying area in the Ems. |
| | | 18. Neerland—Harbor. |
| 7th group..... | { | 19. Kaiser Wilhelm Kanal (Kiel Canal). |
| | | 20. Kieler Förde. |
| | | 21. Marienleuchte, Fehmarnbelt. |

2. Swinemünde, 11.30 a. m.

- | | | |
|----------------|---|--|
| 1st group..... | { | 1. Memel. |
| | | 2. Pillau. |
| | | 3. Channel to Königsberg. |
| 2d group..... | { | 4. Danzig. |
| | | 5. Stolpmünde. |
| | | 6. Kolberg. |
| 3d group..... | { | 7. Swinemünde—Off-lying sea area. |
| | | 8. Swinemünde—Harbor. |
| | | 9. Stettiner Hafl. |
| 4th group..... | { | 10. Tilsenow. |
| | | 11. Arkona. |
| | | 12. Barth. |
| 5th group..... | { | 13. Warnemünde. |
| | | 14. Channel to Wismar. |
| | | 15. Travemünde. |
| 6th group..... | { | 16. Marienleuchte, Fehmarnbelt. |
| | | 17. Fehmarnsund. |
| | | 18. Buik. |
| 7th group..... | { | 19. Kaiser Wilhelm Kanal (Kiel Canal). |
| | | 20. Rendeburg. |
| | | 21. Flensburg, Innenförde. |

Example of message (relating to 1st group, Norddeich):

$$\frac{JK}{1} 55 \qquad \frac{JK}{2} 56 \qquad \frac{JK}{3} 43$$

Significance: List—Difficult drift ice; navigation only practicable for large steamers. Husum—Difficult drift ice; navigation only practicable with the assistance of ice breakers. Tønning—Close pack ice; navigation difficult but practicable for sailing vessels assisted by tugs.

MEXICO CITY (CHAPULTEPEC)—W/T TIME SIGNALS ESTABLISHED.

Position.—Lat. 19° 25' N., long. 99° 11' W. (approximately).

Call signal.—XDA.

Details.—Time signals are transmitted twice daily by Mexico City (Chapultepec) W/T station, at 7^h 00^m 00^s and 13^h 00^m 00^s G. M. T. (astronomical). On Sundays and public holidays the first signal only is sent. For the purpose of these signals Tacubaya

Observatory (19° 24' 17" .9 N., 99° 11' 40" .0 W.) is connected by land telegraph line to the W/T station. The procedure is as follows:

7^h 00^m 00^s time signal (wave length 1,200 meters).

G. M. T. (astronomical).		
H. m. s.	H. m. s.	
6 58 10-6 56 27		XDA (call signal of Chapultepec) sent three times.
6 56 30-6 56 49		QSD (transmission of time signal) sent three times.
6 57 00-6 59 50		A dot is sent at each second, omitting Nos. 29, 53, 56, 57, 58, and 59.
7 00 00-7 00 02		A dash of two seconds' duration, the beginning of which is the time signal.

13^h 00^m 00^s time signal (wave length, 5,800 meters).

12 54 10-12 54 27	XDA (call signal of Chapultepec) sent three times.
12 54 30-12 54 49	QSD (transmission of time signal) sent three times.
12 55 00-12 59 50	A dot is sent at each second, omitting Nos. 29, 53, 56, 57, 58, and 59.
13 00 00-13 00 02	A dash of two seconds' duration, the beginning of which is the time signal.

NOTE.—7^h 00^m 00^s and 13^h 00^m 00^s G. M. T. (astronomical) correspond to 6^h 23^m 13.33^s and 6^h 23^m 13.33^s mean time of the meridian of Tacubaya, or 1,200 (noon) and 1,900 (6.00 p. m.) Mexican civil mean time (meridian of 105° W.).

—From Admiralty Notice to Mariners, London, 1927, year 1928.

NORFOLK STATION USING TUBE SET FOR COMMERCIAL TRAFFIC.

The bureau has been requested by the district communication superintendent, fifth naval district, to invite the attention of all ship operators that the Norfolk radio station (NAM) is using a tube set on 600 and 2,400 meters, and for that reason it will require much closer tuning in order to pick up and communicate with this station.

LOST COMMERCIAL RADIO OPERATORS' LICENSES.

Printed below is a list of radio operators' licenses which have been reported to this bureau as having been lost. Should any of them be found, they should be returned to the bureau for cancellation. Inspectors and others concerned should see that lost licenses are not being used by unauthorized persons.

Name.	Grade.	Number.	Date issued.	Port issued.
Agnes, Joaquin M.	Second.	402	Mar. 3, 1922	New York.
Akerberg, Herbert V.	do.	1288	Sept. 27, 1922	Detroit.
Bahrman, Carl J.	First.	23844	Oct. 5, 1920	New York.
Becker, John.	Second.	14921	June 24, 1921	Detroit.
Boothroyd, Philip D.	First.	4405	Jan. 12, 1922	Seattle.
Burt, Fred G.	do.	25	Nov. 10, 1921	Washington.
Cestone, Michael.	do.	20972	Mar. 25, 1921	New York.
Clark, Silas Franklin.	do.	1367	Sept. 10, 1921	Baltimore.
Cole, Edwin A.	do.	1535	do.	New Orleans.
Ferguson, Earl.	do.	20907	Feb. 19, 1921	New York.
Hallock, Joseph H.	do.	4416	Feb. 16, 1922	Seattle.
Hodge, Clarence R.	do.	1089	Mar. 6, 1922	Baltimore.
Jones, Stephen Barr.	do.	4484	June 21, 1922	Seattle.
Kingsley, Chester F.	do.	359	Apr. 6, 1922	Boston.
Lamont, John James.	do.	4007	Sept. 22, 1922	New York.
Lewis, Garrett W.	do.	4525	Oct. 26, 1922	Seattle.
MacAlpin, Alexander Douglas.	do.	20818	Jan. 8, 1921	New York.
Nadell, Aaron.	do.	794	Sept. 13, 1921	New Orleans.
Porter, Owen Frederick.	do.	1929	Sept. 4, 1921	San Francisco.
Purple, Leroy.	do.	1065	Jan. 27, 1922	Baltimore.
Staffa, George.	do.	1335	Aug. 8, 1921	Do.
Stelle, Page.	do.	23630	Apr. 4, 1921	New Orleans.
Templeton, Everett Morris.	do.	22312	Mar. 29, 1921	Baltimore.
Thompson, Thomas B.	do.	20641	Jan. 25, 1921	New York.
Watson, Clifton H.	do.	4413	Feb. 15, 1922	Seattle.
Wilson, George M.	do.	22323	Apr. 16, 1921	Baltimore.
William, Avery Wilson.	do.	22266	Mar. 21, 1921	Chicago.
Wuerpel, Charles E.	Second.	825	Apr. 13, 1922	New Orleans.
Wylie, Ralph D.	First.	4417	Feb. 17, 1922	Seattle.

REFERENCES TO CURRENT RADIO PERIODICAL LITERATURE.

The following list of references is 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. Abstracts and articles which are essentially of amateur or novice interest are not listed. For about two years these lists were prepared in mimeographed form and since August 1, 1922, they have been published in the Radio Service Bulletin. A complete file of the lists in mimeographed form previous to August 1, 1922, can be consulted at the Bureau of Standards in Washington. Files of earlier lists can also be consulted at the Library of Congress in Washington, the Engineering Societies Library in New York, and the John Crerar Library in Chicago.

These references are classified according to a decimal system outlined in a report prepared at the radio laboratory of the Bureau of Standards, An Extension of the Dewey Decimal Classification Applied to Radio. It is expected that this classification will be published later. In this list the subjects corresponding to the 10 principal classes of the radio classification are given, and preceding each reference is given a number which corresponds to the classification of the reference. The subjects corresponding to the various decimal divisions of the 10 principal classes are not given in these lists, but can be found in the classification. In case a reference could properly be assigned to two or more of the numbers of the classification, it appears only once in this list, with the number corresponding to the subject in connection with which the reference is of greatest importance. In this list, under the first eight principal classes, the numbers assigned to the references are preceded by the letter "R," which is an abbreviation for the number 621.384 which is assigned to radio communication in the regular Dewey Decimal Classification. Under the class "R800—nonradio subjects," the numbers shown in this list are not preceded by an "R," but are the numbers assigned to the subject of the reference in the regular complete Dewey Classification.

The Bureau of Standards can not furnish copies of the various periodicals or other publications to which references are given. Copies of these publications may be secured from newdealers or from publishers, or may be consulted at libraries. Most United States Government publications to which references are given can be purchased, at the prices stated, from the Superintendent of Documents, Government Printing Office, Washington, D. C. Copies of United States patents can be secured for 10 cents each from the Commissioner of Patents, Washington, D. C.

Radio Literature.—Readers of the Radio Service Bulletin who find these lists of references to current radio periodical literature of real use and desire to have their publication continued are requested to write to the Bureau of Navigation, Department of Commerce, Washington, D. C., expressing their views in the matter. If a reasonable number of requests for the continuance of these lists are not received, their publication will be discontinued.

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- R125.6 Bishop, L. W., Loop transmission, *QST*, 6, pp. 7-8, January, 1923.
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RADIO STANDARDIZATION CONFERENCE.

During the past two years radio communication has grown very rapidly, and radio apparatus and service have developed along many divergent lines. A large number of new manufacturers of radio apparatus have been added to the considerable number in existence several years ago. Each of these manufacturers has, to a large extent, developed his radio apparatus along his own lines without much regard to the products of other manufacturers. The result has been a large variety of kinds of radio apparatus differing widely in construction and performance. In some cases the products of one manufacturer are not suited for use in connection with the products of another. In determining the performance of even simple types of radio apparatus different radio men often use methods which differ in important respects. The consumer demands uniformity and dependability in the radio service and apparatus which he uses. Radio terminology now in use is far from uniform. In all these and in other respects there is a real need for radio standardization. Lack of such standardization has been brought to the attention of the Bureau of Standards by producer, distributor, and consumer.

At the request of six radio organizations the Bureau of Standards, in cooperation with the American Engineering Standards Committee, called a conference on radio standardization, which met in New York, January 12. Over 100 persons were present, representing nearly that number of different associations, manufacturers, dealers, operating companies, and other organizations interested in radio. Dr. F. C. Brown, Acting Director of the Bureau of Standards, presided. Dr. J. H. Dellinger, chief of the radio laboratory of the Bureau of Standards, showed how the widespread interest in radio has brought with it an increasing demand for uniformity and dependability in radio service and apparatus. Dr. A. N. Goldsmith, secretary of the Institute of Radio Engineers, stated that while standardization involves the danger of stagnation, it is only by a reasonable amount of standardization along wise directions that gross abuse of public confidence can be avoided. William H. Davis, president of the National Radio Chamber of Commerce, expressed the belief that the radio industry is to-day in a situation where it must be careful or else lose the respect of the public. J. V. L. Hogan, consulting radio engineer, emphasized the need for education not merely of the consumers, but also of the manufacturers, dealers, and perhaps of the engineers. Dr. P. G. Agnew, secretary of the American Engineering Standards Committee, described the function of that committee as the provision of machinery for passing from the stage of standardization by societies or associations to standardization on a national scale, and outlined the procedure followed by that committee.

Admiral Ziegemeier, director of naval communications, and Commander S. C. Hooper, of the Bureau of Engineering, Navy Department, spoke of the interest of the Navy Department as a large user of radio equipment, and urged the importance of giving full consideration to radio communication with ships and other isolated places. K. B. Warner said that the American Radio Relay League is glad to assist in this development looking toward the betterment of the art, and expressed hope that they would be a definite help on account of their long practical field experience in the use of apparatus. William A. Fitzgerald told of the interest of the National Retail Dry Goods Association in the development of tests for the standardization of radio apparatus, particularly receiving sets. M. C. Rypinsky, of the Associated Manufacturers of Electrical Supplies, Radio Apparatus Section, expressed the view that the conference should turn its attention mainly to the standardization of radio apparatus and radio broadcasting itself rather than undertaking commercial dimensional standardization which might interfere with the development of the art. A. H. Griswold, of the American Telephone & Telegraph Co., spoke of the necessity for keeping problems of regulation separate from those of standardization.

The conference voted that action should be taken toward formulation of standards of radio apparatus and service, and that a single, broadly representative, national committee should be organized, following the American Engineering Standards Committee procedure, for dealing with all phases of radio standardization, including commercial standardization, methods of measurement and testing, and nomenclature. It

was also voted that the national committee should determine the type and scope of standardization to be undertaken immediately, including a consideration of testing facilities and other related lines of activity. L. T. Robinson, secretary of the American Institute of Electrical Engineers, and Dr. A. N. Goldsmith, secretary of the Institute of Radio Engineers, announced the appointment of an advisory committee of 13 to assist in the organization of the national "sectional" committee and necessary technical subcommittees.

ELECTRON-TUBE DETECTOR UNIT FOR RADIO RECEPTION.

Announcement has previously been made of the publication of Bureau of Standard Circular No. 120, Construction and Operation of a Simple Homemade Radio Receiving Outfit, and Circular No. 121, Construction of a Two-Circuit Radio Receiving Equipment with Crystal Detector. These two circulars describe crystal detector receiving sets, the first being a single-circuit set and the latter a two-circuit set. A copy of either of these circulars can be purchased for 5 cents from the Superintendent of Documents.

By using electron tubes, receiving apparatus can be constructed of greater sensitivity than sets employing only crystal detectors. Electron tubes are used for reception in many different kinds of circuits. One of the most elementary uses of the electron tube is as a simple detector. It is also possible to use electron tubes for reception in circuits using various kinds of amplification, or regeneration, beat reception, or other methods. A simple electron-tube detector set will not serve to receive signals transmitted by continuous-wave radio telegraphy.

The Bureau of Standards has received requests for information regarding sets employing an electron-tube detector from persons wishing to construct such sets. To meet this demand, there has been prepared Bureau of Standards Circular No. 133, Description and Operation of an Electron-Tube Detector Unit for Simple Radio Receiving Outfits. This Circular No. 133 describes in detail the construction and operation of a simple electron-tube detector unit. The set with electron-tube detector is more sensitive than a set employing a crystal detector and may be expected to give more satisfactory results.

An antenna, lightning switch, ground connection, and telephone receivers which can be used with the electron-tube detector set are described in Circular No. 120. Tuning devices for use with this electron-tube detector set may be the tuning coil described in Circular 120, or the two-circuit coupler and the variable air condenser described in Circular 121.

A list is given of the apparatus necessary for constructing the electron-tube detector unit, and also a description of the method of assembling and wiring the unit. Illustrations are given showing the arrangement of the various parts, and there is a photograph of the complete assembled detector unit. The cost of the electron-tube detector unit alone, including tube, is estimated to be between \$8 and \$14. These prices do not include the cost of batteries, which add about \$20 to the cost.

A copy of Bureau of Standards Circular No. 133 can be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

NEW SIGNAL CORPS RADIO PUBLICATIONS.

The United States Signal Corps is issuing a series of Radio Communication Pamphlets, describing the principles and operation of radio apparatus, with particular reference to the types of apparatus employed in the radio service of the Signal Corps. Probably the publication of this series which is best known to the public is Signal Corps Radio Communication Pamphlet No. 40, The Principles Underlying Radio Communication. This is a book of over 600 pages, which contains over 300 illustrations, and is an elementary text covering the principles of radio communication and the more important radio methods and apparatus. A copy may be purchased for \$1 from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Wavemeters and Decremeters, Signal Corps Radio Communication Pamphlet No. 28, has recently appeared. It contains 55 pages and a number of illustrations, including photographs. It discusses the principles of the measurement of wave length and also of the measurement of the decrement of damped waves. Detailed descriptions are given of the construction of the various types of wavemeters and decremeters employed by the Signal Corps and instructions for their use. A copy of Radio Communication Pamphlet No. 28 can be purchased for 10 cents from the Superintendent of Documents.

Amplifiers and Heterodynes, Signal Corps Radio Communication Pamphlet No. 9, has also appeared. This is a pamphlet of 37 pages and contains numerous circuit diagrams and photographs. It outlines briefly the principles of amplification and of heterodyne action and describes in detail the various types of amplifiers and heterodyne units employed by the Signal Corps and gives instructions for their care and operation. A copy of Radio Communication Pamphlet No. 9 can be purchased for 10 cents from the Superintendent of Documents.

BUREAU OF STANDARDS TO TRANSMIT STANDARD RADIO WAVE SIGNALS.

There will be transmitted from the Bureau of Standards at Washington, D. C., on March 6, 1923, radio signals of definitely stated wave frequency (wave length), which will make it possible for any person having suitable apparatus to use these signals for calibrating his own wave meter and transmitting and receiving equipment. A preliminary series of tests which demonstrated the feasibility of such transmission was conducted on January 29 and 30. These tests included the measurement of the wave length of signals transmitted from the Bureau of Standards (WWV) by about 30 observers located within 1,000 miles of Washington. These tests yielded data from which it was possible to determine upon suitable ranges of wave lengths and schedules for transmission in the system of standard wave transmission which is being inaugurated.

The wave-length range covered in the transmission on March 6 will be from 550 to 1,500 meters. Announcement of later transmissions on other wave lengths will be made in the Radio Service Bulletin. It appears that the most suitable time to make these transmissions is after 11 p. m., eastern standard time, since the broadcasting stations will be through with their programs by that time. Good distance can be covered, and the interference caused will be a minimum.

The schedule of the transmission of March 6 is given below. All time mentioned is eastern standard time.

Time.	Approximate.	
	Frequency. (kilo- cycles per second).	Wave length (meters).
11.00 to 11.05 p. m., general call.....	550	550
11.05 to 11.10 p. m., standard wave.....		
11.10 to 11.15 p. m., announcements.....		
11.20 to 11.25 p. m., general call.....	600	600
11.25 to 11.30 p. m., standard wave.....		
11.30 to 11.35 p. m., announcements.....		
11.40 to 11.45 p. m., general call.....	440	680
11.45 to 11.50 p. m., standard wave.....		
11.50 to 11.55 p. m., announcements.....		
12.00 to 12.05 a. m., general call.....	380	790
12.05 to 12.10 a. m., standard wave.....		
12.10 to 12.15 a. m., announcements.....		
12.20 to 12.25 a. m., general call.....	320	940
12.25 to 12.30 a. m., standard wave.....		
12.30 to 12.35 a. m., announcements.....		
12.40 to 12.45 a. m., general call.....	260	1,150
12.45 to 12.50 a. m., standard wave.....		
12.50 to 12.55 a. m., announcements.....		
1.00 to 1.05 a. m., general call.....	200	1,500
1.05 to 1.10 a. m., standard wave.....		
1.10 to 1.15 a. m., announcements.....		

The general call will be "QST de WWV standard wave signals" repeated and will be on the same wave length as the standard wave signal. The standard wave signal will be the letters WWV repeated. These signals will be unmodulated continuous wave and will be transmitted on wave lengths approximately those mentioned above. During the standard wave transmission the exact wave length will be measured and given immediately afterwards in the announcements. The general call and announcements will be made by both radio telephony and radio telegraphy.

The signals will be useful in calibrating receiving sets for wave-length settings. Such calibrations will be, however, only rough approximations, since there are usually

variable elements in a receiving set which preclude a permanently accurate calibration. The accuracy of such calibrations will depend on the receiving set used and the experience which the operator has had in making radio measurements. For such calibration it is only necessary to plot a curve giving the relation between wave length and tuner setting, or to mark the wave length directly on the dials.

Probably the principal use of the signals will be for wave-meter calibration. This can be done with great accuracy. It will be necessary to set up an electron-tube generating set or separate heterodyne that will supply sufficient power to operate the indicating device on the wave meter. A 5-watt power tube with about 150 volts on the plate in a Hartley circuit will be satisfactory. The inductor in the generating set may consist of about 300 turns of No. 22 wire on a tube $5\frac{1}{2}$ inches in diameter tapped every 10 turns. A 0.001 microfarad condenser should be connected across the plate and grid tops. The signal is received on a receiving set in a nongenerating (nonoscillating) condition by using the generating set as a heterodyne. When zero beat is obtained, the frequency of the generating set is exactly the same as that of the standard wave signal. The wave frequency or wave length of the generating set is then measured with the wave meter, and as this wave length is accurately known a curve may be plotted showing the relation between wave-meter setting and wave length.

A simpler method, but one not as accurate, is to couple in the wave meter loosely with the inductor of the receiving set. The receiving set in a generating (oscillating) condition is tuned to produce zero beat with the standard wave signal. The setting of the wave meter is then varied, and when the wave meter is in tune with the signal a click will be heard in the telephones. This click is due to the sudden absorption of power from the circuit by the wave meter.

It is hoped that the system of standard wave transmission will have as a result the more accurate measurement and adjustment of radio apparatus of all kinds. Any persons who make accurate measurements of these standard wave signals with a wave meter which has been previously standardized in any manner are invited to send the Bureau of Standards a statement of the wave lengths of these signals as measured by their wave meter, together with information as to when and how the wave meters were last standardized.

CHANGE IN HOURS OF NEW LONDON (CONN.) AND NEW YORK (N. Y.) STATIONS.

New London, Conn. (WST), is open for traffic only from 8 p. m. to 4 a. m.; New York, N. Y. (WCG), only from 8 a. m. to 12 midnight.

NAVAL STATION CLOSED.

The naval station at Jupiter, Fla. (NAQ), is closed.

NEW INTERNATIONAL LIST OF RADIOTELEGRAPH STATIONS.

The International Bureau of the Telegraph Union, Radiotelegraph Service, Berne, Switzerland, has advised this office that a new edition (8th) of the International List of Radiotelegraph Stations will be ready for distribution in the near future. The price of this publication, together with all supplements, is 14 Swiss francs, exclusive of postage. All orders should be placed direct with the International Bureau at Berne.

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