

RADIO SERVICE BULLETIN

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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 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. O. 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.
- Kc. =Kilocycles.

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, 1923, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Houston, Tex. ¹	WFO	300, 450, 600.....	PG	.....	Iris Theater.

¹ Loc. (approximately) 6.35° 30' 00", N. 29° 43' 00"; range, 250; system, Kilbourne & Clark, 1000; hours, 8 a. m.—10 p. m.; rates, ship service, 6 cents per word.

Commercial ship stations, alphabetically by names of vessels.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1923, 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—
Bay State Fishing Co. (general call for all vessels).	KFYY	.....	.....	.....	Bay State Fishing Co..	.....
City of Chattanooga.....	KFMA	.....	PG	N	Ocean S. S. Co. of Savannah (Ga.).	.....
Cleveland ¹	KFJP	.....	.....	.....	Planet S. S. Corp.....	R. C. A.
Euraca ²	KJG	8	PG	X	E. D. Burge.....	Owner of vessel.
Louise ³	KUKN	8	PG	X	A. J. Harris.....	R. C. A.
Mary Winkleman.....	KFJO	8	PG	X	Associated Oil Co.....	.....
McKittrick.....	KFJN	8	PG	X	Swiftsure Oil Transport Co.	I. W. T. Co.
Swiftsure ⁴	KDNG	8	PG	X	Edgar Ames.....	Owner of vessel.
Westerly ⁵	KFJS	.....	PR	X	Becker S. S. Co.....	Do.
W. G. Pollock ⁶	KFJT	.....	PG	X	.....	.....

¹ This vessel is registered under the Panaman flag.

² Range, 300; system, R. C. A., 1000; w. l., 300, 450, 600, 706.

³ Range, 75; system, Kilbourne & Clark, 1000; w. l., 300, 600.

⁴ Range, 300; system, I. W. T. Co., 1000; w. l., 300, 600, 1800.

⁵ Range, 25; system, composite v. t. telephone and telegraph; w. l., 300, 600; station is to be used only in emergencies.

⁶ Range, 200; system, Kilbourne & Clark, 1000; w. l., 300, 600; 706; rates, Great Lakes service, 2 cents per word.

Commercial land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name.	Call signal.	Name.
KDNG	Swiftsure.....b	KFMA	City of Chattanooga.....b
KFJN	McKittrick.....b	KFYY	Bay State Fishing Co., general call for all vessels.....b
KFJO	Mary Winkleman.....b	KJG	Euraca.....b
KFJP	Cleveland.....b	KUKN	Louise.....b
KFJS	Westerly.....b	WFO	Houston, Tex.....c
KFJT	W. G. Pollock.....b		

Broadcasting stations, alphabetically by names of cities.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1923.]

City.	Call signal.	City.	Call signal.
Belvidere, Ill.	WTAH	Portland, Me.	WTAJ
Grand Forks, N. Dak.	KFJM	Stevensville, Mont. (near)....	KFJR
Grand Forks, N. Dak. (portable)....	KFJQ	Toledo, Ohio.	WTAL
Ottumwa, Iowa.	KFJL		

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

[Additions to the List of Radio Stations of the United States, edition of June 30, 1923.]

Call signal.	Station operated and controlled by—	Location of station.	Power (Watts).	Wave length.	Frequency (kilocycles).
KFJL	Harding Manufacturing Co.	Ottumwa, Iowa.	10	242	1,240
KFJM	University of North Dakota.	Grand Forks, N. Dak.	100	229	1,310
KFJQ	Electric Construction Co., valley radio division.	Grand Forks, N. Dak. (portable)....	5	252	1,190
KFJR	Ashley C. Dixon & Son.	Stevensville, Mont. (near)...	50	258	1,160
WTAH	Carmen Ferro.	Belvidere, Ill., Columbia Ave. and Locust St.	10	236	1,270
WTAJ	The Radio Shop.	Portland, Me., 218 Federal St.	50	236	1,270
WTAL	Toledo Radio & Electric Co.	Toledo, Ohio.			

Government land stations, alphabetically by name of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1923, and to the International List of Radiotelegraph stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Fort Des Moines, Iowa.	WZT	800	FX	X	U. S. Army.

Government ship stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1923, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave length.	Service.	Hours.	Station controlled by—
Chateau Thierry.	WXF		O		U. S. Army.
St. Mihiel.	WXB		O		Do.

Government land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name of station.	Call signal.	Name of station.
WXB	St. Mihiel. b	WZT	Fort Des Moines, Iowa. c
WXF	Chateau Thierry. b		

Special land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1923.]

Station.	Call signal.	Station controlled by—
Anchorage, Alaska.....	7XX	W. R. Rathbun, box 1336.
Anchorage, Alaska (portable).....	7XY	Do.
Berkeley, Calif.....	6ZL	F. A. Brandis, 1029 Merced St.
Boston, Mass.....	1ZB	Edward C. Tompson, 35 Ivy St.
Bremerton, Wash.....	7ZZ	H. W. Shams, 1103 Highland St.
Cincinnati, Ohio.....	8XAY	Crodey Manufacturing Co.
Clayton, Mo.....	9ZV	Robert L. Coe, 207 Linden St.
Flint, Mich.....	8ZH	Frank D. Fallain, Police Bldg., Beach St.
Marietta, Ohio.....	8YAA	Marietta College.
Melrose Highlands, Mass.....	1ZC	Grenville B. Gerrish, 30 Morgan St.
Pittsburgh, Pa.....	8YAI	Duquesne University.
Portland, Oreg.....	7ZK	Charles L. Austin, 1556 E. Taylor St.
Potdam, N. Y.....	8XAZ	Kirke E. Davis.
San Francisco, Calif. (portable).....	6XBK	Federal Telegraph Co.
St. Paul, Minn.....	9ZG	Maurice G. Goldberg, 711 Dayton Ave.
San Francisco, Calif.....	6XBJ	D. B. McGown, 1247 Forty-seventh Ave.
Springfield, Ohio.....	8ZC	Ralph E. Humes, 834 Jefferson St.
Trenton, N. J.....	3XAN	Franklyn J. Wolf, Carteret Club.
Waco, Tex.....	5XBG	Baylor University (physics department).

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
1ZB	First district:		
1ZC	Boston, Mass.	8XAY	Eighth district:
3XAN	Melrose Highlands, Mass.	8XAZ	Cincinnati, Ohio.
5XBG	Third district: Trenton, N. J.	8YAA	Potdam, N. Y.
	Fifth district: Waco, Tex.	8YAI	Marietta, Ohio.
	Sixth district:	8ZC	Pittsburgh, Pa.
6XBJ	San Francisco, Calif.	8ZH	Springfield, Ohio.
6XBK	San Francisco, Calif. (portable).		Flint, Mich.
6ZL	Berkeley, Calif.	9ZG	Ninth district:
	Seventh district:	9ZV	St. Paul, Minn.
7XX	Anchorage, Alaska.		Clayton, Mo.
7XY	Anchorage, Alaska (portable).		
7ZK	Portland, Oreg.		
7ZZ	Bremerton, Wash.		

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, 1923, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

- BOSTON, MASS.—System, Wireless Specialty Apparatus Co., 1000 and composite v. t. telephone and telegraph.
- CAPE MAY, N. J.—W. l., 300, 600, 1610.
- CASPER, WYO.—W. l., 1689.
- CLEVELAND, OHIO (WTK).—W. l., 300, 600, 1764.
- LIMA, OHIO.—W. l., 1689.
- LOS ANGELES, CALIF. (KVT).—W. l., 300, 600, 1599.
- MANITOWOC, WIS.—Range, 300; system, composite, 480; w. l., 300, 600, 1666.
- PEARL CREEK DOME, ALASKA.—(Cold Bay oil district) W. l., 450, 1700.
- PORT ARTHUR, TEX.—Station operated and controlled by The Wireless Co., rates, ship service, 10 cents per word.
- ROGERS, MICH.—W. l., 300, 450, 600, 1764.
- SAN DIEGO, CALIF. (KVU).—W. l., 300, 600, 1599.
- STANFORD UNIVERSITY, CALIF.—W. l., 1290.
- WEST PORT ARTHUR, TEX.—Call signal changed to WPA.
- Strike out all particulars of the following-named stations: Arroyo Park Camp, Calif.; Laguna Bell Camp, Calif.; and San Gabriel Camp, Calif.

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, 1923, and to the International List of Radiotelegraph Stations, published by the Berns bureau.]

- ADMIRAL DEWEY.—W. I., 300, 600, 706.
 ADMIRAL EVANS.—System, R. C. A., 1000, w. I., add 706.
 AGNES DOLLAR.—Name changed to Mary E. Moore; Mill & Lumber Co. owner of vessel.
 AGWIMEX.—W. I., 300, 450, 600, 706.
 AGWIWORLD.—W. I., add 706.
 ALAMEDA (WAA).—Range, 200; w. I., 300 600, 706; rates, 8 cents per word.
 ALASKA.—Range, 300; system, Kilbourne & Clark, 1000; w. I., 300, 600, 706; hours, N; rates, 8 cents per word.
 A. M. BYERS.—System, R. C. A., 1000.
 AMERICAN STAR.—W. I., add 706.
 ANACONDA.—W. I., add 706.
 ANTIETAM.—Antietaam S. S. Corp. owner of vessel.
 ARCHER.—W. I., add 706.
 ARGOSY.—W. I., add 706.
 BALDROCK.—System, Navy-Wireless Specialty Apparatus Co., 1000; w. I., add 706.
 BARWICK.—Range, 150; system, Cutting & Washington, 1000; w. I., 300 450, 600.
 BASCOBEL.—Gulf Coast Transportation Co. owner of vessel; station operated and controlled by owner of vessel.
 BASFORD.—Atchison, Topeka & Santa Fe Railway Co., owner of vessel.
 BATON ROUGE.—W. I., add 706.
 BAYPORT.—Range, 150; system, Navy-Lowenstein, 1000; w. I., 300, 450, 600, 706; rates, 8 cents per word; station operated and controlled by owner of vessel.
 BAYWAY.—W. I., add 706.
 BRSEMER CITY.—W. I., add 706.
 BIDWELL.—W. I., 300, 600, 1800; station operated and controlled by R. C. A.
 BUFORD.—Range, 300; system, R. C. A., 1000; w. I., 300, 600, 706; service, PG; hours, N; rates, 8 cents per word; station operated and controlled by owner of vessel.
 CARRILLE.—System, Navy-Lowenstein, 1000.
 CARRILLO.—System, R. C. A., 1000.
 CADDOPEAK.—Charles W. Cook owner of vessel.
 CARENCO.—W. I., add 706.
 CAROLINIAN.—W. I., add 706.
 CAYO MAMBI.—W. I., add 450.
 CATAHOULA.—Cuba Distilling Co. owner of vessel.
 CATHWOOD.—System, R. C. A., 1000; station operated and controlled by F. T. Co.
 CECIL COUNTY.—W. I., add 706.
 CERRO-AZUL.—W. I., add 706.
 CHALLAMBA.—Pacific Motorship Co. owner of vessel; station operated and controlled by owner of vessel.
 CHAMPLAIN.—L. H. Stewart owner of vessel.
 CHINAMPA.—W. I., add 706.
 CHINCHA.—Planet S. S. Corp. owner of vessel.
 CITY OF DETROIT III.—W. I., 300, 600.
 CITY OF EUREKA.—W. I., add 706.
 CITY OF GRAND RAPIDS.—Range, 150; system, R. C. A., 1000.
 CITY OF HOLLAND.—Graham & Morton Transportation Co. owner of vessel.
 CITY OF RENO.—Name changed to Tejon; system, Navy-R. C. A., 1000; w. I., add 706; General Petroleum Co. owner of vessel; station operated and controlled by I. W. T. Co.
 CITY OF SAUGATUCK.—Graham & Morton Transportation Co., owner of vessel.
 CITY OF SAVANNAH.—System, R. C. A., 1000.
 CLEMENT SMITH.—W. I., 300, 450, 600, 706.
 COLUMBIA.—W. I., add 706; hours, N; rates, 8 cents per word.
 COLUSA.—Hours, N.
 COMMERCIAL TRAVELER.—W. I., 300, 450, 600, 706; service, PG; rates, 8 cents per word.
 CONEJOS.—W. I., add 706.
 CORDOVA.—Rates, 8 cents per word.
 CRAMPTON ANDERSON.—W. I., add 706.
 CRISFIELD.—W. I., add 706.
 CROFTON HALL.—W. I., add 706.

- DARDEN.—Range, 300; system, Navy-R. C. A., 1000; w. l., 300, 450, 600, 706; rates, 8 cents per word; U. S. S. B. owner of vessel.
- DELROSA.—Range, 300; system, Navy-R. C. A., 1000; w. l., 300, 600.
- DELISLE.—W. l., add 706.
- DELPHINE.—W. l., add 706.
- DE SOTO.—W. l., add 706.
- DICKENSON.—Range, 300; system, R. C. A., 1000; w. l., 300, 450, 600.
- DONNA LANE.—Station operated and controlled by F. T. Co.
- DOYLESTOWN.—Charles W. Cook owner of vessel.
- DURANGO.—W. l., add 706.
- EAGLE (KIR).—W. l., add 706.
- EAST HAMPTON.—Service, PR (communicates only with vessels *G. S. Allyn* and *M. M. Davis*).
- EASTERN COAST.—W. l., add 706.
- EASTERN PLANET.—W. l., add 706.
- EASTERN SWORD.—W. l., add 706.
- EDITOR.—W. l., add 706.
- EDWARD L. DOHENY, JUNIOR.—W. l., add 706.
- ELDORADO.—System, R. C. A., 1000.
- ELECEDRO.—Name changed to *El Cedro*; Los Angeles Lumber Products S. S. Co. owner of vessel; station operated and controlled by F. T. Co.
- ELISHA WALKER.—W. l., 300, 450, 600, 706.
- ELKRIDGE.—Station operated and controlled by I. W. T. Co. (U. S. L.).
- EL ORIENTE.—W. l., add 706.
- E. R. KEMP.—W. l., add 706.
- ESTHER WEEMS.—System, R. C. A., 1000; w. l., 300, 450, 600, 706; station operated and controlled by I. W. T. Co.
- ETHAN ALLEN.—W. l., add 706.
- EVERETT (KZT).—System, R. C. A., 1000.
- FAVORITE (KIFG).—System, R. C. A., 1000.
- FINLAND.—System, R. C. A., 1000.
- FIRMORE.—W. l., add 706.
- GARGOYLE.—W. l., add 450.
- GASTON.—Rates, 8 cents per word; Southgate Marine Corp. owner of vessel; station operated and controlled by R. C. A.
- GEORGE ALLEN.—W. l., add 706.
- GEO. H. JONES.—W. l., add 706.
- HADNOT.—W. l., add 706.
- HAHIRA.—Range, 300; system, Navy, 1000; w. l., 300, 450, 600, 706; Atlantic Refining Co. owner of vessel; station operated and controlled by R. C. A.
- HALSEY.—W. l., 300, 600, 706, 1800.
- HALWAY.—Name changed to *Gulfstate*.
- HAMMAC.—Name changed to *Emidio*.
- HAMPDEN.—W. l., add 706.
- HANLEY.—Weyerhaguser Lumber Co. owner of vessel.
- HARVEY H. BROWN.—Headwaters S. S. Co. owner of vessel.
- HEFFRON.—W. l., add 706.
- HERA.—W. l., add 706.
- HERMOSA.—System, R. C. A., 1000; rates, 8 cents per word.
- H. M. FLAGLER.—W. l., add 706.
- HOUMA.—Name changed to *Cape Henlopen*; system, R. C. A., 1000; w. l., add 706; Cape S. S. Co. owner of vessel; station operated and controlled by R. C. A.
- HOVEN.—W. l., add 706.
- HULACO.—Associated Oil Co. owner of vessel.
- INDEPENDENCE HALL.—W. l., add 706.
- JACOX.—Charles W. Cook owner of vessel.
- JAMES B. DUBE.—W. l., add 706.
- JAMES MCGEE.—W. l., add 706.
- J. FLETCHER FARRELL.—W. l., add 450.
- J. M. DANZIGER.—W. l., add 706.
- JUNIATA.—System, R. C. A., 1000; w. l., 300, 600, 706.
- LAKE CAYUGA.—Name changed to *Dorothy Wintermote*; w. l., add 706.
- LAKE FERNWOOD.—Name changed to *Virginia Dispatch*.
- LAKE FLATTERY.—Range, 200; system, R. C. A., 1000; w. l., 300, 450, 600; Panama R. R. Co. owner of vessel; station operated and controlled by owner of vessel.
- LAKE ORANGE.—Name changed to *John Gehm*; Bison S. S. Corp. owner of vessel.
- LAKE SEBAGO.—Name changed to *Robert Johnson*.

- LIBERTY.—W. I., add 706.
 LIBERTY MINQUAS.—Name changed to *Republic*.
 LOS ALAMOS.—Range, 300; system, Cutting & Washington, 1000; w. I., 300, 450, 600, 706.
 LUBRICO.—W. I., 300, 600, 1800; station operated and controlled by S. O. R. S. (U. S. L.).
 LYDIA.—W. I., add 706.
 MANITOU.—Hours, N.
 MARY LUCKENBACH.—W. I., add 706.
 MARY WINKLEMAN.—A. J. Harris owner of vessel.
 MCKEESPORT.—W. I., add 706.
 MELROSE.—W. I., add 706.
 MINNESOTA (WMI).—General Shipping Corp. owner of vessel.
 MINNESOTAN.—W. I., add 706.
 M. M. DAVIS.—Service, PR (communicates only with Fairport, Va., and vessels *East Hampton* and *G. S. Allyn*).
 MOHAWK (KVM).—System, R. C. A., 1000.
 MONGOLIA.—Range, 300; system, Navy-Lowenstein, 1000.
 MONTEBELLO.—W. I., 300, 450, 600, 706.
 MONTPELIER.—W. I., add 706.
 MUNCOVE.—System, Navy-International, 1000.
 MUNDELTA.—System, R. C. A., 1000.
 NOBLES.—Station operated and controlled by R. C. A. (U. S. L.).
 NORTHERN STAR.—American Sugar Transit Corp. owner of vessel.
 NORTHWESTERN.—Rates, 8 cents per word.
 OHIOAN.—W. I., add 706.
 OLYMPIC.—Station operated and controlled by owner of vessel.
 ORINOCO.—System, Navy-R. C. A., 1000; w. I., add 706; Orinoco S. S. Corp. owner of vessel.
 ORLEANS.—W. I., add 706.
 ORIENT.—W. I., add 706.
 PAUL H. HARWOOD.—W. I., 300, 600, 706.
 PEACOCK.—Station operated and controlled by S. O. R. S. (U. S. L.).
 PEARLDON.—Name changed to W. D. Anderson; system, Navy-R. C. A., 1000; w. I., add 706; rates, 8 cents per word; station operated and controlled by R. C. A.
 PERSIAN.—System, R. C. A., 1000.
 POINT LOMA.—Hartwood Lumber Co. owner of vessel.
 POLYNESIA.—Name changed to A. D. MacBeth; Lakewood S. S. Co. owner of vessel.
 POMONA.—Weyerhaeuser Lumber Co. owner of vessel; station operated and controlled by R. C. A. (U. S. L.).
 PRESIDENT HARDING.—W. I., add 706.
 PRESIDENT MCKINLEY.—System, Federal arc and Navy-Simon spark, 1000; w. I., add 706.
 PRINCETON.—W. I., add 706.
 REDWOOD.—W. I., 300, 600.
 RICHMONDAL.—Name changed to *Beaconlight*.
 ROBERT E. HOPKINS.—W. I., add 450.
 ROBERT LUCKENBACH.—System, Navy, 1000; w. I., add 706.
 ROBIN GOODFELLOW.—W. I., add 706.
 ROBIN HOOD.—W. I., 300, 450, 600, 706.
 SABOTAWAN.—W. I., add 706.
 SAGUA.—W. I., add 706.
 SAGUACHE.—W. I., add 706.
 ST. PAUL.—Julius Hausmann owner of vessel.
 SALAAM.—W. I., add 706.
 SALEM COUNTY.—Name changed to *Galena*.
 SAN MATEO.—W. I., 300, 450, 600, 706; United Fruit S. S. Corp. owner of vessel.
 SANTA EULALIA.—W. I., add 706.
 SANTA BARBARA.—W. I., add 706.
 SANTA PAULA.—Range, 300; w. I., add 450.
 SANTA ROSALIA.—W. I., add 706.
 SATSUMA.—W. I., add 706.
 SCHROON.—Name changed to *Brush*.
 SCOTTSBURG.—W. I., add 706.
 SEA GULL.—W. I., add 706.
 SELMA CITY.—W. I., add 706.
 SHICKSHINNY.—Fair Oaks S. S. Corp. owner of vessel.

- SILVER SHELL.—W. l., add 706.
 STANLEY DOLLAR.—Dollar S. S. Line owner of vessel.
 STEEL AGE.—W. l., add 706.
 STEELMAKER.—System, R. C. A., 1000; w. l., add 706.
 STEEL MAHINER.—W. l., add 706.
 SUDUFFCO.—Rates, 8 cents per word; station operated and controlled by R. C. A.
 SUEDECO.—Range, 300; system, Navy-Liberty, 1000; w. l., 300, 450, 600.
 SURELCO.—Range, 300; system, Navy, 1000; w. l., 300, 450, 600.
 SUFFOLK.—System, Navy-Lowenstein, 1000; w. l., 300, 600, 706.
 SUMANCO.—Range, 300; system, Navy-Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, 600.
 SUNUGENTCO.—Rates 8 cents per word; station operated and controlled by R. C. A.
 SUPHENCO.—Range, 300; system, Navy, 1000; w. l., 300, 450, 600, 706; rates, 8 cents per word; station operated and controlled by R. C. A.
 SUREMICO.—Rates, 8 cents per word; station operated and controlled by R. C. A.
 SURINAM.—W. l., add 706.
 TEXAS.—W. l., add 706.
 THE HARVESTER.—System, R. C. A., 1000; w. l., 300, 600.
 THE LAMBS.—W. l., add 706.
 TIDE.—Range, 300; system, R. C. A., 1000; w. l., 300, 600, 706.
 TILICUM.—Range, 150; system, Kilbourne & Clark, 1000; w. l., 300, 450, 600; services, PG; hours, X; rates, 8 cents per word; station operated and controlled by owner of vessel.
 TIONESTA.—W. l., 300, 600, 706.
 T. J. WILLIAMS.—W. l., add 706.
 TRINIDADIAN.—System, I. W. T. Co., 1000; w. l., 300, 450, 600.
 TRI MOUNTAIN.—Range, 300; system, Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, 600, 706; Bermuth Lembecke Co. owner of vessel.
 VALDEZ.—Name changed to Brockton; Rutland Lake Michigan Transit Co. owner of vessel.
 VINITA.—Sudden & Christenson owner of vessel.
 VIRGINIA OLSON.—Oliver J. Olson & Co. owner of vessel.
 VIRGINIA EXPRESS.—W. l., add 706.
 VIRGINIAN.—W. l., add 706.
 WALTER JENNINGS.—W. l., add 706.
 WEKKA.—W. l., add 706.
 WEST AFRICA.—System, Federal arc and Navy spark, 1000; w. l., 300, 450, 600, 1800.
 WEST CAMAK.—W. l., add 706.
 WEST CAMARGO.—Station operated and controlled by I. W. T. Co.
 WEST CHATALA.—W. l., add 706.
 WEST DURFEE.—Station operated and controlled by I. W. T. Co.
 WEST ELCASCO.—W. l., add 706.
 WEST ERRAL.—Station operated and controlled by I. W. T. Co.
 WEST HOBOMAC.—Station operated and controlled by I. W. T. Co.
 WEST ISLIP.—System, Navy-Kilbourne & Clark, 1000; station operated and controlled by I. W. T. Co. (U. S. L.).
 WEST ISOM.—W. l., 300, 450, 600, 706; station operated and controlled by I. W. T. Co.
 WEST KADER.—System, Navy-Kilbourne & Clark, 1000.
 WEST MAHOMET.—W. l., add 706.
 WEST MUNHAM.—Station operated and controlled by I. W. T. Co.
 WEST WAUNA.—System, Navy-R. C. A., 1000; w. l., add 706.
 WESTERN GLEN.—W. l., add 706.
 WESTLAND (KJX).—Station operated and controlled by R. C. A.
 WESTERN STATES.—W. l., 300, 600, 706.
 WESTERNER.—W. l., add 706.
 WESTWEGO.—W. l., add 706.
 W. H. TILFORD.—W. l., add 706.
 WILLIAM A. MCKENNEY.—W. l., add 706.
 WILLIAM BOYCE THOMPSON.—W. l., 300, 450, 600.
 WILLIAM G. MATHER.—W. l., 300, 600.
 WILLIAM ISOM.—W. l., add 706.
 WILLSOLO.—W. l., add 706.
 WINSTON-SALEM.—Station operated and controlled by I. W. T. Co.
 WYTHEVILLE.—W. l., add 706.
 YORBA LINDA.—Range, 300; station operated and controlled by F. T. Co.
 Strike out all particulars of the following-named vessels: Allen, Caesar, Lake Tulare, Maud F., Point Adams, Swiftstar, Van Camp No. II, Wisdom II, and Worrell Clarkson.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDEA, read Virginia Despatch; KDFQ, read Gulfstate; KDLC, read W. D. Anderson; KDTJ, read Emidio; KDXN, read A. D. MacBeth; KIJM, read Brush; KLUE, read Robert Johnson; KLUI, read Dorothy Wintermote; KODR, read Galena; KUBJ, read Republic; KUSK, read Tejon; KUTX, read Beaconlight; KZOU, read John Gehm; WGO, signal changed to WPA; WSF, read Mary E. Moore; WVOE, read El Cedro; WTUO, read Cape Henlopen; WAK, read Brockton; strike out all particulars following the call signals, KDAK, KDBK, KEY, KPHK, KDNM, KDPF, KDXC, KFIA, KQT, KYG, WDX, and WES.

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, 1923.]

- KDPT (San Diego, Calif.).—W. I., 244, kc. 1230.
 KDZB (Bakersfield, Calif.).—W. I., 240, kc. 1250.
 KDZT (Seattle, Wash.).—Power, 10.
 KFAW (Santa Ana, Calif.).—W. I., 280, kc. 1070; station operated and controlled by the Radio Den (W. B. Ashford).
 KFBO (San Diego, Calif.).—W. I., 278, kc. 1080.
 KFBK (Sacramento, Calif.).—Power, 100; w. I., 283, kc. 1060.
 KFCD (Salem, Oreg.).—Power, 20; station operated and controlled by Salem Electric Co. (F. S. Barton).
 KFCK (Colorado Springs, Colo.).—W. I., 242, kc. 1240.
 KFCV (Houston, Tex.).—Power, 10.
 KFDP (Des Moines, Iowa).—Power, 100.
 KFHB (Hood River, Oreg.).—Power, 5.
 KFIJ (Platte, S. Dak.).—Power, 10.
 KFJD (Greeley, Colo.).—Power, 50.
 KGB (Tacoma, Wash.).—Power, 50; w. I., 252, kc. 1190; station operated and controlled by Tacoma Daily Ledger.
 KJR (Seattle, Wash.).—Power, 100.
 KNV (Los Angeles, Calif.).—W. I., 256, kc. 1179.
 KTW (Seattle, Wash.).—Power, 500.
 KUY (El Monte, Calif.).—W. I., 256, kc. 1170.
 KXD (Modesto, Calif.).—Power, 10; w. I., 252, kc. 1190.
 KYQ (Honolulu, Hawaii).—Power, 20.
 WAAF (Chicago, Ill.).—W. I., 286 only, kc. 1050.
 WABF (Mount Vernon, Ill.).—Power, 100.
 WBAW (Marietta, Ohio).—Power, 250.
 WCAH (Columbus, Ohio).—Power, 100.
 WCAS (Minneapolis, Minn.).—W. I., 246, kc. 1220.
 WCAU (Philadelphia, Pa.).—Power, 250.
 WCAY (Milwaukee, Wis.).—Power, 250.
 WDAG (Amarillo, Tex.).—W. I., 263, kc. 1140.
 WDAH (El Paso, Tex.).—Power, 100; w. I., 268, kc. 1120.
 WDAY (Fargo, N. Dak.).—Station operated and controlled by Fargo Radio-Electric Co.
 WDZ (Tuscola, Ill.).—Power, 10.
 WEAM (North Plainfield, N. J.).—W. I., 252, kc. 1190.
 WEAS (Washington, D. C.).—Power, 50.
 WGAQ (Shreveport, La.).—Power, 100.
 WGF (Des Moines, Iowa).—Power, 100.
 WGL (Philadelphia, Pa.).—Power, 500.
 WHAG (Cincinnati, Ohio).—Power, 200.
 WHN (Ridgewood, N. Y.).—Changed to New York, N. Y.
 WIAI (Springfield, Mo.).—W. I., 252, kc. 1190.
 WJAT (Marshall, Mo.).—Power, 10.
 WJAZ (Chicago, Ill.).—Power, 1000.
 WJH (Washington, D. C.).—Station operated and controlled by William P. Boyer Co.; w. I., 273, kc. 1100.
 WLAL (Tulsa, Okla.).—Station operated and controlled by Naylor Electrical Co. (Sim Naylor).
 WLAX (Greencastle, Ind.).—Power, 10.
 WMAC (Ozenovia, N. Y.).—Power, 200.
 WMAH (Lincoln, Nebr.).—Power, 100.

WNAL (Omaha, Nebr.).—Power, 20; w. l., 242, kc. 1240.
 WOAX (Trenton, N. J.).—Power, 100.
 WQAZ (Abilene, Tex.).—Station operated and controlled by West Texas Radio Co.
 WQAS (Lowell, Mass.).—Power, 100.
 WQAX (Peoria, Ill.).—Power, 10.
 WRAX (Gloucester City, N. J.).—Power, 100.
 WRW (Tarrytown, N. Y.).—Power, 500; station operated and controlled by Tarrytown Radio Research Laboratory (Koenig Bros.).
 WSAL (Brookville, Ind.).—Power, 10.
 WSY (Birmingham, Ala.).—W. l., 360 only.
 Strike out all particulars of the following-named stations: KFDB, San Francisco, Calif.; KFIJ, Platte, S. Dak.; KGO, Altadena, Calif.; WEAD, Atwood, Kans.; WGM, Atlanta, Ga.; WJAK, Stockdale, Ohio; WJAP, Duluth, Minn.; WLAY, Fairbanks, Alaska; WNAY, Baltimore, Md.; WQAY, Hastings, Nebr.; WRP, Camden, N. J.; and WSAQ, Dartmouth, Mass.

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, 1923, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

CLEVELAND, OHIO (WWO).—W. l., 3795, 3998.
 FORT McARTHUR, TEX.—Read Fort McArthur, Calif.
 PITTSBURGH, PA.—Range, 150; system, composite c. w. and i. c. w.; w. l., variable.
 Strike out all particulars of the following-named stations: Akutan, Alaska, and Cleveland, Ohio (NRH).

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, 1923, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

Strike out all particulars of the following-named vessels: *Santa Leonora* and *South Bend*.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

WUCK, read Fort McArthur, Calif.; strike out all particulars following the call signals KEXQ, KIML, KTK, and NRH.

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, 1923.]

BIRMINGHAM, ALA. (5ZAS).—Address, 1218 Magnolia Avenue.
 CHICAGO, ILL. (9ZN).—Address, 5525 Sheridan Road.
 COLUMBUS, OHIO (8ZAF).—Address, 1816 Devon Road.
 EAGLE ROCK, CALIF. (6XAT).—Address, 5118 Lindmont Street.
 HOUSTON, TEX. (5ZE).—Address, Avenue A, between Second and Third Avenues.
 HOUSTON, TEX. (5ZO).—Address, 1103 McGowen Avenue.
 LOS ANGELES, CALIF. (6XAS).—Address, 1209 Crenshaw Boulevard.
 LOS ANGELES, CALIF. (6ZR).—Address, 1004 Avenue Thirty-seventh West.
 MEMPHIS, TENN. (5ZB).—Address, 359 North McLean Boulevard.
 OGDEN, UTAH (6ZAM).—Address, 1260 Jefferson Street.
 OKLAHOMA, OKLA. (5ZAV).—Address, 223 East Fourth Street.
 SALT LAKE CITY, UTAH (6ZA).—Address, 400 Main Street.
 SALT LAKE CITY, UTAH (6ZT).—Address, 247 East Seventh South Street.
 SAN ANTONIO, TEX. (5ZAK).—Address, 102 Diaz Street.
 Strike out all particulars of the following-named stations: Belmar, N. J. (2XAO); Connelleville, Pa. (portable, 8XAQ); Elgin, Ill. (9ZG); and New York, N. Y. (2XAW).

MISCELLANEOUS.

ALASKAN STATIONS CLOSED UNTIL NEXT SEASON.

The following-named stations closed until next season on the dates set after their names: Becharof (KUDV), August 9; Carlisle (KOV), August 16; Clarks Point (KHG), August 4; Daly (KDJT), August 11; Egegik (KMF), August 8; Ekuk (KMG), August 12; Hawk Inlet (KKAI), July 16; Ikatan (KXW), August 20; Kog-

giung (moored vessel, KUBK), July 25; Koggiung (KVV), August 11; Kvichak (KHB), August 16; Libbyville (KMT), August 18; Nahnke (KHT), August 16; Nahnke (KMK), August 11; Nelson Lagoon (KXV), August 12; Nushagak (KKA), August 5; Pilot Point (KUDT), August 5; Port Moller (KWR), August 19; Ruby (moored vessel, KDRH), July 26; Snag Point (KHF), August 9; Ugashik (KMU), August 5; Unga (KVI), July 21; Warren (KDJU), August 15.

NEW LIST OF RADIO STATIONS IN PREPARATION.

The annual list of Commercial and Government Radio Stations of the United States, edition June 30, 1923, has gone to press and will be ready for distribution about the first of next month. The list of Amateur Radio Stations of the United States also has gone to press. At this time no information can be given as to the date when it will be off the press and ready for distribution. The exact date when these publications may be purchased from the Superintendent of Documents will be published in a future edition of the Bulletin.

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. The 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 described in detail in Bureau of Standards Circular No. 138, A Decimal Classification of Radio Subjects—An Extension of the Dewey System. A copy of this publication may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

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 given in Bureau of Standards Circular No. 138. 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 subject, 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 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.

R000.—Radio communication.

- R007.1 The new amateur regulations. QST, 7, pp. 13-15, August, 1923.
 R007.2 Davis, H. M. How to get a radio license. Popular Radio, 4, pp. 187-195, September, 1923.
 R007.4 Lawrence, L. Control of radio in Manitoba. Radio Bug (Canada), 1, p. 7, July, 1923.
 R007.4 Lapointe, E. Résumé de bill concerning Canadian broadcasting stations. Radio News of Canada, 2, pp. 15-16, August, 1923.
 R010 Un laboratoire industriel de Télégraphie sans fil en France. Radioélectricité, 4, pp. 253-259, July 15, 1923.
 R010 Pohlmann, B. Verstärkerämter: Nach einem Vortrag gehalten am 26 Januar 1923 im Elektrotechnischen Verein. Telegraphen und Fernsprechtechnik, 12, pp. 21-28, May, 1923.
 R010 National Physical Laboratory (annual report for 1922). Electrician, 91, pp. 35-36, July 13, 1923.
 R010 Rapport du Secrétaire général sur le fonctionnement de la Société de Amis de la télégraphie sans fil pendant l'année 1922-23. L'Onde Electrique, 2, pp. 317-326, June, 1923.
 R030 Definition of radio terms (with symbols). Radio News, 5, p. 284, September, 1923.

R100.—Radio principles.

- R100 Machson, A. Principles of radio telegraphy. *Radio* (San Francisco), 5, pp. 22-24, August, 1923.
- R113.1 Final report on the fading tests. *QST*, 7, pp. 29-34, August, 1923.
- R113.1 Burne, W. E., and Cash, J. A. Fading. *Wireless World and Radio Review*, 12, pp. 510-513, July 21, 1923.
- R113.4 Watts, R. A. W. Observations on atmospherics (with discussion). *Wireless World and Radio Review*, 12, pp. 604-612, August 1, and pp. 636-637, August 8, 1923.
- R114 Masoy, R. Les perturbations atmosphériques (with short bibliography). *L'Onde Electrique*, 2, pp. 391-406, July, 1923.
- R114 Austin, L. W. Receiving measurements and atmospheric disturbances at the U. S. Naval Radio Research Laboratory, Bureau of Standards, Washington, March and April, 1923. *Proc. Inst. Radio Engrs.*, 11, pp. 333-338, August, 1923.
- R114 de Bellescize, H. Perturbations atmosphériques set communications par telegraphie sans fil. *Radioelectricité*, 4, pp. 17-21, July 15, 1923.
- R120 Nikirk, T. R. What and how on outside antennas. *Radio Journal* (Los Angeles), 2, pp. 77-78, August, 1923.
- R125.1 Apropos de la radiogoniométrie: Les radiogoniomètres à cadres perpendiculaires. *Radioelectricité*, 4, pp. 265-269, July 15, 1923.
- R125.6 Austin, L. W. Loop unidirectional receiving circuits for the determination of the direction of atmospheric disturbances. *Proc. Inst. Radio Engrs.*, 11, pp. 325-327, August, 1923.
- R125.6 Alexanderson, E. F. W. Unidirectional radio receiving system. U. S. Patent No. 1465108, issued August 1, 1923.
- R125.6 Robinson J. Directional wireless (continued from July issue). *Modern Wireless* (London), 1, pp. 523-526, August, 1923.
- R131 Prove sulle valvole triodiche per radiotelegrafia. *Elettrotecnica*, 10, p. 425, July 5, 1923.
- R131 Vicedomini, P. Prove comparative su triodi per apparati riceventi radio telegrafici. *Elettrotecnica*, 10, pp. 426-432, July 5, and pp. 450-454, July 15, 1923.
- R131 Selection of vacuum tubes. *Radio News*, 5, p. 272, September, 1923.
- R131 Marx, H. J. Difficult tube characteristics explained. *Radio Digest Illustrated*, 6, p. 13, August 4, 1923.
- R131 Snyder, M. L. Notes on vacuum tubes. *Wireless Age*, 10, pp. 68-69, August, 1923.
- R131 Fromy, E. Quelques remarques sur le fonctionnement d'une lampe détectrice. *L'Onde Electrique*, 2, pp. 411-419, July, 1923.
- R131 Harris, J. W. Electron emitting cathode and process of manufacturing the same. U. S. Patent No. 1463413, issued August 7, 1923.
- R131 Rodgers, W. W. How vacuum tubes are made (WD-11 and WD-12). *Radio Broadcast*, 8, pp. 397-403, September, 1923.
- R131 White, W. C. The thoriated tungsten filament (UV-199 and 201A). *Radio Broadcast*, 8, pp. 375-381, September, 1923.
- R131 Roberts, J. H. T. The development of high-power silica valves. *Modern Wireless* (London), 1, pp. 535-539, August, 1923.
- R131 Wilson, W. Thermionically-active substance and method of making the same. U. S. Patent No. 1464124, issued August 7, 1923.
- R131 Wolfers, F. Propriétés des filaments de tungstène. *Radioelectricité*, 4, pp. 22-24, July, 1923.
- R133 Prince, D. C. Vacuum tubes as power oscillators (continued from June issue). *Proc. Inst. Radio Engrs.*, 11, pp. 405-435, August, 1923.
- R134.45 Hulbert, E. O. On superregeneration. *Proc. Inst. Radio Engrs.*, 11, pp. 391-394, August, 1923.
- R134.45 Slocum, T. N. A wonder one-tube portable super. *Radio* (San Francisco), 5, pp. 17-18, August, 1923.
- R134.7 Loewe, S. Receiving apparatus for high-frequency signaling. U. S. Patent No. 1464083, issued August 7, 1923.
- R134.75 Leutz, C. E. Notes on the superheterodyne receiver. *Electrician*, 91, pp. 30-32, July 13, 1923.
- R134.8 Bertram, G. E. M., and Cairns, C. F. Reflex circuits. *Radio News of Canada*, 2, pp. 29, 32-33, August, 1923.
- R134.8 Harris, F. W. The ST 75 an interesting dual amplification receiver. *Modern Wireless* (London), 1, pp. 481-485, August, 1923.
- R141 Slooper, M. B. Some notes on tuned circuits. *Radio Broadcast*, 8, pp. 404-406, September, 1923.
- R145.5 Dempster, J. B., and Hulbert, E. O. Standards of capacity particularly for radio-frequency currents. *Proc. Inst. Radio Engrs.*, 11, pp. 399-404, August, 1923.
- R162 Snyder, J. Selectivity and its applications to reception. *Radio* (San Francisco), 5, p. 31, August, 1923.

R200.—Radio measurements and standardization.

- R210 Winters, S. R. Frequency indicator for broadcasting. *Wireless Age*, 10, p. 61, August, 1923.
- R230 Reissner, A. Practical tables for inductance and coil calculations. *Wireless Age*, 10, p. 70, August, 1923.
- R270 Cowper, A. D. The measurement of signal strength (continued from July issue). *Modern Wireless* (London), 1, pp. 514-518, August, 1923.
- R281.31 Riddle, F. H. The production of porcelain for electrical insulation—Part 4. *Jour. Amer. Inst. Elec. Engrs.*, 42, pp. 743-747, July, 1923.
- R281.35 Hard rubber in radio instruments. *QST*, 7, pp. 35-36, August, 1923.
- R281.47 Stewart, P. M. Varnish, paint, or waterproofing composition and process for making same. U. S. Patent No. 1464234, issued August 8, 1923.
- R281.47 Lloyd, R. S. Composition for varnish. U. S. Patent No. 1462236, issued July 17, 1923.

R300.—Radio apparatus and equipment.

- R340 Trimble, R. F. Electrode and its construction. U. S. Patent No. 1465381, issued August 21, 1923.
- R341 Nicola, H. W. Vacuum tube apparatus. U. S. Patent No. 1463422, issued July 31, 1923.
- R342 Arnold, H. De F. Vacuum tube amplifier. U. S. Patent No. 1465332, issued August 21, 1923.
- R342 Brillouin, L. N. Telephone and wireless telegraphy installation. U. S. Patent No. 1453230, issued August 21, 1923.
- R342.3 Robinson, E. H. Stabilizing reactance-capacity coupled amplifiers. *Wireless World and Radio Review*, 12, pp. 514-517, July 21, 1923.
- R342.5 Keddall, G. P. A power amplifier (used with loud speaker). *Modern Wireless* (London), 1, pp. 498-502, August, 1923.

- R342.6 Scott-Taggart, J. A new high-frequency amplifying system. *Modern Wireless* (London), 1, pp. 506-509, August, 1923.
- R342.6 Munitz, A. L. Haselina's neodyne receiver. *Radio Journal* (Los Angeles), 8, pp. 80-83, August, 1923.
- R343 The dirotel receiver. *Radio and Model Engineering*, 3, pp. 120-127, 1923.
- R343 Reimsen, A. Various types of receiving sets. *Wireless Age*, 10, pp. 65-67, August, 1923.
- R343 Loewe, S. Radio receiving system. U. S. Patent No. 1464333, issued August 14, 1923.
- R343 Kolster, F. A. Radio receiving method and apparatus. U. S. Patent No. 1463322, issued August 7, 1923.
- R343 Cockaday, L. M. How to build the Haynes DX receiver. *Popular Radio*, 4, pp. 222-229, September, 1923.
- R343.7 Nicols, H. W. Signaling. U. S. Patent No. 1463433, issued July 31, 1923.
- R344.3 James, W. Wireless telephony—Choice control transmitter for experiments. *Wireless World and Radio Review*, 12, pp. 580-583, August 1, 1923.
- R344.3 Felder, L. R. Continuous wave and radiophone transmitter. *Radio News*, 5, 270-271, September, 1923.
- R348 Chireix, H. Receiving system. U. S. Patent No. 1462882, issued July 24, 1923.
- R348 Nicolson, A. McL. Selective apparatus for signaling circuit. U. S. Patent No. 1464104, issued August 7, 1923.
- R348 Read, H. S. Electric circuits. U. S. Patent No. 1464111, issued August 7, 1923.
- R374 Pierman, A. N. Mounting for stems of crystal detectors. U. S. Patent No. 1463554, issued July 31, 1923.
- R375 de Roos, J. L. De electrolytische gelijkrichter. *Radio Nieuws*, 6, pp. 296-270, August, 1923.
- R376 Kennedy, A. E. Theoretical and experimental study of the telephone receiver. *Post Office Elec. Engrs. Jour.*, 16, pp. 144-171, July, 1923.
- R377 Hanson, E. C., and Carlson, W. L. Radiotelegraph system. U. S. Patent No. 1463391, issued July 31, 1923.
- R377 Carlson, W. L., and Hanson, E. C. Radio telegraph system. U. S. Patent No. 1463386, issued July 31, 1923.
- R381 Goldstone, F. J. Electric condenser. U. S. Patent No. 1465264, issued August 21, 1923.
- R381 Cardwell, A. D. What you should know about condensers. *Radio Broadcast*, 3, pp. 430-434, September, 1923.
- R381 Chapman, E. H. The measurement of wireless quantities—Capacity of fixed condensers. *Modern Wireless* (London), 1, pp. 530-534, August, 1923.
- R382 Kendall, G. P. Multi-layer coils. *Radio News*, 5, pp. 268-269, September, 1923.
- R382 Lodge, O. Helpful formulas for designing your coils. *Popular Radio*, 4, pp. 230-234, September, 1923.
- R382.6 Mould, J. T. Honeycomb inductance coils. *Wireless World and Radio Review*, 12, pp. 620-624, August, 8 1923.
- R385 Dettienbaugh, F. S. Electric filters (continued from July issue). *QST*, 7, pp. 18-25, August, 1923.
- R386 An explanation of radio filters. *Radio and Model Engineering*, 3, pp. 128-130, 1923.
- R387.1 Wolf, M. Shielding of receivers. *Wireless Age*, 10, pp. 71-72, August, 1923.

R400.—Radio communication systems.

- R402 Winters, S. R. Directive radio transmission on a wave length of 10 meters. *Wireless Age*, 10, pp. 55-56, August, 1923.
- R412 Heising, R. A. Signaling. U. S. Patent No. 1465358, issued August 21, 1923.
- R412 Carson, J. R. Translating circuit. U. S. Patents Nos. 1463796 and 1463796, issued August 7, 1923.
- R412 Loewe, S. Thermionic translating device. U. S. Patent No. 1463475, issued July 31, 1923.
- R431 Resonance wave coil (interview with Dr. Cohen). *QST*, 7, p. 36, August, 1923.
- R431 Marriott, R. H. Interference. *Proc. Inst. Radio Engrs.*, 11, pp. 375-390, August, 1923.
- R431 Marchant, E. W. Methods of reducing interference in wireless receiving sets (with discussion). *Wireless World and Radio Review*, 12, pp. 463-466, July 7, and pp. 496-498, July 14, 1923.
- R431 Scott Taggart, J. Undesirable noises in valve receivers and their prevention. *Modern Wireless* (London), 1, pp. 480-492, August, 1923.
- R435 Botty, W. E. Method of and means for secret signaling. U. S. Patent No. 1464085, issued August 7, 1923.
- R435 Hartley, R. V. L. Secret signaling. U. S. Patent No. 1464093, issued August 7, 1923.
- R440 Espenschied, L. L., and Bown, R. Call system of radiotelephony. U. S. Patent No. 1464265, issued August 14, 1923.
- R440 Heising, R. A. Radio communication. U. S. Patent No. 1465357, issued August 21, 1923.
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- R513 Radio fog signals (stations operated by U. S. Lighthouse Service). *Wireless Age*, 10, p. 77 August, 1923.
- R521.1 Chandier, C. K. Directional wireless telegraphy in aircraft. *Jour. Inst. Elec. Engrs. (London)*, 61, pp. 803-811, July, 1923.
- R525 Booth, W. T. Antenna system (airplane antenna). U. S. Patent No. 1464188, issued August 7, 1923.
- R545 We hear from our friends in Australia (transcontinental amateur tests). *Radio Journal* (Los Angeles), 3, pp. 64-57, August, 1923.
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- R550 Baker, W. B. G. Description of the General Electric Co.'s broadcasting station at Schenectady, N. Y. *Proc. Inst. Radio Engrs.*, 11, pp. 339-373, August, 1923.
- R550 Eckersteij, P. P. The British Broadcasting Co.'s position. *Modern Wireless* (London), 1, pp. 485-488, August, 1923.
- R550 Wells, W. B. Broadcasting in Great Britain is threatened. *Radio Bug* (Canada), 1, p. 8, July, 1923.
- R551.1 Driencourt, L. Emploi de la telegraphie sans fil pour la détermination des longitudes et l'unification de l'heure. *L'Onde Electrique*, 2, pp. 377-390, July, 1923.
- R570 Hammond, J. H., Jr. System for the transmission and reception of radiant energy. U. S. Patent No. 1463994, issued August 7, 1923.
- R599 Russia develops the radio. *Radio Bug* (Canada), 1, p. 6, July, 1923.

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- 347.7 Harbord, J. G. Patents and the public. *Wireless Age*, 16, pp. 50-60, August, 1923.
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BALANCED TRANSFORMER METHOD FOR MEASURING RESISTANCE CAPACITY AND INDUCTANCE AT RADIO FREQUENCIES.

A method has been developed for measuring rapidly radio-frequency resistance, capacity, inductance, and impedance. This method involves a balance between a standard and the instrument under test and uses a balanced transformer for securing the adjustment. It covers the entire range of frequencies used in radio work. It has the inherent advantage that the test sample is in the circuit at the same time as the standard. The method is independent of the impressed electromotive force. It seems to be a reliable zero method and makes possible, for example, the determination of the inductance of very small coils or short, straight wires. A publication describing this method will be issued later on and announced in the *Radio Service Bulletin*.

RADIO-FREQUENCY PHASE DIFFERENCE AND DIELECTRIC CONSTANT OF INSULATING MATERIALS.

A paper is in preparation giving the radio-frequency properties of some miscellaneous electrical insulating materials. This paper will present some data on the radio-frequency phase difference and dielectric constant of some miscellaneous electrical insulating materials, such as asbestos filled materials, celluloid films, cellulose nitrate, khotinski cement, vulcanized fiber, glass, marble, mica, paper, pulp-board, slate, varnish, wax, and wood. These data do not represent a complete study of any of the materials. They are useful, however, to the radio engineer or amateur who has use for various types of electrical insulating materials. The place and date of publication will be announced in the *Radio Service Bulletin*.

RADIO SIGNALS OF STANDARD FREQUENCY.

Below is given the schedule of transmissions of standard frequency signals from WWV, Bureau of Standards at Washington, D. C. These signals should be of interest to all transmitting station operators, as they may be used for checking wave meters and adjusting transmitting and receiving apparatus. Their accuracy is better than three-tenths of 1 per cent. Information regarding their use was given in the February (1923) issue of the *Radio Service Bulletin*. More detailed information is given in Bureau of Standards Letter Circular No. 92, which may be obtained on application to that bureau.

Commercial and ship operators should be especially interested in the transmission of October 20. This transmission includes most of the frequencies assigned to marine and commercial traffic. The transmission on November 5 covers the frequency band used by class B broadcasting stations. Measurements made at the Bureau of Standards of the frequencies on which broadcasting stations are operating indicate that a few stations are not remaining on their assigned frequencies, and hence are causing interference with programs from their own as well as other broadcasting stations. This situation can be relieved by using these signals to calibrate a wave meter for use in adjusting transmitting equipment. The signals on November 20 cover approximately the same band as those of October 20. The frequencies transmitted on December 5 cover those used by all broadcasting stations, as well as some used by amateurs. This complete schedule has been so planned that a wave meter may be accurately calibrated over a range from 150 to 1,700 kilocycles if all the transmissions are received.

The procedure will be slightly different from that followed in past transmissions. All transmission will be by unmodulated continuous-wave telegraphy, and no announcements will be made by voice. The time of transmitting any one frequency

is thus considerably reduced. The procedure followed during these transmissions will in other respects be similar to that followed in the past. A complete frequency transmission will include a "general call," a "standard frequency signal," and "announcements." The "general call" will be given at the beginning of the 8-minute period and will continue for about 2 minutes. This will include a statement of the frequency. The "standard frequency signal" will be a series of very long dashes with the call letters WWV intervening. This signal will continue for about 4 minutes. The "announcements" will be on the same frequency as the "standard frequency signal" just transmitted and will contain a statement of the measured frequency. An announcement of the next frequency to be transmitted will then be given. There will then be a 4-minute interval while the transmitting set is adjusted for the next frequency. With sensitive receiving apparatus, it should be possible to receive these signals anywhere east of the Mississippi River.

Schedule of standard frequency transmission from WWV.

[Wave length in meters is given in parentheses.]

Eastern standard time.	Kilocycles.			
	Oct. 20.	Nov. 5.	Nov. 20.	Dec. 5.
11 to 11.08 p. m.	166.5 (1,800)	500 (600)	150 (1,999)	500 (600)
11.12 to 11.20 p. m.	220 (1,363)	580 (517)	190 (1,578)	790 (428)
11.24 to 11.32 p. m.	275 (1,090)	640 (468)	240 (1,249)	900 (338)
11.36 to 11.44 p. m.	315 (952)	700 (428)	290 (1,034)	1,100 (273)
11.48 to 11.56 p. m.	375 (800)	760 (394)	350 (833)	1,300 (231)
12 to 12.08 a. m.	425 (705)	833 (360)	430 (697)	1,500 (200)
12.12 to 12.20 a. m.	500 (600)	920 (328)	500 (600)	1,600 (187)
12.24 to 12.32 a. m.	686 (480)	1,000 (300)	570 (528)	1,700 (176)

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