RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

Washington, March 1, 1923—No. 71

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.
O=Government business exclusively.
Hours =Hours of operation:
N=Continuous service.
X=No regular hours.
m=a. m. (12 m=midday).
s=p. m. (12 s=midnight).
Rates =Ship or coast charges in cents: c.=cents. (The rates in the international list are given in francs and centimes.)
I. W. T. Co. =Independent Wireless Telegraph Co.
R. C. A. =Radio Corporation of America.
S. O. R. S. =Ship Owners' Radio Service.
C. w. =Continuous wave.
I. c. w. =Interrupted continuous wave.
V. t. =Vacuum tube.
FX =Fixed station.
U. S. L. =After operating company denotes that the change applies only to the

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—
Calapan, P. I. (Mindoro).[1]	.....	300, 600, 952.....	PG	.....	Philippine Insular Government.
Los Angeles, Calif.[2].....	KWH	540.....	FX	X	Examiner Printing Co.
San Ysidro, Calif.[3].....	KFN	300, 450, 600.....	FX	X	Lester Picker.

[1] Loc. (approximately) 0.121° 11′ 00″, N. 13° 24′ 30″; range, 150; system, R. C. A.; hours, 8 a. m.–12 noon, 2–5.30 p. m.; Sundays and holidays, 9–11 a. m., 2–3.30 p. m.; ship schedule last 10 minutes of each hour.
[2] Range, 150; system, composite v. t. telephone.
[3] Loc. (approximately) 0.117° 05′ 06″, N. 32° 34′ 40″; range, 150; system, composite, c. w. and spark, 700.

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—
Calawali.....	KFDT	.....	PG	N	Los Angeles S. S. Co..	
Chinampa[1].....	KFDM	5	PG	X	Standard Oil Co. of N. J.	R. C. A.
Elmore[2].....	KFFG	.....	PG	X	American Tug Boat Co.	
Eurana.....	KFDW	.....	PG	X	New York Shipbuilding Corp.	
Pennsylvania Sun.....	KFFC	8	PG	X	Sun Co.....	
Rowena.....	KFDN	.....	.....	.....	Morrill Goddard.....	
Tonawanda[3].....	KFDS	4	PG	X	Columbia River Packers Assn.	Owner of vessel.

[1] Range, 200; system, R. C. A., 1000; w. l., 300, 450, 600.
[2] Range, 150; system, Kilbourne & Clark, 1000; w. l., 300, 450, 600.
[3] Range, 200; system, composite, 1000; w. l., 300, 450, 525, 600.

Commercial land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name.	Call signal.	Name.
KFDM	Chinampa.....b	KFFC	Pennsylvania Sun.....b
KFDN	Rowena.....b	KFFG	Elmore.....b
KFDS	Tonawanda.....b	KFN	San Ysidro, Calif.....c
KFDT	Calawali.....b	KWH	Los Angeles, Calif.....c
KFDW	Eurana.....b		

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.
Bozeman Mont.....	KFDO	Lincoln, Nebr.....	KFDU
Brookville, Ind.....	WSAL	Lindsborg, Kans.....	WDAD
Chicago, Ill.....	WSAH	Lowell, Mass.....	WQAS
Chicago, Ill.....	WWAY	Mount Vernon, Wash.....	KFGF
Clemson College, S. C.....	WSAC	Oak, Nebr.....	KFEQ
Des Moines, Iowa.....	KFDP	Omaha, Nebr.....	KFCZ
Douglas, Wyo.....	KFEV	Savannah, Ga.....	WRAB
Elgin, Ill. (near).....	WTAS	Syracuse, N. Y.....	WBAB
Fayetteville, Ark.....	KFDV	Washington, D. C.....	WQAW
Fort Dodge, Iowa.....	KFER	Westhampton, Va.....	WQAT

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

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

Call signal.	Station operated and controlled by—	Location of station.	Wave lengths.	Power to antenna (watts).
KFCY	Western Union College	Le Mars, Iowa	360	100
KFCZ	Omaha Central High School	Omaha, Nebr	360	200
KFDO	H. Everett Cutting	Bozeman, Mont., 420 West Koch Street.	360	50
KFDP	Hawkeye Radio & Supply Co	Des Moines, Iowa	360	250
KFDR	Bullock's Hardware & Sporting Goods (Robert G. Bullock).	York, Nebr	360	10
KFDU	Nebraska Radio Electric Co	Lincoln, Nebr	360	20
KFDV	Gilbreth & Stinson	Fayetteville, Ark	360	100
KFEQ	J. L. Scroggin	Oak, Nebr	360	200
KFER	Auto Electric Service Co	Fort Dodge, Iowa	360	20
KFEV	Radio Electric Shop	Douglas, Wyo	360, 485	100
KFGF	Buchanan Stevens & Co	Mount Vernon, Wash	360	10
WBAB	Andrew J. Potter	Syracuse, N. Y	360	20
WDAD	Central Kansas Radio Supply (Wm. L. Harrison).	Lindsborg, Kans	360	10
WQAS	Prince-Walter Co	Lowell, Mass	360	10
WQAT	Radio Equipment Corp	Westhampton, Va	360	50
WQAV	Huntington & Guerry (Inc.)	Greenville, S. C	360	500
WQAW	Catholic University	Washington, D. C	360	5
WRAB	Board of Public Education	Savannah, Ga	360	
WSAC	Clemson Agricultural College	Clemson College, S. C	360	500
WSAH	A. J. Leonard, jr	Chicago, Ill., 4801 Woodlawn Avenue.	360	500
WSAL	Franklin Electric Co	Brookville, Ind	360	20
WTAS	George D. Carpenter	Elgin, Ill. (near), 665 South Street.	360	500
WWAY	Marigold Gardens (L. E. Dutton)	Chicago, Ill	360	500

Government land stations, alphabetically by names of stations.

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

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Camp Nichols, P. I. (Rizal Province).	WYT		O		U. S. Army.
Camp Stotsenburg, P. I. (Clark Field).	WYS		O		Do.
Corregidor, P. I. (Kindley Field).	WYR		O		Do.
Cristobal, C. Z. (France Field).	WYP		O		Do.
Moundsville, W. Va. (Langin Field).	WYI		O		Do.
Pearl Harbor, Hawaii (Luke Field, Ford Island).	WYQ*		O		Do.
Rantoul, Ill. (Chanute Field).	WYJ		O		Do.
West Point, N. Y	WUAH	1100	O		Do.

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.	Wave lengths.	Service.	Hours.	Station controlled by—
Dellwood [1]	WXR	300, 600, 2400, variable.	O	X	U. S. Army.

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.
WUAH	West Point, N. Y.....c	WYQ	Pearl Harbor, Hawaii.....c
WXR	Dellwood.....b	WYR	Corregidor, P. I.....c
WYI	Moundsville, W. Va.....c	WYS	Camp Stotsenburg, P. I.....c
WYJ	Rantoul, Ill.....c	WYT	Camp Nichols, P. I.....c
WYP	Cristobal, Canal Zone.....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—
Beatty, Pa.....	8YAG	600, 375.....	St. Vincents College.
Chicago, Ill.....	9XY	Variable.....	Westinghouse Electric & Mfg. Co.
Columbus, Ohio.....	8XAT	600; 375.....	Superior Radio & Telephone Equipment Co.
Glenbrook, Conn.....	1XAK	600, 375, 375.....	Stanford Radio Service Co.
Grosse Point Farms, Mich.	8XAS	270, variable....	Henry B. Joy, 301 Lake Shore Road.
Key West, Fla.....	4XP	525.....	Aeromarine Airways (Inc.), 90 Duval Street.
Los Angeles, Calif.....	6XBC	Variable.....	Thomas E. Nikirk, 1060 West Eighty-ninth Street.
Los Angeles (portable)..	6XBD	175, 550, variable.	Los Angeles County Forestry Department.
Seattle, Wash.....	7XU	Variable.....	Rhodes Co., 1321 Second Avenue.
Washington, D. C.....	3ZK	600, 375.....	Capt. Livingston Swentzel, 2029 Thirty-fourth Street NW.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
1XAK	First district: Glenbrook, Conn.	7XU	Seventh district: Seattle, Wash.
3ZK	Third district: Washington, D. C.		Eighth district:
4XP	Fourth district: Key West, Fla.	8XAS	Grosse Point Farms, Mich.
	Sixth district:	8XAT	Columbus, Ohio.
6XBC	Los Angeles, Calif. (portable).	8YAG	Beatty, Pa.
6XBD	Do.	9XY	Ninth district: Chicago, Ill.

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.]

CAMP 60, CALIF.—W. L., 527, 1650.
CAMP 61, CALIF.—W. L., 527, 1650.
CAMP 61-C, CALIF.—W. L., 527, 1650.
CASCADA, CALIF. —W. L., 527, 1650.
JACKSON, OHIO.—Location (approximately) 0.82° 40′ 00″, N. 39° 10′ 00″.
KATALLA, ALASKA.—W. L., 300, 600, 1650.

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.]

AGWISMITH.—Range, 200; system, I. W. T. Co., 1000; w. l., 300, 450, *600*, hours, X
ATLANTA CITY.—Station operated and controlled by I. W. T. Co.
BAKERSFIELD.—Station operated and controlled by R. C. A.
BRILLIANT.—Range, 300; system, R. C. A., 1000.
BRUSH.—North Atlantic & Western S. S. Co. owner of vessel.
BUCKEYE STATE.—Name changed to President Taft.
CANIBAS.—Matson Navigation Co. owner of vessel.
CATAHOULA.—Range, 300; system, Navy-Liberty, 1000; w. l., 300, *600*.
CEDARHURST.—Range, 300; system, Navy-Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, *600*.
COMMERCIAL PATHFINDER.—Station operated and controlled by R. C. A.
COMMERCIAL SPIRIT.—Station operated and controlled by R. C. A.
COUTOLENE.—Name changed to Anthony O'Boyle.
CUBA (KDLK).—Rates, 8 c. per word.
DAUNTLESS.—System, R. C. A., 1000; service, PG; rates, 8 c. per word.
DELAWARE SUN.—Sun Oil Co. owner of vessel.
DELISLE.—W. l., 300, *600*, 1800; Baltimore S. S. Co. owner of vessel; station operated and controlled by R. C. A.
DIANA DOLLAR.—Dollar S. S. Line owner of vessel.
EASTERN GALE.—Station operated and controlled by R. C. A.
EDGAR BOWLING.—System, Navy-Lowenstein, 1000; w. l., 300, 450, *600*.
ELABETO.—Name should read El Abeto.
FLORENCE OLSON.—Name changed to Willapa.
GENERAL G. W. GOETHALS.—W. l., 300, 450, *600*.
HASTINGS.—Range, 300; system, Navy-Lowenstein, 1000; w. l., 300, 450, *600*.
HENRY S. GROVE.—Nautilus S. S. Corp. owner of vessel.
HICKMAN.—Station operated and controlled by I. W. T. Co.
J. A. TALBOT.—Name changed to F. A. Douty; range, 150; system, R. C. A., 1000; w. l., 300, 450, *600*; rates, 8 c. per word; Multnomah Lumber & Box Co. owner of vessel; station operated and controlled by owner of vessel.
J. N. PEW.—Sun Oil Co. owner of vessel.
JOHN C. KIRKPATRICK.—Andrew F. Mahony owner of vessel.
JUNEAU.—Rutland Lake Michigan Transit Co. owner of vessel.
LAKE CAYUGA.—System, Navy-Simon, 1000.
LAKE GERA.—Lone Star S. S. Co. owner of vessel.
LAKE PEPIN.—Hammond Lumber Co. owner of vessel.
LAKE SEBAGO.—Pacific Spruce Corp. owner of vessel.
LAKE SHORE.—Name changed to Olympic.
LEBEC.—Station operated and controlled by I. W. T. Co.
MAINE.—Station operated and controlled by S. O. R. S.
MARY LUCKENBACH.—System, R. C. A., 1000; w. l., 300, 450, *600*.
MOJAVE.—Station operated and controlled by I. W. T. Co.
MONTPELIER.—W. l., 300, *600*.
MUNARGO.—System, R. C. A., 1000, and I. W. T. Co., arc; w. l., 300, 450, *600*, 1800; station operated and controlled by I. W. T. Co.
ORIZABA.—System, Navy, 1000; and I. W. T. Co., arc; w. l., 300 450, *600*, 1800.
ORMIDALE.—W. l., 300, *600*; Ormidale S. S. Corp. owner of vessel.
PENNSYLVANIAN.—W. l., 300, 450, *600*; rates, 8 c. per word.
PLAINFIELD.—Name changed to Mary Weems.
POINT LOBOS.—Rates, 8 c. per word.
PRESIDENT TAFT.—Correct name President Roosevelt (original name Peninsula State).
ROBERT LEWERS.—Range, 150; system, Kilbourne & Clark, 1000.
SAGUA.—Sagamo S. S. Corp. owner of vessel.
SEA GULL.—Range, 300; system, R. C. A., 1000; w. l., 300, 450, *600*.
SOUTH BEND.—Name changed to J. L. Luckenbach.
STANLEY DOLLAR.—Name changed to W. R. Chamberlain, jr., W. R. Chamberlain owner of vessel.
STEADFAST.—W. l., 300, 450, *600*.
STEEL WORKER.—System, R. C. A., 1000.
SUCROSA.—System, R. C. A., 1000.
SUNOIL.—Sun Oil Co. owner of vessel.
SYLVAN ARROW.—Hours, X.

TANAMO.—Sagamo S. S. Corp. owner of vessel.
TUSTEM.—Range, 300; system, Federal arc, w. l., 300, *600*, 1800; station operated and controlled by S. O. R. S.
UTACARBON.—Station operated and controlled by owner of vessel.
VACUUM.—Station operated and controlled by R. C. A., 1000.
WALTER D. NOYES.—Range, 300; system, Navy-Lowenstein, 1000; w. l., 300, *600*; rates, North and South American services 4 c. per word, transoceanic 8 c. per word; station operated and controlled by owner of vessel.
WEST CAWTHON.—System, Navy-Lowenstein, 1000; w. l., 300, 450, *600*; hours, X, U. S. Shipping Board owner of vessel.
WEST COHAS.—Station operated and controlled by S. O. R. S.
WEST GREYLOCK.—Frank V. Barns owner of vessel; station operated and controlled by S. O. R. S.
WEST HESSELTINE.—W. l., 300, 450, *600*.
WEST IRMO.—U. S. Shipping Board owner of vessel.
WEST KASSON.—System, Navy-Lowenstein, 1000; w. l., 300, 450, *600*.
WILLIAM ISOM.—System, R. C. A., 1000; w. l., 300, *600*; Cuba Distilling Co. owner of vessel.
WILLIAM PERKINS.—System, Navy-Liberty, 1000; w. l., 300, 450, *600*.
WINNECONNE.—Range, 150; system, Telefunken, 1000; w. l., 300, *600*.
WINONA.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600*.
Strike out all particulars of the following-named vessels: Fordonian, Louise, New York (KSN), and Teresa.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDIV, *read* Olympic; KDRW, *read* President Taft; KDWS, *read* President Roosevelt; KENN, *read* El Abeto; KEXQ, *read* J. L. Luckenbach; KFGE, *read* F. A. Douty; WHS, *read* W. R. Chamberlain, jr.; WJEI, *read* Mary Weems; WPK, *read* Willapa; WVOU, *read* Anthony O'Boyle; strike out all particulars following the call signals KQV, KRU, KSN, KUKN, KUXQ, WCT, and WJF.

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.]

KDZQ (Denver, Colo.).—Station operated and controlled by William D. Pyle.
KFEC (Portland, Oreg.).—W. l., add 485.
WCAT (Rapid City, S. Dak.).—W. l., add 360.
WCAY (Milwaukee, Wis.).—W. l., add 485.
WDAY (Fargo, N. Dak.).—Station operated and controlled by Fargo Radio Service Co. (Kenneth M. Hance).
WEAY (Houston, Tex.).—Station operated and controlled by Iris Theater (Will Horowitz, jr.).
WIAI (Springfield, Mo.).—W. l., add 485.
WIAJ (Neenah, Wis.).—Station operated and controlled by Fox River Valley Radio Supply Co. (Quinn Brothers).
WJAN (Peoria, Ill.).—Station operated and controlled by Peoria Star; w. l., add 485.
WKAH (West Palm Beach, Fla.).—Station operated and controlled by Planet Radio Co. (R. C. Bender).
WQAN (Scranton, Pa.).—W. l., add 485.
WRAA (Houston, Tex.).—Station operated and controlled by William M. Rice Institute.
WSL (Utica, N. Y.).—W. l., add 485.
Strike out all particulars of the following-named stations: KFED, Polytechnic, Mont.; WDV, Omaha, Nebr.; WDY, Roselle Park, N. J.; WHAF, Pittsburgh, Pa.; WIAX, Lincoln, Nebr.; WJAE, San Antonio, Tex.; WJAF, Muncie, Ind.; WJK, Toledo, Ohio; WKAG, Louisville, Ky.; WLAF, Lincoln, Nebr.; WLAR, Marshalltown, Iowa; WNAF, Enid, Okla.; WOH, Indianapolis, Ind.

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.]

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.]

BURNSIDE.—Strike out all particulars.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

Strike out all particulars following the call signal WXR.

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. (3XAA).—Address, 1409 Edmonston Avenue.
ENID, OKLA. (5ZM).—Address, 211 News Building.
HOUSTON, TEX. (5YG).—Station operated and controlled by William M. Rice Institute.
LITTLE ROCK, ARK. (5XAB).—W. l., *200*, 375, variable.
LOS ANGELES, CALIF. (6XABA).—Call signal changed to 6XBA.
LOS ANGELES, CALIF. (6ZG).—Address, 5128 South Van Ness Avenue.
OKLAHOMA CITY, OKLA. (5XT).—W. l., *200*, 375, variable; station operated and controlled by E. C. Hull and H. S. Richards, 1911 West Ash Street.
OMAHA, NEBR. (9YP).—Station operated and controlled by Technical High School (Board of Education).
RENO, NEV. (6ZO).—Address, 604 Elko Avenue.
SAN FRANCISCO, CALIF. (6XACA).—Call signal changed to 6XBB.
SUNNYVALE, CALIF. (6XAG).—Station operated and controlled by Tom Lambert.
YANKTON, S. DAK. (9YAK).—W. l., *200*, 375.
Strike out all particulars of the following-named stations: Atlanta, Ga. (4XF); East Lansing, Mich. (8YG); Fort Riley, Kans. (9ZE); Peoria, Ill. (9YAN); Pittsburgh, Pa. (8XW); Portland, Oreg. (7ZT); Roanoke, Va. (3ZAB); Savannah, Ga. (4XB); and Scranton, Pa. (8ZAB).

MISCELLANEOUS.

INFORMATION FROM THE BERNE BUREAU.

Egypt.—Radiograms can be exchanged between vessels and Syria by means of the Alexandria radio station. The rate is the same as the rate for Egypt increased by an additional rate of 30 centimes per word.

Italy.—The Italian Government points out the fact that ship stations frequently transmit the same radiogram to two Italian coast stations on different dates. The Italian Government enters the radiogram twice on their accounts. In order to prevent inconveniences and the loss of money resulting therefrom, they have requested that operators of ship stations never omit the indication "duplicate" in their radiogram. The Italian Government holds that in case the word "duplicate" is omitted the ship station should be required to pay twice the coast and telegraph rate.

Brazil.—The coast station at Fernando de Noronha is open to PG service. Rate is 60 centimes per word, minimum 6 francs per radiogram.

Sweden.—Beginning February, this year, the rates of Swedish coast stations were reduced to 30 centimes per word, minimum 3 francs per radiogram.

Greece.—Beginning February 13, last, the station at Vari was opened to PG service, call letters SXB. This station replaces the station Athens No. 2.

Turkey.—Turkey has neither ship nor coast stations open to PG service. This country will not accede to certain regulations regarding the accounts for radiograms originating from foreign vessels in the harbor of Constantinople.

STORM AND WEATHER FORECASTING ON THE ATLANTIC OCEAN.

The need for and value of a weather forecasting service for the benefit of ships in mid-ocean, and especially along the routes between the United States and Europe, has been long recognized, but there have been inherent difficulties which prevented the inauguration of a service of this character. Chief among these difficulties has been the impracticability of collecting promptly and accurately current weather

east as the Grand Banks for the benefit of ships leaving North Atlantic ports and bound east. Lack of observations over the ocean areas has prevented the extension of these forecasts to cover the eastern sections of these routes. Radio now renders the collecting of observations and the disseminating of the forecasts to ships, regardless of their position in the lanes, a quite feasible matter. The cooperation of shipmasters in supplying the observations and the organizing of a forecasting system are now the essential factors in providing a service that is destined to be of inestimable value to navigation interests on the oceans. An experimental service of this character had been projected and was in readiness for trial when the outbreak of the great war put a stop to the arrangements.

It is apparent that a forecasting service for ships in mid-ocean can not be conducted from any station located on continental shores, and no island in the American-European lanes is advantageously located for the purpose. The ideal arrangement would be for more "floating islands"—ships anchored at selected positions—with trained meteorologists and forecasters on board, to serve as collecting stations where the weather reports would be charted and the forecasts disseminated on fixed schedules. This is not possible of realization in the near future, and possibly may never be practicable. Shore stations can not be utilized because of the volume of radio transmissions which would interfere with the prompt reception of ship observations, and a still greater deterrent is that only a comparatively few ships have radio equipment sufficiently powerful for a sending range of more than a few hundred miles, and reports could not be received from those any considerable distance at sea.

The most practical solution of the problem at the present time is the use of ships traveling the lanes with more or less regularity on which the work can be conducted collaterally and without interference with the ships' radio traffic. Moreover, international cooperation and considerable expenditures are required for an exclusive project of this kind, and the present conditions of world finance would take it out of the range of consideration at this time.

However, it is practicable to accomplish very effective results under existing conditions and with very little cost if the free and sympathetic cooperation of vessel masters and radio operators can be procured. The practicability of the scheme already has been demonstrated by the French training ship *Jacques Cartier* during the past year on the occasion of its several trips between French and American ports. This ship has among its corps of instructors Professors Coyecque and Adeline, who are experienced meteorologists and forecasters. They employed the weather observations taken at various points in the United States and Canada, which are regularly broadcast at 10.30 a. m. and p. m. (75th meridian time) from the naval radio station at Arlington (NAA), and similar observations from European stations broadcast on schedule from the Eiffel Tower, supplemented by observations obtained through the courtesy of ships that were accosted. These reports were charted, and forecasts prepared therefrom were transmitted in English and in French to ships within its range. An average of about six ship reports an hour were assembled. This was a very gratifying accomplishment when it is considered that no publicity had been given to the project and vessel masters in general were not informed regarding the work.

The *Jacques Cartier* will continue this work. The United States Weather Bureau is deeply interested in the pioneer project which it is believed will lay the foundation for extensions in forecasting services which will ultimately prove of great economic value to ocean transportation interests. The cooperation of vessel masters in responding to the calls from the *Jacques Cartier* for weather reports will go far toward making this experimental work a success. On an average, there are about 300 ships of 5,000 tons or more displacement on the Atlantic routes between Europe and North America every day, and with cooperation on the part of ships of all nations a sufficient number of observations may be procured to issue reliable forecasts for a period of 24 hours or more in advance, which will be made available free of cost to all vessels within the range of the *Jacques Cartier*.—*From the United States Weather Bureau.*

APPLICATION FOR RADIO CALL LETTERS.

Applications for radio call letters for vessels newly equipped with wireless apparatus should be filed with the collectors of customs at the various ports at the time application is made for the official number and signal letters and not before such time. When the official number has already been assigned, the application for radio call letters should give the number, and, in case a vessel has had a former name, the name should be given. All particulars regarding the hours of service, class of service, rates, etc., should be reported without delay in order that the data may be published in the Radio Service Bulletin and furnished to the International Radiotelegraph Bureau

INFORMATION FROM THE HYDROGRAPHIC OFFICE.

Free medical advice to seamen by radio.—To the list of United States Public Health stations and the United Fruit Co.'s hospitals offering free medical advice to vessels at sea by radio has been added the United States Marine Hospital No. 14 at New Orleans, La. Calls upon the hospital may be made through the naval radio station at New Orleans, La., by vessels in the region of the Gulf of Mexico. Call signal NAT.

International Ice Patrol Service.—For the purpose of carrying on the International Ice Observation and Ice Patrol Service provided for by the International Convention for the Safety of Life at Sea, London, 1913–14, the U. S. Coast Guard cutters *Tampa* and *Modoc* have been detailed for this service.

The object of the Ice Patrol Service is to locate the icebergs and field ice nearest to the trans-Atlantic steamship lane. It will be the duty of the patrol vessels to determine the southerly, easterly, and westerly limits of the ice, and to keep in touch with these fields as they move to the southward, in order that radio messages may be sent out daily, giving the whereabouts of the ice, particularly the ice that may be in the immediate vicinity of the regular trans-Atlantic steamship lanes.

During the months of March, April, May, and June, and as much longer as necessary, these two vessels will obtain fuel and other necessary supplies at Halifax, N. S. They will alternate on patrol, making alternate cruises of about 15 days in the ice region, the 15 days to be exclusive of time occupied in going to and from base. The movements of the vessels will be so regulated that on the fifteenth day after reaching the ice region the vessel on patrol will be relieved by the second vessel, if possible, at which time the first vessel will proceed to base, replenish her fuel supply, and return in time to relieve the other vessel at the end of the latter's 15-day cruise. It is important that the patrol be continuous, and the vessel on patrol will not leave her station until relieved by the other vessel unless it is absolutely necessary to do so.

Having located the ice, the patrol vessel will send the following daily radiograms. All time in radiograms will be in 75th meridian time: (*a*) At 6 a. m. and 6 p. m. (75th meridian time) ice information will be sent broadcast for the benefit of vessels, using 600-meter wave length. This message will be sent three times, with an interval of 2 minutes between each. (*b*) At 8 p. m. (75th meridian time) a radiogram will be sent to the Hydrographic Office, Washington, D. C., through the nearest land radio stations, defining the ice danger zone, its southern limits, or other definite ice news. The telegraphic address of the Hydrographic Office is "Hydrographic, Washington, D. C." (*c*) Ice information will be given at any time to any ship with which the patrol vessel can communicate on 600-meter wave length.

Ice information will be given in as plain, concise English as practicable, and will state in the following order: (*a*) Position of patrol vessel. (*b*) Location and description of ice. (*c*) Other data.

While on this duty, the patrol vessel will endeavor by means of daily radio messages to keep ships at sea advised of the limits of the ice fields, etc.

The ice patrol vessel's radio call letters are KFOG. They will use a wave length of 600 meters when communicating with passing vessels.

The radio messages from the patrol ships will be given publicity by the Hydrographic Office, as follows:

(*a*) By radio broadcast from—

Station.	Seventy-fifth meridian, standard time.	Wave length (meters).
Arlington	10.30 a. m. 8.55 p. m.	5,950, C. W. 2,650, spark.
Annapolis	5 p. m.	17,145, C. W.
Boston	11 a. m. 5 p. m.	1,630, spark.
New York	10.30 a. m. 5 p. m.	1,822, spark.
Norfolk	10.45 a. m. 4 p. m.	1,851, spark.
Ice-patrol ship	6 a. m. 6 p. m.	600.

(b) All reports of ice are published in the Daily Memorandum and the Weekly Hydrographic Bulletin.

NOTE.—The work of the U. S. Coast Guard cutters engaged on ice patrol duty will be greatly facilitated if the principal trans-Atlantic steamship companies instruct the masters of their vessels to report the following data by radio to the patrol vessels: (a) Icebergs or obstructions sighted, giving date, time, latitude, longitude, and direction of drift if an iceberg, together with the temperature of the water at the time. (b) Surface temperature of the sea water every four hours when between latitudes 39° N. and 48° N., and crossing longitudes 52° W. and 44° W. when bound either east or west, and giving the latitude and longitude, course, and speed at time of each observation. These data will facilitate the plotting of a temperature curve which will be useful in locating the branches of the Labrador Current.

Radio interference with messages from the ice patrol vessels.—The ice patrol vessels send out information daily relative to the ice conditions, at 6 a. m., 6 p. m., and 8 p. m. (75th meridian time). It is therefore requested that masters and others will instruct their radio operators to desist, as far as practicable, from operating at the above times.

VIOLATION OF ARTICLE 46 OF THE INTERNATIONAL CONVENTION.

Attention of all radio operators is invited to the above-cited article of the International Convention service regulations, as the bureau has received a number of reports of violations of this regulation. The article is herewith quoted for the information of all concerned:

The exchange of correspondence between shipboard stations shall be carried on in such a manner as not to interfere with the service of the coastal stations, the latter as a general rule being accorded the right of priority for the public service.

JUPITER (FLA.) STATION OPEN TO GOVERNMENT TRAFFIC.

The notice in the Bulletin for last month was incomplete, in that it should have read, "Closed to commercial traffic only."

975 METERS TO BE USED IN TURKISH WATERS.

The United States Shipping Board has informed this office that by agreement of the Allied Communication Officers the wave length of 975 meters is assigned to United States naval vessels operating in Turkish waters. This wave length and no other is used by United States vessels. In view of this fact, it is believed that the difficulties which have appeared from time to time will disappear. The station at Constantinople does not call, receive, nor send on any wave length other than 975 meters.

WAVE LENGTHS USED BY DEVIZES RADIO STATION.

The difficulties which have been experienced at the Devizes station in the reception of long-distance radiograms from ships are found to be increased by the fact that the wave length used by ships frequently differs appreciably from the wave length nominally used for communication with Devizes, viz, 2,100 meters C. W. Recent observations showed that the wave length actually used varied from 2,080 to 2,180 meters.

The use of different wave lengths by the ships not only necessitates a continual adjustment of the receiving apparatus at Devizes, but also increases the probabilities of interference, and may even lead to a call from a ship being missed if the station is at the time listening to another ship which is using a different wave length.

It is accordingly proposed to arrange for Devizes to send out every four hours a long dash lasting a minute on a standard wave of 2,100 meters C. W., to enable the ships to check, and adjust if necessary, the wave length of the transmitter on board. It is essential that ships equipped with C. W. apparatus be accurate in their adjustments. In order to avoid encroaching on the time available for the exchange of traffic, it is proposed to arrange for the standard wave to be emitted toward the end of the period of 10 minutes, viz, 35 to 46 minutes past the hour G. M. T., during which ships using long wave C. W. are at present required to keep watch on 2,400 meters. Devizes will as at present broadcast on 2,400 meters the call signals of the ships for which messages are on hand, and they will ask ships to "Stand by" until 44 minutes past the hour for the standard wave of 2,100 meters. This standard wave will be emitted at 0044, 0444, 0844, 1244, 1644, and 2044 G. M. T.

CAPETOWN TIME SIGNALS AMENDED.

South Africa.—Cape of Good Hope.
Position.—On Slang Kop point. Lat. 34° 08′ 45″ S., long. 18° 19′ 17″ E.
Details.—Capetown W/T station broadcasts time signals daily as undermentioned.

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:

G. M. T. (astronomical.) h.	m.	s.	
8	59	30	Group I.
		32	
		34	
8	59	38	Group II.
		40	
8	59	44	Group III.
8	59	48	Group IV.
		50	
8	59	54	Group V.
		56	
		58	
9	00	00	

Each signal may be used as indicating the exact G. M. T. recorded above; the beginning of the last dash of the series corresponding exactly with $9^h\ 00^m\ 00^s$ G. M. T., corresponding to $11^h\ 00^m\ 00^s$ standard time.—*From Notice No. 68 of 1923, Admiralty, London, January 10, 1923.*

CALL LETTERS ASSIGNED TO COUNTRIES BY BERNE BUREAU.

Call letters.	Country.
AAA-AMZ	Germany.
ANA-APZ	Dutch Indies.
AQA-AWZ	Norway.
AXA-AXZ	Poland.
AYA-AYZ	Venezuela.
AZA-AZZ	
B	Great Britain.
CAA-CEZ	Chile.
CFA CKZ	Great Britain protectorates.
CLA-CMZ	Spain.
CNA-CNZ	Morocco.
COA-COZ	Great Britain.
CPA-CPZ	Bolivia.
CQA-CQZ	Monaco.
CRA-CRZ	Portugal (colonies).
CSA-CUZ	Portugal.
CVA-CVZ	Rumania.
CWA-CWZ	Uruguay.
CXA-CXZ	Spain.
CYA-CZZ	Mexico.
DAA-DSZ	Germany.
DTA-DTZ	Danzig (Free State).
DUA-DZZ	Germany.
EAA-EHZ	Spain (colonies).
EIA-EZZ	Great Britain.
F	France (colonies and protectorates).
G	Great Britain.
HAA-HAZ	Hungary.
HBA-HBZ	Switzerland.
HCA-HCZ	Ecuador.
HDA-HEZ	Netherlands.
HFA-HFZ	Kingdom of Serbia.
HGA-HHZ	Siam.
HIA-HIZ	Dominican Republic.
HJA-HKZ	Colombia.
HLA-HNU	Spain.
HNV-HNZ	New Hebrides.
HOA-HZZ	France (colonies and protectorates).
I	Italy (colonies).
J	Japan.
KAA-KAY	Germany.
KAZ	Danzig (Free State).
KBA-KBZ	Germany.
KCA-KCZ	Lettonia.
KDA-KZZ	United States.
LAA-LHZ	Norway.
LIA-LRZ	Argentina.
LSA-LUZ	Great Britain.
LVA-LVZ	Guatemala.
LWA-LWZ	Norway.
N	United States.
OAA-OBZ	Peru.
OCA-OFZ	Great Britain.
OGA-OIZ	Denmark.
OJA-OJZ	Finland.
OKA-OKZ	Czechoslovakia.
OLA-OMZ	Netherlands.
ONA-OTZ	Belgium (colonies).
OUA-OZZ	Denmark.
PAA-PIZ	Netherlands.
PIA-PJM	Curacao.
PJN-PJZ	Dutch Guiana.
PKA-PMZ	Dutch Indies.
PNA-PPZ	Brazil.
PQA-PSZ	Portugal.
PTA-PVZ	Brazil.
PWA-PWZ	Cuba.
PXA-PZZ	Netherlands.
Q	Reserved for abbreviations.
RAA-RQZ	Russia.
RRA-RZZ	
SAA-SMZ	Sweden.
SNA-STZ	Brazil.
SUA-SUZ	Egypt.
SVA-SZZ	Greece.
TAA-TRZ	Turkey.
TFA-TIZ	Iceland.
TGA-THZ	Greece.
TIA-TOZ	Spain.
TPA-TUZ	Norway.
TVA-TZZ	Netherlands.
UAA-UMZ	France (colonies and protectorates).
UNA-UNZ	Kingdom of Serbia.
UOA-UOZ	Austria.
UPA-UZZ	Italy.
VAA-VGZ	Canada.
VHA-VKZ	Australia.
VLA-VMZ	New Zealand.
VNA-VNZ	Africa.
VOA-VOZ	Newfoundland.
VPA-VSZ	Great Britain (colonies and protectorates autonomous).
VTA-VWZ	British Indies (Persian Gulf).
VXA-VZZ	Great Britain (colonies and protectorates).
W	United States.
XAA-XDZ	Mexico.
XEA-XMZ	Great Britain.
XNA-XSZ	China.
XTA-XZZ	Great Britain.

INTERNATIONAL SIGNALS OF STANDARD WAVE INTENSITY AND FREQUENCY.

Systematic study of radio wave transmission phenomena is being furthered through special signals transmitted from high-power stations, under the auspices of the International Union of Scientific Radio Telegraphy. Scientific observers are invited to make systematic measurements of these signals and to write to the Bureau of Standards, Washington, D. C., both for information on methods and to send in results of observations. The European stations listed below send a special signal daily at the time mentioned, including the letters URSI and a two-minute dash. The American stations do not send the special signal; measurements can, however, be made on them while they are transmitting on their regular operating schedules. All of these stations transmit continuous waves except the Eiffel Tower, which transmits damped waves.

Stations now transmitting URSI signals.

	Greenwich time.	Approximate wave length.	Approximate radiation height.	Approximate antenna current.
		Meters.	*Meters.*	*Amperes.*
Eiffel Tower (FL)	10.35	2,600	85	88
Nantes (UA)	14.15	9,000	135	180
Bordeaux (LY)	19.55	23,400	170	480
Rome (IDO)	16.00	10,500	120	100

The following American stations may be measured on regular transmission and may begin sending URSI signals in the near future:

New Brunswick, N. J. (WII)	13,600	66	390
Radio Central (St. James, Long Island, N. Y.) (WQK)	16,800	80	702
Marion, Mass. (WSO)	11,620	66	600
Annapolis,[1] Md. (NSS)	17,200	130	350

[1] Sends time signals at 2.55 and 16.55 (Greenwich time).

Measurements can also be made on the high-power stations at Tuckerton, N. J. (WGG), and Glace Bay, Nova Scotia (GB), during their regular operating schedules.

The URSI signals mentioned above are intended, primarily, for measurements of received signal intensity in connection with studies of transmission phenomena.

In addition to the URSI signals just mentioned the Eiffel Tower (FL) and Lyon (YN) on the 1st and 15th of each mouth send out special signals intended for wave-length measurements. The times given in this paragraph are all Greenwich time—18 Greenwich time corresponding to 1 p. m. time of the 75th meridian west (eastern standard time). At 18 the Eiffel Tower transmits, on about 5,000 meters, the letter A, and then starting at 18.01 a dash lasting two minutes. At 18.10 the Eiffel Tower transmits, on about 7,000 meters, the letter B, followed by a dash lasting two minutes. At 18.20 Lyon transmits, on approximately 10,000 meters, the letter C, followed by a dash. At 18.30 Lyon transmits, on approximately 15,000 meters, the letter D, followed by a dash. Measurements of the wave lengths of these signals sent from Eiffel Tower and Lyon are made at the laboratory of the Etablissement Central de la Télégraphie Militaire, in Paris, and the results of these measurements are transmitted from Lyon at 19.

On Tuesday of each week the wave lengths of the URSI signals transmitted from Nantes and Bordeaux are measured at this same laboratory, and the results of these wave-length measurements are transmitted on the following day from Nantes and Bordeaux in connection with the URSI signals.

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.

cation 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 numbers assigned to the references are preceded by the letter "R," which is an abbreviation for the number 621.384, which is assigned to radio communication in the regular Dewey decimal classification. Under the class "R800—Nonradio subjects," the numbers shown in this list are not preceded by an "R," but are the numbers assigned to the subject of the reference in the regular complete Dewey classification.

The Bureau of Standards can not furnish copies of the various periodicals or other publications to which references are given. Copies of these publications may be secured from 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.

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

R000.—*Radio communication.*

R007.1 Protest from telephone company against radiophone service overruled. Electrical World, **81**, p. 242, January 27, 1923.

R007.2 The effort to provide us with a new and workable radio law (what happened in Washington during the public hearings). Wireless Age, **10**, pp. 42-48, February, 1923.

R007.2 Important litigation (United States radio bill). QST, **6**, pp. 38-39, February, 1923.

R007.4 Regulation of amateur radio stations by inspectors (Canada). Radio (Toronto), **5**, p. 25, January, 1923.

R007.4 Government control of radio (Canada). Radio (Toronto), **5**, p. 44, January, 1923.

R007.4 Canada's air cops cut interference (license fees). Radio Digest Illustrated, **4**, p. 6, February 3, 1923.

R007.5 New radio regulations in Australia. Radio (San Francisco), **5**, p. 38, February, 1923.

R007.5 The radio conference (held on January 24 by the Radio Society of Great Britain). Wireless World and Radio Review, **11**, pp. 587-588, February 3, 1923.

R007.6 DeValbreuze, R. La radiotéléphonie (conference of Radio Telegraph Congress held at Marseille) Radioélectricité, **3**, pp. 535-539, December, 1922.

R055 Karapetoff, V. Finding published electrical information. Electrical World, **80**, pp. 1380-1382, Dec. 23, 1922.

R055 The new Burgess radio atlas of the world. Published by the Burgess Battery Co., Madison, Wis. Price, 10 cents.

R060 The exhibition of the Physical Society of London. Wireless World and Radio Review, **11**, pp. 534-535, January 20, 1923.

R091 Liston, J. Some developments in the electrical industry during 1922 (Radio). General Electric Review, **26**, pp. 31-35, January, 1923.

R100.—*Radio principles.*

R111 Press, A. The physics of hysteresis loss. Electrical World, **81**, pp. 213-214, January 27, 1923.

R111 Karapetoff, V. The "heavisidion." Journal American Institute Electrical Engrs., **42**, pp. 127-138, February, 1923.

R111 See, T. J. New theory of the ether (in English). Astronomische Nachrichten, **217**, pp. 194-283, November, 1922.

R111 Hering, C. Electromagnetic forces (revision of laws). Journal American Institute Electrical Engrs., **42**, pp. 139-154, February, 1923.

R113 Godley, P. "Dead spots," what they are and how to find them. Popular Radio, **3**, pp. 202–207, March, 1923.

R114 Austin, L. W. Drahtloser Verkehr über grosse Entfernungen. Jahrbuch der drahtlosen Telegraphie, **20**, pp. 372-386, November, 1922.

R114 Radio waves and attenuation (transmission formula). Wireless Age, **10**, p. 58, February, 1923.

R120 Andrews, F. J. Some facts about antennas. Radio (San Francisco), **5**, pp. 23–24, February, 1923.

R124 Le collecteur d'ondes, le cadre. La Nature, **51**, pp. 13–15, January 13, 1923.

R124 Frame aerials in radio reception: A consideration of some of their properties with data for construction. Wireless World and Radio Review, **11**, pp. 555–559, January 27, 1923.

R132.3 Tyers, P. D. The theory of resistance amplification. Wireless World and Radio Review, **11**, pp. 606–607, January 13, 1923.

R134.7 Greaves, V. F. The Armstrong "radio fliver" (one tube super-regenerative hook-up on wave lengths of 190–400 meters). Radio (San Francisco), **5**, pp. 15–16, February, 1923.

R 134.7 Robbins, R. J. The Bishop ultraregenerator (modern high power receiving set that anyone can build and operate. A "super" without the super's perplexing faults). Radio Section, New York Globe, pp. 1–2, February 3, 1923.

R 140 Lodge, O. How to get the greatest efficiency out of your radio circuits. Popular Radio, **3**, pp. 208–212, March, 1923.

R 141 Refinements in receiving circuits. Wireless World and Radio Review, **11**, pp. 601–602, February 3, 1923.

R 145.3 Grover, F. W. Tables for the calculation of the inductance of circular coils of rectangular cross section (abstract of Bureau of Standards Scientific Paper No. 455). Journal Franklin Institute, **195**, pp. 246–248, February, 1923.

R145.3 Hoffman, R. J. Measurement charts for determining the dimensions of your coil. Popular Radio, **3**, pp. 198–201, March, 1923.

R145.3 Wolf, M. Flat spiral inductance data. Wireless Age, **10**, pp. 67–68, February, 1923.

R145.5 Pearson, S. O. Electrostatic capacity in radio circuits. Wireless World and Radio Review, **11**, pp. 573–575, January 27, 1923.

R148 Bouck, Z. Radio telephone modulation (part 2). Radio Section, New York Globe, p. 1, January 27, 1923.

R200.—*Radio measurements and standardization.*

R201.5 Watt, R. A. W. and Herd, J. F. Note on electromagnetic screening. Wireless World and Radio Review, **11**, pp. 532–534, January 20, 1923.

R210 Cady, C. Neue Methoden zum Konstanthalten der Frequenz in Hochfrequenz kreisen. Physical Review, **18**, pp. 142–143, November, 1922; Jahrbuch der drahtlosen Telegraphie, **18**, p. 387, November, 1922.

R240 Gleissner, G. Methoden zur Herstellung von Hochfrequenzspannungen bestimmter Phasenverschiebung. Jahrbuch der drahtlosen Telegraphie, **20**, pp. 342–356, November, 1922.

R281 Rodman, C. J. Durable insulating oils. Electric Journal, **20**, pp. 51–53, February, 1923.

R281 Weisberg, L. Process of making a molding composition. U. S. Patent No. 1443936, issued January 30, 1923.

R281 Weisberg, L. Resinous product (insulating materials). U. S. Patent No. 1443935, issued January 30, 1923.

R300.—*Radio apparatus and equipment.*

R320.8 Elwell, C. F. The design of radio towers and masts: Wind pressure assumptions. Electrician **90**, pp. 88–89, January 26, 1923.

R328 Bouvier, P. Antennes à prises de terre multiples. Radioélectricité, **3**, pp. 523–530, December, 1922.

R330 Leblanc, M. Über Röhren mit drei Elektroden in denen der elektrische Strom durch Ionen übertragen wird. Zeitschrift für Fernmeldtechnik, **3**, pp. 143–144, November 15, 1922.

R330 A new non-oscillating tube (Doule). Wireless Age, **10**, pp. 59–63, February, 1923.

R330 Barreter tubes. Wireless World and Radio Review, **11**, p. 603, February 3, 1923.

R332 Middleton, G. N. Properties of vacuum tubes. Radio (Toronto), **5**, pp. 15–18, January, 1923.

R331 White, W. C. Electrode structure. U. S. Patent No. 1444438, issued February 6, 1923.

R341 Hendrick, S. A. Making a tube rectifier (for charging batteries). Radio (San Francisco), **5**, pp. 25–26, February, 1923.

R341 Schmidt, A. High-voltage thermionic rectifiers. General Electric Review, **26**, pp. 115–119, February, 1923.

R343 Stone, E. W. The vacuum tube as a detector and amplifier. Radio (San Francisco), **5**, pp. 17–18, February, 1923.

R343 Ringel, A. The operation of receiving tubes from direct current power supply. Wireless Age, **10**, pp. 64–65, February, 1923.

R343 Some simple methods of controlling low frequency valves. Wireless World and Radion Review, **11**, pp. 624–625, February 10, 1923.

R343 Flewelling, E. T. The Flewelling circuit (the author explains how circuit varies from common types of regenerators). Radio Section, New York Globe, p. 1, February 10, 1923, and p. 3, February 17, 1923.

R343 Jacquet, L. High amplification for Flewelling super. Radio Section, New York Evening Mail, p. 4, February 17, 1923.

R343.5 Bradbury, B. Radio receiving system. U. S. Patent No. 1443200, issued January 23, 1923.

R343.7 Focarty, L. F. Valve current from a. c. mains. Wireless World and Radio Review, **11**, pp. 521–524, January 20, 1923.

R344 Joos, G. Theorie des Elektronenröhrengenerators. Annalen der Physik, **374**, pp. 505–547, January 4, 1923.

R344.3 Experimental station design: Rectified high tension for continuous wave telephony transmitter. Wireless World and Radio Review, **11**, pp. 592–595, February 3, 1923.

R346 Tarr, P. R. A practical radiophone. Radio (San Francisco), **5**, pp. 31–32, February, 1923.

R348 Lüschen, F. Tonfrequenz Wechselstromtelegraphie. Elektrotechnische Zeitschrift, **44**, pp. 28–31, January 11, 1923.

R353 Moore, A. T. C. Characteristics of 5 KW. Elwell-Poulsen arc generator. Engineering, Dec. 8, 1922: Electrical World, **81**, p. 348, February 10, 1923.

R353 Mathison, V. G. Multiplex arc radio. Radio (San Francisco), **5**, pp. 10–12, February, 1923.

R367 De Forest, L. The motion picture (records speech and action). Popular Radio, **3**, pp. 159–169, March, 1923.

R381 Meyer, U. Über gleichstrommessungen der Kapazität und des Isolationswiderstandes. Tele-

R381 Winters, S. R. New and efficient Navy condenser. Wireless Age, 10, p. 63, February, 1923.
R384.1 Tsubouchi, A. Standardization of wave meters (In English). Research Report No. 115 of Electrotechnical Laboratory of the Japanese Department of Communications, Tokyo, September, 1922.
R384.1 Reading wave lengths on the receiving set (set can determine wave length of incoming signals). Radio (San Francisco), 5, p. 29, February, 1923.
R385.5 The remarkable new "glow discharge" transmitter. Popular Radio, 3, p. 240, March, 1923.
R387.7 Demuth, W. Insulators for wireless telegraphy: Their development and mechanical testing. Jahrbuch der drahtlosen Telegraphie, 20, pp. 278-301, October, 1922.
R388 Gasser, H. S. and Erlanger, J. A study of the action currents of nerve with the cathode-ray oscillograph (from the laboratories of Pharmacology and Physiology of the Washington University School of Medicine, St. Louis, Mo.). American Journal Physiology, 62, pp. 496-523, November, 1922.
R388 Johnson, J. B. A low-voltage cathode-ray oscillograph. Electrical Communications, 1, No. 2; Electrical World, 81, p. 347, February 10, 1923.
R388 Legg, J. W. Expansion of oscillography by the portable instrument. Journal American Institute Electrical Engrs., 42, pp. 106-111, February, 1923.

R400.—*Radio communication systems.*

R402 Weichmann, R. Un spectre de bandes d'absorption de l'eau pour des longueurs d'onde de d'ordre de plusieurs décimètre. Annalen der Physik, 371, pp. 501-546, 1921; L'Onde Electrique, 1, p. 744, December, 1922.
R402 Marconi, G. How I send along invisible beams. Popular Radio, 3, pp. 213-217, March, 1923.
R412 Gill, F. Future of long distance in Europe. Telephony, 84, pp. 19-23, February 3, 1923.
R412 Talking from New York to England by radio telephone. Western Electric News, 11, pp. 19-20, February, 1923.
R412 Carrier current in operation at Hartford, Conn. Electrical World, 81, p. 350, February 10, 1923.
R412 Heising, R. A. Carrier-wave signaling system. U. S. Patent No. 1444606, issued February 6, 1923
R412 Taylor, J. B. Communication by high frequency waves. General Electric Review, 26, pp. 61-64, January, 1923.
R430 Manneback, C. Radiation from transmission lines. Journal American Institute Electrical Engrs., 42, pp. 95-105, February, 1923.
R431 DeBellescize, H. J. Atmospheric disturbance reducing means. U. S. Patent No. 1443011, issued January 23, 1923.
R450 Pearson, E. F. Radiophone insures service to customers. Electrical World, 80, pp. 1395-1396, December 23, 1922.
R460 Hammond, J. H. Multiplex system in teledynamic control. U. S. Patent No. 1444417, issued February 1, 1923.
R460 Espenschied, L. Signaling system (duplex). U. S. Patent No. 1443985, issued February 6, 1923.
R470 "Wired wireless" stands good test. Radio Digest Illustrated, 4, p. 3, January 27, 1923.

R500.—*Application of radio.*

R510 Rogers, S. Radio for lightkeepers and net haulers. Radio Section, New York Evening Mail, p. 1, February 17, 1923.
R513 Experimental radio fog signal station at Inchkeith, Scotland. Lighthouse Service Bulletin. No. 61, p. 283, January 2, 1923.
R514 Radio compass. Radio (Toronto), 5, pp. 27-28, January, 1923.
R520 Aersdeu. The application of wireless to commercial flying. Wireless World and Radio Review, 11, pp. 620-621, February 10, 1923.
R533 Rosenbaum, B. Neure Ergebnisse der Zugtelephonie. Jahrbuch der drahtlosen Telegraphie, 20, pp. 367-371, November, 1922.
R545 The transatlantic triumph (complete account). QST, 6, pp. 7-21, February, 1923.
R545 Transatlantic amateur tests successful (complete). Wireless Age, 10, pp. 55-58, February, 1923.
R545 Maxim, H. P. The radio amateur. Popular Radio, 3, pp. 188-197, March, 1923.
R550 Hammond, J. H., jr. A plan for a pay-as-you-enter radio net. Popular Radio, 3, pp. 170-174, March, 1923.
R550 Howard, W. H. Sobre las ondas de la Plata (broadcasting in Brazil). Wireless Age, 10, pp. 39-41, February, 1923.
R550 Chronique des auditions radiophoniques. Radioélectricité, 3, pp. 493-507, December, 1922.
R551 Mitchell, W. G. W. How to make use of the scientific time signals. Wireless World and Radio Review, 11, pp. 501-504, January 13, 1923.
R553 Standard waves from Bureau of Standards. Radio Section, New York Globe, p. 19, February 17, 1923.

R700.—*Radio manufacturing.*

R700 Wholesome growth in radio industry. Electrical World, 81, p. 364, February 10, 1923.
R700 Germans plan to invade United States market (radio). Radio Section, New York Evening Mail, p. 3, February 3, 1923.
R740 Radio—A Pacific coast analysis: How the jobber has come into the picture—The problem of the department store—The present inadequacy of broadcasting in the far west. Electrical World, 81, p. 246, January 27, 1923.

R800.—*Nonradio subjects.*

533.85 Gehrts, A. Verfahren zur Erzeugung hoher Vakua. Helios (Leipzig), 28, pp. 589-593, December 10, 1922.
621.313.7 Kruse, S. Synchronous rectifiers for plate supply. QST, 6, pp. 33-38, February, 1923.
621.313.7 Hughes, H. An efficient magnetic rectifier. Wireless Age, 10, p. 68, February, 1923.
621.354.3 The Tungar rectifier (for charging storage batteries). Wireless World and Radio Review, 11, pp. 540-542, January 20, 1923.
621.382.8 Cohen, L. Alternating-current cable telegraphy. Journal Franklin Institute, 195, pp. 185-192, February, 1923.
621.385 Demarest, C. S. Transmission controlling apparatus for telephony. U. S. Patent No. 1444830, issued February 13, 1923.

MEASUREMENTS ON ELECTRON TUBES AND AMPLIFIERS.

For a number of years the Bureau of Standards has been making measurements of the various properties of electron tubes and also measurements of the voltage amplification of amplifiers. The various kinds of apparatus and methods used for these measurements have been undergoing an evolution as the properties of the tubes have become better known. Descriptions of such apparatus and methods as are now used at the bureau are given in Letter Circular 86, Methods of Measuring Voltage Amplification of Amplifiers, and Letter Circular 87, Methods of Measuring Properties of Electron Tubes, just issued.

Letter Circular 86 describes in detail methods for measuring the voltage amplification of both audio-frequency amplifiers and radio-frequency amplifiers, outlines precautions to be observed, and gives circuit diagrams.

Letter Circular 87 describes in detail methods for measurements of internal input resistance, internal output resistance, and the amplification coefficient of an electron tube, using a combination alternating-current bridge. It also describes methods for the measurement of the direct-current characteristics of a tube, the power output of generator tubes, and the measurement of detection factor. This letter circular also describes precautions which should be observed in making the various measurements and gives circuit diagrams.

A limited supply of copies of each of these two letter circulars is available at the bureau. So long as a supply remains available a copy of either of these letter circulars can be obtained on application to the bureau by any person who can show that he has actual use for it.

RADIO CONFERENCE TO BE HELD IN WASHINGTON.

The Secretary of Commerce, Mr. Hoover, has called a second conference of representatives of the radio industry to consider what can be done from an administrative point of view to lessen the amount of interference in broadcasting. A committee has been appointed and the hearings will be open to representatives of the radio interests. The conference will be held in the Department of Commerce, Nineteenth and Pennsylvania Avenue NW., on the 20th of this month. A preliminary conference of radio inspectors of the Bureau of Navigation has been called to meet on the 12th instant.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
5 CENTS PER COPY
SUBSCRIPTION PRICE, 25 CENTS PER YEAR

Return to Radio Service Bulletins Index