RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

Washington, December 1, 1922—No. 68

CONTENTS.

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 italics.
Service —Nature of service maintained:
PG=General public.
PR=Limited public.
RC=Radio compass station.
P=Private.
G=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 transaction of the public business.

22413—22

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—
Aberdeen, Wash.[1]	KZE	300, 450, 550, 600.	PR	X	Grays Harbor Stevedore Co.
Fresno, Calif.[2]	KDNU	425	P	X	San Joaquin Light & Power Corp.
Guntersville, Ala.[3]	WKH	540	P	X	Nashville, Chattanooga & St. Louis Ry.
Los Angeles, Calif.[4]	KPK	540	P	X	Los Angeles Examiner.
Miami Beach, Fla.[5]	WAX	300, 450, 600, 1050, 1800.	PG & PR	N	T. R. T. Co.
Stanford University, Calif.[6]	KPGH	415	P	X	Leland Stanford University.
St. Croix Falls, Wis.[7]	WPL	525	P	X	Northern States Power Co.
Tullahoma, Tenn.[8]	WJJ	540	P	X	Nashville, Chattanooga & St. Louis Ry.

[1] Loc. (approximately) 0.122° 30′ 03″, N. 46° 59′ 00″; range, 300; system, Kilbourne & Clark, 1000; rates none.
[2] Loc. (approximately) 0.119° 49′ 00″, N. 36° 43′ 00″; range, 125; system, composite, v. t. and composite spark, 1000.
[3] Loc. (approximately) 0.95° 20′ 00″, N. 34° 25′ 00″; range, 300; system, composite, 282.
[4] Range, 150; system, composite, v. t. telephone and telegraph (portable station).
[5] Loc. 0.25° 48′ 21″, N. 80° 07′ 15″; range, 500; system, Navy-Wireless Specialty Apparatus Co., 480 and 1000; rates, ship service 10c. per word.
[6] Loc. 0.122° 30′ 12″, N. 37° 25′ 35″; range, 150; system, composite, v. t. telephone.
[7] Loc. (approximately) 0.92° 40′ 00″, N. 45° 04′ 00″; range, 100, system, composite, v. t. telephone.
[8] Loc. (approximately) 0.86° 15′ 00″, N. 35° 23′ 00″; range, 300; system, composite, 282.

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—
Hugh Kennedy[1]	KFCJ		PG	X	Buffalo S. S. Co.	
Indian[2]	KFEK	5	PG	X	Merchants & Miners Transportation Co.	I. W. T. Co.
Ohio	KFCS	5	PG	X	E. W. Scripps	R. C. A.
Seaward	KFEH				C. B. De Mille Productions (Inc.).	
Stephen M. Clement	KFBX		PG	X	American S. S. Co.	
St. Michael	KFCO		PG	X	Nicola Filiberto	
Tamarack IV[3]	KFBW	5	PG	X	Dr. H. N. Torrey	Do.

[1] Range, 150; system, Wireless Specialty Apparatus Co., 1000; w. l., 300, 600; rates, Great Lakes service 2 c. per word.
[2] Range, 150; system, R. C. A., 240; w. l., 300, 600.
[3] Range, 200; system, R. C. A., v. t. telephone and telegraph; 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.	
KDNU	Fresno, Calif.	c	KFZZ	General call for all I. W. T. Co. vessels	b
KFBW	Tamarack IV	b	KPGH	Stanford University, Calif.	c
KFBX	Stephen M. Clement	b	KPK	Los Angeles, Calif. (portable)	c
KFCJ	Hugh Kennedy	b	KZE	Aberdeen, Wash.	c
KFCO	St. Michael	b	WAX	Miami Beach, Fla.	c
KFCS	Ohio	b	WJJ	Tullahoma, Tenn.	c
KFEH	Seaward	b	WKH	Guntersville, Ala.	c
KFEK	Indian	b	WPL	St. Croix Falls, Wis.	c
KFOG	General call for all North Atlantic ice patrol vessels	b			

Broadcasting stations, alphabetically by names of cities.

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

City.	Call signal.	City.	Call signal.
Asturia, Oreg.	KFOG	Lawrenceburg, Tenn.	WOAN
Baltimore, Md.	WNAY	Mishawaka, Ind.	WOAQ
Casper, Wyo.	KFCQ	Okmulgee, Okla.	WPAC
Casper, Wyo.	KFDF	Omaha, Nebr.	WOAW
Charleston, S. C.	WNAQ	Parsons, Kans.	WOAJ
Charleston, S. C.	WOAH	Polytechnic, Mont.	KFED
Chicago, Ill.	WPAD	Portsmouth, Va.	WOAQ
Colorado Springs, Colo.	KFCK	San Antonio, Calif.	KFGL
Columbus, Ohio.	WPAL	San Diego, Calif.	KFFA
Fort Monroe, Va.	WNAW	Scranton, Pa.	WHAY
Frankfort, Ky.	WOAK	Spokane, Wash.	KFDC
Grove City, Pa.	WSAJ	Stamford, Tex.	WOAZ
Honolulu, Hawaii.	KYQ	Stanford University, Calif.	KFGH
Houston, Tex.	WRAA	Tacoma, Wash.	KFEJ
Independence, Mo.	WPAG	Tecumseh, Nebr.	WTAU
Johnstown, Pa.	WTAC	Topeka, Kans.	WPAM
Kalamazoo, Mich.	WOAP	Tyler, Tex.	WOAP
Kenosha, Wis.	WOAR	Yankton, S. Dak.	WNAX
Knoxville, Tenn.	WNAV	Webster Groves, Mo.	WOAL

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.
KFCK	Colorado Springs Radio Co.	Colorado Springs, Colo.	360
KFGL	Los Angeles Union Stock Yards	San Antonio, Calif.	485
KFCQ	Motor Service Station (Norman R. Hood)	Casper, Wyo.	360
KFDC	Radio Supply Co. (E. B. Craney)	Spokane, Wash.	360
KFDF	Wyoming Radio Corp.	Casper, Wyo.	360
KFED	Billings Polytechnic Institute	Polytechnic, Mont.	360
KFEJ	Guy Gresson	Tacoma, Wash.	360
KFFA	Dr. R. O. Shelton	San Diego, Calif.	360
KFOG	Asteria Budget	Asteria, Oreg.	360
KFGH	Leland Stanford University	Stanford University, Calif.	360
KYQ	Electric Shop	Honolulu, Hawaii	360
WNAQ	Charleston Radio Electric Co.	Charleston, S. C.	360
WNAV	Peoples Telephone & Telegraph Co.	Knoxville, Tenn.	360
WNAW	Peninsular Radio Club (Henry Kunzmann)	Fort Monroe, Va.	360
WNAX	Dakota Radio Apparatus Co.	Yankton, S. Dak.	360
WNAY	Ship Owners Radio Service	Baltimore, Md.	360
WOAF	Tyler Commercial College	Tyler, Tex.	360
WOAH	Palmetto Radio Corp.	Charleston, S. C.	360
WOAJ	Ervine Electrical Co.	Parsons, Kans.	360
WOAK	Collins Hardware Co.	Frankfort, Ky.	360
WOAL	William E. Woods	Webster Groves, Mo.	360
WOAN	Vaughn Conservatory of Music (James D. Vaughn).	Lawrenceburg, Tenn.	360
WOAP	Kalamazoo College	Kalamazoo, Mich.	360
WOAQ	Lyradion Manufacturing Co.	Mishawaka, Ind.	360
WOAQ	Portsmouth Radio Association (Dr. C. T. Mercer).	Portsmouth, Va.	360
WOAR	Henry P. Lundskow	Kenosha, Wis., 1065 Sheridan Road	360
WOAW	Woodmen of the World.	Omaha, Nebr.	360
WOAZ	Perick Hughes Co.	Stamford, Tex.	360
WPAC	Donaldson Radio Co.	Okmulgee, Okla.	360
WPAD	W. A. Wiabroldt & Co.	Chicago, Ill.	360
WPAG	Central Radio Co.	Independence, Mo.	360
WTAL	Superior Radio & Telephone Equipment Co.	Columbus, Ohio	360
WPAM	Auerbach & Guetzel	Topeka, Kans., 709 Kansas Avenue	360
WRAA	Rice Institute	Houston, Tex.	360
WRAY	Radio Sales Corp.	Scranton, Pa.	360
WSAJ	Grove City College	Grove City, Pa.	360
WTAC	Penn Traffic Co.	Johnstown, Pa.	360
WTAU	Rnegg Battery & Electric Co.	Tecumseh, Nebr.	360

Government ship 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.	Station controlled by—
President	NURL	Post Office Department.

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—
Atlanta, Ga	4XN	200, 275, 375	Bryan Electric Co.
Cherrydale, Va	3XD	150, 200, 225, 250.	Edwin L. White, 1 Columbia Street.
Chicago, Ill	9XU	Variable	Midwest Radio Central, Drake Hotel.
Cincinnati, Ohio	8XT	200, 375, variable.	Crosley Manufacturing Co.
Columbus, Ohio	8XR	200, 375	Entrekin Electric Co
Detroit, Mich	8XZ	Variable	Radio Inspector, eighth district.
Fullerton, Calif	6XAN	Variable	Bryan H. Dennis, 115 West Amerige Avenue.
Fulton, Mo	9YR	200, 375	Westminster College.
Helena, Mont	7ZC	200, 375	Fred C. Ashall, 536 North Warren Street.
Hoboken, N. J	2XAJ	175, 200, 275, 250.	Delaware, Lackawanna & Western R. R. Co.
Hood River, Oreg	7ZA	200, 375	H. B. Read (The Radio Shop).
Los Angeles, Calif	6XK	Variable	Reginald P. MacKenzie, 1015 Fourth Avenue.
Los Angeles, Calif	6XT	Variable	Bible Institute of Los Angeles.
Memphis, Tenn	5ZB	200, 375	Walker L. Wellford, jr., 205 South Belvedere Boulevard.
Minneapolis, Minn	9ZT	200, 250, 375	Donald C. Wallace, 54 North Pennsylvania Avenue.
North Little Rock, Ark	5ZR	200, 375	Hobart J. Bell, 1508 Main Street.
Oklahoma City, Okla	5XG	175, 200, 375	National Radio Manufacturing Co.
Port Jefferson, N. Y	2XS	5000, 3500	R. C. A., 233 Broadway, New York, N. Y.
Rochester, N. Y	8XQ	Variable	Rochester Gas & Electric Corp., 84 Clinton Avenue North.
Rolla, Mo	9YN	200, 375	Missouri School of Mines and Metallurgy.
San Diego, Calif	6XAI	Variable	W. K. Axbill, 5038 Cliff Place.
Seattle, Wash	7XR	Variable	Louis Wasmer, 419 Thirteenth Street North.
Seattle, Wash	7XS	Variable	Brott Laboratories, 2345b Forty-second Avenue North.
Stockton, Calif	6XAL	Variable	Paul Oard, 1217 East Street North.
Underwood, Wash. (near).	7XQ	Variable	Northwestern Electric Co., Pittock Block, Portland, Oreg.
Washington, D. C	3XI	Variable	Catholic University of America.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
	Second district:		Seventh district:
2XAJ	Hoboken, N. J.	7XQ	Underwood, Wash. (near).
2XS	Port Jefferson, N. Y.	7XR	Seattle, Wash.
	Third district:	7XS	Seattle, Wash.
3XD	Cherrydale, Va.	7ZA	Hood River, Oreg.
3XI	Washington, D. C.	7ZC	Helena, Mont.
4XN	Fourth district: Atlanta, Ga.		Eighth district:
	Fifth district:	8XQ	Rochester, N. Y
5XG	Oklahoma City, Okla.	8XR	Columbus, Ohio.
5ZB	Memphis, Tenn.	8XT	Cincinnati, Ohio.
5ZR	North Little Rock, Ark.	8XZ	Detroit, Mich.
	Sixth district:		Ninth district:
6XAI	San Diego, Calif.	9YN	Rolla, Mo.
6XAL	Stockton, Calif.	9YR	Fulton, Mo.
6XAN	Fullerton, Calif.	9XU	Chicago, Ill.
6XK	Los Angeles, Calif.	9ZT	Minneapolis, Minn.
6XT	Los Angeles, Calif.		

ALTERATIONS AND CORRECTIONS.

COMMERCIAL 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 Berne bureau.]

CAGAYAN DE SULU, P. I.—Loc. (approximately) 0.118° 30′ 30″, N. 06° 30′ 30″, range, 500.

BALABAC, P. I.—Loc. (approximately) 0.117° 00′ 30″, N. 07° 59′ 00″; range, 300; system, Marconi; w. l., 600, 1200; service, PG; hours, 8 a. m.–12 noon, 2–5.30 p. m., and on Sundays and holidays from 8–10 a. m., 4–5.30 p. m.; ship schedule first 10 minutes of every hour.

DEARBORN, MICH.—System, composite, v. t., telephone, and telegraph.

HONOLULU, HAWAII (KYQ).—Strike out all particulars.

NORTHVILLE, MICH.—System, De Forest, v. t. telephone and telegraph.

TULSA, OKLA.—W. l., 1640.

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.

ACHILLES.—Station operated and controlled by owner of vessel.

AQUARIUS.—W. l., 300, 450, *600*.

BARRYTOWN.—System, Telefunken, 1000; station operated and controlled by R. C. A.

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

BASCOBEL.—W. l., 300, 450, *600*.

CAPE MAY.—W. l., 300, 450, *600*.

C. A. SMITH.—Rates, transoceanic 8 c. per word.

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

CELILO.—Chas. R. McCormick S. S. Co., owner of vessel.

CHALLAMBA.—Range, 300; system, Kilbourne & Clark, 1000; w. l., 300, 450, *600*; rates, 8 c. per word.

CITY OF EVERETT.—Abram I. Kaplan, owner of vessel.

COLUMBIA.—System, Federal arc, 360 with chopper.

COLON.—Station operated and controlled by owner of vessel.

COURTOIS.—Name changed to Munmotor.

COWICHE.—Station operated and controlled by owner of vessel.

CHASTER HALL.—System, R. C. A., 1000.

DARIEN.—Station operated and controlled by owner of vessel.

DELCO.—Name changed to Domino; station operated and controlled by R. C. A.

DEUEL.—W. l., 300, 450, *600*.

D. F. MCALLISTER.—W. l., 300, 450, *600*.

DIO.—W. l., 300, 450, *600*; hours, X.

DOCHET.—Range, 300; system, Navy-Marconi, 1000; w. l., 300, 450, *600*.

EASTERN KNIGHT.—System, Navy-Marconi, 1000.

EASTERN LEADER.—W. l., 300, 450, *600*.

EGLANTINE.—W. l., 300, 450, *600*; station operated and controlled by R. C. A.

ELDENA.—W. l., 300, 450, *600*.

ELMSPORT.—W. l., 300, 450, *600*.

GENERAL G. W. GOETHALS.—Station operated and controlled by owner of vessel.

GENERAL O. H. ERNST.—Station operated and controlled by owner of vessel.

GENERAL W. C. GORGAS.—W. l., 300, 450, *600*.

GEORGE ALLEN.—W. l., 300, 450, *600*.

HAMER.—General Petroleum Corp., owner of vessel.

HASTNAL.—W. E. Price, owner of vessel.

HENRY D. WHITON.—Range, 200; system, Kilbourne & Clark, 1000; w. l., 300, 450, *600*; rates, 8 c. per word; station operated and controlled by S. O. R. S.

HERIDA.—W. l., 300, 450, *600*.

HIGHO.—W. l., 300, 450, *600*.

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

JAMES MACNAUGHTON.—Station operated and controlled by R. C. A.

J. R. GORDON.—Range, 200; system, Kilbourne & Clark, 1000; w. l., 300, 450, *600*; rates, 8 c. per word.

KEWANEE.—Associated Oil Co., owner of vessel.
LABETTE.—W. L., 300, 450, *600*.
LAKE FIVE.—System, Navy-Marconi, 1000; w. l., 300, 450, *600*.
LAKE FLORIAN.—Lykes Bros. S. S. Co., owner of vessel.
LAKE FORNEY.—New Hampshire S. S. Co., owner of vessel.
LAKE TIPPAH.—Philadelphia and Norfolk S. S. Co., owner of vessel.
LANCASTER.—Station operated and controlled by S. O. R. S.
MACON.—W. L., 300, 450, 500, *600*.
MAGMERIC.—System, Navy-Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, *600*.
MEDON.—Alaska S. S. Co., owner of vessel.
MONTPELIER.—American Ship & Commerce Navigation Corp., owner of vessel.
MULTNOMAH.—Charles R. McCormick S. S. Co., owner of vessel.
NEPONSET.—System, Navy-Lowenstein, 1000.
NYANZA.—Name changed to Commercial Guide; Nyanza S. S. Co., owner of vessel.
PINELLAS.—Name changed to Carolinas; Carolina S. S. Corp., owner of vessel; station operated and controlled by R. C. A.
PLAYA.—Name changed to Paul Shoup.
PUENTE.—Name changed to W. W. Mills.
ROBIN HOOD.—W. L., 300 440, 550, *600*.
SAGUA.—W. L., 300, 450, *600*.
SOCONY 88.—Standard Transportation Co., owner of vessel.
SOCONY 92.—Standard Transportation Co., owner of vessel.
STEELORE.—Range, 300; system, R. C. A., 1000; w. l., 300, *600*.
STEEL TRAVELER.—Range, 300; system, R. C. A., 1000; w. l., 300, 450, *600*; station operated and controlled by R. C. A.
ULYSSES.—Station operated and controlled by owner of vessel.
VABA.—Station operated and controlled by I. W. T. Co.
WAHEENA.—Charles R. McCormick S. S. Co., owner of vessel.
WAPAMA.—Charles R. McCormick S. S. Co., owner of vessel.
WEST CANON.—W. L., 300, *600*, 1800.
WESTERN SCOUT.—Correct call signal WXEA.
WESTERN WORLD.—Range, 300; system, Navy-Kilbourne & Clark, 1000; w. l., 300, 450, *600*; hours, X.
WEST HAVEN.—Station operated and controlled by R. C. A.
WEST MODUS.—Station operated and controlled by I. W. T. Co. (U. S. L.).
WILLAMETTE.—Charles R. McCormick S. S. Co. owner, of vessel.
WILLHILO.—Williams S. S. Co. owner, of vessel.
Strike out all particulars of the following-named vessels: H. M. Whitney; James S. Whitney; Lyman Stewart; and Pleiades.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDSS, name changed to W. W. Mills; KDYE, name changed to Paul Shoup; KIZB, name changed to Domino; KULB, name changed to Carolinas; WJO, name changed to Commercial Guide; WVOI, name changed to Munmotor; strike out all particulars following the call signals, KYQ, WNP, WFV, WPW, and WTL.

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.]

KDYQ (Portland, Oreg.).—W. L., add 360.
KFAV (Venice, Calif.).—Station operated and controlled by Abbot Kinney Co.
KFBK (Sacramento, Calif.).—W. L., add 485.
KFBM (Astoria, Oreg.).—Station operated and controlled by Cook & Foster and Astoria Hardware Co.
KFBU (San Francisco, Calif.).—W. L., 400, 485; station operated and controlled by Mercantile Trust Co. of California.
KHD (Colorado Springs, Colo.).—W. L., add 360.
KHJ (Los Angeles, Calif.).—W. L., 400, 485; station operated and controlled by Times-Mirror Co.
KNT (Aberdeen, Wash.).—Station operated and controlled by Grays Harbor Radio Co. (Walter Hemrich).
KZC (Seattle, Wash.).—Station operated and controlled by Public Market and Department Stores Co.
WAAN (Columbia, Mo.).—W. L., add 485.
WBAD (Minneapolis, Minn.).—Station operated and controlled by Sterling Electric Co.

WBZ (Springfield, Mass.).—W. l., 400.
WEAB (Fort Dodge, Iowa).—W. l., add 485.
WFAA (Dallas, Tex.).—Station operated and controlled by Dallas News and Dallas Journal.
WFAD (Salina, Kans.).—Station operated and controlled by Watson Weldon Co.
WGF (Des Moines, Iowa).—W. l., add 485.
WHAL (Lansing, Mich.).—Station operated and controlled by Lansing Capital News.
WHK (Cleveland, Ohio).—Station operated and controlled by Radiovox Co. (Warren R. Cox).
WIP (Philadelphia, Pa.).—W. l., add 485.
WLAJ (Waco, Tex.).—W. l., add 485.
WLAT (Burlington, Iowa).—Station operated and controlled by Radio and Specialty Co.
WMAM (Beaumont, Tex.).—W. l., add 485.
Strike out all particulars of the following-named stations: KDYN, Redwood City, Calif.; KDYU, Klamath Falls, Oreg.; KDZD, Los Angeles, Calif.; KDZJ, Eugene, Oreg.; KFAB, Portland, Oreg.; WBAE, Peoria, Ill.; WBAQ, South Bend, Ind.; WDAA, Nashville, Tenn.; WDAW, Atlanta, Ga.; WEAZ, Waterloo, Iowa; WFAL, Houston, Tex.; WFAP, Peoria, Ill.; WFAX, Binghamton, N. Y.; WGAF, Tulsa, Okla.; WHAN, Wichita, Kans.; WHAT, Yale, Okla.; WIAG, Birmingham, Ala.; WIAN, Allentown, Pa.; WKAJ, Fargo, N. Dak.; WKAT, Frankfort, Ind.; WMAU, Shreveport, La.; WSV, Little Rock, Ark.; WTK, Paris, Tex.

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 Berne bureau.]

FORT D. A. RUSSEL.—Correct orthography Fort D. A. Russell.
VLADIVOSTOK, RUSSIA.—Strike out all particulars.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

NPH, strike out all particulars and WVW read Fort D. A. Russell.

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.]

BALTIMORE, MD. (3XX).—Address 2817 Windsor Avenue.
CONWAY, ARK. (5XAC).—W. l., 200, 375, variable.
DAVENPORT, IOWA (9XAC).—W. l., 250, 375, variable; address 5000 Brady Street.
EL PASO, TEX. (5ZAD).—Address 809 North Oregon Street.
GRAND COTEAU, LA. (5XZ).—W. l., 200, 375.
GREAT NECK, N. Y. (2XAN).—Address 20 West Thirty-fourth Street, New York, N. Y.
KALAMAZOO, MICH. (8XF).—W. l., add 500.
LITTLE ROCK, ARK. (5XAB).—Station operated and controlled by Dr. L. M. Hunter only.
LOS ANGELES, CALIF. (6ZAA).—Changed to Pasadena, Calif., 647 North Madison Avenue.
MONTGOMERY, ALA. (5XR).—Address 7 Walnut Street.
PHILADELPHIA, PA. (3XB).—Station operated and controlled by W. C. Elgin, 1000 Chestnut Street.
PITTSBURGH, PA. (8ZAE).—Address 3220 Orleans Street.
WACO, TEX. (5ZAF).—Station operated and controlled by Sanger Bros.
WASHINGTON, D. C. (3XAF).—W. l., 1650, 2500, variable.
Strike out all particulars of the following-named stations: Asheville, N. C. (4ZD); Detroit, Mich. (8XO); Hoboken, N. J., Car No. 782 (2XAJ); Madison, Wis. (9XI); Milwaukee, Wis. (9YZ); Minneapolis, Minn. (9ZT); Portland, Oreg. (7XG); St. Paul, Minn. (9ZAH).

MISCELLANEOUS.

GENERAL CALL SIGNAL ASSIGNED TO ICE PATROL VESSELS.

Call letters KFOG have been assigned to all ice patrol vessels of the North Atlantic International Ice Patrol. Any vessel desiring to communicate with the vessel on patrol regarding conditions in the ice fields should use the above-mentioned signal.

INTERFERENCE BY EXPERIMENTAL STATIONS.

Experimental stations should, as far as possible, avoid using a radiating antenna for testing while other stations in the vicinity, including broadcasting stations, are operating. The early morning hours are probably best suited for testing. See paragraph 3, section 4, act of August 13, 1912.

COMPASS STATIONS CLOSED TEMPORARILY.

On the 14th of last month service was suspended from the radio compass stations at Fort Stevens, Oreg. (NPE), and Ocean Park, Wash. (NPE), pending installation of temporary transmitters. The period during which service will be suspended is not known at present.

RECONSTRUCTION OF THE SCHEVENINGEN RADIO STATION.

The Netherlands Government is preparing to enlarge the present radio station at Scheveningen. The station, which will be ready for operation in the early part of 1923, is designed to communicate with all parts of the continent of Europe and will be equipped also for wireless telephone broadcasting.

ALASKAN STATIONS CLOSED.

The station at Akutan (KMW) closed for the season on October 31, last.

CHANGE IN STATIONS TRANSMITTING WEATHER REPORTS.

Beginning on the 20th ultimo, weather broadcasts now transmitted from the United States naval radio station at Miami, Fla., will be transferred to the naval station at Jupiter, Fla. (NAQ). The weather will be broadcasted at 11.30 a. m. and 6. p. m. (seventy-fifth meridian time). Hurricane warnings will be broadcasted when issued and repeated at two-hour intervals until midnight. The transmission will be by spark on a wave length of 1688 meters. The position of this station is 0.80° 05′ 02″, N. 26° 56′ 54″.

INFORMATION FROM THE BERNE BUREAU.

Faroe Islands.—Beginning November 1, this year, the charge for interior radiotelegraph messages within these islands will be 10 centimes per word; minimum, 1 franc for ordinary telegrams; and 30 centimes per word minimum, 3 francs for urgent radiotelegrams.

Portugal.—The coast station of Porto is now open for service.

Belgium.—The legal time was reestablished on October 8, last.

Denmark.—Beginning November 1, this year, the Danish interior charge will be 10 centimes per word; minimum, 1 franc.

Spain.—The coast station Vigo is provisionally closed for public service.

France.—The legal time was reestablished on October 8 last.

Norway.—Beginning November 1, this year, the interior charge on radiotelegrams originating in or destined to Norway will be 10 centimes per word, with a minimum of 1 franc for ordinary radiograms; and 30 centimes per word, with a minimum of 3 francs for urgent radiograms.

INFORMATION FROM THE HYDROGRAPHIC OFFICE.

Samoa Islands.—Apia radio station, call letters VMG, wave 600 meters (spark), transmits daily, at 0730 GMT, a weather bulletin containing a brief review of the local meteorological conditions, including barometric pressure, temperature, and the direction and force of the wind. Location (approximately) lat. 13° 51′ S., long. 171° 48′ W.

Sweden (radio compass station, Hallo, the Skagerrack).—Hallo compass station, in lat. 58° 20′ 08″ N., lon. 11° 13′ 00″ E., was opened for general service on November 1, 1922. The station will determine the bearing of a vessel on the 600-meter wave. It is not equipped with a sending apparatus but is controlled by the Goteborg radio station, which will furnish the necessary information on a wave length of 600 meters. A vessel desiring bearings should call Goteborg (SAB). When that station has answered, the vessel sends the abbreviation "QTE." (What is my true bearing), followed by the call signal or call signals of the station or stations from which the bearings are desired. The vessel then waits for the signal "K." When this is received, the

vessel repeats its distinguishing signal, alternated by the letter "V," for a period of 50 seconds. This signal should be made slowly with the dashes considerably prolonged. Goteborg will then repeat the abbreviation "QTE" (Your bearing from ..... was ..... degrees), followed by the call signal of the radio station and a group of four figures (from 0000 to 3599). This group indicates the true bearing, in degrees and tenths of degrees, of the ship station from the radio compass station. Immediately after the vessel has received the bearings it should repeat the group of figures and give the customary signal for closing the message. Goteborg then repeats the closing signal.

Example: A vessel with the distinguishing signal "SGL" desires bearings from Vinga (SAL) and Hallo (SAM) radio compass stations. Goteborg radio station (SAB) is called:

— . — . — SAB SAB SAB DE SGL SGL SGL . — . — .
— . — . — SGL SGL SGL DE SAB SAB SAB — . —
— . — . — SAB DE SGL — . . . — QTE . . — — . . SAL SAM . — . — .
— . — . — SGL DE SAB — . —
— . — . — SGL . . . — . . . — . . . — SGL SHL . . . — . . . —
. . . — etc. (less than 50 seconds) . . . — — . . . —
SGL . — . — .
— . — . (This signal is made slowly and with prolonged dashes.)
SGL DE SAB — . . . — QTE SAL 2925
SAM 2030 — . . . — SAB . — . — .
— . — . — SAB DE SGL — . . . — SAL 2925 SAM
2030 — . . . — SGL . . . — . —
— . — . — SGL DE SAB . — . — SAB . . . — . —

A charge of 5 kronor ($1.34) is made for a single bearing from Hallo or from Vinga. The maximum distance on which accurate bearings may be expected is about 150 miles. All steps have been taken to furnish bearings to a high degree of accuracy, but it must be understood, however, that the Swedish Telegraph Administration will incur no liability for any consequence which may result, directly or indirectly, from transmission of inaccurate bearings or from any other cause.

In order to obtain a check on the work of the radio compass station, a short report containing the following information should be sent to Kungl. Telegrafstyrelsens Radiobyra, Stockholm 2: (*a*) The name of the vessel, (*b*) the name of the radio compass station, (*c*) date and hour (Greenwich mean time) the vessel received the bearing, (*d*) the bearing received from the radio compass station, (*e*) the position of the vessel at the time in question, determined by other means than by radio bearings, (*f*) the probable accuracy of the estimated position of the vessel, (*g*) weather conditions at the time of obtaining the bearings, (*h*) eventual remarks, (*i*) the signature of the master or the responsible navigator.

CONFERENCE ON RADIO STANDARDIZATION.

The Bureau of Standards of the Department of Commerce has called a conference on radio standardization to be held on Friday, January 12, 1922, in New York City. The desirability of calling a general conference on radio standardization has been apparent in many ways, and this call is issued by the Bureau of Standards at the specific request of the following associations and organizations: Institute of Radio Engineers; National Radio Chamber of Commerce; Radio Apparatus Section, Associated Manufacturers of Electrical Supplies; National Retail and Dry Goods Association; American Radio Relay League; Radio Corporation of America.

These organizations have pointed out that there is need for greater uniformity in the methods of describing, rating, and testing of performance of radio apparatus. Invitations are being issued to all of the national associations of an engineering and technical nature which are known to be interested in radio standardization. The representation of radio manufacturers will, in general, be through the trade associations of which they are members. While it is desired to make the conference thoroughly and broadly representative, it is expected that the organizations invited will limit their representation to one or two persons in order that the conference may be as effective as possible.

The purpose of the conference is to consider, broadly, (1) whether a formulation of standards for radio apparatus and service shall be made; (2) if so, what general classes of apparatus or service should be included; and (3) what procedure shall be recommended for carrying out the conclusions reached by the conference. If the conference decides that radio standards should be formulated, it is expected that they will be prepared with special consideration of the wide range of interests which are con-

cerned with the subject, and that these standards may ultimately be adopted with the approval of the American Engineering Standards Committee as an American standard.

AMPLIFIER USING ALTERNATING-CURRENT SUPPLY.

A notice of the publication of a paper from the Bureau of Standards on the above subject in the Journal of the A. I. E. E. appeared in the issue of the Radio Service Bulletin for August 1, 1922, and stated that this paper would be available as a publication of the Bureau of Standards in a few months, and that a notice of the publication would appear in the Radio Service Bulletin. This paper has been issued as Bureau of Standards Scientific Paper No. 450, An Electron-Tube Amplifier using 60-Cycle Alternating Current to Supply Power for the Filaments and Plates, by P. D. Lowell. A copy of this paper may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C.; price, 5 cents.

MULTILAYER COILS FOR RADIO APPARATUS.

In radio apparatus coils of more than one layer, or multiple-layer coils, are frequently used, particularly when it is desired to obtain a coil of comparatively large inductance in a small space. Multilayer coils are also used in many other fields of electrical work. A simple form of multilayer coil is wound layer upon layer in a channel of rectangular cross section. Coils of this type are useful in low-frequency work. Multilayer coils of this simple type, however, have a very considerable capacity between layers and are therefore not suitable for radio work in which the capacity of coils must be kept low. To reduce this capacity, means must be found either to reduce the potential between adjacent turns in different layers or to increase the distance between layers. The first method is employed in coils prepared with a "banked" winding, in which the wire is so carried as to achieve the winding of several layers simultaneously. For the method of increasing the distance between layers it is found that a small separation between wires brings about a very appreciable reduction of capacity, but beyond a moderate separation little is gained. In one type of coil adjacent layers are separated by thin pieces of insulation of perhaps 1 or 2 millimeters in thickness. In a type of coil known as "honeycomb" the wire is carried diagonally back and forth across the cross section while it is being wound, with the result that wires which run parallel to one another are separated by at least twice the diameter of the covered wire. In the design of electrical apparatus, and particularly radio apparatus, it is important to be able to calculate the inductance of the various types of multilayer coils.

Formulas for the inductance of simple types of multilayer coils have been derived by a number of scientists. It is also found that for the bank-wound, "honeycomb," and similar low-capacity windings used in radio work the same formulas apply as for a simple circular coil of rectangular cross section, provided that an appropriate correction be made for the space occupied by the insulation. The formulas are, however, complicated, and for any given case the necessary computation is tedious. Furthermore, there are a number of different formulas, some of which are most accurate for short coils, others for long coils or other particular types of coils, so that the engineer may find it difficult to select the formula which is best suited to his particular problem. If many calculations have to be made, some means of reducing the labor of computation and avoiding the difficulty of selecting the most suitable formula is a practical necessity.

Such aids which have heretofore appeared have taken the form of a single empirical formula to cover the whole range of types of coils or of charts from which the inductance, or some function simply related to the inductance, can be interpolated. These methods do not allow of an accuracy greater than about 1 per cent at best, and in some instances the curves have been based upon unsuitable formulas and give only a rough degree of accuracy.

There has recently appeared Bureau of Standards Scientific Paper No. 455, Tables for the Calculation of the Inductance of Circular Coils of Rectangular Cross Section, by Frederick W. Grover. This paper gives tables which have been carefully calculated, by means of which the inductance of multilayer coils may be quickly and accurately computed by the simplest of arithmetical operations. The tabulated values in the tables are correct to 1 part in 10,000. The necessity for long and tedious computations directly from the complicated formulas and for selecting the most suitable formula for a given case are thus avoided. The formulas on which the tables are based are collected for reference, and the theoretical problems involved and the limitations of each formula are discussed. Examples are given to illustrate and explain the use of the tables. The calculation of mutual inductance for certain

cases of multilayer coils is treated. This paper should be regarded as supplementary to Bureau of Standards Scientific Paper No. 169, Formulas and Tables for the Calculation of Mutual and Self-Inductance, which covers many different kinds of inductance coils. A copy of Scientific Paper No. 455 may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

BIBLIOGRAPHY AND PATENTS ON ELECTRICAL INSULATING MATERIALS.

During an investigation of the properties of certain types of electrical insulating materials which the Bureau of Standards has been conducting for several years a rather comprehensive bibliography has been prepared of papers, books, and other publications which cover various types of electrical insulating materials. During the course of this same investigation an examination was made of the patents on various types of electrical insulating materials, particularly materials of the phenolic type, as represented by United States patents issued on such materials and the methods of their manufacture. A list was compiled, after search, of the more important United States patents on such materials and methods. This list covers patents issued prior to September 1, 1920. It is expected that at a later date this list will be brought down to date.

Announcement has previously been made of the publication of Bureau of Standards Technologic Paper No. 216, Properties of Electrical Insulating Materials of the Laminated, Phenol-methylene Type, which can now be purchased for 30 cents per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C. Space did not permit the publication in Technologic Paper No. 216 of the complete bibliography of insulating materials mentioned above or of the patent list mentioned.

A considerable demand has arisen for copies of the bibliography, and of the patent list, and these have been issued in mimeographed form as Bureau of Standards Letter Circular No. 50, Bibliography of Books and Periodicals on Tests, Properties and Uses of Electrical Insulating Materials, and Letter Circular No. 51, List of the More Important United States Patents Covering the Materials and Methods of Manufacture of Insulating Materials. Only a limited supply of these two Letter Circulars is available, but a copy will be sent on request to the bureau, so long as the supply lasts, to any person who can show actual use for it.

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CHANGE IN RATES FOR TROPICAL RADIO TELEGRAPH CO. STATIONS.

Effective the 1st instant, the radio stations operated by the above-named company at New Orleans, La. (WNU), Fort Morgan, Ala. (WIO), and Burrwood, La. (WBW), will charge 10 cents per word for ship traffic in lieu of 12 cents per word, as charged heretofore.

NEW LIST OF AMATEUR STATIONS.

The new list of "Amateur Radio Stations of the United States," edition June 30, 1922, is now available for distribution. The price of this publication is 25 cents per copy. All remittances should be forwarded to the Superintendent of Documents, Government Printing Office, Washington, D. C.

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