

RADIO SERVICE BULLETIN

ISSUED MONTHLY

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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 Lists of Radio 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 Type** = Call signal (letters) assigned.
- = 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.
- Power Service** = Height of antenna (meters) and intensity of current at its base (meters-amperes).
- = 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 beacon, RF=circular radiobeacon, B=ship station, FC=coast station, A=aircraft.
- Hours** = Hours of operation: N=continuous service, X=no regular hour, Y=sunrise to sunset.
- Accounts** = Message accounts settled by.
- 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, 1930, and to the International List of Fixed and Land Stations, published by the Berne bureau]

Station	Class	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Licensee
Angola, Ind. ¹ -----	FA	WNAJ	3,160 (94.93)-----	P	X	Aeronautical Radio (Inc.)
Crosson, Pa. ² -----	FA, FX	WAEG	392 (765), 408 (750), 414 (725), 426 (715), 2,722 (110.21), 2,734 (109.72), 4,108 (73.02), 6,365 (47.13), 8,915 (37.43), 12,180 (24.63).	P	X	Do.
Frijoles, Tex. ³ -----	FX	KGUM	2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,200 (47.92), 6,275 (47.80), 12,210 (24.57).	P	X	Do.
Indio, Calif. ⁴ -----	FA, FX	KGUQ	2,326 (128.97), 2,344 (127.98), 3,484 (86.10), 4,140 (72.46), 5,630 (53.28), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).	P	X	Do.
Litchfield, Ohio ⁵ -----	FA	WNAK	3,160 (94.9)-----	P	X	Do.
New Brunswick, N. J. ⁶ -----	FC	WAY	6,500 (46.15), 12,500 (23.60).	PR	X	R. M. C. A.

¹ Loc. (approximate) 85° 10' 00" W., 41° 40' 00" N.; type, A1, A3.

² Loc. (approximate) 78° 35' 00" W., 40° 28' 00" N.; type, A1, A2, A3.

³ Type, A1.

⁴ Loc. 116° 12' 27" W., 33° 42' 17" N.; type, A1, A2, A3.

⁵ Loc. (approximate) 83° 00' 00" W., 41° 10' 00" N.; type, A1, A2, A3.

⁶ Loc. 74° 29' 15" W., 40° 30' 10" N.; type, A1, A2; power, 150/100.

Commercial ship stations, alphabetically, by names of vessels

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1930, and to the International List of Ship Stations, published by the Berne bureau]

Name of vessel	Call signal	Rates, all services (cents)	Service	Hours	Owner	Message accounts settled by—
City of Fort Worth	KONM				Southern S. S. Co.	
Excellbur ¹	KGWT	8	PG	N	Export S. S. Corporation	
H. F. DeBardeleben	WEDY				Bulk Transportation Corporation	
Rajo ¹	KGWU		P	X	John Rados	
San Antonio	KUCM				Southern S. S. Co.	

¹ Type, A1, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600), 5,525 (54.3), 5,555 (54), 6,590 (45.52), 8,290 (36.19), 8,450 (35.5), 11,650 (27.15), 11,110 (27), 13,240 (22.66), 16,590 (18.094), 16,660 (18.007), 22,100 (13.575), 22,220 (13.501).

² Type, A1, A2; fy., 5,525 (54.3), 5,555 (54), 6,635 (45.21), 8,290 (36.19), 8,330 (36.01), 8,450 (35.5), 11,050 (27.15), 11,110 (27).

Commercial aircraft stations, alphabetically, by names of craft

[Additions to the List of Radio Stations of the United States, edition of June 30, 1930, and to the International List of Aircraft Stations published by the Berne bureau.]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Licensee
NAT No. 72 ¹	KHSEV	3,106 (96.59), 3,160 (94.9)	P	X	National Air Transport (Inc.).
NAT No. 74 ¹	KHSLO	do	P	X	Do.
NAT No. 76 ¹	KHSJQ	do	P	X	Do.
NAT No. 77 ¹	KHSPK	do	P	X	Do.
NAT No. 83 ¹	KHSAZ	do	P	X	Do.
NAT No. 84 ¹	KHSFU	do	P	X	Do.
NAT No. 85 ¹	KHSBY	do	P	X	Do.
NAT No. 86 ¹	KHSQJ	do	P	X	Do.
NAT No. 87 ¹	KHSRI	do	P	X	Do.
NAT No. 88 ¹	KHSOL	do	P	X	Do.
NAT No. 89 ¹	KHSPK	do	P	X	Do.
NAT No. 90 ¹	KHSCX	do	P	X	Do.
NAT No. 91 ¹	KHSDW	do	P	X	Do.
NAT No. 92 ¹	KHSGT	do	P	X	Do.
NAT No. 93 ¹	KHSBS	do	P	X	Do.
NC-422H ¹	KHSIR	do	P	X	Do.
NC-426H ¹	KHSMN	do	P	X	Do.
NC-427H ¹	KHSNM	do	P	X	Do.
NC-667M	KHFMN		P	X	Pan American Airways (Inc.).
NC-670M	KHFGT		P	X	Do.
NC-830M ¹	KHPAZ	3,106 (96.59)	P	X	Varney Air Lines (Inc.).
NC-831M ¹	KHPBY	do	P	X	Do.
NC-832M ¹	KHPGX	do	P	X	Do.
NC-833M ¹	KHPDW	do	P	X	Do.
NC-10340 ¹	KHPEV	do	P	X	Do.
NC-10341 ¹	KHPFU	do	P	X	Do.
NC-10342	KHLIR		P	X	Pacific Air Transport (Inc.).
NC-10343	KHLJQ		P	X	Do.
NC-10344	KHPGT		P	X	Varney Air Lines (Inc.).

¹ Type, A3.

Government ship station, alphabetically, by name of station

[Addition to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1930, and to the International List of Fixed and Land Stations published by the Berne bureau]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Service	Hours	Owner
Violet	WWAD	375 (800), 410 (730), 500 (600)	O	X	Department of Commerce, Bureau of Lighthouses.

Commercial and Government land, ship, aircraft, radiobeacon, and radiocompass stations, alphabetically by call signals

Call signal	Name of station	Call signal	Name of station
KGUM	Frijole, Tex.....fx	KHSFU	NAT No. 84.....a
KGUQ	Indo, Calif.....fa, fx	KHSGT	NAT No. 92.....a
KGWT	Excalibur.....b	KHSBS	NAT No. 93.....a
KGWU	Rajo.....b	KHSIR	NC-422H.....a
KONM	City of Fort Worth.....b	KHSJQ	NAT No. 76.....a
KHFGT	NC-670M.....a	KHSPK	NAT No. 77.....a
KHFMN	NC-667M.....a	KHSLO	NAT No. 74.....a
KHLIR	NC-10342.....a	KHSMN	NC-426H.....a
KHLJQ	NC-10343.....a	KHSNM	NC-427H.....a
KHPAZ	NC-830M.....a	KHSOL	NAT No. 88.....a
KHPBY	NC-831M.....a	KHSPK	NAT No. 89.....a
KHPGX	NC-832M.....a	KHSQJ	NAT No. 86.....a
KHPDW	NC-833M.....a	KHSRI	NAT No. 87.....a
KHPEV	NC-10340.....a	KUCM	San Antonio.....b
KHPFU	NC-10341.....a	WAEG	Cresson, Pa.....fa
KHPGT	NC-10344.....a	WAY	New Brunswick, N. J.....fc
KHSAZ	NAT No. 83.....a	WEDY	H. F. DeBardleben.....b
KHSBY	NAT No. 85.....a	WNAJ	Angola, Ind.....fa
KHSCX	NAT No. 90.....a	WNAK	Litchfield, Ohio.....fa
KHSDW	NAT No. 91.....a	WWAD	Violet.....b
KHSEV	NAT No. 72.....a		

Broadcasting stations, by name of State and city

[Addition to the List of Radio Stations of the United States, edition of June 30, 1930]

State and city	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)
Vermont: Rutland	WSYB	1,500 (200)	100

Broadcasting station, by call signal

Call signal	Location of transmitter (mail address)	Owner	Frequency in kilocycles, meters in parentheses	Power (watts)
WSYB	Rutland, Vt., 33 Center St.	Seward & Weiss Music Store (H. E. Seward, jr., and Philip Weiss).	1,500 (200)	100

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, 1930]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)	License
Pennsylvania: Lansdale	W3XA	6,425 (46.7), 12,850 (23.35), 25,700 (11.678).	500	Norden-Hauk Electric Manufacturing Co., Delaware Ave. and South St., Philadelphia, Pa.
Portable				
Maryland	W3XAF	1,030 (285)	500	Consolidated Gas, Electric Light & Power Co. of Baltimore, Lexington Building, Baltimore, Md.
New Jersey	W2XDE	1,608 (186.57), 2,302 (130.32), 3,076 (97.53), 4,108 (73.02), 5,510 (54.44), 6,158 (48.74).	400	Bell Telephone Laboratories (Inc.), 463 West St., New York, N. Y.
United States (throughout)	W10XAP	17,300 (17.34), 25,700 (11.67), 34,600 (8.67), 51,400 (5.83), 60,000 (5), 400,000 (.75).	7½	National Broadcasting Co. (Inc.), 711 Fifth Ave., New York, N. Y.

Relay broadcasting stations, alphabetically, by names of stations

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1930]

Station	Call signal	Frequency in kilocycles, meters in parentheses	Power (watts)	Owner
Portable				
United States (throughout)	W10XAL	1,584 (189.89), 2,392 (125.41).	50	National Broadcasting Co. (Inc.), 711 Fifth Ave., New York, N. Y.
Do.	W10XAO	do.	50	Do.

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

Call signal	District and station	Call signal	District and station
W2KDE	Second district: New Jersey (portable).		
W3XA	Third district: Lansdale, Pa.	W10XAL	Portable: United States (throughout).
W3XAF	Maryland (portable).	W10XAO	Do.
		W10XAP	Do.

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, 1930, and to the International List of Fixed and Land Stations, published by the Berne bureau]

- ALAMEDA, CALIF. (KGSB).—Fy., strike out 3,460 (86.70), 6,350 (47.24), 8,015 (37.43), 12,180 (24.63), add 3,076 (97.52), 5,510 (54.44); power, 18/9.
- BARTLESVILLE, OKLA.—Power, 45.7/20.
- BERKELEY, CALIF.—Fy., strike out 1,712 (175.23), add 2,410 (124.5).
- BIG SPRINGS, TEX. (municipal airport).—Class of station, FX only; fy., strike out 278 (1,080), 3,484 (86.10), 5,630 (53.29), add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- BUFFALO, N. Y., Radio (WBL).—Fy., add 5,525 (54.3).
- BURBANK, CALIF. (Los Angeles).—Fy., add 2,326 (128.97), 2,344 (127.98), 3,484 (86.10), 4,140 (72.46), 5,630 (53.28), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57); hours, strike out N, add X.
- CAMDEN, N. J.—Power, 23.08/4.
- CHATHAM, MASS., Radio.—Correct call WCM (U. S. L.).
- CHICAGO, ILL. (WJC).—Loc. 87° 38' 01" W., 41° 48' 06" N.; fy., add 7,340 (40.87), 7,355 (40.79), 7,370 (40.71), 7,835 (38.29), 7,955 (37.72), 15,610 (19.218), 15,670 (19.145), 15,730 (19.072), 15,760 (19.036), 15,880 (18.892), 15,910 (18.856); hours, N.
- COLUMBUS, OHIO (WAEB).—Fy., add 2,722 (110.21), 2,734 (109.72), 4,108 (73.02); power, 15.38/5.
- DALLAS, TEX. (Love Field—KGUF).—Class of station, FX only; fy., strike out 278 (1,080), 3,484 (86.10), 5,600 (53.57), 5,630 (53.29), add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- DETOUR, MICH., Radio.—Fy., add 5,525 (54.3); power, 30/4.
- DOUGLAS, ARIZ.—Fy., 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- FORT WORTH, TEX. (Meacham Field).—Class of station, FX only; fy., strike out 278 (1,080), 3,484 (86.1), 5,600 (53.57), add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- FRANKFORT, MICH., Radio.—Fy., add 169 (1,775).
- HARRISBURG, Pa. (WAED).—Power, 15.38/2.
- HONOLULU, HAWAII, Radio (KYG).—Power, 20/1.5.
- JACKSON, MISS.—Fy., add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- LAWRENCEVILLE, N. J. (WLO).—Power, 49/100.
- LAWRENCEVILLE, N. J. (WNC).—Power, 49/100.
- LAZY BAY, ALASKA, Radio.—Service, strike out P, add PR.
- LOS ANGELES, CALIF., Radio (KSM).—Power, 24/3.
- LUDINGTON, MICH., Radio.—Fy., add 169 (1,775).
- MANISTIQUE, MICH., Radio.—Fy., add 169 (1,775).
- MANITOWOC, Wis., Radio.—Fy., add 169 (1,775).
- MENOMINEE, MICH., Radio.—Fy., add 169 (1,775).
- MIAMI, FLA. (WKDL).—Fy., add 5,405 (55.50).
- MUSSEL ROCK, CALIF. (KGQ).—Power, 20/1.5.
- NEWARK, N. J. (WAEF).—Power, 23.08/4.
- NEW ORLEANS, LA. (Menefee airport—WQDQ).—Class of station, FX only; fy., strike out 278 (1,080), 3,484 (86.10), 5,600 (53.57), add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- NEW ORLEANS, LA., Radio (WNU).—Power, 30/4.
- NEW YORK, N. Y. (North Beach—WOA).—Fy., strike out 8,015 (37.43), 12,210 (24.57).
- ORLAND TOWNSHIP, ILL.—Call changed to WNAT.
- PHOENIX, ARIZ.—Fy., add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).
- PITTSBURGH, Pa.—Class of station, FA, FX; fy., strike out 3,468 (86.5), add 2,722 (110.21), 2,734 (109.72), 4,108 (73.02); power, 15.38/5.
- PORTLAND, OREG., Radio (KPK).—Fy., add 170 (1,765).
- ROCKY POINT, N. Y. (WES).—Loc., changed to New Brunswick, N. J., loc., (approx.) 74° 29' 15" W., 40° 30' 10" N.; power, 100/25.
- ROCKY POINT, N. Y. (WEV).—Loc., changed to New Brunswick, N. J., loc., (approx.) 74° 29' 15" W., 40° 30' 10" N.; power, 100/25.

ROCKY POINT, N. Y. (WKQ).—Loc., changed to New Brunswick, N. J., loc., (approx.) 74° 29' 15" W., 40° 30' 10" N.; power, 100/25.

SAN ANTONIO, TEX. (Winburn Field).—Class of station, FX only; fy., strike out 278 (1,080), 3,484 (86.1), 5,600 (53.57), add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).

SAN JUAN, P. R. (WGU).—Fy., strike out 6,717.5 (44.659), add 6,852.5 (43.785).

SAN JUAN, P. R. (Pan American airport—WMDU).—Fy., add 5,405 (55.50).

SAYVILLE, N. Y., Radio (WML).—Read Sayville, N. Y.; class of station, FX.

TUCKERTON, N. J., Radio (WSC).—Fy., strike out 8,390 (35.76).

WACO, TEX. (municipal airport).—Class of station, FX only; fy., strike out 278 (1,080), 3,484 (86.10), 5,600 (53.57), add 2,326 (128.97), 2,344 (127.98), 4,140 (72.46), 6,260 (47.92), 6,275 (47.80), 12,210 (24.57).

Strike out all particulars of the following-named stations: Baltimore, Md. (WEQ), Beaumont, Tex. (KGKM); Cedar Rapids, Iowa (municipal airport); Cheboygan, Mich.; Cumberland, Md.; Darlington, Md. (near); Philadelphia, Pa. (WJV); Tacoma, Wash. (municipal airport); Williamsport, Md.

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, 1930, and to the International List of Ship Stations, published by the Berne bureau]

AFEL.—Power, 21.54/12.

ALEGHANY.—Power, 33.3/15.

ANN ARBOR No. 3.—Power, 12.77/4.

ANN ARBOR No. 4.—Power, 12.77/4.

ANN ARBOR No. 7.—Power, 20.15/4.

ANNISTON CITY.—Fy., strike out 410 (730), 454 (660), add 143 (2,100), 151 (1,985), 153 (1,960), 157 (1,910), 159 (1,885), 160 (1,875), 400 (750), 468 (640).

ARA.—Power, 27/12 and 7.

ARTIGAS.—Power, 28/13.

BARRYTOWN.—Fy., add 500 (600); power, 12/3; rates, Great Lakes service, 4 cents per word, transoceanic service, 8 cents per word; accounts, R. C. A.

BERKSHIRE.—Power, 21.34/15.

BETTY WEEMS.—Power, 15.15/6.2.

BIBCO.—Power, 70/14.5.

BORINQUEN.—Type, A1, A2; 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); power, 32/10; service, PG; hours, N.; rates, 8 cents per word; accounts, R. M. C. A.

BRAVE COEUR.—Power, 23/7.

BREAKER.—Power, 15/8.

BRILLIANT.—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); power, 26.8/10.

CASEY.—Power, 21.54/16.

CATALINA.—Power, 17/5.

CHATHAM.—Power, 33.3/12.

CITY OF DALLAS.—Type, B; fy., 375 (800), 425 (705), 500 (600); power, 17/9; service, PG; hours, X; rates, 8 cents per word; accounts, Southern S. S. Co.

CITY OF PANAMA.—Fy., add 5,555 (54), 8,330 (36.01), 11,110 (27), 16,580 (18.094), 16,860 (17.794).

CLEARWATER.—Power, 23.08/15.

D. J. MORAN.—Power, 29/7.

EAST INDIAN.—Fy., add 157 (1,910); rates, Great Lakes service, 4 cents per word, transoceanic service, 8 cents per word.

ESSEX.—Power, 33.3/6.8.

FLORIDA.—Type, A1, A2; fy., 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (600); service, PG; hours, N; rates, 8 cents per word; accounts, R. M. C. A.

FOUR WINDS.—Power, 17/4; service, strike out P, add PG; hours, strike out N, add X; rates, 8 cents per word.

GIBLOW.—Type, A1, A2; 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); power, 22/10; service, PG; hours, X; rates, 8 cents per word; accounts, R. M. C. A.

GOOD WILL.—Fy., strike out 468 (640); power, 20/12.

GUATEMALA.—Owner, Panama Mail S. S. Co.

HARVEY H. BROWN.—Power, 18/10.

ISOBEL WEEMS.—Owner, A. H. Bull S. S. Co. (Inc.).

- JEAN WEEMS.—Owner, A. H. Bull S. S. Co. (Inc.).
- KIHNA.—Type, A1, A2; fy. 375 (800), 425 (705), 500 (600), 5,525 (54.3), 5,555 (54), 8,290 (36.19), 11,050 (27.15), 11,230 (26.71), 16,580 (18.094), 16,860 (17.794), power, 20.4/9.5, service, PG; service, X; rates, 8 cents per word.
- LAKE ARLINE.—Type, B; fy., 375 (800), 410 (730), 425 (705); power, 20/7; service, PG; hours X; rates, 4 cents per word; accounts, R. C. A.
- LORRAINE CROSS.—Power, 75/14.
- LUSITANIA.—Type, A1, A2; fy., 5,525 (54.3), 5,555 (54), 8,290 (36.19).
- MALANG.—Fy., strike out 425 (705), add 400 (750), 468 (640).
- MOHAWK (WRCE).—Power, 9.2/3.
- MUNARDEN.—Type, strike out B, add A2; power, 26/7.8; accounts, R. M. C. A.
- NANCY WEEMS.—Power, 19.69/7.75.
- NEWTON (KGWK).—Type, A2; fy., 375 (800), 400 (750), 425 (705), 468 (640), 500 (600); power, 18/5; service, PG; hours, X; rates, 8 cents per word; accounts, R. M. C. A.
- OAKPARK.—Fy., strike out 410 (730), add 425 (705).
- OCCIDENTAL.—Owner, Texas Co. (Inc.).
- ORIENTE.—Owner, Agwi Navigation Co.
- ORION.—Power, 20/10; service, strike out P, add PG; accounts, Carl J. Forstmann.
- PENNSYLVANIA (WMDS).—Fy., strike out 13,240 (22.66), add 11,110 (27); power, 13/1.2.
- PETER H. CROWELL.—Power, 30/5.
- PRESIDENT GRANT.—Owner, American Mail Line.
- PRESIDENT JEFFERSON.—Owner, American Mail Line.
- REPUBLIC LIFEBOAT No. 1.—Read Republic Lifeboat No. 18.
- RESTORER.—Hours, strike out X.
- SAN BERNARDINO.—Fy., add 410 (730); power, 21/16.
- SAN DIEGO (KOLC).—Power, 29/10.
- SAN JULIAN.—Power, 25/12.
- SAN MARCOS.—Power, 23/10.
- SANWAN.—Owner, Frank G. Moran.
- SAUGERTIES.—Power, 20/15.
- SCHOODIC.—Power, 23.08/14.
- SEA.—Power, 15/7.
- SWIFTSURE.—Fy., add 153 (1,960), 157 (1,910), 159 (1,885), 400 (750), 468 (640).
- TACHIRA.—Power, 22/10.
- TIMBERMAN.—Fy., add 468 (640).
- T. L. DÜROCHER.—Type, A1, A2; fy., 375 (800), 394 (760), 410 (730), 425 (705); power, 5/5; service, PG; hours, X; rates, 4 cents per word; accounts, R. C. A.
- TOPA TOPA.—Fy., 157 (1,910), 159 (1,885).
- WEST ELDARA.—Power, 128/14.
- WEST SEGOVIA.—Power, 21.54/10.
- WILLPOLO.—Power, 23/16.
- Strike out all particulars of the following-named vessels: Etak, Socony, Thalia (KGWL), Torrent.

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, 1930, and to the International List of Aircraft Stations, published by the Berne bureau]

- NC-23V.—Fy., strike out 393 (765), add 414 (725), 2,662 (112.70), 3,070 (97.71), 5,690 (52.72), 8,650 (34.68).
- NC-75K.—Fy., strike out 375 (800), 393 (765), 457 (665), 3,106 (96.58), add 8,015 (37.43).
- NC-106N.—Fy., strike out 393 (765), add 414 (725), 8,650 (34.68).
- NC-142M.—Fy., strike out 375 (800), 393 (765), 457 (655), 3,106 (96.58), add 8,015 (37.43).
- NC-311N.—Fy., strike out 3,256 (92.13), 4,795 (62.56), 6,425 (46.69), add 3,160 (94.9); service, P; hours, X.
- NC-369N.—Fy., strike out 3,256 (92.13), 4,795 (62.56), 6,425 (46.69), add 3,160 (94.9).
- NC-668M.—Type, A1; fy., 333 (900), 414 (725), 500 (600), 2,662 (112.70), 3,070 (97.71), 5,690 (52.72), 8,650 (34.68).
- NC-801E.—Call changed to KHHFT.
- NC-985H.—Fy., strike out 3,256 (92.13), 4,795 (62.56), 6,425 (46.69), add 3,160 (94.9).
- NC-9177.—Name changed to NC-9167.
- Strike out all particulars of the following-named stations: C-184E, C-740K.

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, 1930, and to the International List of Fixed and Land Stations, published by the Bureau]

- ALBANY, N. Y.—Loc., 73° 47' 51'' W., 42° 44' 10'' N.
 ATLANTA, GA.—*Read* Hapeville (Atlanta), Ga.; loc. 84° 24' 39'' W., 33° 40' 05'' N.
 BELLEFONTE, PA.—Loc. 77° 42' 42'' W., 40° 53' 42'' N.
 BOISE, IDAHO.—Loc., 116° 11' 15'' W., 43° 37' 12'' N.
 BOSTON, MASS. (WSX).—Loc., 71° 00' 43'' W., 42° 20' 12'' N.
 CAYTE, P. I.—*Fy.*, strike out 108 (2,776), 13,308 (22.54); add 17,744 (16.9), on this frequency transmits time signals 0255 to 0300, transmits weather 0430, transmits time, weather, and hydrographic warnings 1355 to 1400 G. C. T.
 CHEYENNE, WYO.—Loc., 104° 50' 30'' W., 41° 08' 57'' N.
 CLEVELAND, OHIO.—Loc., 81° 51' 00'' W., 41° 25' 01'' N.
 ELKO, NEV.—Loc. (approximate), 115° 45' 00'' W., 40° 55' 00'' N.
 FORT WORTH, TEX.—Loc., 97° 20' 36'' W., 32° 49' 54'' N.
 FRESNO, CALIF.—Loc., 119° 51' 15'' W., 36° 45' 55'' N.
 GLENDALE, CALIF. (Los Angeles).—Loc. (approximate), 118° 15' 00'' W., 34° 09' 00'' N.
 GREENSBORO, N. C.—*Read* Guilford, N. C. (Greensboro); loc. 79° 55' 52'' W., 36° 05' 59'' N.
 IOWA CITY, IOWA.—Loc., 91° 33' 23'' W., 41° 38' 56'' N.
 KANSAS CITY, MO.—*Read* Parkville, Mo. (Kansas City); loc. 94° 38' 24'' W., 39° 09' 12'' N.
 KEY WEST, FLA. (WBP).—Loc., 81° 45' 01'' W., 24° 34' 02'' N.
 LA CROSSE, WIS.—Loc. (approximate), 91° 14' 00'' W., 43° 47' 00'' N.
 MAYWOOD, ILL. (Chicago).—Loc. (approximate), 87° 55' 00'' W., 41° 53' 00'' N.
 MEDFORD, OREG.—Loc., 122° 51' 05'' W., 42° 21' 64'' N.
 NEW BRUNSWICK, N. J. (Hadley Field).—Loc., 74° 26' 05'' W., 40° 33' 16'' N.
 NORTH PLATTE, NEBR.—Loc., 100° 41' 50'' W., 41° 07' 55'' N.
 OAKLAND, CALIF. (KCV).—Loc. (approximate), 122° 12' 00'' W., 37° 44' 00'' N.
 OKLAHOMA CITY, OKLA. (KQK).—Loc., 97° 32' 20'' W., 35° 25' 50'' N.
 OMAHA, NEBR.—*Read* Bellevue, Nebr. (Omaha); loc., 95° 55' 41'' W., 41° 07' 35'' N.
 PASCO, WASH.—Loc., 119° 06' 38'' W., 46° 14' 26'' N.
 PENSACOLA, FLA.—Weather reports now transmitted on 113 (2,653) at 1648 and 2303 G. C. T.
 PLEASANT VALLEY, NEV.—*Read* Winnemucca, Nev. (Pleasant Valley); loc., 117° 37' 54'' W., 40° 20' 30'' N.
 PORTLAND, OREG. (KCY).—Loc., 122° 30' 33'' W., 45° 32' 23'' N.
 RENO, NEV.—Loc. (approximate), 119° 49' 00'' W., 39° 32' 00'' N.
 RICHMOND, VA.—*Read* Sandston, Va. (Richmond); loc., 77° 20' 18'' W., 37° 30' 08'' N.
 ROCK SPRINGS, WYO.—Loc. (approximate), 109° 14' 00'' W., 41° 37' 45'' N.
 ST. LOUIS, MO. (KCQ).—*Read* Robertson, Mo. (St. Louis); loc., 90° 22' 02'' W., 38° 44' 12'' N.
 SALT LAKE CITY, UTAH.—Loc., 111° 56' 24'' W., 40° 46' 39'' N.
 SAN FRANCISCO, CALIF. (Mare Island).—Aviation weather reports now transmitted on 42.8 (7,005) and 108 (2,776) at 0218 and 1418 G. C. T.
 SEATTLE, WASH. (KCZ).—Loc. (approximate), 122° 19' 00'' W., 47° 28' 00'' N.
 SPARTANBURG, S. C.—Loc., 81° 56' 35'' W., 34° 57' 54'' N.
 STREVELL, IDAHO.—Loc., 113° 10' 15'' W., 42° 00' 03'' N.
 TULSA, OKLA.—*Read* Dawson, Okla. (Tulsa); loc. 95° 54' 00'' W., 36° 11' 26'' N.
 WASHINGTON, D. C.—*Read* Silver Hill, Md. (Washington, D. C.); loc. (approximate) 76° 57' 00'' W., 38° 50' 45'' N.
 WASHINGTON, D. C. (Arlington, Va.—NAA).—*Fy.*, strike out 8,030 (37.34), add 8,870 (33.82), 13,305 (22.54); time signals are now transmitted from 0255 to 0300, 0755 to 0800, 1655 to 1700 G. C. T. on 113 (2,653), 690 (434.5), 4,015 (74.72), 8,870 (33.82), 12,045 (24.9); aviation weather and upper air currents are now transmitted at 0105, 1305 G. C. T. on 4,015 (74.72) and 13,305 (22.54).
 WASHINGTON, D. C. (Annapolis, Md.—NSS).—*Fy.*, add 12,045 (24.9) on which time signals are transmitted from 0255 to 0300, 0755 to 0800, 1655 to 1700 G. C. T.
 WICHITA, KANS.—Loc. 97° 17' 06'' W., 37° 39' 08'' N.
 WILLIAMSVILLE, N. Y. (Buffalo).—Loc. (approximate) 78° 43' 00'' W., 42° 56' 30'' N.

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, 1930, and to the International List of Ship Stations, published by the Berne bureau]

ABEL P. UPSHUR.—Call changed to NRDQ; owner, U. S. Coast Guard.

WARRINGTON.—Call changed to NIRG (U. S. L.).

Strike out all particulars of the following-named vessels: Burns, Downes, Essex, Farquhar, Galveston, Kennedy, Ludlow, Melvin, Mervine, Monaghan, Moody, Mullany, Percival, Selfridge, Somers, Sumner, Yarborough.

AIRWAY RADIOBEACON STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1930, and to the International List of Stations Performing Special Services, published by the Berne bureau]

DES MOINES, IOWA (*range*).—Loc. $93^{\circ} 32' 07''$ W., $41^{\circ} 39' 54''$ N.

MARINE RADIOBEACON STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1930, and to the International List of Stations Performing Special Services, published by the Berne bureau]

CAPE ST. ELIAS LIGHT STATION, ALASKA.—Hours, operates the first 15 minutes of each hour.

RADIO-COMPASS STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1930, and to the International List of Stations Performing Special Services published by the Berne Bureau]

BAR HARBOR, ME.—Transmitter loc., $68^{\circ} 11' 48''$ W., $44^{\circ} 18' 51''$ N.

BETHANY BEACH, DEL. (single group).—Receiver and transmitter loc. (NBN), $75^{\circ} 03' 23''$ W., $38^{\circ} 32' 45''$ N.; transmitter loc. (NSD), $75^{\circ} 05' 22''$ W., $38^{\circ} 47' 40''$ N.

CAPE HATTERAS, N. C.—Transmitter loc. $75^{\circ} 31' 18''$ W., $35^{\circ} 15' 59''$ N.

CAPE HENLOPEN, DEL.—Receiver and transmitter loc., $75^{\circ} 05' 22''$ W., $38^{\circ} 47' 40''$ N.; arc of calibration, 0° – 200° .

CAPE HINCHINBROOK, ALASKA.—Arc of calibration, 114° – 294° .

CAPE MAY, N. J.—Transmitter loc. (NSD), $75^{\circ} 05' 22''$ W., $38^{\circ} 47' 40''$ N.

CATTLE POINT, WASH.—Receiver loc., $122^{\circ} 57' 45''$ W., $48^{\circ} 27' 04''$ N.; arc of calibration, 120° – 280° .

EMPIRE, OREG.—Receiver and transmitter loc., $124^{\circ} 18' 32''$ W., $43^{\circ} 22' 58''$ N.

EUREKA, CALIF.—Arc of calibration, 24.5° – 17° .

FIRE ISLAND, N. Y. (New York R/C group).—Receiver and transmitter loc., $73^{\circ} 13' 01''$ W., $40^{\circ} 37' 55''$ N.

FORT STEVENS, OREG.—Receiver and transmitter loc., $123^{\circ} 58' 30''$ W., $46^{\circ} 11' 49''$ N.; arc of calibration, 180° – 10° .

FOLLY ISLAND, S. C. Incorrectly spelled olly Island, (U. S. L.)

KLIPSAN BEACH, WASH.—Arc of calibration, 190° – 345° .

LAKEHURST, N. J.—Receiver and transmitter loc., $74^{\circ} 19' 15''$ W., $40^{\circ} 01' 58''$ N.

MANASQUAN, N. J.—Transmitter loc. (NFK), $74^{\circ} 01' 58''$ W., $40^{\circ} 07' 05''$ N.

MANASQUAN, N. J.—Transmitter loc. (NJY), $73^{\circ} 13' 01''$ W., $40^{\circ} 37' 55''$ N. (U. S. L.).

NEW DUNGENESS, WASH.—Receiver loc., $123^{\circ} 07' 57''$ W., $48^{\circ} 10' 33''$ N.; arc of calibration 240° – 140° .

NEW DUNGENESS, WASH. (Juan de Fuca Strait R/C group).—Arc of calibration, 240° – 140° .

NORTH ISLAND, S. C.—Arc of calibration, 40° – 270° .

PENSACOLA, FLA.—Receiver loc., $87^{\circ} 16' 56''$ W., $30^{\circ} 20' 46''$ N.; transmitter location, $87^{\circ} 16' 10''$ W., $30^{\circ} 20' 53''$ N.; arc of calibration, 110° – 240° aircraft only. (U. S. L.)

POINT MONTARA, CALIF.—Arc of calibration, 175 – 351° .

POINT REYES, CALIF.—Arc of calibration, 122° – 359° .

POINT ST. GEORGE, CALIF.—Arc of calibration, 180° – 10° .

POYNER'S HILL, N. C.—Arc of calibration, 351° – 155° .

ST. PAUL, ALASKA.—Arc of calibration, 60° – 300° .

SANDY HOOK, N. J.—Transmitter loc. (NJY), $73^{\circ} 13' 01''$ W., $40^{\circ} 37' 55''$ N. (U. S. L.)

SOAPSTONE POINT, ALASKA.—Receiver and transmitter loc., 136° 29' 49' W. 58° 05' 40' N.

TATOOSH, WASH.—Arc of calibration, 170°-90°.

VIRGINIA BEACH, VA. (Chesapeake Bay R/C group).—Transmitter loc., 76° 18' 12" W., 36° 49' 05" N.; arc of calibration, 0°-160°.

WHITEFISH POINT, MICH.—Transmitter loc., 84° 57' 22" W., 46° 46' 19" N.

Commercial and Government land, ship, aircraft, radiobeacon and radio compass stations, alphabetically by call signals

KCAA, read Dawson, Okla. (Tulsa); KCQ, read Robertson, Mo. (St. Louis); KHHJQ, read NC-9167; KHNKP, read KHHFT; KJF, read Bellevue, Nebr. (Omaha); KRC, read Parkville, Mo. (Kansas City); KSNA, read Republic Lifeboat No. 18; KSQ, read Winnemucca, Nev. (Pleasant Valley); NAMVP, read NVMVP (U. S. L.); NENL, read Heron (call incorrectly given as ENL) (U. S. L.); NITG, read NIRG (U. S. L.); the following additions should be made only to the list of Commercial and Government Radio Stations of the United States, page 149: NMC, Point Bonita, Calif.—fc; NMD, Block Island, R. I.—fc; NMF, Nahant, Mass.—fc; NMG, Mobile, Ala.—fc; NMH, Washington, D. C.—fc; NMN, Cape Henry, Va.—fc; NMV, Fort Lauderdale, Fla.—fc; NMW, Port Townsend, Wash.—fc; NMY, Rockaway Beach, N. Y.—fc; NOA, Staten Island, N. Y. (base 2)—fc; NOB, Buffalo, N. Y.—fc; NOC, Barataria, La. (Grand Isle)—fc; NOD, Curtis Bay, Md.—fc; NOF, St. Petersburg, Fla. (base 21)—fc; NOG, Gloucester, Mass. (base 7)—fc; NOI, Biloxi, Miss. (base 15)—fc; NOJ, San Pedro, Calif. (base 17)—fc; NOK, Anacortes, Wash. (base 12)—fc; NOL, Port Angeles, Wash. (base 13)—fc; NON, New London, Conn. (Academy)—fc; NOP, Woods Hole, Mass. (base 18)—fc; NOQ, Fernandina, Fla. (base 20)—fc; NOU, New London, Conn.—fc; NOV, Cape May, N. J. (base 9)—fc; NOY, Unalaska, Alaska—fc; NOZ, Sault Ste. Marie, Mich.—fc; NRVO, read C. G. 222; NUJD, read NRDQ; NZPS, read NAPS (U. S. L. p. 145); WES, read New Brunswick, N. J.; WEV, read New Brunswick, N. J.; WHZ, read Hapeville, Ga. (Atlanta); WIBJ changed to KGDU—name changed to Four Winds; notice of deletion of KGDU should have only read WIDJ, strike out all particulars; (KGDU still assigned to Four Winds, formerly named Tempress—Bulletin for October in error); WKQ, read New Brunswick, N. J.; WNAJ, read WNAT; WNR, read Sandston, Va. (Richmond); WRW, read Guilford, N. C. (Greensboro); WWX, read Silver Hill, Md. (Washington, D. C.); strike out all particulars following the call signals KFZF, KGKM, KGKW, KGNL, KGWL, KHJNM, KHLGX, KRA, NAFS, NANF, NANZ, NAZM, NENZ, NEPN, NIFJ, NIZX, NRDG, NRGM, NUJZ, NULT, NUMC, NUMJ, NUML, NUQX, NURC, WEQ, WHF, WJV, WKZ, WPJ, WSCV, WSY.

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, 1930, and the International List of Broadcasting Stations published by the Berne bureau]

KFKA (Greeley, Colo.).—Mail address, P. O. Drawer 735, 1002 Ninth Street.

KFOR (Lincoln, Nebr.).—Mail address, Forty-sixth and O Streets.

KFYR (Bismarck, N. Dak.).—Power, 1,000 night, 2,500 day experimentally.

KGRS (Amarillo, Tex.).—Mail address, Bellaire Park, Colorado and Gulf Highway.

KMAC (San Antonio, Tex.).—Loc. 98° 29' 19" W., 29° 25' 37" N.; mail address 430 St. Marys Street.

KOH (Reno, Nev.).—Loc. 119° 53' 31" W., 39° 30' 33" N.; mail address, 440 North Virginia Street; fy., 1,380 (217.4); power, 500.

KSMR (Santa Maria, Calif.).—Licensee, Santa Maria Radio.

KUJ (Longview, Wash.).—Licensee, Paul R. Heitmeyer.

KWSC (Pullman, Wash.).—Power, 1,000 night, 2,000 day.

KXYZ (Houston, Tex.).—Loc. (approximate), 95° 28' 00" W., 29° 45' 00" N.; mail address, Main and Rusk Streets.

WBNY (New York, N. Y.).—Call changed to WAWZ; licensee, Pillar of Fire.

- WSBO (Wellesley Hills, Mass.).—Loc., changed to Babson Park, Needham, Mass.— $71^{\circ} 15' 56''$ W., $42^{\circ} 17' 25''$ N.; mail address, Great Plain Avenue; power, 500.
- WCOS (Springfield, Ohio).—Mail address, Statler Hotel, Cleveland, Ohio.
- WDSU (New Orleans, La.).—Loc., changed to Gretna, La.— $90^{\circ} 03' 07''$ W., $29^{\circ} 54' 18''$ N.
- WENR (Downers Grove, Ill.).—Call incorrectly given as WEBR in list of Commercial and Government Radio Stations of the United States, page 165 as WEBR.
- WEXL (Royal Oak, Mich.).—Mail address, 509 South Washington Street.
- WPKD (Philadelphia, Pa.).—Call changed to WTEL.
- WIBU (Poyette, Wis.).—Fy., 1,210 (247.9).
- WJDX (Jackson, Miss.).—Power, 1,000.
- WJZ (Bound Brook, N. J.).—Licensee, National Broadcasting Co. (Inc.).
- WORD (Batavia, Ill.).—Call changed to WCHI.
- WRAX (Philadelphia, Pa.).—Licensee, WRAX Broadcasting Co.
- WRBU (Gastonia, N. C.).—Call changed to WSOC.
- WRC (Washington, D. C.).—Licensee, National Broadcasting Co. (Inc.).
- WROL (Knoxville, Tenn.).—Mail address, 1828 West Cumberland Avenue; power, 100.
- WSEN (Columbus, Ohio).—Loc., $82^{\circ} 59' 27''$ W., $39^{\circ} 57' 48''$ N.; mail address, 375 East Broad Street; power, 100.
- WTAX (Streator, Ill.).—Loc., changed to Springfield, Ill.— $89^{\circ} 39' 00''$ W., $39^{\circ} 47' 56''$ N.; licensee, WTAX (Inc.); mail address, 416 East Capitol Street; power, 100.

EXPERIMENTAL 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, 1930]

CONNECTICUT: South Manchester (W1XAM).—Strike out all particulars.

MASSACHUSETTS:

Chestnut Hill (W1XS).—Strike out all particulars.

Somerville (W1XB).—Strike out all particulars.

Worcester (W1XZ).—Strike out all particulars.

PENNSYLVANIA: East Pittsburgh (W8XAV).—Fy., strike out 2,000 (150) to 2,100 (142.9), 2,750 (109.1) to 2,850 (105.3).

WASHINGTON:

East Wenatchee (W7XAT).—Strike out all particulars.

Seattle (W7XP).—Strike out all particulars.

Wenatchee (W7XAS).—Strike out all particulars.

Portable

CALIFORNIA: San Francisco (W6XBK).—Fy., strike out 300 (1,000), add 375 (800).

NEW JERSEY (W2XDD).—Fy., add 6,425 (46.69).

Truck No. 1 (W1OXM).—Strike out all particulars.

Truck No. 2 (W1OXX).—Strike out all particulars.

Truck No. 3 (W1OXY).—Strike out all particulars.

Aircraft

Aircraft (any of N. A. T. (Inc.).—W1OXW).—Strike out all particulars.

X-855E (W1OXF).—Name changed to The Blue Streak; fy., strike out 400 (750), 1,608 (186.57), 6,335 (47.35), add 1,604 (187.03), 3,256 (92.5), 6,425 (46.7), 8,650 (34.68).

RELAY BROADCASTING 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, 1930]

COLORADO: Denver (W9XA).—Class, read Experimental only; licensee, National Broadcasting Co. (Inc.).

NEW JERSEY: Cross Hassock Bay (W2XE).—Fy., add 6,120 (49.02).

VISUAL BROADCASTING 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, 1930]

ILLINOIS: Chicago (W9XAG).—Strike out all particulars.

MASSACHUSETTS: Lexington (W1XAY).—Strike out all particulars.

NEW JERSEY:

Bound Brook (W3XL).—Strike out all particulars.

Camden (W3XAD).—Fy., strike out 2,100 (142.9) to 2,200 (136.4), add 35,300 (8.5) to 36,200 (8.29), 39,650 (7.56) to 40,650 (7.38), 43,000 (6.97) to 46,000 (6.52), 48,500 (6.18) to 50,300 (5.96), 60,000 (5) to 400,000 (0.75).

Newark (W2XBA).—Strike out all particulars.

OREGON: Portland (W7XAO).—Strike out all particulars.

Portable

NEW YORK: New York (W2XBS).—Fy., add 2,000 (150) to 2,100 (142.9).

MISCELLANEOUS

LIST OF VESSELS EQUIPPED WITH A RADIO COMPASS

The following-named vessels are additions to the lists published in Commercial and Government Radio Stations of the United States, edition June 30, 1930, and the International List of Ships Stations published by the Berne bureau:

Name	Call signal	Owner
COMMERCIAL		
Borinquen.....	KGWQ	New York & Porto Rico S. S. Co.
Brilliant.....	KGWS	Standard Transportation Co.
Florida.....	KGWR	Peninsular & Occidental S. S. Co.
Four Winds.....	KGDU	Stanley G. Harris.
Gielow.....	KGWJ	Joseph A. MacDonald.
Kihna.....	WRDX	J. Fuller Feder.
Lake Arline.....	KGWO	Lake Arline S. S. Co.
Lake Benbow.....	KVAE	Ford Motor Co.
Mariposa.....	WODV	Buckeye S. S. Co.
Maritana.....	WODW	Do.
Orion.....	WODE	Carl J. Forstmann.
T. L. Durocher.....	KGOW	T. L. Durocher & Co.

GENERAL ORDERS OF THE FEDERAL RADIO COMMISSION

Temporary service for motion pictures (General Order No. 74, October 11, 1929, amended November 25, 1930)

It is ordered, I. General Order No. 74 is hereby amended to provide a temporary or emergency radio service in connection with motion-picture production.

II. The service herein provided for shall be called "Temporary service for motion pictures."

III. The frequencies 1,552 and 1,556 kilocycles, hitherto reserved by General Order No. 74 for ship stations and/or coastal stations shall, in addition thereto, be made available for temporary use in connection with the production of motion pictures. The frequency 1,554 kilocycles shall be available for assignment to this service where telephone communication is used.

IV. These frequencies shall be available for the use of all responsible applicants who need frequencies for this class of service, but only at such times as the frequency is actually needed to supply communication between points where other communication facilities can not be used. Applications must therefore specify the exact geographical points between which communication is desired, together with a statement as to the availability of other forms of communication.

V. In no case will a license be issued for a longer period than 90 days, or for power in excess of 250 watts.

This order shall be effective on the day first above written.

Definition of "marine relay service," and regulations governing the issuance of such licenses (General Order No. 100, November 10, 1930)

It is ordered, 1. That the term "marine relay service" shall be construed to mean a radiotelegraph communication service carried on between coastal stations communicating with one another for the relaying of, or pertaining to, maritime mobile communications.

2. Upon application and proper showing being made the commission may issue a license or other instrument of authorization for marine relay service.

(a) To any coastal station, for the transmission of radio operating signals utilizing the calling or individual working frequencies licensed to such coastal station for mobile service. Radio operating signals are defined as a letter, figure, or combination of letters and figures, or both, designed to facilitate the conduct of communications; for example, the list of abbreviations to be used in radio transmissions, Appendix 1 to the General Regulations of the International Radio Convention.

(b) To any Great Lakes coastal station, for the relaying of messages either destined to or originating at mobile stations on the Great Lakes: *Provided, however,* That such messages shall be relayed only upon the working frequencies licensed to such coastal station which are available for both fixed and mobile service under the provisions of the International Radio Convention.

(c) To any other coastal station, for the relaying via another coastal station of messages destined to a mobile station: *Provided, however,* That such messages shall be relayed only upon the working frequencies licensed to such coastal station for mobile service, and: *Provided further,* That this service is not to be used for the normal routing of traffic, but only when, for any reason, the initial coastal station has been unable to communicate directly with such mobile station.

3. Licenses for marine relay service will authorize communication only between coastal stations located in the same geographical area. The areas to be designated are as follows: (a) Atlantic-Gulf area, (b) Great Lakes area, (c) Pacific area. This order shall be effective the day first above written.

Alaskan station licenses extended (General Order No. 101, November 14, 1930)

It is ordered, That all existing licenses except those for stations in Alaska, for the services specified below be, and the same are hereby extended as follows:

(a) Until 3 o'clock a. m., eastern standard time, April 1, 1931; Point-to-point, coastal, marine relay, ships above 1,500 kilocycles, aeronautical and aeronautical point-to-point, and aircraft.

(b) Until 3 o'clock a. m., eastern standard time, May 1, 1931; Police, fire, experimental visual broadcasting, and experimental relay broadcasting.

It is further ordered, That all licenses covering the operation of any radio station in Alaska, except broadcasting stations, which expire between the date of this order and June 1, 1931, are hereby extended until 3 o'clock a. m., eastern standard time, June 1, 1931.

This order, however, is subject to the conditions that it shall not be deemed or construed as a finding or decision by the commission, or as any evidence whatsoever, that the continued use or operation of any of said stations serve, or will serve, public interest, convenience or necessity, or that public interest, convenience, or necessity would be served by the granting of any pending application for a renewal of any of said licenses; and any licensee subject to this order who continues to use or operate his station during the period covered by this order shall be deemed to have consented to said conditions. The commission reserves the right to change the frequency assignment of any station, the license of which is affected by this order, during the extension herein provided if, in the opinion of the commission, such change is advisable.

The provisions of General Order No. 89, requiring that applications for renewal of license be filed so as to be received at the offices of the supervisor of radio in charge of the district in which the station is located at least 30 days prior to the expiration date of the license sought to be renewed, shall be construed to apply to the extension dates hereinabove authorized.

The licenses for the following services are not affected by the terms of this order, and the expiration date shall be as specified in the existing license: Geophysical, general experimental, special experimental, temporary services, ships below 1,500 kilocycles, and amateur.

This order shall be effective on the day first above written.

RATIFICATIONS OF THE INTERNATIONAL RADIOTELEGRAPH CONVENTION

On November 4, 1930, the instrument of ratification of Rumania was deposited in the archives of the Department of State.

The British and French Governments have agreed on the accession as from October 22, 1930, of the New Hebrides.

AUTOMATIC RADIOBEACON ESTABLISHED AT VANCOUVER ISLAND, CANADA

This station located on Entrance Island in longitude 128° 02' 27'' W., latitude 50° 26' 26'' N.; call signal, VGC; transmits on a frequency of 310 kilocycles (968 meters) i. c. w. (1,000 cycle note). Transmission characteristic: Call signal VGC twice followed by two dashes, the duration of the two dashes being approximately equal to that of the call signal repeated twice. Transmission period: The transmission period consists of the repetition of the above characteristic for 1 minute and 15 seconds followed by a silent interval of 1 minute and 45 seconds, thus:

.....

 Repeated for 1 minute and 15 seconds

Silent

 1 minute and 45 seconds

Schedule of operation: In clear weather commencing on the hour, transmission period as described, i. e., 1 minute and 15 seconds followed by a silent period of 1 minute and 45 seconds, followed by a further transmission period of 1 minute and 15 seconds ending at 4 minutes and 15 seconds past the hour; in foggy weather whenever the atmosphere in the vicinity of the station is so obscure as to impede navigation, the transmission period of 1 minute and 15 seconds with the silent period of 1 minute and 45 seconds will be repeated every 3 minutes.

Masters of vessels equipped to receive these signals are requested to listen in when in the vicinity of the station and report results of such reception to the division superintendent, British Columbia Radio Service, Old Post Office Building, Victoria, B. C., Canada.

NORTH FORELAND EXPERIMENTAL RADIOBEACON DISCONTINUED

This radiobeacon located at the lighthouse in longitude 1° 27' E., latitude 51° 22' N. (approximately) has been discontinued, however, arrangements are being made for the establishment of a permanent beacon but several months will elapse before it is in operation.

WEATHER REPORTS FURNISHED BY WELLINGTON, NEW ZEALAND

This station (call signal ZLW) transmits upon request weather reports regarding conditions in the following-named localities: Auckland, East Cape, Gisborne, Wanganui, Cape Egmont, Farewell Spit, Greymouth, Cape Campbell, Akaroa Heads and Bluff.

The New Zealand coast station charge for a message of inquiry regarding weather conditions is 50 cents for 20 words. Any charges involved will be debited by the Post and Telegraph Department to the ship concerned.

List of broadcasting stations of Canada

Call signal	Owner of station	Location of station	Frequency in kilocycles, meters in parenthesis	Power input to antenna (watts)
CFAC	The Calgary Herald.....	Herald Building, Calgary, Alberta.	690 (434.8)	500
CFBO	C. A. Munro (Ltd.).....	Capital Theater, St. John, New Brunswick.	890 (337.1)	50
CFCA	Star Publishing & Printing Co....	Southwest corner Yonge St. and St. Clair Ave., Toronto, Ontario.	840 (357.1)	500
CFCF	Canadian Marconi Co.....	Mount Royal Hotel, Montreal, Quebec.	1,030 (291.3)	500
CFCH	Abitibi Power & Paper Co. (Ltd.)..	Iroquois Falls, Ontario.....	600 (500)	250
CFCN	Western Broadcasting Co.....	708 Crescent Road N.W., Calgary, Alberta.	690 (434.8)	500
CFCO	Western Ontario "Better Radio" Club.	103 King St. W., Chatham, Ontario.	1,210 (247.9)	100

List of broadcasting stations of Canada—Continued

Call signal	Owner of station	Location of station	Frequency in kilocycles, meters in parenthesis	Power input to antenna (watts)
CFOT	Victoria Broadcasting Association.	1405 Douglas St., Victoria, British Columbia.	630 (476.2)	500
CFCY	The Island Radio Co.	143 Great George St., Charlottetown, Prince Edward Island.	960 (312.5)	250
CFJC	D. S. Daigleish & Sons (Ltd.)	186 Victoria St., Kamloops, British Columbia.	1,120 (267.9)	15
CFLC	Radio Association of Prescott	Victoria Hall, Prescott, Ontario.	1,010 (297)	50
CFNB	James S. Neill & Sons (Ltd.)	Queen Street, Fredericton, New Brunswick.	1,210 (247.9)	50
CFQC	The Electric Shop (Ltd.)	1322 Osler St., Saskatoon, Saskatchewan.	910 (329.7)	500
CFRB	Rogers Majestic Corporation (Ltd.)	Lot 70, Township of King, York County, Ontario.	960 (312.5)	4,000
CFRC	Queens University, Department of Electrical Engineering.	Fleming Hall, Queens University, Kingston, Ontario.	930 (322.6)	500
CHCA	The Western Farmer (uses station CJCJ, the Albertan Publishing Co. (Ltd.), Calgary, Alberta.	Calgary, Alberta.	690 (434.8)	500
CHCK	W. E. Burke	36 Upper Hillsboro St., Charlottetown, Prince Edward Island.	960 (312.5)	30
CHCS	The Hamilton Spectator	Spectator Building, Hamilton, Ontario.	880 (340.9)	10
CHCT	G. F. Tull & Ardern (Ltd.) (uses station CKLC, the Alberta Pacific Grain Co., Red Deer, Alberta)	Red Deer, Alberta.	840 (357.1)	1,000
CHGS	R. T. Holman (Ltd.)	Holman Building, Summerside, Prince Edward Island.	1,120 (267.9)	100
CHLS	W. G. Hassell (uses station CKCD, the Vancouver Daily Province, Vancouver, British Columbia).	Vancouver, British Columbia.	730 (411)	50
CHMA	Christian and Missionary Alliance.	10940 Eighty-third St., Edmonton, Alberta.	530 (547.2)	250
CHML	Maple Leaf Radio Co. (Ltd.)	Thirteenth St., Mount Hamilton, Ontario.	880 (340.9)	50
CHNS	Halifax Herald (Ltd.)	Lord Nelson Hotel, Halifax, Nova Scotia.	930 (322.6)	500
CHRC	E. Fontaine	Victoria Hotel, 42 Palace Hill, Quebec, Quebec.	880 (340.9)	100
CHWC	R. H. Williams & Sons (Ltd.)	Sec. 2, township 18, range 18 (near Pilot Butte, Saskatchewan).	960 (312.5)	500
CHWK	Chilliwack Broadcasting Co. (Ltd.)	Wellington Ave., Chilliwack, British Columbia.	1,210 (247.9)	5
CHYC	Northern Electric Co. (Ltd.) (uses station CKAC, La Press Publishing Co. (Ltd.), Montreal, Quebec).	Lot 1102, Provincial Highway No. (near St. Hyacinthe, Quebec) 2.	730 (411)	5,000
CJBC	Jarvis Street Baptist Church (uses station CKGW, Gooderham & Worts (Ltd.), Bowmanville, Ontario).	Toronto, Ontario.	600 (484.8)	5,000
CJBR	Saskatchewan Cooperative Wheat Producers (Ltd.) (uses station CKCK, Leader Publishing Co. (Ltd.), Regina, Saskatchewan).	Regina, Saskatchewan.	960 (312.5)	500
CJCA	The Edmonton Journal (Ltd.)	Northwest corner sec. 5, township 54, range 23, west of fourth meridian (near Edmonton, Alberta), 318 Charlotte St., Sydney, Nova Scotia.	630 (322.6)	500
CJCB	N. Nathanson	318 Charlotte St., Sydney, Nova Scotia.	880 (340.9)	50
CJCJ	The Albertan Publishing Co. (Ltd.)	Eighteenth Ave. and Seventh St. E., Calgary, Alberta.	650 (454.8)	500
CJGC	London Free Press & Printing Co. (Ltd.)	Hotel London, London, Ontario.	910 (329.7)	500
CJGX	The Winnipeg Grain Exchange	Yorkton, Saskatchewan.	630 (476.2)	500
CJOC	Harold R. Carson	Marquis Hotel, Lethbridge, Alberta.	1,120 (267.9)	50
CJOR	G. C. Chandler	Block 20, Sea Island, British Columbia.	1,210 (247.9)	50
CJRM	Jas. Richardson & Sons (Ltd.)	Lot 8, east 40 feet of lot 9, block 79, plan No. 96, old city Meese Jaw, Saskatchewan.	600 (500)	500
CJRW	do.	Fleming, Saskatchewan.	600 (500)	500
CJRX	do.	Middlechurch, Manitoba.	11,720 (25.6)	2,000

List of broadcasting stations of Canada—Continued

Call signal	Owner of station	Location of station	Frequency in kilocycles, meters in parenthesis	Power input to antenna (watts)
CJSC	The Evening Telegram (uses station CKGW, Gooderham & Worts (Ltd.), Bowmanville, Ontario.)	Toronto, Ontario.....	690 (434.8)	5,000
CKAC	La Press Publishing Co. (Ltd.)..	Lot 1102, Provincial Highway No. 2 (near St. Hyacinthe, Quebec).	730 (411)	5,000
CKCD	Vancouver Daily Province.....	142 Hastings St. W., Vancouver, British Columbia.	730 (411)	50
CKCI	"Le Soleil" (Ltd.).....	Victoria Hotel, 42 Palace Hill, Quebec, Quebec.	880 (340.9)	22½
CKCK	Leader Publishing Co (Ltd.).....	Regina, Saskatchewan.....	960 (312.5)	500
CKCL ¹	The Dominion Battery Co.....	20 Trinity St., Toronto, Ontario..	580 (517.2)	500
CKCO	Dr. G. M. Geldbert.....	282 Somerset St. W., Ottawa, Ontario.	890 (337.1)	100
CKCR	John Patterson.....	Wehkel Block, King St., Waterloo, Ontario.	1,010 (297)	50
CKCV	G. A. Vandry.....	66 St. Joseph St., Quebec, Quebec.	880 (340.9)	50
CKFC	United Church of Canada.....	Corner Hemlock and Twelfth Ave., Vancouver, British Columbia.	730 (411)	50
CKGW	Gooderham & Worts (Ltd.).....	Bowmanville, Ontario.....	690 (434.8)	5,000
CKIC	Acadia University.....	Wolfville, Nova Scotia.....	930 (322.6)	50
CKLC	Alberta Pacific Grain Co. (Ltd.)..	Red Deer, Alberta.....	840 (357.1)	1,000
CKMC	R. L. MacAdam.....	Cobalt, Ontario (East Side).....	1,210 (247.9)	15
CKMO	Sprott-Shaw Radio.....	Room 1604, Bekins Building, Vancouver, British Columbia.	730 (411)	50
CKNC	Canadian National Carbon Co. (Ltd.)..	Hillcrest Park, Toronto, Ontario..	580 (517.2)	500
CKOC	Wentworth Radio & Auto Supply Co. (Ltd.)..	Royal Connaught Hotel, Hamilton, Ontario.	880 (340.9)	50
CKPC	Metal Shingle & Siding Co. (Ltd.)..	King St., Preston, Ontario.....	1,210 (247.9)	25
CKPR	Midland Broadcasting Corporation.	278 King St., Midland, Ontario.....	930 (322.6)	50
CKUA	University of Alberta.....	Campus, University of Alberta, Edmonton, Alberta.	580 (517.2)	500
CKWX	A. Holstead & Wm. Hanlon.....	1220 Seymour St., Vancouver, British Columbia.	730 (411)	100
CKX	Manitoba Telephone System.....	Eighth St., south of Princess Ave., Brandon, Manitoba.	540 (555.6)	500
OKY	do.....	Provincial Agricultural College grounds, Winnipeg, Manitoba.	780 (384.6)	5,000
CNRA	Canadian National Railways.....	Moncton, New Brunswick.....	630 (476.2)	500
CNRC	Canadian National Railways (uses station CFAC, Calgary Herald, Calgary, Alberta.)	Calgary, Alberta.....	690 (434.8)	500
CNRD	Canadian National Railways (uses station CKLC, Alberta Pacific Grain Co., Red Deer, Alberta.)	Red Deer, Alberta.....	840 (357.1)	1,000
CNRE	Canadian National Railways (uses station CJCA, Edmonton Journal, Edmonton, Alberta.)	Edmonton, Alberta.....	930 (322.6)	500
CNRH	Canadian National Railways (uses station CHNS, Halifax Herald (Ltd.), Halifax, Nova Scotia.)	Halifax, Nova Scotia.....	930 (322.6)	500
CNRL	Canadian National Railways (uses station CJGC, London Free Press & Printing Co. (Ltd.), London, Ontario.)	London, Ontario.....	910 (329.7)	500
CNRM	Canadian National Railways (uses station CKAC, La Press Publishing Co. (Ltd.), near St. Hyacinthe, Quebec.)	Montreal, Quebec.....	730 (411)	5,000
CNRO	Canadian National Railways.....	Ottawa, Ontario.....	600 (500)	500
CNRQ	Canadian National Railways (uses station CKCV, G. A. Vandry, Quebec, Quebec.)	Quebec, Quebec.....	880 (340.9)	50
CNRR	Canadian National Railways (uses station CKCK, Leader Publishing Co. (Ltd.), Regina, Saskatchewan.)	Regina, Saskatchewan.....	960 (312.5)	500
CNRS	Canadian National Railways (uses station CFQC, The Electric Shop (Ltd.), Saskatoon, Saskatchewan.)	Saskatoon, Saskatchewan.....	910 (329.7)	500

¹ The call signal CFCL is used by this station during Sunday broadcasts only.

List of broadcasting stations of Canada—Continued

Call signal	Owner of station	Location of station	Frequency in kilocycles, meters in parenthesis	Power input to antenna (watts)
CNBT	Canadian National Railways (uses station CFCA, Star Publishing & Printing Co., Toronto, Ontario).	Toronto, Ontario	840 (357.1)	500
CNRV	Canadian National Railways	Vancouver, British Columbia (Lulu Island, British Columbia)	1,030 (291.3)	500
CNRW	Canadian National Railways (uses station CKY, Manitoba Telephone System, Winnipeg, Manitoba).	Winnipeg, Manitoba	780 (384.6)	5,000
CNRX	Canadian National Railways (uses station CFRB, Rogers Majestic Corporation (Ltd.), Toronto, Ontario).	Toronto, Ontario	960 (312.5)	4,000
CPRY	Canadian Pacific Railway Co. (uses station CKGW, Gooderham & Worts (Ltd.), Bowmanville, Ontario).	Bowmanville, Ontario	660 (434.8)	5,000
CKOW	Nestle's Milk Products (Canada) (Ltd.) (uses station CFCA Star Publishing Co., (Ltd.), Toronto, Ontario).	Toronto, Ontario	840 (357.1)	500

List of Mexican broadcasting stations

Call signal	Location	Frequency in kilocycles, meters in parentheses	Power (watts)
XEA	Guadalajara	1,200 (250)	100
XEB	Mexico City	899 (333)	1,000
XEC	Toluco	1,333 (225)	50
XED	Reynosa	961 (312)	10,000
XEE	Linares	1,000 (300)	10
XEF	Oaxaca	1,132 (265)	100
XEG	Mexico City	829 (291)	2,000
XEH	Monterrey	965 (265)	100
XEI	Morelia	1,000 (300)	100
XEJ	Ciudad Juarez	857 (350)	100
XEK	Mexico City	1,000 (300)	100
XEL	Saltillo	1,090 (275)	10
XEM	Tampico	841 (352)	500
XEN	Mexico City	732 (425)	1,000
XEO	do	984 (445)	100
XEQ	Ciudad Juarez	750 (400)	1,000
XER	Mexico City	984 (445)	100
XES	Tampico	800 (337)	500
XET	Monterrey	800 (337)	1,500
XETA	Nogales		
XEU	Vera Cruz	800 (375)	50
XEV	Puebla	1,035 (290)	100
XEW	Mexico City	780 (385)	5,000
XEX	do	923 (231)	500
XEY	Merida	547 (540)	100
XEZ	Mexico City	588 (510)	500
XFA	do	0-21, 429 (0-14) 500-600 (600-500) 6,977-7,143 (43-42)	50
XFC	Jalapa	804 (373)	350
XFD	Mexico City	6,667 (45) 11,111 (27)	50
XFE	Villahermosa	9,091 (331)	
XFF	Chihuahua	632 (373)	350
XFG	Mexico City	923 (325)	250
XFH	do	638 (470)	2,000
XFI	do		250
XFI	do	792 (367)	1,000
XFZ	do	859 (340)	500

KENNELLY-HEAVISIDE LAYER HEIGHT OBSERVATIONS FOR 4,045 AND 8,650 KILOCYCLES

In a paper of the above title by T. R. Gilliland, Research Paper No. 246, Bureau of Standards Journal of Research, November, 1930, the results obtained by the echo method of measuring the height of the Kennelly-Heaviside layer, from January to June, 1930, are given. The method consists of receiving and recording on an oscillograph of signals from a high-power transmitter which is sending out pulses of peaks of extremely short duration, with relatively long intervals of no emission between pulses. Additional pulses or "echoes" appear on the received record between the transmitted pulses. The measured time interval between the main pulse and the first echo is used to calculate the height of the Kennelly-Heaviside layer, from which the echoes come. The transmissions were furnished by the Naval Research Laboratory. Two 20-kilowatt piezo-controlled transmitters were used, one operating on 4,045 kilocycles and the other on 8,650 kilocycles, each being modulated by means of an unbalanced multivibrator circuit. The records were made at the Bureau of Standards field station at Kensington, Md., a distance of 21 kilometers from the transmitter. Two evening tests are also described. Graphs are given comparing the heights with sun-spot numbers and terrestrial magnetic data. Records taken on April 28, 1930, the day of the eclipse, are shown. Reprint copies of this paper will be available within a few weeks and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price will be quoted by that office on application.

AERONAUTIC RADIO DEVELOPMENTS

The Bureau of Standards reports progress on the development of a combined transmitter for the simultaneous broadcast of radiotelephone and visual type radio range-beacon signals. This is designed to remove the principal limitation on the present radio aids to air navigation, viz, that the pilot receives no beacon service while receiving weather or other telephonic information. A master oscillator controls simultaneously a radiotelephone transmitter and a beacon transmitter. The former supplies the carrier-frequency waves and the speech-modulated waves to an open antenna. The latter supplies only the radiobeacon sidebands to the beacon loop antennas. Filter arrangements and automatic volume control have been worked out to facilitate the reception of these signals aboard the aircraft. The fundamental adjustments necessary in the experimental model of this transmitter have been completed and performance tests begun at various distances from the station. A number of tests were made approximately 125 miles from the transmitting station. In these tests successful reception of both the voice and beacon signals was accomplished, with indications that this reception could be obtained over greater distances. Satisfactory sharpness of beacon courses was obtained. As a result of these and other tests the feasibility of the combined service is assured.

For some months a detailed study has been in progress on the characteristics and performance of airplane receiving antennæ of various types. One object of this investigation was to find an antenna arrangement having the same desirable electrical characteristics as the vertical pole antenna but free from the problems of mechanical vibration and ice formation encountered in the use of the pole antenna. One of the advantages of the vertical pole antenna is its freedom from course errors in radio range beacon reception. A number of different antenna arrangements have been studied, both by theoretical analysis and by practical observation in the air and on the ground. For each antenna studied, the tests in the air included observation of the received voltage, the localizing effect or variation of the received voltage in the immediate vicinity of the beacon tower, and the course errors as observed by circling the beacon. These were compared directly with results obtained using the vertical pole antenna. The antenna arrangements studied included the inclined antenna, with both forward or backward inclination (one example of the latter being the trailing wire antenna); the horizontal dipole antenna; the horizontal V antenna; the horizontal L antenna; the inclined V antenna; the symmetrical transverse T antenna; and the symmetrical longitudinal T antenna. The symmetrical longitudinal antenna with a vertical lead-in was found to have an advantageous combination of the desired operating characteristics. The two flat-top elements lie along a line parallel to and directly above the axis of the fuselage, held by short vertical supports, considerably shorter than the usual pole antenna (10 to 18 inches instead of 5 to 6 feet). Equivalent effective height is secured through the use of the flat top. It is essential that the longitudinal T antenna be located in a position such that the

electrical effect of the airplane frame acting as the counterpoise is symmetrical; this is not always possible in the case of open cockpit airplanes, but is usually possible in cabin airplanes. This type of antenna is free from course errors in radio range beacon reception. It is superior to the vertical pole antenna structurally, and in respect to ice formation, mechanical vibration, and aerodynamic resistance.

The bureau has begun preliminary work on the development of a radio system to aid in preventing collisions between airplanes. The aim is to give automatic warning to an airplane of the presence and approximate position of any other airplane within a radius of about 3 miles from it. A fundamental limitation is that only one frequency, or at most a very few frequencies, can be made available for this service. The system involves the continuous transmission of ultra-high-frequency radio waves from each airplane. Directivity of reception or transmission, or both, will inform the pilot of the direction of danger.