

RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

Washington, January 2, 1923—No. 69

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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. L.	=Wave lengths assigned: Normal wave lengths in italica.
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.

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.

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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 Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Arroyo Park Camp, Calif. ¹	KEY	1,650.....	P	X	Southern California Edison Co.
Chicago, Ill.....	WCT	.....	PG	.....	R. C. A.
Laguna Bell Camp, Calif. ²	KYG	1,650.....	P	X	Southern California Edison Co.
San Gabriel Camp, Calif. ³	KQT	1,650.....	P	X	Do.
Springfield, Mass. ⁴	WBZ	500.....	P	X	Westinghouse Electric & Manufacturing Co.

¹ Loc. 0.118° 10' 42", N. 34° 13' 48"; range, 50; system, Westinghouse v. t. telephone and telegraph.
² Loc. 0.118° 09' 00", N. 33° 38' 10"; range, 50; system, Westinghouse v. t. telephone and telegraph.
³ Loc. 0.118° 06' 35", N. 34° 05' 30"; range, 50; system, Westinghouse v. t. telephone and telegraph.
⁴ Loc. 0.72° 33' 08", N. 42° 08' 30"; range, 200; system, Westinghouse v. t. telephone and telegraph.

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 Berne bureau.]

Name of vessel.	Call signal.	Rates.	Service.	Hours.	Owner of vessel.	Station controlled by—
Dix.....	KFEM	.....	PG	X	.....	R. C. A.
Fisher.....	KFCX	8	PG	X	Portland Trawling Co.	
Goliath ¹	KFDI	8	PG	N	U. S. S. B.....	Do.
Good Will.....	KFGI	.....	PG	.....	Keith Spading.....	
Habeakala.....	KFEU	.....	PG	.....	Inter Island Steam Navigation Co.	Do.
J. A. Talbot.....	KFGE	.....	PG	X	San Pedro Launch & Towboat Co.	
Logan.....	KFDE	.....	PG	N	E. W. Winston.....	R. C. A.
North King.....	KFRW	.....	PG	X	Frank M. Warren.....	
Petrel.....	KFDG	8	PG	X	Portland Trawling Co.	Do.
Sea Gull.....	KFCW	8	PG	X	do.....	
Wheaton ²	WNUA	8	PG	X	U. S. S. B.....	Do.

¹ Range, 300; system, Navy, 1,000; w. l., 300, 450, 600; station operated and controlled by Communications and Radio Service, C. S. S. B., 10 Grosvenor Gardens, London, England, S. W. 1.
² Range, 300; system, Navy—R. C. A., 1,000; w. l., 300, 450, 600.

Commercial aeroplane 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—
Buckeye ¹	KPBY	325.....	P	X	Aeromarine Airways (Inc.), 1800 Times Building, New York, N. Y.

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

Commercial land and ship stations, alphabetically by call signals.

[b=ship station; c=land station.]

Call signal.	Name.	Call signal.	Name.
KEY	Arroyo Park Camp, Calif.....c	KFEW	North King.....b
KFCW	Sea Gull.....b	KFGE	J. A. Talbot.....b
KFCX	Fisher.....b	KFGI	Good Will.....b
KFDE	Logan.....b	KQT	San Gabriel Camp, Calif.....c
KFDG	Petrel.....b	KYG	Laguna Bell Camp, Calif.....c
KFDI	Goliath.....b	WBZ	Springfield, Mass.....c

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Broadcasting stations, alphabetically by names of cities.

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

City.	Call signal.	City.	Call signal.
Agricultural College, N. Dak	WPAK	New Haven, Conn.	WPAJ
Amarillo, Tex.	WQAC	Philadelphia, Pa.	WWAD
Amsterdam, N. Y.	WPAS	Plainview, Tex.	WSAT
Beloit, Kans.	WPAR	Reedley, Calif.	KFAZ
Birmingham, Ala.	WOAY	Richmond, Calif.	KFCM
Corvallis, Oreg.	KFDI	Santa Barbara, Calif.	KFHJ
Denver, Colo.	WFDL	Springfield, Mo.	WQAB
do.	KFEP	Springfield, Vt.	WQAE
Dubuque, Iowa.	WQAK	Thomasville, Ga.	WPAX
El Paso, Tex.	WPAT	Trenton, N. J.	WOAX
Evansville, Ind.	WOAU	Tucson, Ariz.	KFDJ
Frostburg, Md.	WPAQ	Waterloo, Iowa.	WRAN
Hastings, Nebr.	WQAY	Waupaca, Wis.	WPAH
Laurium, Mich.	WPAV	Wilmington, Del.	WOAT
Mattson, Ill.	WQAL	do.	WPAW
Middletown, Conn.	WOAS	Winchester, Ky.	WPAP
Moorehead, Minn.	WPAU		

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 length.
KFAZ	C. H. Westherill.	Reedley, Calif., 1348 Z Street.	360
KFCM	Richmond Radio Shop.	Richmond, Calif.	360
KFDJ	University of Arizona.	Tucson, Ariz.	360
KFDI	Oregon Agricultural College.	Corvallis, Oreg.	360
WFDL	Knicht-Campbell Music Co.	Denver, Colo.	360
KFEP	Radio Equipment Co.	do.	360
KFHJ	Fallen Co.	Santa Barbara, Calif.	360
WQAB	Batley's Radio Shop.	Middletown, Conn.	360
WOAT	Boyd M. Hump.	Wilmington, Del., 215 Market Street.	360
WOAU	Sowder Belling Piano Co.	Evansville, Ind.	360
WOAX	Franklyn J. Wolf (Monument Pottery Co.).	Trenton, N. J.	360
WOAY	John M. Wilder.	Birmingham, Ala., 3017 First Avenue South.	360
WPAH	Wisconsin Department of Markets.	Waupaca, Wis.	485
WPAJ	DeCottle Radio Corp.	New Haven, Conn.	360
WPAK	North Dakota Agricultural College.	Agricultural College, North Dakota.	360, 485
WPAP	Theodore D. Phillips.	Winchester, Ky.	360
WPAQ	General Sales & Engineering Co.	Frostburg, Md.	360
WPAR	R. A. Ward.	Beloit, Kans.	360
WPAS	J. & M. Electric Co.	Amsterdam, N. Y.	360
WPAT	St. Patrick's Cathedral.	El Paso, Tex.	360
WOAU	Concordia College.	Moorehead, Minn.	360, 485
WPAV	Paul Tinetti & Sons.	Laurium, Mich.	360
WPAW	Radio Installation Co.	Wilmington, Del.	360
WPAX	S-W Radio Co. (J. R. Shumate, Jr.).	Thomasville, Ga.	360
WQAB	Southwest Missouri State Teachers College.	Springfield, Mo.	360
WQAC	F. B. Oish.	Amarillo, Tex.	360
WQAE	Moore Radio News Station (Edmund B. Moore).	Springfield, Vt.	360
WQAK	Appel-Higley Electric Co.	Dubuque, Iowa.	360
WQAL	Coles County Telephone & Telegraph Co.	Mattson, Ill.	360
WQAY	Gaston Music & Furniture Co.	Hastings, Nebr.	360
WRAN	Black Hawk Electrical Co.	Waterloo, Iowa.	360
WSAT	Plainview Electric Co.	Plainview, Tex.	360

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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 Bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Afognak, Alaska.....	WWT	.....	O	X	Bureau of Fisheries, Department of Commerce.
Davenport, Iowa ¹	WOC	780.....	O	X	Palmer School of Chiropractic.

¹ Loc. 0.90° 38' 00", N. 41° 30' 00"; range, 150; system, composite, v. t. telegraph; station is operated in connection with the U. S. Signal Corps.

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.
WOC	Davenport, Iowa.....c	WWT	Afognak, Alaska.....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—
Albuquerque, N. Mex..	5XAM	300, 250, 375.....	Harley L. Sherwood, 1518 East Central Avenue.
Atlanta, Ga.....	4YD	300, 375.....	Georgia School of Technology, Signal Corps Unit.
Bozeman, Mont.....	7ZL	300, 375.....	H. Everett Cutting, 420 West Koch Street.
College Park, Ga.....	4XO	300, 375.....	Atlanta & West Point R. R. Co.
Cleveland, Ohio.....	8XO	Variable.....	Westinghouse Electric & Manufacturing Co.
Detroit, Mich.....	8YW	300, 375.....	Detroit Junior College (Board of Education).
Fort Worth, Tex.....	5YV	300, 375.....	Kuighis of Columbus School.
Houston, Tex.....	5XAN	300, 240, 360, 375.....	QRV Radio Co.
Kansas City, Mo.....	9XV	Variable.....	Samuel E. Adair, Sweeney Building.
Keyport, N. J.....	2XAS	525.....	Aeromarine Airways (Inc.), 1800 Times Building, New York, N. Y.
Marietta, Ohio.....	8ZO	300, 375.....	George M. Withington, 316 Fifth Street.
New York, N. Y.....	2XV	Variable.....	Russel S. Ohl, 2120 Harrison Avenue.
Piedmont, Calif.....	6XAO	Variable.....	G. M. Best, 109 Greenbank Avenue.
Rochester, N. Y.....	8XAO	300, 375.....	Victor G. Martin (Eastman School of Music).
Seattle, Wash.....	7XT	300, 360, 425.....	Western Radio (Inc.), 1121 Pine Street.
St. Petersburg, Fla.....	4ZH	300, 375.....	E. Richard Hall, 2904 Central Avenue.
Takoma Park, Md.....	3XAJ	300, 250.....	Bliss Electrical School.
Waco, Tex.....	5XAK	300, 375.....	Jackson's Radio Engineering Laboratories.
Webster, N. Y.....	8XAN	300, 375, variable.....	Charles F. Nichols, Elm Street.
Yonkers, N. Y.....	2ZS	300, 375.....	Carman R. Runyon, Jr., 544 North Broadway.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
2XAS	Second district: Keyport, N. J.	6XAO	Sixth district: Piedmont, Calif.
2XV	New York, N. Y.	7XT	Seventh district: Seattle, Wash.
2ZS	Yonkers, N. Y.	7ZL	Bozeman, Mont.
3XAJ	Third district: Takoma Park, Md.	8XAN	Eighth district: Webster, N. Y.
4XO	Fourth district: College Park, Ga.	8XAO	Rochester, N. Y.
4YD	Atlanta, Ga.	8XO	Cleveland, Ohio.
4ZH	St. Petersburg, Fla.	8YW	Detroit, Mich.
5XAK	Fifth district: Waco, Tex.	8ZO	Marietta, Ohio.
5XAM	Albuquerque, N. Mex.	9XV	Ninth district: Kansas City, Mo.
5XAN	Houston, Tex.		

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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.]

BOLINAS, CALIF. (KET).—W. I., 13,310 (typographical error in annual list of stations).

CASCADA, CALIF.—Range, 200; w. I., 527 only.

EAST PITTSBURGH, PA.—W. I., 500, 1875.

MINNEAPOLIS, MINN.—W. I., 525.

Strike out all particulars of the following-named stations: Everett, Wash. (KJB); Julian, Alaska; Seattle, Wash. (KPL); and Washington Bay, Alaska (KQS).

COMMERCIAL SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

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

NOTE.—(U. S. L.) after operating company denotes that the change applies to the List of Radio Stations of the United States only; does not apply to the Berne list. Hereafter where the rate is given without the service specifically stated—that is, North and South American and transoceanic services—it should be understood that the rate is for both classes of service. When the rate is for one class of service only, the class of service will be stated.

ALBERT JEFFRESS.—Garland S. S. Corp. owner of vessel.

ALLAQUASH.—Station operated and controlled by I. W. T. Co.

APEX.—Range, 200.

AVALON.—(WFH).—Rates, between East San Pedro, Calif. and Avalon, Calif. (ferry service), 1 c. per word.

CAIDAS.—Name changed to Corinto; range, 200; system, Kilbourne & Clark, 1000; Pacific Mail S. S. Co. owner of vessel.

CAPE MAY.—Station operated and controlled by I. W. T. Co. (U. S. L.).

CITY OF MIAMI.—Miami-Havana Navigation Corp.

CITY OF SPOKANE.—Station operated and controlled by I. W. T. Co.

COMMERCIAL SCOTT.—Commercial Scout S. S. Co. owner of vessel.

COUTOLENE.—Anthony O'Boyle owner of vessel.

COVEDALE.—Station operated and controlled by R. C. A. effective February 1, 1923.

DOMINO.—System, Navy-Lowenstein, 1000; w. I., 300, 450, 600; rates, 8 c. per word.

EASTERN BREEZE.—System, Navy-Kilbourne & Clark, 1000; w. I., 300, 450, 600.

EASTERN TRADER.—Name changed to Horace Luckenbach; Luckenbach S. S. Co. owner of vessel.

EDDIS.—System, Standard Radio Co., 1000.

EL DIA.—W. I., 300, 600.

EL SIGLO.—Range, 150; system, R. C. A., 1000; hours, X.

GENERAL W. C. GORGAS.—Rates, 8 c. per word.

HAMBRO.—Name changed to Mojave; General Petroleum Corp. owner of vessel.

HAMER.—Name changed to Lebec.

HATTERAS.—System, Kilbourne & Clark, 1000; station operated and controlled by R. C. A.

HILTON.—Range, 200; system, I. W. T. Co., 1000.

HOBOKEN.—Commercial Spirit S. S. Co. owner of vessel.

HOLLYWOOD.—System, Navy-R. C. A., 1000; hours, X.

HOWICK HALL.—Range, 300; system, R. C. A., 1000; w. I., 300, 450, 600.

IMLAY.—Station operated and controlled by I. W. T. Co. (U. S. L.).

JAMES MACNAUGHTON.—Range, 150; system, R. C. A., 1000; w. I., 300, 600; rates, Great Lakes service 2 c. per word.

LA BREA.—System, Federal arc, 500 with chopper.

LAKE GALIEN.—Philadelphia & Norfolk S. S. Co. owner of vessel.

LAKESHORE.—System, Navy-Kilbourne & Clark, 1000.

LOS ANGELES.—System, Federal arc, 500 with chopper.

MAHUKONA.—Station operated and controlled by R. C. A. (U. S. L.).

MERIDEN.—Meriden S. S. Co. owner of vessel.

MONTICELLO.—American Ship & Commerce Navigation Corp. owner of vessel.

OHIO.—Range, 150; system, R. C. A., 1000; w. I., 300, 450, 600.

PAUL LUCKENBACH.—Range, 200; system, Telefunken, 1000; hours, X.

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

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

- PRESIDENT HARDING.**—Station operated and controlled by R. C. A.
PRESIDENT TAFT.—Systems Federal arc and Navy-Simon, 1000.
PUGET SOUND.—Station operated and controlled by I. W. T. Co.
RED HOOK.—Name changed to Commercial Traveler; Commercial Traveler S. S. Co. owner of vessel.
RODMAN SWIFT.—System, Western Electric, 1000; service, P.
SAGADAHOC.—Sagadahoc S. S. Corp. owner of vessel.
SANTA CLARA.—System, Marconi, 1000; w. l., 300, 450, 600.
SANTA MALTA.—W. l., 300, 450, 600.
SANTA ROSA.—System, R. C. A., 1000; w. l., 300, 450, 600.
SANTA VERONICA.—W. l., 300, 450, 600.
SUCARESCO.—Rates, 8 c. per word.
SUSQUEHANNA (WEM).—Austin G. Jones owner of vessel; station operated and controlled by I. W. T. Co.
WAWALONA.—Station operated and controlled by R. C. A.
WEST CANOKIA.—Station operated and controlled by R. C. A.
WESTERNER.—Station operated and controlled by R. C. A.
WESTERN SCOUT.—Correct call signal WXE A.
WEST HELIX.—Station operated and controlled by I. W. T. Co.
WEST JESTER.—Station operated and controlled by I. W. T. Co. (U. S. L.).
WEST MAXIMUS.—System, Navy-Lowenstein, 1000; w. l., 300, 450, 600.
WEST SEGONTA.—Range, 200; system, Navy-Kilbourne & Clark, 1000; w. l., 300, 450, 600.
WESTWEGO.—Range, 300.
WILLIAM CAMPTON.—Range, 200.
WILLSOLO.—System, Navy-Wireless Specialty Apparatus Co., 1000; Williams S. S. Co. owner of vessel.
WM. F. HERRIN.—System, Federal arc, 500 with chopper.
W. W. MILLS.—Pure Oil S. S. Co. owner of vessel.

Strike out all particulars of the following-named vessels: *Buccaneer*, *Crudoil*, *Fueloil*, *George E. Weed*, *Hattie Luckenbach*, *Lake Fisher*, *Martha Washington*, *Mexoil*, *Panoil*, *Patricia*, and *Tormenter*.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDDA, read *Commercial Traveler*; **KDSH**, read *Mojave*; **KDTN**, read *Lebec*; **KOQV**, read *Corinto*; **KULK**, read *Harace Luckenbach*; strike out all particulars following the call signals, **KDIM**, **KDTX**, **KFL**, **KFN**, **KFO**, **KJA**, **KJB**, **KODD**, **KQS**, **KUQB**, **KUQC**, **KUQD**, **KUQF**, **WNF**, **WQIA**.

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.]

- KFC** (Seattle, Wash.).—W. l., add 485.
KGW (Portland, Oreg.).—W. l., 400; station operated and controlled by **Portland Morning Oregonian**.
KNT (Aberdeen, Wash.).—Station operated and controlled by **Grays Harbor Radio Co.** (Walter Hemrich).
WAAP (Wichita, Kans.).—W. l., add 485.
WCAE (Pittsburgh, Pa.).—W. l., 400.
WCAW (Quincy, Ill.).—W. l., add 485.
WCAZ (Quincy, Ill.).—Changed to **Carthage, Ill.**; station operated and controlled by **Robert E. Compton and Carthage College**.
WEAN (Providence, R. I.).—W. l., add 485.
WPAZ (Charleston, S. C.).—W. l., add 485.
WHAH (Joplin, Mo.).—Station operated and controlled by **Hafer Supply Co.**
WHAP (Decatur, Ill.).—Station operated and controlled by **Otta & Kuhns**, 160 South Water Street.
WIAR (Paducah, Ky.).—Station operated and controlled by **Paducah Evening Sun**.
WJAX (Cleveland, Ohio).—W. l., add 485.
WKY (Oklahoma City, Okla.).—Station operated and controlled by **WKY Radio Shop**.
WLAG (Minneapolis, Minn.).—W. l., 400, 485.
WLAG (Minneapolis, Minn.).—W. l., 300 only; station operated and controlled by

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WMAT (Duluth, Minn.).—W. I., add 485.

Strike out all particulars of the following-named stations: KDYR, Pasadena, Calif.; KFBA, Lewiston, Idaho; KFBJ, Boise, Idaho; KGF, Pomona, Calif.; KYF, San Diego, Calif.; WAAG, Shreveport, La.; WAFO, Charlestown, W. Va.; WAAR, Huntington, W. Va.; WA'AV, Athens, Ohio; WCF, New Haven, Conn.; WDAN, Shreveport, La.; WFAK, Sanford, Me.; WFO, Dayton, Ohio; WIAA, Waupaca, Wis.; WJAH, Rockford, Ill.; WKAM, Hastings, Nebr.; WLAD, Hastings, Nebr.; WMAS, Richmond, Va.; WMC, Youngstown, Ohio; and WPAN, Houston, Tex.

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 Berne bureau.]

GENERAL ROBERT W. SWARTWOUT.—Correct orthography, General Robert W. Swartwout.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

WYU, read General Robert W. Swartwout.

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.]

BIRMINGHAM, ALA., (5ZI).—Address, 2017 First Avenue.

BOZEMAN, MONT., (7XB).—W. I., 200, 375, only.

BYRON, ILL. (9ZG).—Changed to Elgin, Ill.

CINCINNATI, OHIO (8YAD).—Station operated and controlled by East High School (C. M. Howe).

COLUMBUS, OHIO (8ZAF).—Address, 1188 Willard Avenue.

DENVER, COLO. (9XAG).—Address, 713 Lincoln Street.

DUBUQUE, IOWA (8ZA).—Address, 295 Villa Street.

NEENAH, WIS. (9ZL).—Station operated and controlled by Fox River Radio Supply Co. (Corbelius & William Quinn).

NEW ORLEANS, LA. (5XM).—W. I., 200, 250, 375.

NORMAN, OKLA. (5XW).—W. I., 200, 375, variable.

ORANGE, TEX. (5XAD).—W. I., 200, 240, 375, variable.

ORONO, ME. (1XAH).—W. I., 230, 500.

OSSING, N. Y. (2XX).—Station operated and controlled by Robert F. Gowen.

PHILADELPHIA, PA. (3XK).—W. I., 275, 1300.

PORTLAND, OREG. (7XF).—W. I., 200-550.

PRINCETON, N. J. (3XU).—W. I., 275, variable; address, Palmer Physical Laboratory.

READING, PA. (3XAH).—W. I., 200, 375.

SAN FRANCISCO, CALIF. (6XB).—Station operated and controlled by Mercantile Trust Co.

SAN FERNANDO, CALIF. (6ZN).—Address, 452 Chatsworth Drive.

SEATTLE, WASH. (7XK).—W. I., 200, 375, variable.

STAUNTON, VA. (3YE).—W. I., 200, 375.

Strike out all particulars of the following-named stations: Belleville, Ill. (9XX); Birmingham, Ala. (5XAG); Buffalo, N. Y. (8ZM); Columbus, Ohio (8YO); East St. Louis, Ill. (9ZAG); Houston, Tex. (5XS); Houston, Tex. (5ZAA); Iowa City, Iowa (9YA); Los Altos, Calif. (6XAC); Philadelphia, Pa. (3XAD); Philadelphia, Pa. (3XAG); Portland, Oreg. (7YH); Portland, Oreg. (7ZI); Seattle, Wash. (7YE); South San Antonio, Tex. (5XI); Syracuse, N. Y. (8XI).

MISCELLANEOUS.

OCEAN LETTERS ON SHIPPING BOARD VESSELS.

This service, as the term is usually understood, is a deferred service whereby messages from a ship bound in one direction are transmitted to a ship bound in the opposite direction to be mailed upon the arrival of the receiving ship. The rate for such service is \$1.20 for 20 words (includes registration and mailing), with 4 cents for each additional word and it is usual to limit these messages to a maximum of 100 words, cable count. These messages are prefixed "OL," and this prefix is neither counted or charged for. The tolls are divided evenly between the sending and receiving ships, the registration and mailing fee (12 cents) accruing to the receiving ship. Example: Sending ship 54 cents, receiving ship 66 cents.

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GENERAL CALL FOR I. W. T. CO. SHIPS.

The general call signal KFZZ has been assigned for all vessels the radio stations of which are operated and controlled by the I. W. T. Co. This general call will be used by I. W. T. Co. ship or coast stations desiring to ascertain whether there is an I. W. T. Co. vessel within range, and any I. W. T. Co. vessel hearing another ship or coast station calling KFZZ should answer. This call signal also will be used in broadcasting general instructions to I. W. T. Co. ships.

BROADCASTING STATIONS VIOLATING SECTION 2 OF THE ACT OF AUGUST 13, 1912.

Operators of broadcasting stations are cautioned not to communicate with other stations. The transmission of acknowledgments to individuals relating to the receipt of letters, telegrams, and telephone calls is direct communication and not authorized in the licenses of broadcasting stations. Section 2 of the act of August 13, 1912, states that the license of a station "shall state the purpose of the station," and as broadcasting stations are licensed for the specific service of broadcasting, any operator using a broadcasting station for point-to-point communication may have his license suspended or revoked in the discretion of the Secretary of Commerce. Owners of broadcasting stations should see that the above-cited act is not violated, as the use of their stations for purposes other than specified in the station license is sufficient cause for the suspension or revocation of their station license.

SHIP STATIONS NOT PROPERLY LICENSED.

Owners of vessels equipped with wireless apparatus, companies operating and controlling the apparatus, and radio inspectors are advised to see that all ship stations are properly licensed as required by section 2 of the act of August 13, 1912, in that the correct ownership of the vessel and the ownership of the station are shown in the license. When a vessel changes ownership the old ship station license should be surrendered, notwithstanding the fact that the period for which the station was licensed may not have expired, and a new license procured showing the new ownership and any other changes in the data required in the license. It has been reported to the bureau that a number of vessels, especially vessels sold by the U. S. Shipping Board to private owners, are violating the law in this respect.

INFORMATION FROM THE HYDROGRAPHIC OFFICE.

Broadcasting of notices to mariners by Mexican stations.—The Mexican Government inaugurated on November 1 last a new service of picking up and broadcasting notices to mariners emanating from foreign radio stations, American and Cuban. The notices will be broadcast for three consecutive days at 12 o'clock (local time) as follows:

The radio station of Tampico will pick up for broadcasting notices emanating from stations situated on the coast between Florida and Rio Bravo and also from Cabo San Antonio radio station of Cuba.

The Merida and Payo Obispo stations will broadcast notices emanating from the Cuban stations and also those of the coast up to Colon, Panama.

The station of Salina Cruz will broadcast notices emanating from stations situated on the coast between Balboa, Panama and Rio Suchiate.

The stations of Hermosillo and Mexicali will broadcast notices emanating from stations situated between the Mexican boundary and San Francisco.

Each of the above stations will also pick up and broadcast in the same manner notices emanating from vessels navigating within the zone assigned to that station.

A copy of all the notices received and broadcasted will be sent to the captain of the respective port with a view to their being made public.

Storm warnings by radio, Queensland.—The following arrangements have been made for issuing warnings of cyclonic disturbances off the coast of Queensland from December to April. By arrangement with the Commonwealth Meteorological Bureau, warning of a cyclonic disturbance is dispatched by urgent telegram (Sundays included) to the radio stations and post offices of the ports in the area likely to be affected. Radio stations will broadcast such warnings to all vessels, and in special cases the meteorologist will indicate when his next report will issue.

At 4.30 p. m. (local time) daily, except Sundays, radio stations will broadcast an "Ocean Forecast Message," giving the state of the weather, direction and force of the wind, and state of the sea at 3 p. m. along the Queensland coast, followed by a forecast

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INFORMATION FROM THE BERNE BUREAU.

West French Africa.—The station at Kotonou is now open. Particulars are as follows: Location, Dahomey, 2° 28' 48" E. Greenwich; 6° 20' 46" N.; call signal FKO; range, 300 miles; system, S. F. R. spark; w. l., 600 meters; service, PG; hours, 8-11 and 14-17 GMT; rates, 45 centimes per word; accounts are settled by the Administration of Posts of Senegal at Dakar.

Cape Verde Islands.—The station at Praia is now open. Particulars are as follows: Location, 0.23° 30' 00" N., 14° 55' 00"; call signal CRK; range, 400 miles; system, Marconi; w. l., 600, 800, 1,000, 1,530; service, PG; hours, 10-22 GMT; rates, 45 centimes per word; minimum 4 francs 50 centimes; land line, 40 centimes per word.

Greece.—The name of the station Vari is changed to Athens Radio. The land line rates for Greece are 15 centimes per word, minimum, 1 franc 50 centimes; for urgent messages 45 centimes per word; for the island of Crete, Lemnos, Tenedos, Chios, Mytilene, Samos, Inyros, and Icarie the rate is 25 centimes per word, urgent messages 75 centimes per word.

New Zealand.—The meteorological information is transmitted daily (except Sunday) by the coast station Apia at 8.30 GMT on 600 meters and 23.30 GMT on 2,000 meters.

Portugal.—The coast stations S. Maria, Funchal, and S. Miguel are reopened.

WEATHER REPORTS TRANSMITTED BY WALFISCH BAY STATION AND PRESS BY CAPE TOWN STATION.

Radio Operator Center, of the Shipping Board vessel *Eastern Glen*, reports that the station at Walfisch Bay, call signal WNV, sends weather at 11.00 GMT. This report consists of clouds, winds, their direction and force, rains, local thunder showers, and sometimes heat of wind. Also sends condition of sea. This is a coast forecast. Repeats weather at 13.00 GMT. Wave length, 600 meters.

VNC (Cape Town) sends press at 01.15 GMT; press given out by Reuter's Service and lasts from 10 to 30 minutes. Sends each word twice on a wave of 600 meters.

ADMIRALTY NOTICE TO MARINERS.

South Africa.—Cape of Good Hope.

Cape Town.—Amended time of W/T time signals.

Position.—Lat. 34° 08' 45" S., long. 18° 19' 17" E.

Details.—Cape Town W/T station now broadcasts time signals daily in accordance with the undermentioned procedure:

The signals, which are controlled from the Cape Observatory, are preceded by the usual warning signal and comprise a series of 12 dashes (each of about three-quarters of a second's duration) extending over half a minute, divided up into five groups, a dash commencing at each of the following times:

GMT (astronomical).				GMT (astronomical).			
h.	m.	s.		h.	m.	s.	
20	59	30	}..... Group I.	20	59	48	}..... Group IV.
00	00	32		00	00	50	
00	00	34		20	59	54	
20	59	38	}..... Group II.	00	00	56	}..... Group V.
00	00	40		00	00	58	
20	59	44 Group III.	21	00	00	

Each signal may be used as indicating the exact GMT recorded above: the beginning of the last dash of the series corresponding exactly with 21^h 00^m 00^s GMT, corresponding to 23^h 00^m 00^s standard time.—From Notice No. 1813 of 1922, Admiralty, London, November 2, 1922.

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

The Coast Guard Service is always ready to render any assistance to vessels in distress or to remove obstructions, and desires close cooperation between the vessels at sea, shipowners, and their agents. Hereunder are instructions for communicating with the Coast Guard offices and vessels:

Eastern division.—Information for the commander, eastern division, Boston, Mass., or for the cutters *Osceola*, *Tampa*, or *Arched* attached to the eastern division:

be sent by one of the following methods: (a) Office commander, eastern division, fourteenth floor, Customhouse, Boston, Mass., telephone, Main 281; telegraph, Coast Guard division, Boston; radio, Navy radio, Boston, Mass. call NAD. (b) *Ossipee*, stationed at Portland, Me., by one of the methods under (a); radio, Otter Cliffs, Me., NBD; also *Ossipee* direct, NRJ. (c) *Tampa*, stationed at Boston, Mass., by one of the methods under (a); telephone, Charlestown 1400, ask for communication; radio, Navy radio, Boston, Mass., NAD; also *Tampa* direct NITU. (d) *Acushnet*, stationed at Woods Hole, Mass., by one of the methods under (a); telephone, Falmouth 664; radio, Newport, R. I., NAF; also *Acushnet* direct NRU.

New York division.—The offices of the division commander are located in room 724 Customhouse, New York City, also the U. S. Barge Office, New York City. The division embraces that part of the Atlantic coast between the Thames River, Conn., and Delaware Breakwater. The outer limit of offshore cruising is about 350 miles from New York.

Arrangements have been made with the communication service of the third naval district and the superintendents of the fourth and fifth Coast Guard districts for the prompt transmission of information to the division commander about wrecks and vessels in need of assistance at sea or along the coast. Messages may be given to any wireless station for transmission to New York by radio; to any Coast Guard station on the coasts of New York or New Jersey to be forwarded by telephone; to the Western Union and Postal Telegraph systems, using address "Coast Guard, New York"; also by local telephone, Broad 1455, and through the Customhouse, Broad 1642.

The vessels attached to the New York division are the *Seneca*, a cruising cutter located at New York, and the *Kickapoo*, a seagoing tug stationed at Cape May, N. J. The *Gresham*, now undergoing repairs, is expected to be ready for service in January, 1923. The radio call letters of the *Seneca* are NRE, *Kickapoo* NITX, and *Gresham* NRG, which may be used for direct communication with those vessels. The *Kickapoo* when in port has direct telephone connection through Coast Guard Station No. 136, Cape May, N. J.

The office in the Barge Office is open from 7 a. m. to 9 p. m. daily for the reception of messages. The telephone call of the superintendent fourth district is Bay Shore 743, and of the superintendent fifth district is Asbury Park 690 W. The home telephone call of the division commander is Bergen 6622.

Sixth district.—Vessels in distress within the scope of operations of the sixth district may notify by wireless either of the three radio compass stations in this district: Cape Henlopen, Del., Bethany Beach, Del., and Hog Island, Va., which are in direct telephone communication with all stations of the Coast Guard from 139 to 157, inclusive, at all times and with the office of the superintendent from 9 a. m. to 4.30 p. m. by Coast Guard telephone. At night call Bell phone No. 70 for superintendent. Superintendent's office and stations of the sixth district are also in direct telephone communication by Coast Guard telephone with Cape May (N. J.) regular station and the compass station.

For communication by public telephone for superintendent's office call Bell phone Lewes 70; for stations 139 to 146 call Bell phone Lewes 122; for stations Nos. 146 to 151 call Chesapeake & Potomac Ocean City, Md., 59; for stations Nos. 151 to 157 Chesapeake & Potomac call 65 Chincoteague, Va., or 1 Magotha, Va.

Norfolk division.—The office of the Norfolk division is located in the Withers Building, Norfolk, Va., phone 21167 (night and holidays 36289). Radio messages or telegrams are delivered day and night. Vessels requiring assistance, passing derelicts, or other obstructions between latitude 38-30 N. and 27-00 N, the northern and southern limits of the Norfolk division, are requested to notify the commander, Norfolk division, by radio via Norfolk naval radio (NAM) or the nearest radio, stating date and time, latitude and longitude of the position of the vessels or obstructions, including full information. Cutters are stationed at Norfolk, Va., Wilmington, N. C., and Savannah, Ga., ready to proceed at once. These vessels are provided with radio compass, and a continual radio watch is kept day and night in port and at sea. The position of the cutters is always known to the Norfolk division office and the commandant of the naval district.

In order to avoid delay, a vessel sending from a position between Cape Hatteras, N. C., and Cape Romain, S. C., may communicate direct with the cutter at Wilmington, N. C., via Morehead City, N. C., naval radio station (NAN), and a vessel whose position is between Cape Hatteras, N. C., and Jupiter Inlet, Fla., may send direct to the cutter at Savannah, Ga., via St. Augustine, Fla., or Jupiter Inlet, Fla., or Charleston, S. C., naval radio stations. Arrangements have been made with radio and telegraph stations to deliver and forward promptly such messages. Note on such message

and any vessel stranding or observed to be in distress by station crews is reported at once to this office. The Coast Guard stations may be communicated with by the International Code Signals or Morse Blinkers.

Gulf division.—The Gulf division, with headquarters at Key West, Fla., extends from Cape Canaveral to the Rio Grande. The Florida waters to the northward of the cape are also covered by the cutter at Key West in case of necessity should the cutter *Yamacraw*, stationed at Savannah and attached to the Norfolk division, for any reason be unable to proceed. The *Yamacraw* cruises as far south as Jupiter. This division has three cruising cutters: *Sauhee*, at Key West; *Tallahpoosa*, at Mobile; and *Comanche*, at Galveston. Of these the *Comanche* is the least able. In addition, there are several small patrol and harbor vessels, viz: *Vidette*, at Miami; *Cossack*, at Key West; *Arrow*, at Tampa (now undergoing repairs at Mobile); *Penrose*, at Pensacola; *Messenger*, at Mobile; and *Darcy*, at New Orleans. Although they frequently render minor assistance, the three large cutters only can be depended upon to render aid to vessels in distress at sea. They cruise anywhere in the gulf or in foreign waters near by should their presence be needed, provided the particular cutter at the time is available.

The Gulf division also has supervision of all Government telephone lines from the North Carolina-South Carolina border to the Rio Grande. This territory is divided into sections, with headquarters at Beaufort, S. C., Jacksonville, Fla., Pascagoula, Miss., and Galveston, Tex. These lines connect up the various lighthouses and Coast Guard stations with the private telephone exchanges, and while they are too numerous to describe in detail it should be mentioned that all Coast Guard stations and all lighthouses on the Florida east coast from St. Augustine, Fla., to Sand Key, inclusive, connect with the telephone exchange at Key West, Fla., and the office of the division commander. The only lighthouses that can not communicate are Rebecca Shoals and Dry Tortugas.

Vessels in the waters of the Gulf division desiring assistance should call up the nearest radio station; on the east coast either of the Government stations at St. Augustine, Jupiter, or Key West; in the northern gulf they should endeavor to reach the *Tallahpoosa* or *Comanche* direct or by one of the radio stations. All persons other than masters of distressed vessels having knowledge of disaster should immediately communicate the same to this office direct by land wire or through one of the Coast Guard or light stations. This applies particularly to the east coast. In vicinity of Mobile or Galveston messages should be sent to the *Tallahpoosa* and *Comanche*, respectively. If unable to reach them, wire division commander at Key West, as he keeps informed of the daily position of the cruising vessels under his command.

Northern division.—Vessels in distress in this district should communicate with the following-named office and vessels: Division commander, northern division, 408 Pioneer Building, phone Main 4464. If the office of the division commander can not be reached at night, Sundays, or holidays, it is requested that all information be communicated to the division commander's residence, phone Capitol 4731. Commanding officer, *Haida*, stationed at Port Townsend, Wash.; *Snohomish*, stationed at Port Angeles, Wash.; *Algonquin*, stationed at Astoria, Oreg.; *Unalga*, stationed at Juneau, Alaska.

Should a master who has requested assistance find that his vessel is able to proceed with safety and does not require assistance, a message to that effect should be promptly sent, in order that the cutter may return to her station or be dispatched on some other mission. Call letters for all of the stations mentioned above are not given, as it is assumed that all vessels have on board a list of Commercial and Government Radio Stations of the United States.

STATIONS VIOLATING REGULATION 14 OF THE ACT OF AUGUST 13, 1912.

It has been reported to the bureau that certain stations are violating the above-named regulation which requires: "In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired."

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

publication of these references will be continued if the readers of the Radio Service Bulletin find them useful. The Bureau of Navigation will be pleased to receive suggestions from readers as to the desirability of continuing their publication. 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 number 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 "R500—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 newsdealers 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.

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 R113.4 Thomson, Elihu, Is the "Heaviside theory" valid? Popular Radio, 2, pp. 231-235, December, 1922.
 R113.5 Reichelderfer, F. W., Forecasting thunderstorms by means of static electricity, Monthly Weather Review, 49, p. 132, March, 1921.
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RADIO INSPECTOR EXAMINATION, NO. 54 (ASSEMBLED) MARCH 7, 1923.

The United States Civil Service Commission announces an open competitive examination for radio inspector on the above date at any of the places listed hereon at which examination is requested in applications received in time to mail examination papers. Vacancies in the positions of radio inspector and assistant radio inspector in the Bureau of Navigation, Department of Commerce, at \$1,800 to \$2,200 a year (plus "bonus," see below), and in positions requiring similar qualifications at these or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Range in salary.—The entrance salary within the range stated will depend upon the qualifications of the appointee as shown in the examination and the duty to which assigned.

Bonus.—Appointees whose services are satisfactory may be allowed the increase granted by Congress of \$20 a month.

Citizenship and sex.—All citizens of the United States who meet the requirements, both men and women, may enter this examination; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles. For these positions in the Bureau of Navigation men are desired.

Duties.—The duties of radio inspectors will be primarily to inspect the radio apparatus on steamships, to insure its compliance with the law, and to inspect shore stations. The inspectors may be also called upon to examine radio operators. The duties of radio inspectors require some office experience, therefore competitors should outline fully in their applications any office experience they may have had.

The duties of assistant radio inspectors will be primarily the assisting of radio inspectors in the enforcement of the wireless communication laws. Assistant radio inspectors will be required to inspect the radio equipment on board vessels and in land stations, which involves the carrying of 30 or 40 pounds of testing and measuring instruments. The inspection work requires a knowledge of the installation and operation of the several types of radio installations, including the adjustment and tuning of transmitters and receivers.

Subjects and weights.—Competitors will be examined in the following subjects, which will have the relative weights indicated.

	Weights.
1. Theoretical and practical questions in the construction, use, and adjustment of radio apparatus and auxiliaries (eligible rating required).....	50
2. Education and experience in the line of the required duties.....	50
Total.....	100

Applicants must attain an eligible rating in the first subject.

Education and experience.—Applicants must have received a bachelor of science degree from a school of recognized standing, such educational training to have included a special course in radio or kindred sciences, or show that they are senior students in such institutions; or have had the equivalent of a high-school education and at least two years' experience in special radio work, such as the manufacture, installation, or adjustment of commercial or governmental wireless apparatus. It is essential that applicants be wireless telegraph operators.

Statements as to education and experience are accepted, subject to verification.

Age.—Applicants must have reached their twenty-first but not their fiftieth birthday on the date of examination. These age limits do not apply to persons entitled to preference because of military or naval service, but such applicants must not have reached the retirement age.

Retirement.—Classified employees who have reached the retirement age and have served 15 years are entitled to retirement with an annuity. The retirement age for railway mail clerks is 62 years, for mechanics and post office clerks and carriers 65

salary to provide for this annuity, which will be returned to persons leaving the service before retirement with 4 per cent interest compounded annually.

Photographs.—Applicants must submit to the examiner on the day of the examination their photographs, taken within two years, securely pasted in the space provided on the admission cards sent them after their applications are filed. Proofs or group photographs will not be accepted. Photographs will not be returned to applicants.

Residence and domicile.—Applicants may be examined at any place at which this examination is held, regardless of their place of residence; but only those who have been actually domiciled in the State or Territory in which they reside for at least one year previous to the examination, and who have the county officer's certificate in the application form executed, may become eligible for permanent appointment to the apportioned service in Washington, D. C.

Oral examination.—Applicants may be required to report either in Washington, D. C., or elsewhere, for oral examination to determine their personal characteristics and address, tact, judgment, adaptability, and general fitness for the performance of the duties of the position. An applicant who fails to pass the oral examination will not be eligible for appointment. Applicants will be notified of the date and place of the oral examination.

Applications.—Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C., or to the Secretary of the United States Civil Service Board at any place listed hereon. Applications should be properly executed, excluding both vouchers and the medical certificate, and filed with the commission at Washington in time to arrange for the examination at the place selected by the applicant.

The exact title of the examination, as given at the head of this announcement, should be stated in the application form.

Preference.—Applicants entitled to preference should attach to their applications their original discharge, or a photostat or certified copy thereof, or their official record of service, which will be returned.

GREAT LAKES NAVAL STATIONS CLOSED.

The following-named naval radio stations on the Great Lakes have been closed: Alpena, Mich., Buffalo, N. Y., Detroit, Mich., Duluth, Minn., Eagle Harbor, Mich., Mackinac Island, Mich., Milwaukee, Wis., Whitefish Point, Mich., Detour Point, Mich., and Grand Marais, Mich. It is not known definitely at this time whether these stations will be reopened. When such information is available notice will be published in this BULLETIN.

At the present time the only naval stations open on the Great Lakes are Chicago, Ill., Manistique, Mich., and Cleveland, Ohio. The two named first are accepting commercial traffic. Cleveland only handles air mail service traffic.

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