

**RADIO DIVISION****RADIO SERVICE BULLETIN**

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**ABBREVIATIONS AND SYMBOLS**

The necessary corrections to the list of Commercial and Government 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. W=west longitude. N=north latitude. S=south latitude. E=east longitude.
Call	= Call signal (letters) assigned.
Type	= Type of wave classified as follows: A1=continuous wave (tube), A, arc=continuous wave, A2=interrupted continuous wave, A3=phone, B=spark.
Fy.	= Frequency in kilocycles; normal frequency in italics; wave length in meters in parentheses.
Service	= Nature of service maintained: PG=general public (ship to shore), PR=limited public (limited to public correspondence between fixed stations), P=private (limited commercial and special), O=Government business exclusively.
Class	= FX=fixed station (point-to-point service), RG=radio-compass station, FA=aeronautical station, AB=aviation station, RF=directional radiobeacon, B=ship station, FC=coast station.
Hours	= Hours of operation: N=continuous service, X=no regular hour, Y=sunrise to sunset.
Accounts	= Message accounts settled by.
I. R. T. Co.	= Intercity Radio Telegraph Co.
I. W. T. Co.	= Independent Wireless Telegraph Co.
M. R. T. Co.	= Mackay Radio & Telegraph Co.
R. C. A.	= Radio Corporation of America.
R. M. C. A.	= Radiomarine Corporation of America.
T. R. T.	= Co. Tropical Radio Telegraph Co.
C. w.	= Continuous wave.
I. c. w.	= Interrupted continuous wave.
A. c.	= Alternating current.
V. t.	= Vacuum tube.
M. a.	= Meters-amperes.
U. S. L.	= Applies only to the list of Commercial and Government Radio Stations of the United States.
Δ	= Equipped with a radio compass (direction finder).

## NEW STATIONS

## Commercial land stations, alphabetically, by names of stations

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

Station	Class	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
Beaumont, Tex. <sup>1</sup>	FX	KGKM	1,592 (187.97), 1,712 (175.23)	P	N	City of Beaumont.
Indianapolis, Ind. <sup>2</sup>	FX	WMDH	3,160 (94.9), 3,168 (94.8), 3,172 (94.6), 3,178 (94.4), 3,184 (94.2), 3,238 (92.65), 3,244 (92.5)	P	X	Indiana Electric Corp.
Marquette, Mich. <sup>1</sup>	FC, FX	WAN	143 (2,100), 165 (1,820), 171 (1,755), 410 (730), 425 (705), 454 (660), 4,116 (72.886), 5,525 (54.298), 8,630 (34.76)	PG, PR		Intercity Radio Telegraph Co.
Vigo, Ind. <sup>2</sup>	FX	WMDM	3,160 (94.936), 3,166 (94.756), 3,172 (94.577), 3,178 (94.399), 3,184 (94.221), 3,238 (92.649), 3,244 (92.476)	P	X	Indiana Electric Corp.

<sup>1</sup> Type, A1, A2, A3.

<sup>2</sup> Type A1.

<sup>3</sup> Type, A2; hours, 6 a. m. to 12 p. m.; rates, ship service, 10 cents (52 centimes) per word.

## Commercial ship stations, alphabetically, by name of vessels

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

Name of vessel	Call signal	Rates, all services (cents)	Service	Hours	Owner	Message accounts settled by—
Alpha	WMDP	8	PG	X	James W. Perry	M. R. T. Co.
Brandywine	WGUF	8	PG	X	Hillcone S. S. Co.	R. M. C. A.
City of San Francisco	WMDW	8	PG		Panama Mail S. S. Co.	
Fordham	WMDR	8	PG	X	Atlantic & Pacific Fish Co.	Do.
Janelew	KDFS	8	PG	X	U. S. S. B.	
Karador	WMDO				J. E. Dadswell	
Lavada	KDFV	8	PG	X	U. S. S. B.	
Meton	KDBM	8	PG	X	Meton S. S. Co.	Do.
Muntropic	KOPJ	8	PG	X	Munson S. S. Line	Do.
Notre Dame	WMDT	8	PG	X	Atlantic & P. Fish Co.	Do.
Ntra. Sra. Del Rosario. <sup>1</sup>	KZAJ	4	PG		Genato & Co.	Owner.
Pennsylvania	WMDS	8	PG	N	American Line S. S. Corp.	R. M. C. A.
Salt Lake City	WMDL					
Samar <sup>2</sup>	KZAB	4	PG	X	Manila R. R. Co.	Owner.
Shasta	WMDJ				Charles A. Landers, Lawrence Oliver, and O. J. Gesser.	
S. O. Co. No. <sup>3</sup>	WMDQ				Far West Fisheries (Inc.)	Do.
Spitkit II <sup>3</sup>	WMDN		P	X	Palmer K. Leberman	Do.
Visayas II <sup>4</sup>	KZDK	4	PG		Ty Camco Sobrino	Do.
West Jaffrey	KOCK	8	PG	X	U. S. S. B.	
West Pocasset	WMDK	8	PG	X	do.	

<sup>1</sup> Type, B; fy., 414 (729), 500 (600); hours, 7 to 12 a. m., 3 to 7 and 8 to 10.30 p. m.

<sup>2</sup> Type, A1; fy., 5,615 (53.423).

<sup>3</sup> Type, A3; fy., 2,320 (129.3).

<sup>4</sup> Type, A1; fy., 500 (600); hours, 8 to 11 a. m., 3 to 5 and 9 to 11 p. m.

*Commercial land and ship stations, alphabetically, by call signals*

Call signal	Name of station	Call signal	Name of station
KDFB	Janelew..... b	WMDK	West Pocasset..... b
KDFV	Lavada..... b	WMDL	Salt Lake City..... b
KGKM	Beaumont, Tex..... fx	WMDM	Vigo, Ind..... fx
KOCK	West Jaffrey..... b	WMDN	Spitkit II..... b
KOPJ	Muntropic..... b	WMDO	Karador..... b
KZAB	Samar..... b	WMDP	Alpha..... b
KZAJ	Ntra. Sra. Del Rosario..... b	WMDQ	S. O. Co. No. 3..... b
KZDK	Visayas II..... b	WMDR	Fordham..... b
WAN	Marquette, Mich..... fc, fx	WMDS	Pennsylvania..... b
WGUI	Brandywine..... b	WMDT	Notre Dame..... b
WMDH	Indianapolis, Ind..... fx	WMDW	City of San Francisco..... b
WMDJ	Shasta..... b		

*Commercial aircraft stations, alphabetically, by names of craft*

[Additions to the List of Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
NC75-K	KHFK		P	X	Pan American Airways (Inc.)
NC813-H	KHFJ		P	X	Do.
NC814-H	KHFI		P	X	Do.
NC9688	KHFL		P	X	Do.

*Commercial aircraft stations, alphabetically, by call signals*

Call signal	Name of station	Call signal	Name of station
KHFI	NC814-H.	KHFK	NC75-K.
KHFJ	NC813-H.	KHFL	NC9688.

*Broadcasting stations, alphabetically, by names of States and cities*

[Additions to the List of Radio Stations of the United States, edition of June 30, 1929]

State and city	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)
Wyoming: Casper.....	KDFN	1,210 (247.9).....	100

*Broadcasting stations, alphabetically, by call signals*

Call signal	Location of transmitter (mail address)	Owner	Frequency in kilocycles, meters in parentheses	Power (watts)
KDFN	Casper, Wyo.....	Donald L. Hathaway.....	1,210 (247.9).....	100

*Government land stations, alphabetically, by names of stations*

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations published by the Berne bureau]

Station	Class	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
Philadelphia, Pa. (fourth naval reserve district).	FX	NDM		O		U. S. Navy.
Teller, Alaska	FX	WZR	645 (465).....	O		U. S. Army.

<sup>1</sup> Loc. (approximately) 166° 40' 00" W., 65° 15' 00" N.; type, A2; hours, 8 a. m. to 5 p. m.

## Government land and ship stations, alphabetically, by call signals

Call signal	Name of station	Call signal	Name of station
NDM	Philadelphia, Pa. (fourth naval reserve district)	WZR	Teller, Alaska

## Experimental stations, alphabetically, by names of stations

Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)	Owner
Aircraft No. 33	W10XJ	1,624 (184.73), 2,344 (127.99), 2,722 (110.21), 3,082 (97.339), 3,468 (86.505), 4,180 (71.77), 4,765 (62.959), 5,630 (53.286).	50	National Air Transport (Inc.)

## Experimental, relay broadcasting, and visual broadcasting stations grouped by districts, alphabetically, by call signals

Call signal	District and station
W10XJ	Aircraft: No. 33

## ALTERATIONS AND CORRECTIONS

## COMMERCIAL LAND STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berns bureau]

- ABERDEEN, WASH.—Fy., 353 (859), 425 (705), 500 (600).  
 BOSTON, MASS. RADIO (WBF).—Fy., 143 (2,100), 147 (2,040), 436 (690), 500 (600), 4,172 (71.098), 5,525 (54.298), 6,770 (44.31), 8,550 (35.09), 10,450 (28.71), 11,050 (27.15), 12,370 (24.25), 12,940 (23.18), 16,575 (18.10), 17,580 (17.065), 22,100 (13.575), 22,400 (13.393).  
 BRADENTON, FLA.—Type, strike out A3.  
 BUFFALO, N. Y. RADIO (WAM).—Fy., add 143 (2,100), 184 (1,630), 194 (1,545), 454 (660), 5,525 (54.298).  
 CHICAGO, ILL. RADIO (WFL).—Type, A2; fy., 181 (1,655), 410 (730), 425 (705), 454 (660), 4,116 (72.886), 5,525 (54.298), 8,630 (34.76).  
 CLEVELAND, OHIO RADIO (WTK).—Fy., 143 (2,100), 165 (1,820), 171 (1,755), 184 (1,630), 194 (1,545), 410 (730), 425 (705), 454 (660), 4,116 (72.886), 5,525 (54.298), 8,630 (34.76).  
 CLEVELAND, OHIO (WTL).—Fy., 184 (1,630), 194 (1,545), 4,116 (72.886), 8,630 (34.76); hours, 8 a. m. to 8 p. m.  
 COLUMBUS, OHIO (WCL).—Fy., 184 (1,630), 194 (1,545).  
 DAYTONA BEACH, FLA.—Type, strike out A3.  
 DETROIT, MICH. RADIO (WDI).—Fy., add 143 (2,100), 184 (1,630), 194 (1,545), 454 (660).  
 DULUTH, MINN. RADIO (WME).—Fy., add 184 (1,630), 194 (1,545), 454 (660), 5,525 (54.298).  
 DULUTH, MINN. RADIO (WRL).—Fy., strike out 179 (1,675), 190 (1,578).  
 EAST MORICHES, N. Y. RADIO.—Fy., add 125 (2,400).  
 ENSENADA, P. R. RADIO.—Fy., add 438 (685).  
 FORT LAUDERDALE, FLA.—Type, strike out A3.  
 FRANKFORT, MICH. RADIO.—Fy., add 454 (660).

- HILLSBORO, OREG. RADIO (KEK).—Type, add A2.  
 LAKE CITY, FLA.—Type, strike out A3.  
 LAKELAND, FLA.—Type, strike out A3.  
 LUDINGTON, MICH. RADIO.—Fy., add 143 (2100).  
 MANISTIQUE, MICH. RADIO.—Fy., 454 (660).  
 MANITOWOC, WIS. RADIO.—Fy., add 454 (660).  
 MENOMINEE, MICH. RADIO.—Fy., add 454 (660).  
 MOBILE, ALA. RADIO (WNN).—Fy., 143 (2,100), 147 (2,040), 442 (680), 500 (600),  
 4,148 (72.324), 5,525 (54.298), 6,785 (44.22), 10,470 (28.65), 11,050 (27.15),  
 11,290 (26.57), 12,970 (23.13), 13,180 (22.76), 16,575 (18.10), 22,100 (13.575),  
 22,580 (13.286).  
 NEW ORLEANS, LA. RADIO.—Fy., strike out 73 (4,110), 90 (3,333), 176 (1,750).  
 PALATKA, FLA.—Type, strike out A3.  
 PHILADELPHIA, PA. RADIO (WNV).—Fy., 438 (685), 500 (600).  
 PORT ARTHUR, TEX. RADIO.—Fy., 131 (2,290), 143 (2,100), 418 (720), 500 (600).  
 PUNTA GORDA, FLA.—Type, strike out A3.  
 ROGERS, MICH.—Read ROGERS CITY, MICH. RADIO.—Type, add A1; fy., add  
 143 (2,100), 177 (1,695), 454 (660).  
 ST. AUGUSTINE, FLA.—Type, strike out A3.  
 SANFORD, FLA.—Type, strike out A3.  
 SAYVILLE, N. Y. RADIO (WSL).—Fy., 5,525 (54.298), 5,675 (52.863), 8,670  
 (34.60), 11,050 (27.15), 11,350 (26.43), 13,060 (22.97), 16,580 (18.094), 16,900  
 (17.751), 22,100 (13.575), 22,700 (13.216).  
 SHEBOYGAN, WIS. RADIO.—Fy., strike out 171 (1,755), add 454 (660).  
 WEST PALM BEACH, FLA. (WNG).—Type, drop A3.  
 Strike out all particulars of the following-named stations: Gallup, N. Mex.;  
 Guadalupe, Calif.; Springfield, Mass.

## COMMERCIAL SHIP STATIONS, ALPHABETICALLY, BY NAMES OF VESSELS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

- A. A. AUGUSTUS.—Accounts, I. R. T. Co.  
 A. D. MACBETH.—Accounts, I. R. T. Co.  
 AFEL.—Owner, Mississippi Shipping Co.; accounts, M. R. T. Co.  
 ALABAMA.—Fy., strike out 394 (760), add 425 (705).  
 ALBATROSS (KELD).—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600).  
 ALBERT E. WATTS.—Fy., add 410 (730).  
 ALBERT HILL.—Type, A1.  
 ALPENA.—Fy., 375 (800), 394 (760), 410 (730), 425 (705).  
 AMASA STONE.—Fy., add 425 (705).  
 AMERICA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910),  
 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600);  
 accounts, R. M. C. A.  
 AMERICAN MERCHANT.—Fy., strike out 410 (730), 454 (660).  
 AMERICAN TRADER.—Fy., 375 (800), 425 (705), 500 (600); accounts, R. M. C. A.  
 AMIDA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910),  
 159 (1,885), 160 (1,875), 375 (800), 400 (750), 468 (640), 500 (600).  
 ANN ARBOR No. 3.—Fy., 375 (800), 410 (730), 425 (705).  
 ANN ARBOR No. 4.—Fy., add 425 (705).  
 ANN ARBOR No. 5.—Fy., add 425 (705).  
 ANN ARBOR No. 6.—Fy., add 425 (705).  
 ANN ARBOR No. 7.—Fy., add 425 (705).  
 ARA.—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 159 (1,885), 160 (1,875), 375  
 (800), 400 (750), 425 (705), 468 (640), 500 (600).  
 ARAS.—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 400  
 (750), 425 (705), 468 (640), 500 (600), 5,525 (54.3), 5,555 (54), 8,330 (36),  
 11,050 (27.15), 11,230 (26.7), 13,240 (22.65).  
 ARCHER.—Accounts, R. M. C. A. (U. S. L.).  
 ARIZONAN.—Call changed to WACX; owner, Williams S. S. Corp.  
 ARMINDA.—Type, B; fy., 375 (800), 410 (730), 425 (705); rates, Great Lakes  
 service 4 cents per word.  
 ASHTABULA.—Fy., add 425 (705).  
 ASTORIA.—Type, B; fy., 375 (800), 425 (705), 500 (600); service, PG; hours, X;  
 rates, 8 cents per word; accounts, R. M. C. A.  
 ATLAS.—Fy., strike out 400 (750), add 410 (730).

- AUSTRALIA.—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).
- AZTEC.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- BARBARA CATES.—Type, B; fy., 375 (800), 425 (705), 500 (600).
- BENSON FORD.—Fy., 143 (2,100), 157 (1,910), 375 (800), 394 (760), 410 (730), 425 (705).
- BERWINDGLEN.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); accounts, R. M. C. A.
- BRUSH.—Accounts, R. M. C. A. (U. S. L.).
- BUCCANEER.—Fy., 375 (800), 410 (730), 425 (705), 5,525 (54.3), 5,555 (54), 5,615 (53.4).
- C. A. CANFIELD.—Fy., add 400 (750), 468 (640).
- CALAWAII.—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).
- CALIFORNIA (KDRG).—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).
- CALIFORNIA STANDARD.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600).
- CAROLYN.—Fy., strike out 410 (730), 454 (660); accounts, owner.
- CHARLES L. WHEELER.—Fy., add 410 (730), 454 (660).
- CHICKASAW.—Owner, American Scantic Line (Inc.).
- CITIES SERVICE TOLEDO.—Type, B; fy., 375 (800), 425 (705), 500 (600).
- CITY OF BIRMINGHAM.—Fy., strike out 137 (2,190), 141 (2,130).
- CITY OF CHATTANOOGA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 160 (1,875), 375 (800), 410 (730), 425 (705), 468 (640), 500 (600).
- CITY OF CLEVELAND III.—Service, PG and P; hours, N (first class), X (third class).
- CITY OF DETROIT III.—Service, PG and P; hours, N (first class), X (third class).
- CITY OF FAIRBURY.—Hours, N (first class), X (third class).
- CITY OF HONOLULU.—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- CITY OF OMAHA.—Accounts, R. M. C. A. (U. S. L.).
- CLAVARACK. Accounts, M. R. T. Co.
- CLEARWATER.—Owner, Mississippi Shipping Co.; accounts, M. R. T. Co.
- COLDWATER.—Type, A2; fy., add 400 (750), 468 (640).
- COLONEL JAMES M. SCHOONMAKER.—Fy., strike out 454 (660), add 425 (705).
- COLONEL JAMES PICKANDS.—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 375 (800), 394 (760), 410 (730).
- COMMERCIAL ORLEANIAN.—Accounts, M. R. T. Co.
- COMMERCIAL TRADER.—Fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- CONEHATTA.—Owner, American Scantic Line (Inc.).
- CONNEMAUT.—Fy., strike out 189 (1,587), add 375 (800).
- CONTOY.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 160 (1,875), 375 (800), 400 (750), 425 (705), 454 (660), 468 (640), 500 (600).
- CREOLE (WEDN).—Fy., 375 (800), 425 (705), 500 (600).
- CRISTOBAL.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600); accounts, R. M. C. A.
- CYPRUS.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); service, PG; hours, X; rates, 8 cents per word; owner, D. C. Jackling.
- DARDEN.—Owner, Spencer Kellogg and Sons.
- DELPHINE.—Fy., add 155 (1,935).
- DIXIANO.—Fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- D. J. MORAN.—Owner, Continental S. S. Co.
- DOROTHY.—Type, B; fy., 375 (800), 425 (705), 500 (600); service, PG; hours, X; rates, 8 cents per word.
- DULCINO.—Owner, S. S. Marina Corp.
- DWIGHT F. DAVIS.—Fy., strike out 6,590 (45.52), add 274 (1,095), 6,515 (46).
- EASTERN PLANET.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).
- EASTERN STATES.—Service, PG and P; hours, N (first class), X (third class).
- EGLANTINE.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).
- ELLENOR.—Fy., strike out 410 (730), 454 (660); accounts, owner.

- ELMORE.—Fy., add 375 (800).  
 ERNEST H. MEYER.—Fy., add 410 (730); accounts, owner.  
 EXARCH.—Fy., strike out 137 (2,190), 141 (2,130); add 153 (1,960); accounts, owner.  
 F. A. BAILEY.—Type, A2; fy., 143 (2,100), 151 (1,985), 375 (800), 410 (730), 425 (705); accounts, I. R. T. Co.  
 FAITH.—Fy., strike out 468 (640), add 454 (660); accounts, R. M. C. A.  
 FAYETTE BROWN.—Rates, Great Lakes service 4 cents per word.  
 FISH HAWK.—Type, As; fy., 375 (800), 400 (750), 425 (705), 500 (600).  
 FLUOR SPAR.—Type, A2; fy., 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600).  
 FONTANA.—Accounts, I. R. T. Co.  
 FRANK BILLINGS.—Accounts, I. R. T. Co.  
 FRANK SEITHER.—Accounts, I. R. T. Co.  
 G. A. TOMLINSON.—Accounts, I. R. T. Co.  
 GENERAL MARKHAM.—Fy., strike out 410 (730), 454 (660).  
 GENEVIEVE LYKES.—Type, A2; fy., add 410 (730), 454 (660).  
 GEORGE H. INGALLS.—Fy., add 375 (800).  
 GEORGE PEIRCE.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).  
 GEORGE WASHINGTON (KDCL).—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).  
 GEORGIAN (KUDL).—Call changed to WACY; fy., 375 (800), 425 (705), 500 (600).  
 GLOUCESTER.—Fy., add 410 (730), 454 (660); hours, N (first class), X (third class).  
 G. N. WILSON.—Fy., add 375 (800).  
 GOODTIME.—Accounts, I. R. T. Co.  
 GRAND ISLAND.—Accounts, I. R. T. Co.  
 GREATER BUFFALO.—Service, PG and P.  
 GREATER DETROIT.—Service, PG and P.  
 GULFGEM.—Type, A2; fy., add 400 (750).  
 GULFLIGHT.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600).  
 GULFSTAR.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600).  
 GULFTRADE.—Fy., strike out 410 (730), 454 (660), add 400 (750).  
 HAIDA.—Type, A2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600); service, PG; hours, X; rates, 8 cents per word; accounts, R. M. C. A.  
 HANOVER.—Accounts, R. M. C. A. (U. S. L.).  
 HILDA.—Type, B.  
 HUALALAI.—Type, A1-2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).  
 HURON.—Fy., strike out 189 (1,587).  
 ILLYRIA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).  
 JAMES ELLWOOD JONES.—Type, A1-2; fy., add 410 (730), 454 (660).  
 JEANNE.—Type, A1 and A3; fy., 375 (800), 425 (705), 500 (600), 5,525 (54.3), 5,555 (54).  
 JITNEY.—Service, PG and P; hours, N (first class), X (third class).  
 JOHN A. KLING.—Type, A2; fy., 143 (2,100), 151 (1,985), 375 (800), 394 (760), 410 (730), 425 (705).  
 JOHN F. CUSHING.—Type, A2; fy., add 394 (760); accounts, R. C. A.  
 JOSEPH M. CUDAHY.—Fy., strike out 400 (750).  
 KATHERINE.—Correct orthography, Katharine.  
 KEARNY.—Fy., strike out 410 (730), 454 (660); hours, N (first class), X (third class).  
 KNOXVILLE CITY.—Fy., strike out 410 (730), 454 (660); hours, X.  
 KOYOLA.—Fy., 5,525 (54.3), 5,555 (54), 11,050 (27.15), 11,110 (27).  
 LAKE ALLEN.—Type, A3; fy., 2,452 (122.35); service, P; hours, X.  
 LAKE CRYSTAL.—Type, A3; fy., 2,452 (122.35); service, P; hours, X.  
 LAKE HEMLOCK.—Type, A3; fy., 2,452 (122.35); service, P; hours, X.  
 LAKE KYTTLE.—Type, A3; fy., 2,452 (122.35); service, P; hours, X.  
 LAKE LOUISE.—Type, A3; fy., 2,452 (122.35); service, P; hours, X.  
 L. E. BLOCK.—Fy., add 5,525 (54.3), 5,555 (54), 8,330 (36); accounts, I. R. T. Co.  
 LEVIATHAN.—Type, A1-2 and B; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705),

- 500 (600), 5,525 (54.3), 5,555 (54), 8,290 (36.19), 8,450 (35.5), 11,050 (27.15), 11,110 (27), 11,230 (26.7); hours, N; accounts, R. M. C. A.
- LIBERTY GLO.**—Type, A2; fy., add 400 (750), 468 (640).
- LIGONIER.**—Type, A2; fy., add 400 (750).
- LIVINGSTONE ROE.**—Correct orthography Livingston Roe.
- LONE STAR.**—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600).
- M. A. BRADLEY.**—Fy., 375 (800), 394 (760), 410 (730), 425 (705).
- MAGMERIC.**—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- MAHUKONA.**—Type, A3; fy., 2,518 (120).
- MAKAWAO.**—Fy., 375 (800), 425 (705), 500 (600).
- MARGARET.**—Fy., 375 (800), 425 (705), 500 (600).
- MARGO.**—Type, A2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 375 (800), 394 (760), 410 (730), 425 (705).
- MARY D.**—Type, A2; fy., 375 (800), 425 (705), 400 (750), 468 (640), 500 (600).
- MEMORY III.**—Type, A1-2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); service, PG; hours, X; rates, 8 cents per word.
- MEXICO.**—Owner, Alaska S. S. Co.
- MIZPAH.**—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 5,525 (54.3), 5,615 (53.4), 5,555 (54), 8,330 (36.01).
- MOSELLA.**—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).
- MYSTIC.**—Name changed to Munmystic.
- NANUK.**—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- NARBO.**—Type, A2; fy., 143 (2,100), 151 (1,985), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).
- NASHABA.**—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 160 (1,875), 375 (800), 500 (600).
- NATIRAR.**—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705).
- NEW ORLEANS.**—Type, B; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 454 (660), 500 (600); hours, N (first class), X (third class).
- NOMAD.**—Fy., 375 (800), 425 (705), 468 (640), 500 (600), 5,525 (54.3), 5,615 (53.4), 8,330 (36.01), 11,050 (27.15), 11,110 (27); service, PG; rates, 8 cents per word.
- NOR'EASTER.**—Type, A1-2; fy., 375 (800), 425 (705), 500 (600).
- NORTH DAKOTA.**—Type, A1; fy., 375 (800), 425 (705), 454 (660), 468 (640), 500 (600); service, PG; rates, 8 cents per word.
- NORTH KING.**—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- ORIOLE.**—Fy., 375 (800), 425 (705), 500 (600).
- ORLEANS.**—Fy., 375 (800), 425 (705), 500 (600); accounts, owner.
- OSCAR D. BENNETT.**—Fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).
- PETER HELMS.**—Type, B; fy., 375 (800), 425 (705), 500 (600).
- PETREL (KFDG).**—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600).
- POINT SAN PABLO.**—Type, B; fy., 375 (800), 425 (705), 500 (600).
- POINT SAN PEDRO.**—Type, B; fy., 375 (800), 425 (705), 500 (600).
- PONCE.**—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600).
- PRESIDENT HARDING.**—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).
- PRESIDENT JOHNSON.**—Type, B and A2; fy., 375 (800), 410 (730), 425 (705), 454 (660), 500 (600), 5,525 (54.3), 5,555 (54), 8,450 (35.5), 11,050 (27.15), 11,110 (27), 16,575 (19), 16,660 (18); accounts, owner.
- PRESIDENT MADISON.**—Fy., 143 (2,100), 160 (1,875), 375 (800), 425 (705), 500 (600).
- PRESIDENT MCKINLEY.**—Fy., 143 (2,100), 151 (1,985), 160 (1,875), 375 (800), 425 (705), 500 (600).
- PRESIDENT ROOSEVELT.**—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).
- RADNOR.**—Accounts, R. M. C. A. (U. S. L.).
- REDMAN.**—Name changed to Mundixie.
- REPUBLIC (WTCW).**—Fy., 143 (2,100), 151 (1,985), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).



SALVATION LASS.—Accounts, M. R. T. Co.

SANTA MARIA (KFTI).—Fy., 143 (2,100), 151 (1,985), 159 (1,885), 375 (800), 425 (705), 500 (600).

SANTA MARIA (WPBW).—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).

SAUGERTIES.—Accounts, M. R. T. Co.

SCHODACK.—Fy., 375 (800), 425 (705), 500 (600).

SEYELYN.—Type, A2; fy., 5,525 (54.3), 5,555 (54), 8,450 (35.5), 11,050 (27.15), 11,110 (27).

SHICKSHINNY.—Type, A2; fy., add 400 (750), 468 (640).

SIALIA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640).

SIERRA (WKCM).—Type, A1-2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).

SOBRE LAS OLAS.—Type, A1-2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); service, PG; rates, 8 cents per word.

SOLANA.—Fy., 143 (2,100), 151 (1,985), 160 (1,875), 375 (800), 425 (705), 500 (600).

SONORA.—Fy., 375 (800), 410 (730), 425 (705).

SOUTHERN CROSS.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 160 (1,875), 375 (800), 425 (705), 500 (600), 5,525 (54.3), 5,555 (54), 8,450 (35.5), 11,050 (27.15), 11,110 (27), 13,240 (22.66).

STATE OF VIRGINIA.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600).

S. T. CRAPO.—Fy., 375 (800), 394 (760), 410 (730), 425 (705).

STEEL MOTOR.—Fy., 375 (800), 410 (730), 425 (705).

STEEL NAVIGATOR.—Type, A2; fy., 375 (800), 425 (705), 500 (600), 5,525 (54.3), 5,555 (54), 8,290 (36.19), 8,450 (35.5), 11,050 (27.15), 11,110 (27), 13,240 (22.66), 13,270 (22.61).

STEEL VENDOR.—Fy., 375 (800), 410 (730), 425 (705).

SUNDANCE.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).

TAMPA (KOVX).—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705).

TIDEWATER.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).

TRINIDADIAN.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 500 (600).

TULSA.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).

UNICOI.—Type, A, arc.; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600).

VAGABONDIA.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 400 (750), 425 (705), 468 (640), 500 (600).

VIKING.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 160 (1,875), 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600); hours, N (first class), X (third class).

VIOLET RAY.—Fy., 375 (800), 468 (640), 500 (600), 2,320 (129.3); service, PG; rates, 6 cents per word.

WARD.—Accounts, R. M. C. A.

WARWICK.—Fy., 143 (2,100), 151 (1,985), 159 (1,885), 375 (800), 425 (705), 500 (600).

WEST CORUM.—Accounts, M. R. T. Co.

WEST HONAKER.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).

WEST ISLETA.—Hours, N.

WEST NERIS.—Accounts, M. R. T. Co.

WICHITA.—Type, A1-2; fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 410 (730), 425 (705), 454 (660), 500 (600).

WILDWOOD.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); accounts, R. M. C. A.

WILLIAM A. MCKENNEY.—Type, A2; fy., 375 (800), 425 (705), 454 (660), 500 (600).

WILLIAM G. MATHER.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 375 (800), 394 (760), 410 (730), 425 (705).

WILLIAM PENN.—Fy., 141 (2,130), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).

WIND RUSH.—Fy., 375 (800), 425 (705), 500 (600).

W. W. BRUCE.—Owner, Continental S. S. Co.

WYANDOTTE.—Fy., 375 (800), 394 (760), 410 (730), 425 (705).

YAKA.—Type, B; fy., 375 (800), 425 (705), 500 (600).

YOMACHICHI.—Fy., 143 (2,100), 151 (1,985), 153 (1,960), 155 (1,935), 157 (1,910), 159 (1,885), 160 (1,875), 375 (800), 425 (705), 500 (600).

ZAILA.—Type, A2; fy., 375 (800), 425 (705), 500 (600); service, PG; rates, 6 cents per word.

Strike out all particulars of the following-named vessels: Dauntless, Howick Hall, Lake Benton, Meteor, Moody, Ohonkara, Zapala.

#### COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

KDOD, read Livingston Roe; KUDL, call changed to WACY; KUGV, call changed to WACX; WADZ, read Mundixie; WBCP, read Munmystic; WLC, read Rogers City, Mich. Radio; WNBC, read Katharine; strike out all particulars following the call signals, KDYJ, KDYT, KIU, KSIU, KSP, KURV, WBZ, WDCX, WLCZ, WOBZ.

#### COMMERCIAL AIRCRAFT STATIONS, ALPHABETICALLY, BY NAMES OF CRAFT

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

N. A. T. AIRPLANE No. 39 (KHEG).—Strike out all particulars.

#### BROADCASTING STATIONS, BY CALL SIGNALS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929]

KFIO (Spokane, Wash.).—Owner, Spokane Broadcasting Corporation.

KPPY (Spokane, Wash.).—Fy., 1,340 (223.9).

KWBS (Portland, Oreg.).—Call changed to KVEP.

WCDA (Cliffside, N. J.).—Loc. 73° 59' 37" W., 40° 48' 29" N.

WEAN (Providence, R. I.).—Fy., 780 (385).

WIBA (Madison, Wis.).—Owner, Capital Times Co.

WOKO (Mount Beacon, N. Y.).—Owner, Hudson Valley Broadcasting Co. (H. E. Smith & R. M. Curtis).

WWVA (Wheeling, W. Va.).—Power, 5,000.

Strike out all particulars of the following named stations: KFQD (Anchorage, Alaska); KGHB (Honolulu, Hawaii).

#### GOVERNMENT LAND STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

COLON, PANAMA RADIO.—Loc. 79° 54' 33" W., 09° 17' 42" N.

FORT FRANK, P. I. (Carabao Island).—Strike out all particulars.

#### GOVERNMENT SHIP STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1929, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

Strike out all particulars of the following-named vessels: General Alava, Mayflower (NEGZ), Peacock, Warbler, Willet.

#### GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

Strike out all particulars following the call signals, NAMG, NEGZ, KDKR, KDKS, KDKY, WUE.

#### EXPERIMENTAL 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, 1929]

#### CALIFORNIA:

Bolinas (W6XB).—Strike out all particulars.

Bolinas, (W6XU).—Strike out all particulars.

Los Angeles (W6XAM).—Strike out all particulars.

Los Angeles (W6XAN).—Strike out all particulars.

San Mateo County (W6XAQ).—Fy., add 2,400 (12.50), 26,800 (11.194); 28,300 (10.601), 36,000 (8.33), 40,000 (7.50), 50,000 (6), 75,000 (4).

**HAWAII:**

Honolulu (K6XS).—Owner, R. C. A. Communications (Inc.).

Lahaina (K6XX).—Owner, R. C. A. Communications (Inc.).

**ILLINOIS:** Chicago (W9XT).—Strike out all particulars.**MAINE:** Portland (W1XAB).—Strike out all particulars.**MICHIGAN:** Detroit (W8XAO).—Strike out all particulars.**MINNESOTA:** Anoka (W9XL).—Fy., 1,604 (187.03), 2,398 (125.1), 3,256 (92.5); 4,795 (62.57), 6,425 (46.7), 8,650 (34.68), 12,850 (23.35), 17,300 (17.341).**OHIO:** Columbus (W8XJ).—Strike out all particulars.*Portable***CALIFORNIA:** Alma (Holy City) (W6XBH).—Strike out all particulars.**WASHINGTON:** Spokane (W7XAB).—Strike out all particulars.*Locomotive*

Locomotive No. 2724 and Caboose No. 19517 (W2XBO).—Strike out all particulars.

*Vessel*

MU-1 (W2XAO).—Strike out all particulars.

**MISCELLANEOUS****INTERNATIONAL LIST OF CALL SIGNALS AVAILABLE FOR DISTRIBUTION**

A new edition, 1929, of the International List of Fixed, Land, and Mobile Stations, Alphabetically by Call Signals, is now available for distribution by the International Bureau of the Telegraph Union, Radiotelegraph Service, Berne, Switzerland, at 6 francs, 40 centimes, Swiss gold (\$1.30), including supplements to the end of 1930 and postage. Remittances should be forwarded direct to the Berne bureau.

**TIME SIGNALS TRANSMITTED BY SAIGON, FRENCH INDO-CHINA**

This station now transmits time signals from 1,900 to 1,905, G. M. T., corresponding to from 200 to 205, standard time, on frequencies 18.987 kilocycles (15,800 meters) (FZA) and 12,000 kilocycles (25 meters) (FZG), type A1.

**REGULATIONS FOR OBTAINING BEARINGS FROM ITALIAN STATIONS**

Vessels desiring to obtain independent bearings from Murano compass station should call Venice (communication station ICZ) and from Ancona compass station should call Ancona (communication station IQW) on 375 kilocycles. Simultaneous bearings can also be observed if required, as the two compass stations are connected by land line, but the procedure in either case is similar. After the usual preliminary signals and the compass station is ready the ship requiring the bearing must send a series of the letter "V" for a period of three minutes. When the bearing has been obtained, it is communicated to the vessel; in the case of Murano compass station by Venice on 425 kilocycles and in the case of Ancona compass station by Ancona (communication station) on 375 kilocycles. Both stations maintain continuous watch. A charge of 6 francs is made for each bearing.

**USE OF RADIOBEACONS FOR CALIBRATION**

In connection with the synchronizing of all radiobeacon stations on the Great Lakes for the elimination of interference which was made effective on July 1 last, two periods each day from 9.25 to 9.30 a. m. and p. m., central standard time, are reserved for the transmission of time signals from station to station. Because of the above it is not practicable for any radiobeacons to transmit continuously for calibration purposes at these times. Continuous transmission for calibration is also not practicable during any of the scheduled periods of operation for general navigation purposes.

## EXPERIMENTS WITH VISUAL BROADCASTING FOR LOCATING STATIC INTERFERENCE

The visual broadcasting system is to be put to a novel use at the Slough (British) radio research station for the purpose of recording atmospherics. By arrangement with the British Broadcasting Co. special transmissions will be made from Daventry after the normal experimental periods, and these will be picked up at recording stations in various parts of Europe. The transmissions will not take the form of pictures; instead there will be transmitted a series of straight lines, both horizontal and vertical, forming a grid or network. When an atmospheric occurs, deformations of the straight lines will take place to an extent depending upon the intensity of the interference. It is hoped by this means that it may be possible to make records giving the most valuable data for research into the intensity, duration, and origin of individual atmospherics. Since the drums of all receiving apparatus, wherever situated, are synchronized, it will be possible by comparing the results obtained in different places to determine the range at which an individual atmospheric can cause interference and the intensity of this interference in different localities.

## FREQUENCY OF CONINGBEG (IRELAND) LIGHT VESSEL CHANGED

This beacon now operates on a frequency of 307.7 kilocycles (975 meters). Location (approximately), 52° 02' N., 6° 40' W.

## GERMANY RATIFIES INTERNATIONAL CONVENTION

On August 22, 1929, Germany deposited with the State Department its ratification of the International Convention, Regulations, and Supplementary Regulations annexed thereto.

## Naval stations transmitting time signals

Time (Greenwich civil) <sup>1</sup>	Station	Call signal	Frequency in kilocycles, meters in parentheses, and type of emission
0255 to 0300	Arlington, Va.....	NAA	113 (2,655), A2 690 (435), A2 4,015 (74.72), A2 8,030 (37.36), A2 12,045 (24.91), A2
	Annapolis, Md.....	NSS	17.8 (16,855), A1 56 (5,355), A1
	Cavite, P. I.....	NPO	108 (2,775), A2 8,872 (33.81), A2 13,308 (22.54), A2
0355 to 0400	Balboa, Canal Zone.....	NBA	46 (6,520), A1
	Colon, Canal Zone.....	NAX	132 (2,275), A2 42.8 (7,010), A1
0555 to 0600	San Francisco, Calif.....	NPG	66 (4,545), A1 108 (2,775), A2
0800	Annapolis, Md.....	NSS	17.8 (16,855), A1
	Arlington, Va.....	NAA	113 (2,655), A2 690 (435), A2 4,015 (74.72), A2 8,030 (37.36), A2 12,045 (24.91), A2
1355 to 1400	Cavite, P. I.....	NPO	108 (2,775), A2 8,872 (33.81), A2 13,308 (22.54), A2
	Eureka, Calif.....	NPW	108 (2,775), A1 113 (2,655), A2
	Arlington, Va.....	NAA	690 (435), A2 4,015 (74.72), A2 8,030 (37.36), A2 12,045 (24.91), A2
1655 to 1700	Annapolis, Md.....	NSS	17.8 (16,855), A1
	Great Lakes, Ill.....	NAJ	122 (2,460), A2
	Key West, Fla.....	NAR	106 (2,830), A1
	New Orleans, La.....	NAT	104 (2,885), A1
	San Diego, Calif.....	NPL	30.6 (9,800), A1 102 (2,940), A1 102 (2,940), A2
1755 to 1800	Astoria, Oreg.....	NPE	102 (2,940), A2
	Balboa, Canal Zone.....	NBA	46 (6,520), A1
1955 to 2000	Colon, Canal Zone.....	NAX	132 (2,275), A2 42.8 (7,010), A1
	San Francisco, Calif.....	NPG	66 (4,545), A1 108 (2,775), A2
2355 to 2400	Honolulu, Hawaii.....	NPM	26.1 (11,495), A1 106 (2,830), A2

<sup>1</sup> 5 hours faster than eastern standard time.

List of Cuban broadcasting, experimental, and amateur stations (July 28, 1929)

Call signal	Owner	Address	City	Frequency		Power (watts)
				Kilocycles	Meters	
CMC	Cuban Telephone Co.	Rafael María de Labra 181.	Havana	840	357	500
CM1	Instituto Provincial.	Zulueta y Teniente Rey.	do	797	376	500
CM1AZ	Antonio Sarasola	Sánchez 22	Maríel	1,090.2	275	30
CM1PK	Pedro Amat	M. Gómez 16	Guanaajay	1,573	199	7½
CM2AB	Alberto S. Bustamante.	15 entre J y K, Vedado	Havana	1,200	250	10
CM2AC 1	José Acosta	Concepción y Núñez	Marianao	8,950	33.5	7½
CM2AR	Adalberto Alvarez	General Aranguren 39	Havana	1,209	248	75
CM2AY	César Fernández	Real 101	Marianao	8,700	34.5	7½
CM2AZ	Diario de la Marina	Paseo de Martí 103	Havana	993	334	30
CM2BX	Bertín Fernández	Figuras 47	do	961	312.5	15
CM2CF 1	Victor Couillard	Camp. Columbia 30-B	Marianao	8,550	35	7½
CM2CP	Casimiro Pujadas	Carlos III núm. 16	Havana	1,071	280	10
CM2FA	Francisco Arocha	Infanzón 12, Luyanó	do	7,500	40	7½
CM2FG	Alberto Alvarez	4ª Avenida 43	Hershey	1,331	226	20
CM2GZ 1	Jorge L. González	Luz 42	Havana	7,300	41	7½
CM2HP	Cristina W. Vda de Cruet.	Masón 32	do	1,462.5	205	200
CM2IQ 1	José Fernández	Real 89	Marianao	7,500	40	7½
CM2JF	José L. Ferriol	Pluma 13	do	1,196	252	15
CM2JK	Francisco Lavín	San Lázaro 99	Havana	877	342.5	280
CM2JL	José Leiro	4 (Redención) 78-C	Marianao	1,019.7	291	7½
CM2JT 1	José A. Terry	Ave. de la Playa 2	do	8,300	36	7½
CM2JP	Julio E. Power	Villegas 46	Havana	1,111	270	15
CM2KP 1	Juan Fernández de Castro.	3ª Avenida esq. a 4	Marianao	0,650	31	50
CM2LA	Enrique Lasanta	Juan C. Zenea 172	Havana	10,000	30	50
CM2LO	Luis Casas	17 número 86, Vedado	do	952	215	50
CM2LP	Emilio Perera	Trocadero 113	do	835	359	15
CM2LR	José Lara	Patrocinio 29, Vibora	do	1,391	215	15
CM2MA	Modesto Alvarez	A entre 6 y 8, La Sierra	Marianao	1,079	278	50
CM2MC	Oscar Montenegro	Compostela 69	Havana	1,234	243	50
CM2MG	Manuel y G. Salas	General Carrillo 14	do	1,045	287	15
CM2MK	R. V. Watters	Avenida de Italia 29	do	0,350	32	100
CM3OH	José Fernández Tuviaur.	25 número 445, Vedado	do	1,060	260	15
CM2OK	Mario García Vélez	19 número 226, Vedado	do	832.8	360	100
CM2PC	Angel Bertematy	J. Peregrino 108	do	1,415	212	15
CM2RC	Radio Club de Cuba.	Lealtad 153	do	1,162	288	15
CM2RK	Rafil Karman	Rayo 67	do	920	326	50
CM2RM 1	Rogelio Morales	Luz 76	do	8,450	35.5	10
CM2RO 1	Pablo A. Rosado	Santa Rosa s/n	Marianao	8,800	34	7½
CM2SC 1	José del Salto	General Suárez 128	Havana	7,600	39.5	50
CM2SE	Rafael Fernández Morejón.	Estrella 121	do	1,442	208	10
CM2SF	Eusebio Solís	Juana Alonso 9, Luyanó.	do	7,050	42.5	7½
CM2SW	Samuel I. Wheeldon	Avenida 5 entre y 4	Marianao	6,900	43.5	7½
CM2SZ 1	Homero Sánchez	Pervenir 35, Vibora	Havana	1,666.6	180	10
CM2TW	Roberto E. Ramirez	Bernaza 37-B	do	1,176	255	10
CM2UF	Benito Vieto Ferro	Obispo 83	do	1,324	228	100
CM2WD	Samuel I. Wheeldon	Ave. 5 entre 3 y 4	Marianao	1,094	274	7½
CM2WX	Miguel Troncoso	Juan C. Zenea 33	Havana	880	341	150
CM2XA	Lecuona Music Co.	Espada 24-A	do	1,308.5	230	200
CM2XC	Alexander Strang	M. de Castro s/n, Luyanó.	do	7,250	41.5	5
CM2XK	Rafil Karman	Rayo 67	do	7,700	39	7½
CM2XX	Antonio A. Ginard	Reina y Avenida de Columbia.	Marianao	1,335.5	225	10
CM2YB	Francisco Vives	Prado 105	Havana	7,250	41.5	5
CM5AY 1	Angel E. Aguilar	Martí 122	P. Betancourt	8,250	26.5	7½
CM5AZ 1	Ernesto V. Figueroa	Independencia 130	Matanzas	8,300	26	7½
CM5BY 1	León González Vélez	San Isidro 5	do	8,000	37.5	7½
CM5CX	José Alfonso	Diago 73	Ceja	9,350	32	50
CM5EN 1	Escuela Normal	Tello Lamar 41	Matanzas	8,300	36	7½
CM5EV	Leopoldo V. Figueroa	Martí 19	Ceja	832.8	360	100
CM5FC 1	Félix U. Casas	E. Blanchet 19	Matanzas	8,100	37	7½
CM5FL 1	Francisco D. Agramonte.	Santa Catalina 16	P. Betancourt	8,700	34.5	7½
CM5IM 1	Félix U. Casas	Tello Lamar 60	Matanzas	7,900	38	7½
CM5NI	Julio C. Oyarzábal	Luz Caballero 37½	Jovellanos	8,450	35.5	7½
CM5RY 1	Roberté R. de la Torre.	General Betancourt 21	Matanzas	948	307	7½
CM6BY	José Ganduxe	Argüelles 200	Cienfuegos	1,153.1	260	200
CM6DW 1	Eduardo Terry	San Carlos 197	do	1,335.5	225	10

1 Radiotelegraph (code) station.

List of Cuban broadcasting, experimental, and amateur stations (July 26, 1929)—  
Continued

Call signal	Owner	Address	City	Frequency		Power (watts)
				Kilocycles	Meters	
CM6EV	Marfa J. Alvarez	Ma. Escobar 17	Calbari6n	1,199.2	250	50
CM6GR <sup>1</sup>	Gustavo Rodriguez	Castillo 45	Cienfuegos	2,000	150	10
CM6GT <sup>1</sup>	Juan Pablo Ross	Independencia 150	do	1,578	190	5
CM6HS	Santiago Ventura	Col6n 156	Sagua la Grande	1,499.1	200	10
CM6KP	Antonio Galguera	C6spedes 178	Sancti Spiritus	1,071	280	20
CM6KW	Frank H. Jones	Central Tuinuc6	Tuinuc6	815	368	100
CM6WT	Carlos M. P6rez	Col6n esq. a Rodriguez	Santa Clara	1,500	200	7½
CM6LO	Manuel A. Alvarez	Ma. Escobar 17	Calbari6n	922.5	325	250
CM6MN	Juan del Regato	Col6n 33	Santa Clara	1,428	210	20
CM6XJ	Frank H. Jones	Central Tuinuc6	Tuinuc6	15,000	20	100
CM6YR	Diego Iborra	Jos6 Ma. Espinosa 23	Camaguey	1,499.1	200	20
CM7AZ	Pedro Noguera	Maceo 1	Camaguey	1,332.5	225	10
CM7BY	Eduardo V. Figueroa	Independencia 110	Ciego de Avila	1,275.8	235	20
CM7CX <sup>1</sup>	Leonard B. Fox	Central Florida	Florida	8,100	37	15
CM7DW <sup>1</sup>	M. L. de Quintana	Central Tacaj6	Tacaj6	6,976	43	10
CM7FU	Feliciano Isaac	Independencia y F. Callejas	C. de Avila	1,499.1	200	15
CM7GT <sup>1</sup>	Armando Vaquer	Joaqu6n Ag6ero 99	Camaguey	1,537.5	195	5
CM7HS	Porfirio de la Cruz	Rep6blica 39	C. de Avila	1,561.5	192	15
CM7JQ	Leonard B. Fox	Central Florida	Florida	7,138.5	42	5
CM7LO <sup>1</sup>	Francisco Carbonell	Rep6blica 150	Camaguey	1,090.2	275	15
CM7NM	Domingo Caymaros	A. Arango 31	Nuevitas	1,135.6	264	20
CM7OL	Arsenio Vald6s	Chicho Vald6s 34	Ciego de Avila	6,800	44	20
CM8AZ <sup>1</sup>	Alfredo Brook Galo	8 y 17, Vista Alegre	Santiago de Cuba	1,249.2	240	50
CM8BY	Alberto Ravelo	Ave. entre 1 y 3 V. A.	do	2,000	150	30
CM8HS	Guillermo Polanco	M. Corona Baja	do	1,499.1	200	30
CM8KP <sup>1</sup>	Juan Fern6ndez de Castro	R. P. Gorda y C. del Caney	do	10,000	30	100
CM8KW	Melchor Ag6ero	Princesa Baja 31	do	1,200	250	15
CM8MN <sup>1</sup>	do	do	do	6,976	43	50

<sup>1</sup> Radiotelegraph (code) station.

Revised list of European broadcasting stations by frequencies under Prague plan

[See footnotes to this table at end]

Frequency in kilocycles, meters in parentheses	Call signal	Location	Power (watts in antenna)
155 (1,935)	<b>RYK</b>	Kaunas, Lithuania <sup>1</sup>	7,000
160 (1,875)		Hulzen, Holland	6,500
167 (1,800)		Lahti, Finland	40,000
174 (1,725)	<b>FL</b>	Paris, France	12,000
183.5 (1,635)		Zeesen, Germany	25,000
193 (1,553)	<b>5XX</b>	Daventry, Great Britain	25,000
202.5 (1,581)	<b>RA1</b>	Moscow, U. S. S. R. <sup>2</sup>	12,000
207.5 (1,444)	<b>FL</b>	Paris, France (Tour Eiffel)	12,000
212.5 (1,411)		Warsaw, Poland	12,000
222.5 (1,348)	<b>SBG</b>	Motala, Sweden	30,000
230 (1,304)		Kharkov, U. S. S. R.	4,000
250 (1,200)		Stamboul, Turkey	5,000
250 (1,200)	<b>BBE</b>	Boden, Sweden	600
		Reykjavik, Iceland	5,000-7,000
260 (1,153)		Kalundborg, Denmark	7,500
280 (1,072)		Trondjhem (projected), Norway	1,200
280.1 (1,071)	<b>HDO</b>	Hilversum, Holland <sup>3</sup>	6,500
297 (1,010)	<b>HB3</b>	Basel, Switzerland	250
300 (1,000)	<b>RA42</b>	Leningrad, U. S. S. R.	20,000
320 (938)		Moscow, U. S. S. R.	2,000
365 (825)		do	
375 (800)	<b>RA45</b>	Kiev, U. S. S. R.	1,200
385 (778)	<b>RA64</b>	Petrozavodsk, U. S. S. R.	2,000
389 (770)	<b>SBF</b>	Ostersund, Sweden	600
395 (780)		Geneva, Switzerland	250
428 (700)	<b>RA18</b>	Minsk, U. S. S. R.	4,000
442 (680)	<b>HB2</b>	Lausanne, Switzerland	600
527 (570)		Freiburg, Germany	250
527 (570)	<b>LKH</b>	Hamar, Norway	700
530 (566)		Ljubljana, Yugoslavia	3,000
531 (565)		Smolensk, U. S. S. R.	2,000
536 (560)		Augsburg, Germany	250

Revised list of European broadcasting stations by frequencies under Prague plan—  
Continued

Frequency in kilo cycles, meters in parentheses	Call signal	Location	Power (watts in antenna)
536 (560)		Hanover, Germany	250
545 (550)		Budapest (Lakihegy), Hungary	15,000-20,000
554 (542)	SBD	Sundsvall, Sweden	600-10,000
563 (533)		Munchen, Germany	1,500
572 (525)	YLZ	Riga, Latvia	5,000
581 (517)	ORV	Vienna, Austria	15,000
585 (511)		Archangel U. S. S. R.	1,200
590 (509)	EB4RB	Brussels (Radio-Belgique), Belgium	1,000-10,000
599 (500.8)	IMI	Milan, Italy	7,000
603.5 (497)		Moscow, U. S. S. R.	1,200
608 (493)	LKO	Oslo, Norway	1,200
617 (487)	OKP	Prague, Czechoslovakia	5,000
621 (483)	RA39	Gomel, U. S. S. R.	1,200
626 (479)	5GB	Daventry, Great Britain	25,000
630 (476)		Simferopol, U. S. S. R.	1,200
635 (473)		Langenberg, Germany	13,000
644 (466)		Lyon La Doua, France	5,000
653 (459)		Zurich, Switzerland	630
659.3 (455)		Yugoslavia	
662 (453)		Aachen, Germany	250
662 (453)		Free City of Danzig	250
662 (453)		Klagenfurt, Austria	500
662 (453)		Tammerfors, Finland	800
662 (453)	IBO	Bolzano, Italy	200
662 (453)	SCT	Upsala, Sweden	160
662 (453)	LKP	Porsgrund, Norway	700
662 (453)	LKM	Tromsø, Norway	100
662 (453)	LKA	Aalesund, Norway	300
662 (453)	EAJ27	Salamanca, Spain	1,000
666.5 (450)		Moscow, U. S. S. R.	1,000
671 (447)	LKR	Rjukan, Norway	150
671 (447)		Paris, France (P. T. T.)	300
690 (441.1)	IRO	Rome, Italy	3,000
699 (436)	SBA	Stockholm, Sweden	1,000-60,000
699 (436)	SCN	Mahnberget, Sweden	250
698 (429)		Belgrade, Yugoslavia	2,500
702.5 (427)	KA43	Kharkov, U. S. S. R.	4,000
707 (424)		Madrid, Spain	2,000
716 (418)		Berlin, Germany	1,500
725 (413)	ZRN	Dublin, Irish Free State	1,000
729.5 (411)	RA40	Odessa, U. S. S. R.	1,200
734 (408)		Katowice, Poland	10,000
743 (403)		Berne, Switzerland	1,200
747.5 (401)	RA34	Koursk, U. S. S. R.	1,200
752 (399)	5SC	Glasgow, Great Britain	1,000
761 (394)		Bucharest, Rumania	120
761 (394)		Fredrikstad, Norway	700
770 (390)		Frankfort-on-the-Main, Germany	1,500
779 (385.1)		Wlino, Poland	500
779 (385.1)	IGE	Genoa, Italy	1,200
783.5 (383)	RA3U	Dnepropetrovsk, U. S. S. R.	1,200
788 (381)		Toulouse, France	8,000
792.5 (379)	RA56	Artomovsk, U. S. S. R.	1,200
797 (377)	ZZY	Manchester, Great Britain	1,000
806 (372)		Hamburg, Germany	1,500
810.5 (370)	RA44	Tver, U. S. S. R.	1,000
815 (368)	EAJ17	Seville, Spain	1,500
819.5 (366)		Nikolaiev, U. S. S. R.	1,200
824 (364)	LKB	Bergen, Norway	1,000
833 (360)		Stuttgart, Germany	1,500
842 (356)	ZLO	London, Great Britain	2,000
851 (352)		Graz, Austria	500
855.5 (351)	RA59	Leningrad, U. S. S. R.	1,200
860 (349)	EAJ1	Barcelona, Spain	8,000
869 (346)	EAJ8	San Sebastian, Spain	
876 (342)	OKB	Strasbourg, France	100
887 (339)		Brunn, Czechoslovakia	2,400
887 (339)		Bremen, Germany	250
887 (339)		Belgium (under construction)	
891.5 (337)	RA7	Ivan-Vornesensk, U. S. S. R.	1,200
895 (335)		Poznan, Poland	1,200
905 (331.4)	INA	Naples, Italy	1,500
914 (329)		Grenoble, France	
923 (325)		Gleiwitz, Germany	5,000
932 (322)	SCC	Falun, Sweden	500
932 (322)	SBB	Gothenburg, Sweden	10,000
941 (319)		Dresden, Germany	250
941 (319)		Bulgaria	
980 (316)		Marseille, France (P. T. T.)	500

Revised list of European broadcasting stations by frequencies under Prague plan—  
Continued

Frequency in kilo- cycles, meters in parentheses	Call signal	Location	Power (watts in antenna)
959 (313)		Cracow, Poland	500
968 (310)	5WA	Cardiff, Great Britain	1,000
973 (308)		Zagreb, Yugoslavia	700
977 (307)		Yugoslavia	
986 (304)		Bordeaux-Lafayette, France	1,000
995 (301)	2BD	Aberdeen, Great Britain	1,000
1,004 (298)		Hilversum, Holland	6,500
1,013 (295)		Tallinn, Estonia	700
1,022 (293)		Limoges, France	500
1,022 (293)		Kosice, Czechoslovakia	2,000
1,031 (291)		Viiipuri (Viborg), Finland	400
1,040 (288.5)	2LS	Bradford, Great Britain	130
1,040 (288.5)	6BM	Bournemouth, Great Britain	1,000
1,040 (288.5)	2DE	Dundee, Great Britain	130
1,040 (288.5)	2EH	Edinburgh, Great Britain	350
1,040 (288.5)	6KH	Hull, Great Britain	130
1,040 (288.5)	6LV	Liverpool, Great Britain	130
1,040 (288.5)	6FY	Plymouth, Great Britain	130
1,040 (288.5)	6FL	Sheffield, Great Britain	130
1,040 (288.5)	6ST	Stoke-on-Trent, Great Britain	130
1,040 (288.5)	6SX	Swansea, Great Britain	130
1,049 (286)		Montpellier, France	200
1,058 (283)	SCU	Varberg, Sweden	300
1,058 (283)		Berlin, Germany	500
1,058 (283)		Stettin, Germany	500
1,058 (283)		Magdeburg, Germany	500
1,058 (283)		Innsbruck, Austria	500
1,058 (283)	SCR	Uddevalla, Sweden	50
1,058 (283)		Portugal	
1,058 (283)	LKN	Notodden, Norway	50
1,067 (281)		Kobenhavn, Denmark	750
1,076 (279)	OKR	Bratislav, Czechoslovakia	12,500
1,085 (276)		Konigsberg, Germany	1,500
1,094 (274.2)		Torino, Italy	7,000
1,103 (272)		Rennes, France (P. T. T.)	500
1,112 (270)		Kaiserlautern, Germany	500
1,112 (270)	SCO	Norrkoping, Sweden	250
1,112 (270)		Greece	
1,112 (270)	SCF	Hudiksvall, Sweden	150
1,112 (270)	SCQ	Trollhattan, Sweden	250
1,121 (268)	EAJ12	Barcelona, Spain	10,000
1,121 (268)	EAJ19	Oviedo, Spain	
1,130 (265)		Lille, France (P. T. T.)	700
1,139 (263)		Moravska-Ostrava, Czechoslovakia	10,000
1,148 (261)	5NO	Newcastle, Great Britain	1,000
1,157 (259)		Leipzig, Germany	1,500
1,166 (257)	5BH	Horby, Sweden	10,000
1,175 (255)		Toulouse, France (P. T. T.)	5,000
1,184 (253)		Breslau, Germany	1,500
1,193 (251)		Almeria, Spain	
1,202 (250)		Prague, Czechoslovakia	
1,211 (248)		Trieste, Italy	
1,220 (246)		Kiel, Germany	250
1,220 (246)		Kassel, Germany	250
1,220 (246)		Linz, Austria	500
1,220 (246)		Pietarsaari, Finland	250
1,220 (246)		Turku (Abo), Finland	500
1,220 (246)	SOB	Eskilstuna, Sweden	200
1,220 (246)	SOI	Kalmar, Sweden	200
1,220 (246)	SOL	Kiruna, Sweden	200
1,220 (246)	SCP	Saffie, Sweden	400
1,220 (246)	EAJ16	Cartagena, Spain	400
1,229 (244)		Albania	
1,229 (244)		Cracow, Poland (provisional)	1,000
1,238 (242)	2BE	Belfast, Great Britain	1,000
1,247 (240)		Norway	
1,256 (239)		Nuremberg, Germany	2,000
1,265 (237)		Monaco, Monaco	
1,265 (237)		Nice, France	
1,265 (237)		Corsica (France)	
1,265 (237)	SCV	Orebro, Sweden	200
1,274 (235)		Norway	
1,283 (234)		Munster, Germany	500
1,283 (234)		Lodz, Poland	
1,292 (232)		Yugoslavia	
1,301 (231)	SCA	Boras, Sweden	150
1,301 (231)	SCG	Halsingborg, Sweden	200
1,301 (231)	SBC	Malmo, Sweden	600
1,301 (231)	SCS	Umea, Sweden	200



Revised list of European broadcasting stations by frequencies under Prague plan—  
Continued

Frequency in kilocycles, meters in parentheses	Call signal	Location	Power (watts in antenna)
1,310 (229)		Spain	
1,319 (227)		Cologne, Germany	1,500
1,328 (226)		Bucharest, Rumania (University provisional)	
1,337 (225)	8CK	Cork, Irish Free State	1,000
1,346 (223)		Luxembourg	
1,355 (221)		Helsingfors, Finland	900
1,364 (220)		France	
1,373 (218)		Flensburg, Germany	500
1,373 (218)		Innsbruck, Austria <sup>1</sup>	500
1,373 (218)	SCG	Bjoneborg (Pori), Finland	800
1,373 (218)	8CK	Karlstad, Sweden	250
1,373 (218)	8CW	Ornskoldsvik, Sweden	200
1,382 (217)			
1,391 (216)	SCE	Halmstad, Sweden	200
1,400 (214)		Warsaw, Poland	
1,419 (213)		Palermo, Italy	
1,420 (211)		Jassy, Rumania (University provisional)	
1,430 (210)		Hungary	
1,440 (208)		Belgium (Under construction)	
1,450 (207)			
1,460 (206)			
1,470 (204)	8CD	Gavle, Sweden	200
1,480 (203)	8CM	Kristinaham, Sweden	250
1,490 (202)	8CH	Jonkoping, Sweden	250
1,500 (200)	2LS	Leeds, Great Britain	130
1,530 (196)	8CJ	Karlskrona, Sweden	200

<sup>1</sup> Special reference is made to the Kaunas station in the Final Protocol of the Prague conference.

<sup>2</sup> The Union of Soviet Socialist Republic did not participate in the Washington Conference.

<sup>3</sup> Every Sunday. Week days beginning at 18 hours.

<sup>4</sup> The Oslo station will soon be increased to 60 kilowatt antenna.

<sup>5</sup> 12 kilowatts beginning the months of September.

<sup>6</sup> Will be ranged at 35 kilowatts next year.

<sup>7</sup> Up to 18 hours.

<sup>8</sup> Innsbruck will work on 213 meters if the results with 233 meters are not satisfactory.

<sup>9</sup> Innsbruck will work on 218 meters if the results with 233 meters are not satisfactory.

## REFERENCES TO CURRENT RADIO LITERATURE

This is a monthly list of references prepared by the Bureau of Standards and is intended to cover the more important papers of interest to professional radio engineers which have recently appeared in periodicals, books, etc. The number at the left of each reference classifies the reference by subject, in accordance with the scheme presented in A Decimal Classification of Radio Subjects—An Extension of the Dewey System, Bureau of Standards Circular No. 138, a copy of which may be obtained for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. The various articles listed below are not obtainable from the Government. The various periodicals can be secured from their publishers and can be consulted at large public libraries.

## R100.—Radio principles

R100 Morecroft, J. H. Elements of radio communication (book). John Wiley & Sons (Inc.), 1929. New York, N. Y.

A simple textbook of radio introductory to the more comprehensive text "Principles of Radio Communication" by the same author.

R112.1 Strutt, M. J. O. Strahlung von Antennen unter dem Einfluss der Erdbodeneigenschaften; (a) elektrische Antennen, (b) magnetische Antennen. (Radiation from antennas and effects of the earth's influence.) Annalen der Physik, pp. 721-772, 1929.

A thorough discussion of the radiation characteristics of both horizontal and vertical antennas special—of the doublet type.

R113 Yokoyama, E., and Nakai, T. East-west and north-south attenuations of long radio waves over the Pacific. Proc. Inst. Radio Engrs., 17, pp. 1240-1247, July, 1929.

A comparative study of the observed values of field intensity of low-frequency high-powered stations in the Pacific region seems to show a much greater east-west than north-south attenuation during daylight hours in fairly high latitudes. A comparison of observed values with values calculated by various transmission formulae indicates the need for the inclusion in the formulae of a factor depending on direction and latitude.

- R113.4 **Ponta, M., and Rocard, Y.** Sur la couche ionisée de la haute atmosphère. (On the ionized layer of the upper atmosphere). *L'Onde Electrique*, 8, pp. 179-191; May, 1929.  
 In problems concerning the conductivity of the Heaviside layer the mean free path of the electrons is a relevant quantity. An analysis based on the kinetic theory in which the forces of interaction between the molecules and the electrons are considered shows value of the mean free path to be from 40 to 160 times as small as value obtained by the elementary theory.
- R113.5 **Hulburt, E. O.** On the ultra-violet light theory of auroræ and magnetic storms. *Phys. Review*, 34, pp. 344-351; July 15, 1929.  
 Certain details of the ultra-violet light theory of auroræ and magnetic storms are developed and experimental facts which are in accord with the theory are cited.
- R113.5 **Wymore, I. J.** The relation of radio propagation to disturbances in terrestrial magnetism. *Proc. Inst. Radio Engrs.*, 17, pp. 1206-1213; July, 1929.  
 The results of a study of the relationship between radio reception and the changes in the earth's magnetism show that for daylight reception over great distances there is an increase in the intensity of received signal which reaches its maximum in from one to two days and disappears in from four to five days after a magnetic storm.
- R113.6 **Pedersen, P. O.** Long-delayed radio echoes. *Nature (London)*, 124, p. 164; July 27, 1929.  
 Article taken from paper *Wireless Echoes of Long Delay* communicated to the physical section of Danish Royal Society. Shows mathematically that radio echoes occurring after 10 seconds can not be due to propagation of waves within the earth's atmosphere; that echoes occurring after intervals up to 30 seconds are due to propagation along or reflection from Störmer bands as explained in *Nature* (vol. 122, p. 681, 1928); that echoes after several minutes must be from outside the space in which the earth's magnetic field exerts appreciable effect. Transmissions at various wave lengths are also treated.
- R113.6 **Discussion on "The attenuation of wireless waves over land."** *Jour. Inst. of Elec. Engrs.*, 67, p. 931; July, 1929.  
 Discussion between C. R. Englund and R. H. Barfield of certain applications of optical theory in Barfield's paper, *The Attenuation of Wireless Waves Over Land*.
- R113.6 **The effect of the earth on short wave radiation from vertical and horizontal aerials (editorial).** *Experimental Wireless and Wireless Engineering (London)*, 6, pp. 351-352; July, 1929.  
 Results obtained by M. J. O. Strutt and given in a paper in the *Annalen der Physik*, p. 721, 1929 are discussed.
- R113.7 **Burstyn, W.** Die unmittelbare Messungen von Entfernungen durch elektrische Wellen. (Direct measurements of distances by means of electric waves). *Zeits. für Hochfrequenztechnik*, 33, pp. 181-183; May, 1929.  
 Formulas and curves showing the relationship between intensity of reception and distance from the transmitting set are given with a discussion of their accuracy. This method of measuring distances is believed invaluable for ships in foggy weather.
- R114 **Schindelhauer, F.** Elektromagnetische Störungen. (Electromagnetic disturbances.) *Elektrische-Nachrichten Technik*, 6, pp. 231-236; June, 1929.  
 A study of electromagnetic disturbances in the atmosphere and results of experiments carried on at the Meteorological-Magnetic Observatory at Potsdam, Germany.
- R114 **Paoloni, D. B., and Iardi, G. P.** Compte rendu des observations radioatmosphériques faites pendant l'année 1927. (An account of radio atmospheric observations made in 1927.) *L'Onde Electrique*, 8, pp. 222-226; May, 1929.  
 Atmospherics are classed according to the Paoloni radio atmospheric scale. Observations for each class were taken daily during 1927 by an aural system. Observations are summarized in curves and general statements.
- R114 **Dean, S. W.** Correlation of directional observations of atmospherics with weather phenomena. *Proc. Inst. Radio Engrs.*, 17, pp. 1185-91; July, 1929.  
 Description of the results obtained with a cathode-ray direction finder used by the A. T. & T. Co. at Houlton, Me. Direction of storms was determined with a considerable degree of accuracy.
- R114 **Harper, A. E.** Some measurements on the directional distribution of static. *Proc. Inst. Radio Engrs.*, 17, pp. 1214-1224; July, 1929.  
 The utility of directional data on static is shown, and two types of apparatus for directional investigation are compared. A method which gives direction of individual crashes is found superior to the integrating methods. Distribution of thunderstorms over the world is discussed. Probable geographic locations are assigned to disturbances.
- R125.6 **Stenzel, H.** Über die Richtcharakteristik von einer Ebene angeordneten Strahlern. (The directional characteristic of a polarized radiator.) *Elektrische-Nachrichten-Technik*, 6, pp. 165-181; May, 1929.  
 Complete technical discussion of directional characteristics of polarized radio waves
- R132 **von Ardenne, M.** Die aperiodische Verstärkung von Rundfunkwellen. (Aperiodic amplification at broadcast frequencies.) *Zeits. für Hochfrequenztechnik*, 33, pp. 166-175; May, 1929.  
 The problem of aperiodic cascade amplification is thoroughly discussed. Several methods of a. f. and r. f. amplification are given, and are discussed theoretically.
- R133 **Kirschstein, F.** Zur Theorie der rückgekoppelten Rohrsenders. (Theory of back-coupled tube transmitters.) *Zeits. f. Hochfrequenztechnik*, 33, pp. 201-211; June, 1929.  
 Graphical and integral calculus methods are used to explain the functioning of feedback tube generators.
- R134 **Ballantine, S.** Detection at high signal voltages. Part 1. Plate rectification with the high-vacuum triode. *Proc. Inst. Radio Engrs.*, 17, pp. 1153-1177; July, 1929.  
 Article contains a descriptive theory, a mathematical theory for small modulation and large carrier voltages, an apparatus set-up and results, and practical applications of reception at high voltages.

- R138 MacNabb, V. C. The production of emission from oxide-coated filaments. *Jour. Opt. Soc. of America and Rev. of Scientific Instruments*, 19, pp. 33-41; July, 1929.  
Results of investigation of various methods for producing oxide filaments of barium and strontium in an emitting condition.
- R140 Watanabe, Y. Theorie des gekoppelten Schwingungskreises mit Selbsterregung. (Theory of self-excited inductively coupled oscillatory circuits.) *Elektrische-Nachrichten Technik*, 6, pp. 194-210; May, 1929.  
Theory of oscillatory circuits from a mathematical viewpoint.
- R145.3 Grover, F. W. A comparison of the formulas for the calculation of the inductance of coils and spirals wound with wire of large cross section. *Bureau of Standards Journal of Research*, July, 1929. Research Paper No. 90. Obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C.  
Two methods for calculating the inductance of coils of wire having a relatively large cross section are given.
- R170 Dieckmann, M. Beitrag zur Beschreibung des Interferenzgebietes in der Nähe von Empfangsantennen. (Discussion on interference regions in the neighborhood of receiving antennas.) *Zeits. für Hochfrequenztechnik*, 33, pp. 161-166; May, 1929.  
By making simplified assumptions the interference regions in the vicinity of receiving antennas are discussed and pictured by models and drawings. Instantaneous as well as average values of field intensity are given.

## R200.—Radio measurements and standardization

- R201.5 Ferguson, J. G. Shielding in high-frequency measurements. *Bell System Technical Jour.*, 8, pp. 560-590; July, 1929.  
The purpose and usefulness of shielding for high-frequency measurements are outlined. General principles of electrostatic shielding are developed as applied to simple impedances and to networks of impedances, particularly to bridge networks. Partial applications of these principles to the shielding of adjustable impedances and in the construction of actual bridge circuits are described.
- R201.6 Oatley, B. A. A low power audio-frequency current supply for general laboratory use. *Jour. Scientific Instruments* (London), 6, p. 217; July, 1929.  
A description is given of apparatus for providing alternating current of constant frequency and good wave form for use in bridge measurements. The apparatus derives its power from the 100-volt direct current line. Arrangements are provided whereby several observers can use the apparatus simultaneously without mutual interference.
- R202 Kallmann, H. E. Rechteckige Verformung von Resonanzkurven nach einem neuen Prinzip und ihre Anwendung beim Empfang sehr kurzer Wellen. (A new principle in the interpretation of resonance curves and its application to short wave reception.) *Zeits. für Hochfrequenztechnik*, 33, pp. 212-223; June, 1929.  
The sensitivity and selectivity of short wave (of the order of 30 centimeters) receiving sets is thoroughly discussed; also a new method for improving both.
- R210 Giebe, E., and Scheibe, A. Internationale Vergleichung von Frequenznormalen für elektrische Schwingungen. (International comparisons of frequency standards.) *Zeits. für Hochfrequenztechnik*, 33, pp. 176-180; May, 1929.  
Piezo oscillator from the Bureau of Standards and piezo resonators from Germany were tested by the laboratories in Germany, Italy, France, England, and United States and found to vary within  $\pm 1$  part in 25,000.
- R210 Bogardus, H. L., and Manning, C. T. The routine measurement of the operating frequencies of broadcast stations. *Proc. Inst. Radio Engrs.*, 17, pp. 1225-39; July, 1929.  
The method of making "zero beat" measurements of the operating frequencies of broadcasting stations in the second radio district is described showing the method of comparing received signal from a broadcasting station with a signal of known frequency obtained from a 10-kilocycle multivibrator controlled by a 90-kilocycle quartz crystal.
- R210 Morrison, W. A. A high precision standard of frequency. *Proc. Inst. Radio Engrs.*, 17, pp. 1103-1122; July, 1929. Also in *Bell System Technical Jnl.*, 8, pp. 493-514; July, 1929.  
A new standard of frequency is described in which 100,000-cycle quartz crystal-controlled oscillators of very high constancy are employed. These are interchecked automatically and continuously with a precision of about 1 part in 100,000,000. They are checked daily in terms of radio time signals by the usual method employing a clock controlled by current maintained at a submultiple of the crystal frequency. Specially-shaped crystals are used which have been adjusted to have temperature coefficients less than 0.0001 per cent per degree C.
- R214 Lack, F. R. Observations on modes of vibration and temperature coefficients of quartz crystal plates. *Proc. Inst. Radio Engrs.*, 17, pp. 1123-1141; July, 1929. Also in *Bell System Technical Jnl.*, 8, pp. 515-535; July, 1929.  
The characteristics of piezoelectric quartz crystal plates of the perpendicular or Curie cut are compared with 30° or parallel cut plates with reference to the type of vibration of the most active modes, the frequency of these modes as a function of the dimensions and the magnitude and sign of the temperature coefficients of these frequencies. The relation of various dimensional cuts to the temperature coefficient is discussed. The analysis offers an explanation of the low temperature coefficients which can be produced by a proper choice of the dimensional ratios.
- R270 Austin, L. W. Experiments in recording radio signal intensity. *Proc. Inst. Radio Engrs.*, 17, pp. 1192-1205; July, 1929.  
The method of recording intensity of long wave radio signals used at the Bureau of Standards and some of the results obtained are given. Variability of wave propagation in regard to field intensity and angle of incidence is shown in curves. An apparent connection between night signal variation and magnetic storms is shown. The downcoming waves seem to be reflected from rapidly changing masses of ionized gas.
- R275 Lamb, J. J. The modulometer. *QST*, 13, pp. 8-15; Aug., 1929.  
A simple device for measuring the percentage of modulation and generally checking the performance of the phone transmitter is described. Modulometer is essentially the adaptation of the electron-tube peak voltmeter for modulation measurements as previously outlined by C. B. Joliffe.

R300.—*Radio apparatus and equipment*

- R320 Meissner, A. Transmitting antennas for broadcasting. *Proc. Inst. Radio Engrs.*, 17, pp. 1178-1184; July, 1929.  
Fundamental requirements for best broadcast aeri-als are stated. Aeri-als having a height of  $\frac{\lambda}{2}$  are found to produce less upward and greater horizontal radiation than aeri-als having a height of  $\frac{\lambda}{4}$ , and consequently fading due to interference of indirect with ground waves is greatly reduced. Comparative efficiency of vertical and horizontal transmitting antennas at different frequencies is presented on basis of limited tests.
- R330.4 Bcdeau, F., and De Mare, J. Étude de la methode de Beatty pour la mesure de l'amplification d'un étage à resonance. (Study on the Beatty method of measuring the amplification of a resonant stage.) *L'Onde Electrique*, 8, pp. 210-211; May, 1929.  
The method of Beatty (*Experimental Wireless and Wireless Engr.*, 5, January, 1928) for calculating the overall amplification of a resonant stage from the tube design. Circuit constants are discussed. The method involving vectorial analysis is shown useful in design.
- R331 Bartels, H. Über de Maximalleistungen von Schutznetzleistungsröhren. (On the maximum output of screen-grid tubes.) *Elektrische-Nachrichten Technik*, 6, pp. 188-193; May, 1929.  
A comparison of screen-grid with ordinary tubes, bringing out the advantages of the former.
- R342.15 Dijksterhuis, P. R., and Groeneveld, Y. B. F. J. Low-frequency amplification with transformers. *Experimental Wireless and Wireless Engr.* (London), 6, pp. 374-379; July, 1929.  
It is claimed that the problems of low-frequency amplification by transformers are met in the design of the Philip's transformer (Dutch). A nickel-iron alloy core is employed to give a high primary self-inductance independent of amplitude of the voltages to be amplified. A high resistance nickel-alloy wire in the secondary coil is used to prevent a leakage resonance peak in the characteristic curve. A special silver alloy is used in the primary winding to give low resistance and high mechanical strength.
- R344.3 Watanabe, Y. Über den Zwischenkreisröhrensender mit stark gedämpften Sekundärkreis. (On the filter circuit of tube transmitting sets with strongly damped secondary circuit.) *Elektrische-Nachrichten Technik*, 6, pp. 244-248; June, 1929.  
Mathematical analysis of this type of transmitting set giving equations and results of experimental tests.
- R360 Von Ardenne, M. Receiver with aperiodic high-frequency amplification. *Experimental Wireless and Wireless Engr.*, 6, pp. 369-373; July, 1929.  
Loewe double triodes designed to give a high aperiodic radio-frequency amplification and a very low audio-frequency amplification are used in cascade in a long-range receiver. The triodes have a high input resistance and permit great selectivity in the tuned stages. Inter-coupling is prevented through shielding and the use of chokes and by-pass condensers.
- R376.3 Greaves, F. F.; Kranz, F. W.; Crozier, W. D. The Kyle condenser loud-speaker. *Proc. Inst. Radio Engineer*, 17, pp. 1142-1152; July, 1929.  
Describes a loud-speaker developed on the Kyle principle of construction with a view to providing comparatively large actuating force and also sufficient amplitude of vibration to permit efficient and faithful reproduction.
- R376.3 Clarke, H. M. The moving coil loud-speaker. *Experimental Wireless and Wireless Engineer* (London), 6, pp. 380-384; July, 1929.  
A compensation winding, reducing hysteresis, eddy currents and self induction is offered as the solution of the problem of response control of the moving coil loud-speaker. By this winding the impedance of the moving coil is made practically independent of frequency, and by the supplementary use of shunting filters the natural resonance peaks of the speaker may be smoothed to give a desirable response curve.
- R386 Farrar, C. L. Band pass tuning. *Radio Engineering*, 9, pp. 27-30; July, 1929.  
Reduction of sideband cutting in r. f. amplifiers by use of band pass filters.

R500.—*Applications of radio*

- R512 Ludenia, W. Reichweitenversuche mit Zentimeterwellen. (Distance range tests with centimeter waves.) *Elektrische-Nachrichten Technik*, 6, pp. 248-249; June, 1929.  
A short discussion of the use of wave-lengths from 10 to 100 centimeters. Their application is believed most practical where sharp narrow beams are necessary; e. g., for fog signals and lighthouse stations.
- R526.1 Diamond, H., and Dunmore, F. W. A course-shift indicator for the double-modulation type radiobeacon. *Bureau of Standards Journal of Research*, July, 1929. *Research Paper No. 77. Obtainable from Superintendent of Documents, Government Printing Office, Washington, D. C.*  
To further increase reliability of the visual direction beacon system developed by the Bureau of Standards, a course-shift indicating instrument is described which is primarily for station use and indicates to the operator whether the course remains unvarying during operation and also aids in checking of beacon calibration.

R800.—*Nonradio subjects*

- 621.313.7 Demontvignier, M. Les redresseurs à oxyde de cuivre. (Copper-oxide rectifiers.) *L'Onde Electrique*, 8, pp. 192-209; May, 1929.  
A contact of copper and copper-oxide possesses rectifying properties. The use of these properties in commercial a. c. rectifiers is described. An analysis with theoretical curves and actual oscillograms showing the characteristics of the input and output is given. The application of the rectifiers to radio circuits is summarized.
- 621.385 Fuhrer, R. Energieverhältnisse in Ortsnetzen mit Selbstanschlussbetrieb. (Energy relations on local automatic telephone networks.) *Elektrische-Nachrichten Technik*, 6, pp. 213-230; June, 1929.  
Extensive discussion of the energy relations in automatic telephone networks with reference to the new Munich installation. Bibliography is given.